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Mammals, Amphibians and Reptiles of the North East

Edited by Ian Bond · Northumbria Mammal Group

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Mammals, Amphibians and Reptiles of the North East

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INTRODUCTION

In the 1860s, Messrs Mennel and Perkins, Secretaries of the Tyneside Naturalists Field Club, undertook to prepare a catalogue of the mammalia of Northumberland and Durham, in their words "to fill a gap which no-one seemed inclined to occupy". This was the first and so far the only systematic account of all the mammal species across the two counties.

In the intervening 150 years there have been a number of articles published on the distribution of certain individual mammal species either across the North East or, rarely, of all mammal species in a part of the North East. In the 1960s G.A. Cowan, then chairman of the mammal section of the Natural History Society of Northumbria, attempted to update Mennel and Perkins, but his document was never published and unfortunately the manuscript remains lost. The gap that Mennel and Perkins so usefully filled has therefore remained unoccupied ever since.

This book takes its inspiration from a statement by E.L. Gill in the slightly later publication, *The Victoria History of the County of Durham*, published in 1905. In writing the section on mammals, Gill states of the Harvest Mouse *Micromys minutus*, "The harvest mouse appears to have been very rarely noticed in the County of Durham and is doubtless scarce, though I have lately seen it myself a very short distance north of the Tyne." I was at the time attempting to catalogue all records of Harvest Mouse throughout the North East. On the one hand Gill's statement was useful in that it established that Harvest Mice were rarely encountered in County Durham back then, the same situation that occurs today. On the other hand, it would have been useful to have had some of the detail that would have been known to him, not least where exactly north of the Tyne he encountered them. It occurred to me that similarly there is no detailed statement of what is known about the status of most mammals in the North East at the beginning of the 21st century.

This publication is an attempt to update Mennell and Perkins and catalogue the status of mammal species across the North East in the early 21st century. It has been produced by Northumbria Mammal Group with assistance from specialists outside the Group. The species accounts have been written by separate authors, which is reflected in some differences in style and approach between the accounts. However all of the species accounts have been circulated for comments to various naturalists in the North East so we feel that the resulting account is a fair reflection of the consensus on what is known about a particular species.

This book extends the topic a little both in terms of species and geography to include accounts of amphibians and reptiles and to take in that part of the former county of Cleveland that is south of the Tees. There has been considerable increase in interest in amphibians and reptiles in recent years, to a large extent due to the protected status that applies in varying degrees to all of them. Electronic atlases for the North East have been produced for both groups in recent years and these species' accounts expand on those atlases. As there is a total of only nine native and one introduced species currently established in the North East it seemed expedient to combine them with mammals in the same publication. While naturalists have traditionally recorded wildlife in terms of Watsonian vice counties, which for Northumberland and Durham are vice counties 66, 67 and 68, the area that is currently thought of politically as the North East also encompasses the former county of Cleveland. The half of Cleveland that lies south of the River Tees includes a relatively small area of the North York Moors in vice county 62. The area of operation of Northumbria Mammal Group covers the whole of the North East and hence that is the area covered by this book. It is worth noting that an atlas of the distribution of mammals in North

Yorkshire, currently in press, omits the former Cleveland area in vice county 62, so this book fills what would otherwise be a significant gap.

Mammals, Amphibians and Reptiles of the North East also catalogues changes in the status of mammals since Mennell and Perkins' account. Of the Otter *Lutra lutra* they write: "it is abundant in all of the rivers and larger streams and even the smaller burns can often testify to its predatory visits." As a one-line summary this would accurately describe its status today but, as is well documented, its fortunes both regionally and nationally have been dramatically different in between. Mennell and Perkins bemoaned the lack of historical source material that they could draw on for their accounts. Subsequent archaeological and literary research has shed new light on mammals prior to the mid-19th century and some of this information has been included where relevant.

The amount of detailed information available for the different species varies enormously, and ironically it is the species that are rarer that often provide the most information. For example Otters have been recorded in more 10 km squares than any mammal species except Mole *Talpa europaea* and Rabbit *Oryctolagus cuniculus*. It has been possible to document, in some detail, every known occurrence of the introduced Alpine Newt *Ichthyosaura alpestris* but much more difficult to say anything detailed about the Wood Mouse *Apodemus sylvaticus*, a species that is presumed to be ubiquitous and that most people see but few record. So, even if indirectly, this book also highlights what we do not know about certain species.

It is worth stressing that this book is not meant to be an atlas even though distribution maps have been produced for many species. These maps are based on Northumbria Mammal Group's records and records from other groups and individuals that we have kindly been allowed access to for the purposes of this publication. The maps should be treated with a certain amount of caution. Most species are under recorded and some very much so. At a conference for North East natural history recorders the question was posed to the audience as to how many of them had seen Wood Mouse in their house or garden. About 50 hands went up but only one sighting was passed on as a formal record. The maps then may well show an absence of dots where the account says the species exists, simply because while it is known to be part of their distribution, no-one has ever formally submitted a record. Conversely a number of the records that the dots represent have not been verified and again this may contrast slightly with what certain species' accounts say. Following up such records may lead to new knowledge of a species' distribution and is part of what makes natural history so fascinating, but for now it is the species' accounts that should be followed.

On the maps, records are represented as filled circles for post-2000 and open circles for pre-2000 records. Where there is a record for both periods, the post-2000 record takes primacy though in practice most of the recording, particularly of mammals, has been in recent years. Needless to say, the distribution of records reflects where people have taken an interest in recording a particular species and the concentration of records around the Tees Valley in particular is largely a result of the "Mammalaction" project run by Jonathan Pounder at Tees Valley Wildlife Trust.

Our knowledge of the mammals, amphibians and reptiles in the North East is the result of local naturalists, researchers and members of the public who have taken the effort to record their sightings and observations and share them with others. We hope that this book will inspire people to submit their records in order to help us improve our knowledge and monitor changes over

time. We would encourage you to send your wildlife sightings to the Environmental Records Information Centre, whose details you can find in section 10, along with those of other relevant North East wildlife groups.

Any book such as this is just a snapshot in time and it is axiomatic that it will be out of date the day after it is written. As we go to print there is an unconfirmed report of Alpine Newt in Yarm. If true this would mean that Alpine Newts had overcome the considerable obstacle of the River Tees that would otherwise prevent their natural dispersal from Eaglescliffe and potentially allow them to spread more widely in south Cleveland. Over the next 150 years the mammal, amphibian and reptile fauna of the North East are likely to have changed considerably. I hope that this book will give those chronicling such changes a reasonable baseline to work from.

Ian Bond (Editor)

Figure 1. Northumberland

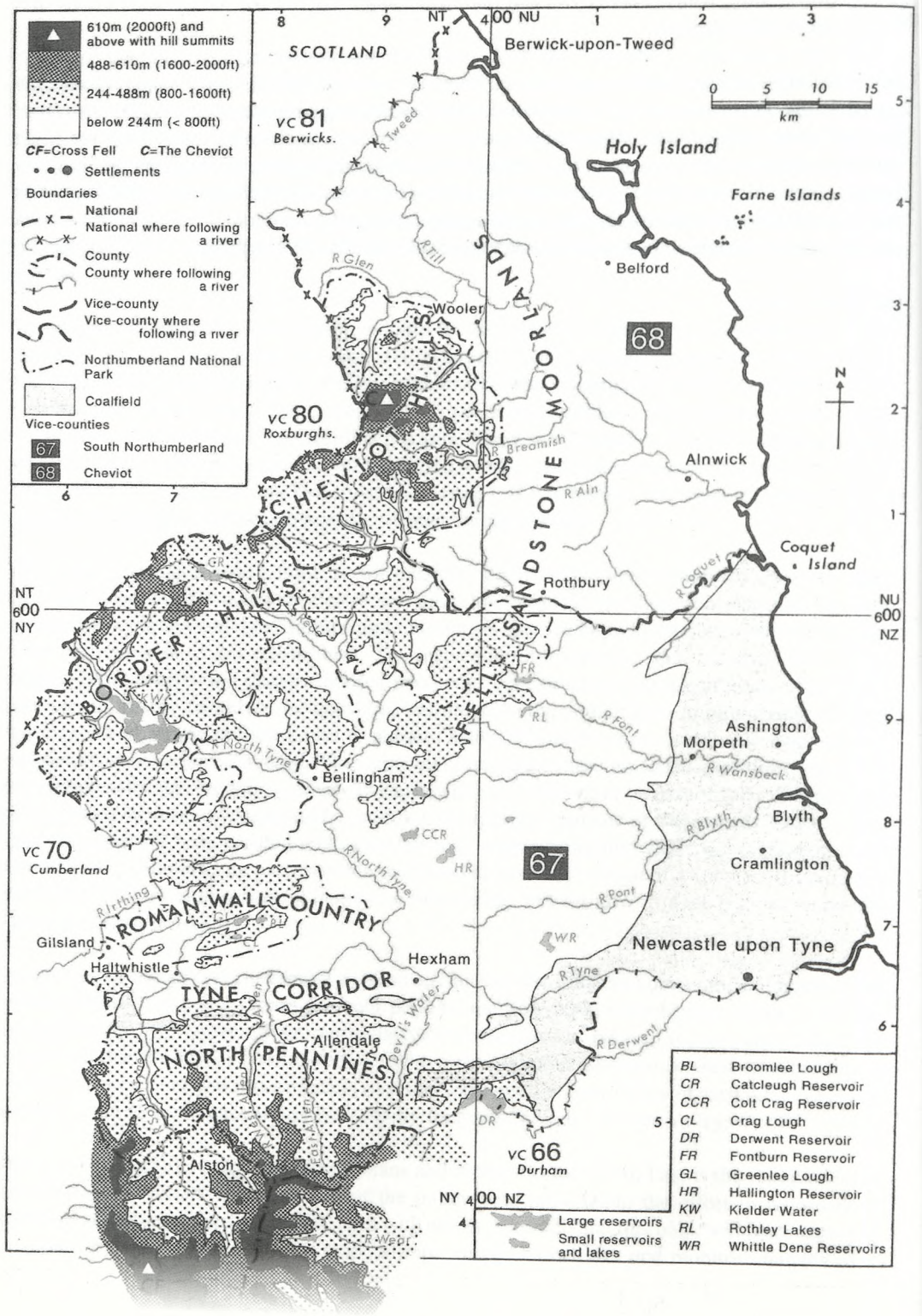
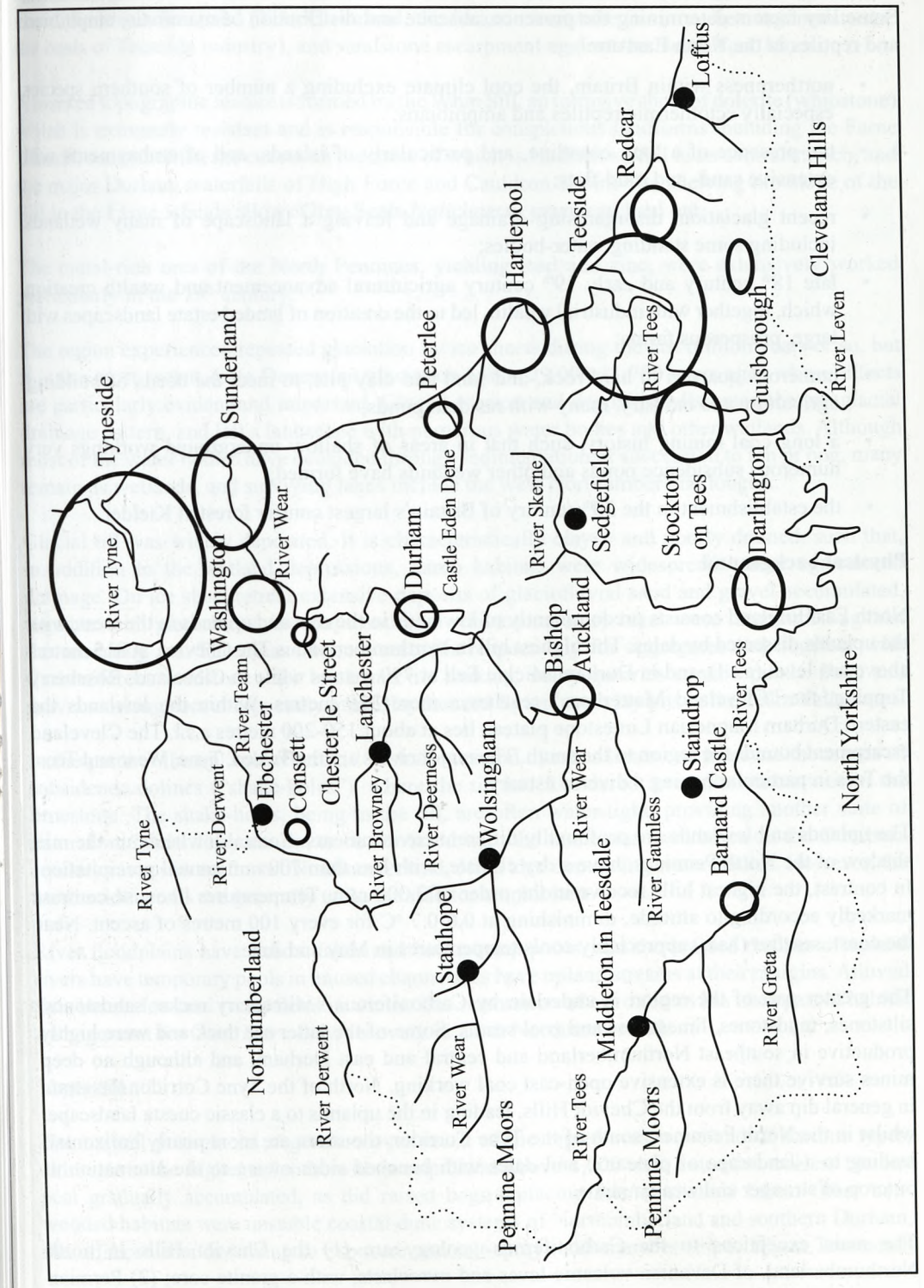


Figure 2. Durham and Cleveland



GEOGRAPHICAL CONTEXT

Some key factors determining the presence, absence and distribution of mammals, amphibians and reptiles in the North East are:

- northernness within Britain, the cool climate excluding a number of southern species, especially ectothermic reptiles and amphibians;
- the presence of a long coastline, and particularly of islands, and of embayments with extensive sand- and mud-flats;
- recent glaciation, disorganising drainage and leaving a landscape of many wetlands, including some standing water-bodies;
- late 18th century and early 19th century agricultural advancement and wealth creation, which, together with industrial wealth, led to the creation of landed estate landscapes with large, prosperous farms;
- numerous quarries in hard rock, and sand and clay pits, to meet the needs of building, agriculture and industry, many with residual ponds;
- a long coal mining history, such that in areas of shallow underground workings very numerous subsidence ponds and other wetlands have formed;
- the establishment in the 20th century of Britain's largest conifer forest at Kielder.

Physical background

North East England consists predominantly of lowlands in the east and uplands in the west, with the uplands dissected by dales. The highest hill in Northumberland is The Cheviot, at 815 metres above sea level (a.s.l), and in Durham Mickle Fell at 790 metres while in Cleveland, Roseberry Topping, the "Cleveland Matterhorn" reaches a mere 320 metres. Within the lowlands the eastern Durham Magnesian Limestone plateau lies at about 150-200 metres a.s.l. The Cleveland escarpment bounds the region to the south. The major rivers are the Tweed, Tyne, Wear and Tees, the Tees in particular having a diverse estuary.

The uplands and lowlands are profoundly different environments. Coastal lowlands, in the rain shadow of the North Pennines, have a dry climate, with less than 700 mm annual precipitation. In contrast, the highest hills receive in the order of 2,000 mm. Temperatures likewise contrast markedly according to altitude, diminishing at 0.6-0.7 °C for every 100 metres of ascent. Near the coast, sea-fret (haar) appreciably cools temperatures in May and June.

The greater part of the region is underlain by Carboniferous sedimentary rocks: sandstones, siltstones, mudstones, limestones and coal seams. Some of the latter are thick and were highly productive in southeast Northumberland and central and east Durham, and although no deep mines survive there is extensive open-cast coal working. North of the Tyne Corridor the strata in general dip away from the Cheviot Hills, leading in the uplands to a classic cuesta landscape, whilst in the North Pennines, south of the Tyne Corridor, the strata are more nearly horizontal, leading to a landscape of plateaux, and dales with benched sides owing to the alternation at outcrop of stronger and weaker strata.

The main exceptions to the Carboniferous geology are (1) the Cheviot Hills in north Northumberland, of Devonian volcanic lavas and pyroclasts, with a granite core; (2) Permian

and Triassic rocks in southeast Durham, including the east Durham plateau (whose soils support intensive agriculture with little habitat diversity) and the Triassic mudstones and sandstones about the lower Tees; and (3) in Cleveland, the Jurassic ironstone (iron-ore-bearing mudstones: the basis of Teesside industry), and sandstone escarpment against the North York Moors.

A marked topographic feature is formed by the Whin Sill, an intrusive sheet of dolerite (whinstone) which is extremely resistant and is responsible for conspicuous landforms including the Farne Islands, coastal cliffs, the cuesta on the crest of which is Hadrian's Wall in its central stretch, and the major Durham waterfalls of High Force and Cauldron Snout. The shelving dip-slope of the Sill in the Farne Islands allows Grey Seals *Halichoerus grypus* to haul out.

The metal-rich ores of the North Pennines, yielding lead and zinc, were extensively worked particularly in the 19th century.

The region experienced repeated glaciation by ice sheets during the last million years or so, but it is the most recent, Late Devensian glaciation (*circa* 29,000-11,700 years ago) whose effects are particularly evident and important. Glacial erosion and deposition disrupted the pre-glacial drainage pattern, and left a landscape with numerous water bodies and other wetlands. Although most of the water bodies have occluded through sedimentation or succession to fen or bog, many remain as wetlands, and surviving lakes include the west Northumberland loughs.

Glacial till was widely deposited. It is characteristically clayey and poorly drained, such that, in addition to the wetland depressions, damp habitats were widespread before agricultural drainage. On ice sheet retreat extensive deposits of glaciofluvial sand and gravel accumulated, together with glaciolacustrine clays and silts where temporary lakes were impounded against the retreating ice. These have been a resource respectively for aggregates and, together with Carboniferous mudstones, for brick and tile making; many quarries contain ponds. Sand and gravel workings occur especially near Blaydon and Ryton, and clay pits in the Team Valley area.

In the parts of the uplands where till is shallower and overlies limestone there are thousands of subsidence dolines ("shake-holes"), where the till has foundered into solution cavities in the limestone. The shake-holes, being in the till, are often water-tight, providing another suite of natural wetlands. They are not to be confused with the numerous shell holes on the Otterburn artillery ranges in northwest Northumberland, often also containing water-bodies. However, the more acidic pools are generally unfavourable for amphibians.

River floodplains have oxbow lakes and backswamp pools, and the braided reaches of upland rivers have temporary pools in unused channels, as have upland streams at their margins. Alluvial flats beside lowland rivers flood in winter. The restoration of old oxbows has been part of habitat management for Otter *Lutra lutra* recovery in north Northumberland.

Vegetation

The natural post-glacial vegetation over much of the region was woodland of various types, although in the higher uplands, with precipitation above 1,000 mm, extensive treeless blanket peat gradually accumulated, as did raised bogs replacing former shallow lakes. Other non-wooded habitats were unstable coastal dune systems of Northumberland and southern Durham, the offshore islands (owing to exposure and salt-spray), salt-marshes (especially at Teesmouth

and in the sheltered strait behind Holy Island, and in Budle Bay), inland crags and other rock surfaces with only open tree cover, river shingles, and some limited areas above the upper tree-line.

However, this is a part of Britain where a particularly high proportion of native woodland has been lost. A main cause was the strenuous efforts of agricultural improvers in the 18th and 19th centuries to remodel the landscape, continued in a different context by coniferisation of native woodland on landed estates in the mid-20th century. The result is that, for Northumberland, only 0.5% of the county is ancient, semi-natural woodland (woods of over 2 ha) and for Durham 1.3%. However, Northumberland in particular now has a high total proportion of tree cover, 16%, partly because of 18th and 19th-century estate woodland planting, but mainly because of the establishment in the uplands by the Forestry Commission of the vast Kielder Forest, mainly between the 1930s and 1980. There are other substantial 20th century plantations, both state and private; Hamsterley is the main County Durham Forestry Commission forest, while a series of smaller plantations front the North York Moors above Guisborough. Durham has only 6.4% woodland cover, as has the former Cleveland county, and the former Tyne and Wear 5.4%. Over the North East as a whole the proportion of woodland and forest in the landscape is 12.0%. The large modern plantations are almost entirely coniferous (with Sitka Spruce *Picea sitchensis* the main species) and account for Northumberland's low proportion of broad-leaved woodland, about 13%. In County Durham, on the other hand, broad-leaved woodland somewhat exceeds conifer woodland in area, and is a feature of the coastal denes and the Derwent valley. Similarly much Cleveland woodland is in the steep-sided coastal gills. The conifer plantations themselves, other than their edges, have little value for amphibians and reptiles while being vital for the survival in the region of Red Squirrel *Sciurus vulgaris*, but broad-leaved woods support Slow Worms *Anguis fragilis* and, in the uplands, Adders *Vipera berus*, as well as the normal suite of woodland mammals.

In the uplands, above the moorland edge, are various types of semi-natural moorland vegetation: acidic grassland, bracken, heathland dominated by heather, and peat bog - the latter mainly blanket bog on the higher ground. Land use here, apart from forestry, is extensive hill grazing and Red Grouse *Lagopus lagopus scotica* game shooting. The elevation of the moorland edge varies markedly across the region, being much higher in the lead mining area of the North Pennines than elsewhere, owing to past land reclamation by the miner-small-holders. In this book an association between Common Lizard *Lacerta vivipara* and the mosaic of moorland edge habitats is noted, partly because rotational burning of the heather moors above is detrimental to reptiles. Only limited areas of lowland heath survive, the most important being Waldridge Fell and Eston Moor. Moorland and lowland heath in general provide relatively undisturbed habitats for reptiles. The other main semi-natural habitats, apart from woods and wetlands, are calcareous and neutral grasslands, the coastal dune systems (where brackish pools in dune slacks provide Common Toad *Bufo bufo* habitat), salt marsh, and cliff and island ecosystems.

Historical background

There was a period of relative peace and economic development from the mid-12 century AD. Royal hunting forests were established, collectively occupying vast tracts of the uplands as well as parks, such as Hulne Park at Alnwick and the Bishop of Durham's Stanhope Park in Weardale. The hunting forests, for a time, preserved woodland, and Red Deer *Cervus elaphus* and Roe Deer *Capreolus capreolus*, and the parks were stocked with Fallow Deer *Dama dama*. Chillingham Park had been enclosed by the 13th century and the feral white park cattle may have been there

then, but are first mentioned in 1646. (The sub-fossil horns of the extinct aurochs, which inhabited the native forests, are unearthed from time to time, particularly from upland peat.)

All changed with the outbreak of the Scottish wars at the end of the 13th century and, particularly in Northumberland, more than three centuries of misery and decivilisation ensued. Disruption and insecurity of life and property prevailed. A powerful brake was put on agricultural progress and settlement, and cultivation retreated from the hills. There was periodic official or semi-official warfare, raiding and reprisal between England and Scotland, and in the dales on either side of the Border there developed during these anarchic times a lawless, clan-based way of life based upon predatory cattle-rustling (reiving) to supplement subsistence agriculture. The hills and valleys nearest to the Border were abandoned for permanent settlement. Harrying penetrated deep into Northumberland and was ruinous to agriculture. This was less the case further from the Border in County Durham where, at least by the 16th century, conditions were more settled.

Defensible stone buildings such as castles, pele towers and bastle houses (strong farmhouses) proliferated, providing bat roosts and hibernacula, and there are summer roosts of Daubenton's Bat *Myotis daubentonii* in the roofs of bastles and castles, near to the rivers and burns over which they forage.

In uplands near to the Border, land abandonment or reduced stocking levels brought about extensive secondary regeneration of woodland and scrub, and natural and semi-natural habitats survived, or became re-established, which would not otherwise have done so, including wetland as well as woodland. It is possible that these upland ecosystems survived in this way after the 17th century, following enclosure into ultra-extensive hill farms, so that in places they have persisted to the present. Certainly ground predators survived longer here than in more peaceful areas: Northumberland was the last English county to lose the Wild Cat *Felis silvestris*, in 1863.

By the later 17th century, however, the region was re-emerging to civilisation. The agricultural essayist, John Grey of Dilston, claimed (1841) that the peasant farming population had been so weakened by the centuries of warfare, raiding and destruction, and therefore unable to resist change, that once the brakes were released agricultural reform, though starting late, was carried further in Northumberland than anywhere else in Britain. Durham shared these trends. Certainly by the middle of the 19th century, landscape and society had been transformed. Enclosure of the lowlands had been completed, with the lowlands being laid out anew into large rectangular fields. (In modern times there has been less impulsion to clear away hedgerows than in other parts of England where fields were not already as large.) On the heavy clayey soils underground drainage was imperative, and the drains led into new field ditches. Some farms, especially in north Northumberland, had ponds to supply water power for threshing machines, and field ponds were fed from drains and streams, or were dug down to the water table, to be replaced in the 20th century by pipe fed troughs. Perhaps because of previous Border military need, a very high proportion of the region was, and still is, held in large estates, some later coming into the hands of families whose wealth was founded on coal or industry. Country houses were built amidst parks, some descended from medieval hunting parks. Lakes and ponds, for amenity and fishing, and arboreta were created.

Hunting foxes replaced hunting deer as the preferred life style of the better off, and fox (and pheasant) coverts planted. Numerous plantations, many of conifers (Norway Spruce *Picea abies*, Scots Pine *Pinus sylvestris* and, especially, European Larch *Larix decidua*) were established in the lowlands for estate timber, and also on the lower moorlands for stock shelter. The opening

up of numerous large and small quarries for building stone and limestone created new habitats, especially ponds. Mills by rivers had mill ponds.

Systematic game management, including control of "vermin", was practised by the end of the 18th century. Mammals which were slaughtered were Polecat *Mustela putorius*, Pine Marten *Martes martes* and Wild Cat. However, as both Rossiter (1998, 1999) and Yalden (1999) have pointed out, reductions in the populations of species regarded as pests had not begun with game preservation by private estates. At parish level churchwardens had been offering bounties for the purpose since the 17th century.

Equally profound changes were occurring away from the land. Coal had been exported from the Tyne to London and elsewhere from medieval times, but with British population growth and the Industrial Revolution, the demand for coal exploded. Mines were sunk across the Northumberland and Durham coalfield and also to coal seams in rural areas. Early horse-drawn waggonways for coal transport evolved into railways with locomotive haulage. The availability of abundant cheap coal facilitated heavy industry, especially on Tyneside, Wearside and, after the mid-19th century, Teesside.

Numerous new habitats developed, especially for amphibians; hundreds of coal mining-subsidence ponds appeared in southeast Northumberland and central Durham, where pond clusters favour the survival of amphibian metapopulations. There were also ponds in colliery yards, for boiler feeds and other uses. Farmland was severed by waggonways, railways, mines, pit-heaps, quarries and factories, leading to countless patches of neglected or casually-managed grassland and scrub habitats, including along disused railways. These patches, where near to ponds, serve as amphibian hibernacula. In the North Pennines reservoirs supported mining activity and there are numerous larger and smaller water-supply reservoirs.

The flourishing industrial economy of Tyneside, Wearside and Teesside up to the outbreak of the First World War created densely built-up urban quarters but also brought about the growth of residential suburbs for the growing middle-class population. Market towns and villages within commuting range similarly expanded. Gardens and their ponds provided new habitat, greatly enlarged again with 20th century greenfield housing estate development. New roads such as the A1(M) provided wide grass verges, enhancing populations of widespread small mammals.

In the second half of the 20th century underground coal mining was gradually replaced by opencast working, and with increased emphasis on land restoration for nature conservation new wetlands have been created following cessation of operations, as they have also following river gravel-working. Examples of the former are at Hauxley and East Chevington, and of the latter at Witton-le-Wear and Caistron. The last two decades of the 20th century saw the planting of numerous broad-leaved woodlands between the Tees and the Tyne as part of Community Forest initiatives, usually close to settlements and limited in size, although some such as Cowpen Bewley Woodland Park on the outskirts of Billingham are quite substantial. These, together with woodland planting on restored mineral sites, will have aided the increase in deer populations, particularly on the urban fringes.

Angus Lunn

CARNIVORES

After the last ice age, some 10,000 years ago, hunter-gatherer humans shared the wooded landscape of what is now the northeast of England with 11 indigenous carnivorous mammals, of which only five have survived continuously to the present day. Habitat loss caused by deforestation and climate change, combined with competition from a growing human population, resulted in the extinction, either nationally, locally or temporarily, of the other six. In particular, Neolithic farmers arrived from mainland Europe around 5,000 years ago and escalated the clearance of the wild woods. They changed the wooded landscape to farmland and the subsequent loss of territory probably contributed to the extinction of the largest carnivores on what had, by then, become the small island of Britain.

Our current understanding of the dates of extinctions is unclear but it is thought that the Brown Bear *Ursus arctos* probably became nationally extinct no later than the Roman period, and the Lynx *Lynx lynx* in the 6th century (Hetherington, 2006). The Wolf *Canis lupus* was next; by the end of the 13th century it was probably confined to Cumbria and the Pennines along with Scotland, and sometime around the end of the 17th century it became extinct in the UK (Harris and Yalden, 2008).

The smaller carnivores persisted but they too were affected by woodland clearance, particularly the Pine Marten *Martes martes* and the Wild Cat *Felis silvestris*. By the 16th century all were considered vermin and a price was on their heads. Elizabeth I's "Act for the Preservation of Grayne" in 1598 made it the responsibility of parish officers to pay bounty on those mammals and birds considered a threat to human resources. Polecat *Mustela putorius* and Fox *Vulpes vulpes* appeared frequently in local parish bounty lists. How well the Act succeeded in depleting carnivore numbers is unknown but there are local examples of very high numbers killed, such as the 563 Polecats killed in 24 years at the beginning of the 18th century in Houghton-le-Spring (Lovegrove, 2007). It may well be that the escalation in persecution in the 19th and early 20th centuries, due to the emergence of game preservation and shooting estates, had an inflated efficiency as it was applied to a carnivore population already depressed by woodland loss and parish bounties.

The advent of game-keeping in support of the intensive rearing of game birds for shooting almost succeeded in making the Pine Marten, Polecat and Wild Cat nationally extinct. According to Langley and Yalden (1977), they were extinct in Durham by 1900, the Wild Cat going first in 1863. Northumberland populations persisted a little longer with extinction of all three species by 1910, again the Wild Cat going first in 1853. Nationally the three species persisted with depressed populations in northwest Scotland (Wild Cat, Pine Marten) and north Wales (Polecat).

Of the carnivores which never became locally extinct, the Badger *Meles meles* dropped to very low numbers and the Fox and Otter *Lutra lutra* survived because of their role as prey species to be ritually hunted with dogs. There is evidence to show that numbers of both species were artificially maintained and even inflated in order to maintain sport. Weasel *Mustela nivalis* and Stoat *Mustela erminea* survived despite wide-spread trapping.

The First World War saw a reduction in the number of gamekeepers and estate workers; subsequent social changes reduced the influence of the landed classes on the management of the countryside, resulting in an easement in carnivore persecution. From that period to this,

carnivore numbers have been in slow increase, with the exception of the Otter which suffered a temporary major reversal in fortunes during the mid 20th century as a result of poor water quality and pesticide poisoning.

Currently Badger, Fox and Otter are well distributed across the North East, as are Stoat and Weasel. The Polecat is present and increasing in numbers, as it recolonises from re-introductions in the west, and Pine Martens exist as a sparse, displaced, non-indigenous population. The Wild Cat is still missing from England and Wales, although there are rumours of an introduction into Northumberland in the 1970s. If this is true then it is likely that the released cats will have hybridised with Domestic Cats *Felis catus* with subsequent loss of the Wild Cat phenotype: a threat to the Wild Cat even in its remote Scottish refugia.

The 1960s and 70s saw the arrival of a new carnivore in the North East, the American Mink *Neovison vison*. Escapees from fur farms have colonised and are now well established on the region's water courses.

Human attitudes to carnivores are changing, particularly for Badger and Fox which now have urban populations with which elements of the human community empathise. The Otter is perceived as a charismatic survivor despite its occasional predation on ornamental fish, and its re-colonisation of the major conurbations of Tyneside, Wearside and Teesside made it a potent symbol of the success of the modern wildlife conservation movement. Badger, Otter, Polecat and Pine Marten are protected by law, but Fox, Stoat, Weasel and Mink are legally culled to support game-bird rearing, a process which in the region's western uplands also protects important populations of breeding waders.

Both Brown Bear and Wolf have revisited England as captive animals, Brown Bear for baiting and as dancing bears (Yalden, 1999): the Bowes Museum has a photograph of a dancing bear in St John's Chapel, Weardale taken circa 1914. The most infamous regional return was that of the Wolf, in the shape of the "Famous Allendale Wolf", which terrorised the farmers and sheep flocks of Allendale and Hexhamshire at the turn of the 20th century. First reported in the *Hexham Courant* on 10 December 1904, the wolf eluded experienced big-game hunters, local fox-hound packs, armed gangs of farmers and the lure of two in-season female wolves, used as bait in a trap, before an adult male wolf was killed on the rail track by the Midland Express on 29 December, 1904, at Cumwhinton in Cumbria. The newspapers of the time reported that Captain Bains of Elm Park, Shotley Bridge had lost a male wolf in October 1904, confirmed by Captain Bains in the *North Mail* of 22 December that year. The question of the day was, did Captain Bains wolf harry the sheep flocks and was the wolf killed at Cumwhinton the same wolf? Reading the contemporary newspaper reports and the internet articles since, the story of the wolf takes on all the trappings of any alien animal story. There were those who denied it ever existed; it was reported to change colour from time to time; there was debate over whether there was more than one; it seemed impossible to agree on its age and even after the dead wolf was found there were those who continued to see it living. What does seem to be agreed is that after the Cumwhinton wolf's death the sheep killing eventually stopped.

Today the pressures on the populations of Badger, Fox, Otter, Stoat, Weasel, Mink, Polecat and Pine Marten are not so much those of traditional game-keeping, although that still exists, but once again the conflict over space in a small island: a burgeoning human population requires space for houses, roads, livestock, agriculture and increasingly, recreation. Badgers, cattle and

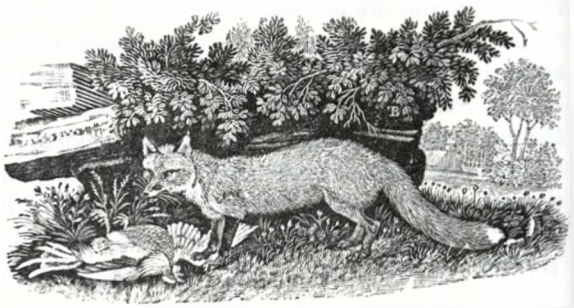
deer share bovine tuberculosis but the Badger becomes the scape-goat in the search for the solution. The ever-expanding road network kills an unknown number of carnivores, but attempts to alleviate this are few and far between. Urban extensions into traditional carnivore territories result in conflict between Badgers, gardeners and green-keepers, and when recreational fisheries are created in the countryside they are a strong temptation for the resident Otters.

Carnivores are adapting to the changing modern environment but there is still a need for robust and deliverable legislation, plans and policies favouring wildlife but most of all, people must change their attitude to sharing the world with carnivores.

Terry Coult

RED FOX *Vulpes vulpes*

The Red Fox is a member of the dog family (*Canidae*) and has a slender dog-like appearance, with reddish fur, pointed ears and an elongated muzzle. The back of the ears and legs are black, and the fur under the throat and belly ranges from white to grey. Foxes are medium sized canids, males weighing from four to eight kilograms, and females weighing from four to six kilograms. The tail of a Fox is bushy in appearance, often with a conspicuous white tip, and is about a third of the body length (www.thefoxwebsite.org, 2012).



Red Fox by Thomas Bewick

Foxes live in a den (earth), which may be a solitary hole, an abandoned (or occupied) Badger sett, or part of an earth made by another animal. Earths can be above or below ground, and foxes may utilise unused or unoccupied buildings, garden sheds, or any other location that they find suitable (www.thefoxwebsite.org, 2012).

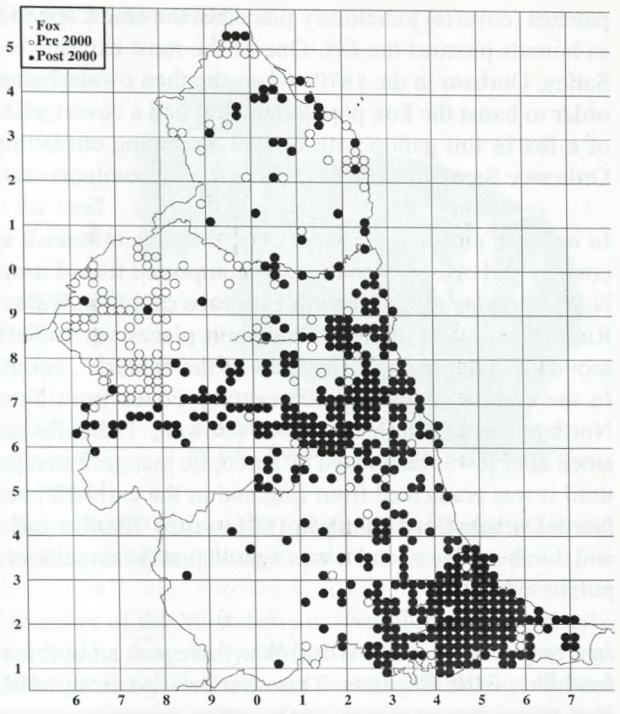
Foxes are territorial and use scent to mark their territories and avoid aggressive encounters with neighbours (www.thefoxwebsite.org, 2012). The size and shape of a territory is determined by the spatial and temporal availability of food, with territory size ranging from 0.1 km^2 in urban areas to 40 km^2 in upland areas. If a Fox is removed from its territory, it is likely that another Fox will move into the area (Baker *et al*, 2006).

Foxes prey on wild mammals, birds, insects and other invertebrates such as earthworms, and will take fruit. Foxes may occasionally kill large numbers of easy prey such as ground nesting birds or captive hens without eating many of them; a behaviour known as "surplus killing" and a response to unnatural stimuli. Where there is an abundance of food, foxes will cache food that cannot be eaten immediately (Natural England, 2012).

In Britain, foxes are found throughout the mainland, the Isle of Wight and Anglesey, but are absent from all the Scottish islands except Skye and Harris in the Outer Hebrides (Baker *et al*, 2006). Foxes began to colonise English cities in the 1940s and urban foxes are now recorded in every North East town and city (www.thefoxwebsite.org, 2012). At the start of the breeding season there are approximately 240,000 adult foxes in Britain: 225,000 are found in rural areas and 33,000 in urban areas (Baker *et al*, 2006). In Northumberland and Durham our before, and after, 2000 distribution maps reflect areas of active survey rather than presenting a true picture of Fox distribution.

Fox numbers in the UK are thought to be stable; however there have not been enough long-term studies carried out to enable Fox population changes to be predicted with confidence (Baker *et al*, 2006). Between 1999-2000 and 2002 the Mammal Society carried out counts of Fox droppings in eight regions of mainland Britain, following the cessation of hunting due to the outbreak of foot and mouth disease in 2001. They found that there was no increase in Fox numbers overall; however there was a small increase in eastern England where it is thought that Fox numbers were recovering following historic persecution by gamekeepers. Fox numbers declined in southeast

England at the same time, probably due to the spread of sarcoptic mange (Baker *et al*, 2006).



In the wild it is rare for a Fox to live longer than two years. In rural areas, where Fox numbers are controlled, up to 80% of the Fox population can be under a year old. In Bristol and London approximately half the population is under one year of age, and only 3% is older than five years (www.thefoxwebsite.org, 2012).

Records of foxes in the North East are primarily sightings of individual animals. This is likely to be because foxes tend to travel and hunt on their own; however, they are not entirely solitary. A dominant male and female will form a pair that will travel, hunt and feed independently, but will meet for periods of time to play or groom each other. These pairs can be monogamous, but research at the University of Bristol has found that this is not always the case, and on some occasions male foxes paired with two or more females (Baker *et al*, 2004). There may be other adult foxes present in addition to the breeding pair. These foxes are referred to as "helpers", and are usually offspring of the pair that have remained with the parents beyond the usual age when foxes disperse (www.thefoxwebsite.org, 2012).

There are still several fox-hunts in the North East area, now limited to drag-hunting. For example, the Tynedale Hunt was established in 1839 in south Northumberland to "help control the fox population in [the] area" and to "give people the pleasure of taking part in an activity that brings together the art of hunting hounds, horsemanship, social contact and a love of the countryside" (www.thetynedalehunt.org, 2012). However, there is little evidence to suggest that fox-hunts played any role in the control of Fox populations (Baker *et al*, 2006). A government enquiry chaired by Lord Burns in 2000, and subsequent public hearings in 2002, led to the passing of the Hunting Act in 2004. The Hunting Act 2004 came into force on 18 February 2005 and "bans hunting with dogs of all wild mammals in England and Wales, including fox, deer, hare and mink, except where it is carried out in accordance with the conditions of one of the exemptions set out in the Act" (Defra, 2012). The ban on fox-hunting still causes controversy and groups such as the Countryside Alliance are campaigning for repeal of the ban.

Fox numbers in the UK have been manipulated by hunting for many years; despite being controlled as vermin they never suffered the severe 19th-century decline other carnivores did, as sufficient foxes needed to be retained to support hunting. There is a long and complex social history associated with foxes and fox-hunters which has had practical outcomes on the Fox population and the North East's countryside. On the ground, artificial earths were created to hold foxes in place and whole landscapes were modified by the planting of small woodlands and gorse

patches (coverts) judiciously placed in the landscape to harbour foxes and to provide good runs, as hounds pursued the fox. One of the most extreme examples was at Broomshields Hall, near Satley, Durham in the 1870s when the then owner had artificial earths built around the estate in order to boost the Fox population, and had a covert planted on the opposite hillside in the shape of a fox in full gallop with his tail streaming out behind him (Cowen, 1955). A glance at any Ordnance Survey map will show just how common such coverts are.

In order to ensure there were enough foxes to hunt it was common to move foxes around the country and on occasion they were imported from Europe to boost the local population. In 1874 N.W. Apperley (1926) records Fox cubs caught in Wales being given to the North Durham Hunt. Richardson (1922) writes "In certain places where foxes were too numerous litters would be moved in the spring to other part of the country", country meaning the hunt's operational area. In the early years of the 20th century Foxes from Norway and Austria were released on the Northumberland/Durham border (Cowen, 1955; Richardson, 1922), breeding with the local stock after it was decimated by sarcoptic mange. Foxes and fox-hounds were also prone to rabies until it was eradicated from England in the early 20th century; Apperley (1924), referring to the North Durham Fox Hounds in 1871, writes "Twelve and a half couples had already died of rabies and dumb madness, and it was agreed that the remainder of the pack be destroyed and a new one purchased."

Just before the Second World War there was an outbreak of albinism in foxes in the southeast foothills of the Cheviots. This was detailed in the 1949 edition of the *Journal of the Royal Zoological Society of Scotland* but more interestingly resulted in *The White Foxes of Gorfenletch*: a novel by Northumberland naturalist Henry Tegner which describes a social history of the white foxes, the people who hunted them and the wildlife of Northumberland at that time (Tegner, 1954).

In 2012, Fox numbers in the North East are heavily controlled for game preservation, but despite this the Fox remains a common and wide-spread carnivore.

Kirstin Aldous and Terry Coult

BADGER *Meles meles*

Badgers are one of the most easily recognisable native wild animals found in the UK. They are often used as an icon of the British countryside and are rooted in popular culture and local tradition. Their ancient association with the land is exemplified by the many place names derived from the older names of the Badger, such as Brock, Pate and Grey. Local examples are Eshott Brocks in Northumberland, Brock Banks at Eastgate and Patefield Brow in Westgate.

Badger
by Terry Coult

Badgers are indigenous and records prove that they once coexisted in the British Isles with Arctic Foxes, *Alopex lagopus*, Wolverines, *Gulo gulo* and Reindeer *Rangifer tarandus*, about 10,000 years ago (Roper, 2010). Badgers are still widely distributed across the North East as the distribution maps show.

The Eurasian Badger is the largest UK member of the Mustelidae or weasel family. Physically, the Badger is a powerfully-built animal with a long body carried on four short legs; their characteristic black-and-white striped head probably evolved as a warning flash to predators. They have five digits on their broad feet and extremely strong claws, which together with their strong limbs make them expert diggers (Neal and Cheeseman, 1996).

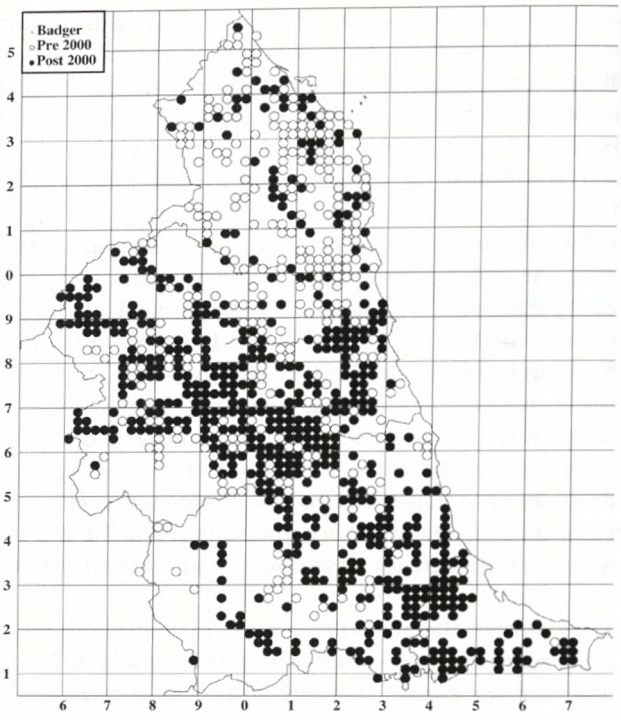
Badgers are nocturnal, but in spite of this, their night vision is generally considered to be poor and they therefore rely on a well-developed sense of smell as their most important sense. They have small ears which lie close to the head and their hearing is comparable to that of a human. Strong tactile black whiskers on either side of a flexible snout help the Badger feel its way through tight spaces (Woods, 1995).

Badgers are social animals and live in clans centred on an underground labyrinth of inter-connected tunnels and chambers known as a sett. Setts typically have several entrance holes with an associated characteristic earth spoil heap. The main sett is usually in continuous use and is often linked above ground to a series of annexe setts and subsidiary setts by recognisable, Badger paths or trods (Clark, 1988). Badgers inhabit a wide range of habitats but setts are most often found in woods and copses, scrub and hedgerow; however they can also be found in sea cliffs, quarries, moorland, open fields and green spaces within city boundaries, providing soils and topography are suitable for burrowing (Neal, 1986). Badger clans mark their respective territories with paths and latrines.

Badgers are omnivores: approximately half their diet comprises earthworms, and the remainder comes from cereals and insects. However, they will also take birds and small mammals when necessary and they have been known to plunder wasps' nests in times of dry weather when earthworms are in short supply (Woods, 1995).

Apart from place names there are many historical records recording former Badger presence, some of the earliest being found as the head bounties paid for and recorded by parish clerks in

their account books. Cowen (1955) provides a comprehensive history of the Badger in Northumberland and Durham, much of which is utilised in this text. The earliest churchwarden's record he quotes is from 1667, from the churchwarden's book of the Parish of Ryton, recording payment for 36 Fox heads and 1 Brocke head in Chopwell. Stanhope Church Parish Accounts show 8 d paid for "2 Broks" in 1703. That is just over three pence per head in modern currency.



Mennell and Perkins (1864) wrote that there were "considerable numbers" of Badgers in many parts of Northumberland and Durham; however by 1895 Sir Alfred Pease stated that Badgers were "practically extinct" in Northumberland and entirely so in the County of Durham. Sir Alfred was then the MP for Cleveland and an ardent Badger digger; in an attempt to bolster Badger numbers he imported and successfully established Cornish Badgers on the family estate in Cleveland (Pease, 1898). By 1903 Thomas Robson of Winlaton reported that Badgers were becoming more common in the Derwent Valley (Cowan, 1955) and it seems likely that they were never as uncommon in Durham as Pease believed.

Badger numbers were at their lowest during the latter part of the 19th century, slowly rising during the early part of the 20th century. The original decline was probably due to the deliberate persecution of Badgers on sporting estates and their recovery due to the migration of rural workers from the countryside to towns and gamekeeper numbers reducing as casualties of the First World War (Roper, 2010).

As well as the loss to sporting estates Badgers were also baited for popular entertainment and Cowen (1955) records that in the 18th and 19th centuries "large numbers of Badgers were caught for the so-called sport of Badger baiting and most public houses with a sporting landlord kept a Badger in a barrel in the yard for customers to try their dogs at".

Casual records are held by Durham and Northumberland Badger Groups of setts, road casualties, sightings, persecution incidents and sett disturbances: the resulting map shows that Badgers are well distributed across the region and the Badger is currently quite common for such a large mammal. Durham County Badger Group has approximately 900 setts on record, including main, subsidiary and outlier setts. Northumberland Badger Group knows of over 500 setts but this could well be an under-estimation due to the difficulty of surveying so large a county. There are fewer records for the uplands, with most setts being found in the agricultural areas and towards the southeast of Northumberland (Mervyn Anthony, pers. comm., 2012). Setts are widely, but not evenly, distributed across the two counties wherever suitable undisturbed habitat exists.

Setts can also be found in urban and suburban areas, although this may be the result of housing development encroaching into historical Badger territories, rather than Badgers colonising urban areas. Urban setts may cause conflict between humans and Badgers through damage to gardens, or at one sett in Durham where Badgers regularly dig up human bones. The altitudinal limit for Badgers in the North East is about 350 metres above sea level (Lesley Johnson, pers. comm., 2012).

South of the River Tees, Badgers are widespread though not particularly common across all of the large woodland complexes in East Cleveland (shades of Sir Alfred Pease?). This appears to have been the case for the past three decades. There has been the occasional record of Badgers in suburban gardens in the south of Middlesbrough, presumably stemming from a colony at Nunthorpe, but the main urban conurbation from Thornaby through to Redcar is devoid of Badgers. One sett which is particularly notable for its location is dug into the bank of bracken on the top of the tall sea cliffs at Hummersea near Loftus (Kenny Crooks, pers. comm., 2012).

Persecution of Badgers has a very long history, appositely condensed into the English verb to badger, meaning to pester or persistently harass. Badger digging has a long history in the North East with many long-standing setts showing the scars of former digs. Until 1985 Badger diggers would avoid prosecution by claiming to be digging for Foxes, proving their guilt being almost impossible. In 1985 Dr David Clark, the then MP for South Shields, managed to get the Wildlife and Countryside (Amendment) Act through Parliament which put the burden of proof, of not digging for Badgers, on the defendant. The first successful prosecution under the amended Act was at Derwentside Magistrates Court, Consett in March 1986. This was a significant breakthrough in Badger protection, giving the police the encouragement to prosecute and eventually leading to a local reduction in Badger digging.

Currently Badgers and their setts are protected under the Wildlife and Countryside Act 1981 (as amended), the Hunting with Dogs Act 2004 and the Protection of Badgers Act 1992, which makes it illegal to kill, injure or take Badgers, or to interfere with a Badger sett. County Durham Badger Group and Northumberland Badger Group work closely with all enforcement agencies to protect Badgers and their setts from continued persecution (Leslie Johnson, pers. comm., 2012).

Unfortunately Badgers still continue to be persecuted. In former mining communities including Durham and Northumberland Badger digging, baiting and lamping are still considered sport by a very small criminal element of the community, and some gamekeepers still kill Badgers. Whilst it has been illegal for fox-hunters to "hard stop" sett entrances for some years, this practice is still reported to occur, especially in Northumberland (Mervyn Anthony, pers. comm., 2012).

However the biggest threats to modern Badgers are the increasing numbers killed on the constantly-expanding road network, and the loss and fragmentation of their habitat to all kinds of development. National and local Planning Policy contains Badger-protection policies but making them work in an ever-shrinking countryside will be a great challenge. The problem of bovine tuberculosis is currently not to be found in Durham and Northumberland, but vigilance is required against any relaxation in the control of cattle movements, and the desire by government to find methods of controlling Badger numbers may eventually impact on the Badgers of Northumberland and Durham.

Terry Coult and Louise Harrington

OTTER *Lutra lutra*

The Eurasian Otter, the species found in the UK, has a Palaearctic and Oriental range extending southeast through Sumatra and into Java. In the UK it is well but unevenly spread across the country (Harris and Yalden, 2008).

Otter by Joan Holding

The coat is medium to rich dark brown with long coarse guard hairs and a dense under fur which traps air to insulate the body. Body length is just over one metre and male Otters are usually larger in size and weight than females (Harris and Yalden, 2008).

Otter habitat is mainly standing and running waters from the coast to the uplands. They are able to exploit coastal waters as long as fresh water is present to wash salt from their coat in order to maintain its insulation. In the North East Otters have been found to use coastal streams in Northumberland around Druridge Bay (O'Hara, 2005) and the seaward Skelton and Kilton Becks in Cleveland. Wilkin (1979) postulates a route for Otters using the coast between the mouth of the Aln and the Coquet and that the route is still available today. In 2010 an Otter was seen attempting to catch a Razorbill *Alca torda* in Marsden Bay (Environmental Records Information Centre (ERIC)) and Otter presence was recorded on the Farne Islands in 2008 (Steel, 2009).

Movement throughout their linear range is usually along water courses but Otters are capable of overland migration across watersheds (Harris and Yalden, 2008). Cross-country routes may be traditional and Coult (1998) records Otters crossing watersheds between the Wear and Tees, Tynedale to Weardale, the South Tyne to the Tees, Derwentdale to Weardale and Weardale to Allendale via the Middlehope Burn. George Wall (pers. comm. to Terry Coult, 1989) recalls a former gamekeeper who maintained an Otter trapping station on the Middlehope Burn (with some success), believing it to be a traditional crossing route for Otters. Wilkin (1979) considers the Devils Water to be a route between the Tyne and the Derwent. Ritson Graham (1993) records Otters crossing the watershed between the North Tyne and the Irthing in Cumbria via the Chirdon Burn in the mid-20th century.

Diet consists primarily of the most available fish species but including seasonal exploitation of amphibians at breeding ponds, water birds, Water Voles and Rabbits. Crustaceans are taken including crayfish in fresh water and crabs in coastal waters. Coult (1998) analysed prey species from Otter spraint (faeces) on the central river Browney in County Durham where the prey species included salmonids, Bullhead *Cottus gobio*, Eel *Anguilla anguilla*, Stone Loach *Noemacheilus barbatulus* and Minnow *Phoxinus phoxinus*. Thom (1997) showed that salmonids formed a large proportion of fish prey in the upper Tyne catchment but that Minnows had an equal value during the summer and autumn. As Otters continue to recolonise populated areas there is a growing trend for them to exploit ornamental and non-native fish in artificial ponds and lakes.

Breeding can take place during every month of the year, with two to three cubs being the norm and exceptionally five (Harris and Yalden, 2008). O'Hara (2005) suggests that in Northumberland breeding occurs in late winter and early spring and the ERIC data for Durham indicates a similar,

but not exclusive, preferential timing. Coult (2010) records two very young cubs, not yet water confident on 3 April 2009 at a holt (den) on the river Browney. Otter den sites may be an above-ground couch of vegetation or an underground holt of which there will be several throughout an Otter's range. Holt sites may be natural, for example under tree root plates, in the burrows of other animals or in rock cavities, but Otters will also use artificial sites, such as disused drains. John Durkin (pers. comm. to Terry Coult, 2010) records a riparian Badger sett on the lower River Derwent in Gateshead which is also used on occasion by Otters. ERIC has a record of cubs in a flood debris stick pile on the river Wear near Durham City in 2007. In Northumberland O'Hara (2005) records breeding in a scrap yard adjacent to the river Tyne.

Otters occupy linear home ranges along water courses which may extend to take in adjacent standing waters. Female Otters have overlapping ranges and males exclusive ranges which overlap those of several females (Harris and Yalden, 2008). Spraint is deposited throughout an Otter's range acting as a scent marker conveying information to other Otters on the utilisation of habitat resources and reducing aggressive encounters (Harris and Yalden, 2008).

An indigenous resident, Otter bones were found in conjunction with those of Brown Bear *Ursus arctos* and Lynx *Felis lynx* during the excavations of the Teesdale Caves (Simms, 1974). Mennell and Perkins (1864), suggest that "our region" can be "designated as the headquarters of this fine animal" claiming it to be "abundant in all the rivers and streams". They quote an unnamed contributor to *The Field* who relates that Otters abounded on the north Northumberland and Berwickshire rivers particularly the Till, "where they were very numerous often as many as half a dozen lying on different parts of the river at the same time". In his 1896 pamphlet William Turnbull of Bellingham who hunted the North Tyne describing how common Otters were, states "there is scarcely a spot which will not harbour them, from a town sewer, to a garden to a shed". Mennell and Perkins (1864) also consider the North Tyne to be a good Otter river but the South Tyne, Wear and Derwent are described as "not much frequented by Otters, being only visited en passant by emigrants from the Tyne to the Tees. The reason given for the lack of Otters on these rivers is the great influx of lead-hush or wash from the mines in the west." Further south again the Tees is considered to be a good river for Otter hunting and J.W. Fawcett (1889) the Satley naturalist sums up in rhyme the difference between Durham's rivers:

An Otter on the Wear,
You may see but once a year,
But an Otter on the Tees,
You may see when 'er you please.

In contrast to this Apperley (1924) regularly found Otters to hunt on the Wear near Durham City in the late 19th century, although he does record a July 1894 hunt near Durham City, which was hampered by the river being stagnant and smelly. He also hunted Otters on the lake at Wynyard Park, Stockton.

In Cleveland, Howes (in Delaney, 1985) reports 19th century presence of Otter on the Tees (including a pre-1800 record from Middlesbrough docks), the Greta at Bowes and the Leven at Ingleby Greenhow. From the Cleveland Hills he records Otters present on Lockwood Beck Reservoir and at Kilton, Liverton and Staithes. Stephens (1957) records an historical record of Otters breeding in the town drains of Darlington, and the former Tubwell Row museum in Darlington had a preserved Otter cub, presented in 1927, which was killed in Darlington's South Park.

Otters were also moved between catchments for hunting: Lomax (1910) records moving Otters between the Greta in Durham and the Calder in Yorkshire and buying in Otters for hunting from Ireland.

At the end of the 19th century Otters could be said to be abundant on the north Northumberland rivers as far south as the North Tyne, less well represented on the South Tyne, poorly represented on the Derwent and Wear and well represented on the Tees and its tributaries.

In 1957 *The Otter Report* was published (Stephens, 1957). The report summarises Otter status within discrete River Board Areas (RBAs). Northumberland and Tyneside RBA is reported as "definitely good numbers", Wear and Tees RBA, "Very little information. Apparently Otters have been less plentiful on the upper Tees in recent years". Possibly an early hint of the decline to come.

On 15 August 1964 T. Paisley, then the master of the Northern Counties Otter Hounds, made a much more telling observation on the status of local Otters, in a note in *The Darlington and Stockton Times*: "There seems to be a general scarcity of Otters in the areas hunted by the Northern Counties Otterhounds."

The 1960s and 1970s saw the nadir in the decline of the Otter in Britain, caused by a cocktail of pollutants, principally organochlorine pesticides, combined with adverse riparian habitat management. Otters became virtually absent from Durham and Cleveland and much reduced in numbers and range in Northumberland. In response to the decline the Otter was given legal protection in 1978 and organochlorine pesticides were phased out over the 20 year period between 1962 and 1983.

The Mammal Society's provisional distribution map for Otter, 1960-70 (Corbet, 1971) illustrates Otters being sparse in Northumberland with only the upper Tees showing records in Durham and Cleveland. One of the authors, Bob Wilkin, does recall finding spraint on the Wear and Tees in the 1970s, but it was very scarce.

In response to the Otter's decline the first all-England survey, the *Otter Survey of England 1977-79* (Lenton *et al*, 1980) was instituted. For the Northumbrian Water Authority area (Tweed to Tees) it found only 14 out of 168 survey sites showing Otter presence and these were on the north Northumberland rivers, nothing was found on the Durham rivers although the *Teesdale*

Mercury 13 February 1974 describes a small bitch Otter deliberately killed by cows at Ornella Farm, Egglesburn.

Subsequent surveys show a slow and steady increase in Otter distribution in the region as water quality and riparian habitats improve to the present day. Signs of Otter could be found sparsely on the central river Tees during the 1980s but it was conspicuous by its absence elsewhere in Durham and Cleveland. An early attempt at re-colonisation of the river Wear and tributaries occurred in March 1987 when tracks of a male Otter were found on the river Browney, and in the summer of 1988 a bitch Otter and cubs were drowned in an eel fisherman's fyke net at Low Burn Hall on the river Wear (Tyrell Brockbank, pers. comm. to Terry Coult, 1991). By the mid-1990s Otter sign was more common on all catchments and by 2002 Otters were well distributed across Northumberland, Durham and Cleveland west of the major conurbations (Coult and O'Hara, 2002). The most recent all England survey the *Fifth Otter survey of England 2009-10* (Crawford, 2010) found 135 out of 168 sites surveyed to be positive in the Northumbrian region. It describes the status of the Otter within the region as "Otters are now using all the available water courses" and "Otters appear to be using the whole of the coast in this region."

O' Hara (2005), describing the status of the Otter in Northumberland, writes "At this present time it is the opinion of the author that the Otter population in Northumberland is certainly at its highest since the 1950s" and "signs of Otter presence now occur on all catchments."

Otters are recorded along the length of both the South and North Tyne including their tributaries, and in urban Newcastle they were recorded on the Ouseburn by Bob Wilkin, for the first time in over 40 years, in May 2000. In 2010 he recorded Otter sign on Willington Gut and the Wallsend Burn. They are present on the whole of the Derwent catchment including at Derwenthaugh where the Derwent joins the Tyne. On the Don they have been recorded through Boldon and down to Jarrow Slake.

On the Wear they are present on the main river and all tributaries and bred in Sunderland south dock in 2010. They are present along the whole of the Tees catchment, including the Skerne through Darlington with spraint locations suggesting a possible crossing from the upper Tees to the Eden catchment via the Maize Beck.

Otters are well established on the Leven and the lower Tees itself and have been seen around the Tees Barrage. North of the Tees Otters are now regularly recorded around the North Tees Marshes from Saltholme to Greatham Creek. They have been reported in Seaton Channel and on the beach at Seaton Snook, at the mouth of the River Tees. They have been found on the Billingham Beck as far as the Billingham Beck Ecology Park and up Claxton Beck as far as Cowpen Bewley Woodland Park (Ian Bond, pers. comm., 2012).

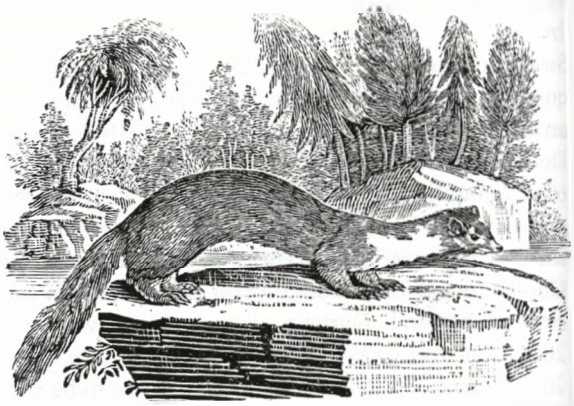
South of the Tees they have been recorded on almost every beck, including Marton West Beck in urban Middlesbrough and they are regularly seen at the mouth of the Kilton Beck where it flows into the sea at Skinningrove (Kenny Crooks, pers. comm., 2012).

At the beginning of the 21st century Otters have reclaimed their former territory and are well distributed across all North East river catchments including those rivers where mining and heavy industry had previously displaced them.

Bob Wilkin and Terry Coult

PINE MARTEN *Martes martes*

Pine Martens are about the size of a small cat with a fox-like face, pricked rounded ears with a pale border, dark brown fur, yellow/cream throat patch and a long bushy tail. They range in length between 46 cm for a small female to 54 cm in a large male with an additional tail length of up to 27 cm. Weight ranges between 0.9 kg in smaller females and 2.2 kg in larger males. In captivity Pine Martens have lived up to 17 years; in the wild they average about three to four years (Harris and Yalden, 2008).



Pine Marten by Thomas Bewick

They are a member of the Mustelid family of which eight species are present in the UK (Harris and Yalden, 2008). These include Stoat *Mustela erminea*, Weasel *M. nivalis*, Polecat *M. putorius* and Mink *Neovison vison*. All eight species are present in Northumbria although their distribution and density within the region varies. The Pine Marten is more arboreal than other Mustelids and is adapted to exploit three-dimensional woodland and rocky habitats. It is a generalist and opportunistic feeder, predating on mammals including squirrels, birds, eggs, fungi, fruit, honey, nuts, and carrion, and sometimes coming to bird tables for scraps (Harris and Yalden, 2008).

A largely solitary animal, mating takes place between June and August with implantation being delayed. Young are born usually in April of the following year with an average of three young born in a secure den site (Birks and Messenger, 2010). Martens are known to use artificial nest boxes and will den in buildings, but mostly denning is within cavities, in rocks, tree holes, disused nests of birds and squirrel dreys (Harris and Yalden, 2008).

In the UK the Pine Marten is principally confined to wooded areas of north, central and western Scotland, with a 1980-1981 re-introduction to Dumfries and Galloway. Home range varies considerably depending on habitat quality and prey availability. It can vary from as little as 2.23 km^2 for a male and 1.49 km^2 for a female in high quality woodland such as Bialowieza Forest in Poland to in excess of 20 km^2 for a male and 8 km^2 for a female in poor quality woodland in Scotland (Birks and Messenger, 2010). Range expansion is reduced by poor habitat, persecution and possible competition with Fox *Vulpes vulpes* and wild-living cats (Harris and Yalden, 2008). Fox are known to predate martens in Scandinavia (Lindstrom *et al*, 1995), predation being highest where Fox are most abundant and woodland cover is low, as in much of the UK. This could be slowing marten re-colonisation of the UK. There is an old Cumbrian saying that when foxes are plentiful martens are scarce, which may turn out to be a truism.

The Pine Marten is protected under both European and UK legislation but unfortunately, despite this legal protection, martens are still killed inadvertently each year by traps or poisoned bait set out for crows or foxes (Trees for Life website, 2012).

From Neolithic times, man has exploited the pelt of the Pine Marten. It was used at court during the Middle Ages, and as numbers became scarce skins were imported (Fairnell, 2003). Harting (1886) records valuable Pine Marten skins being exported from Newcastle upon Tyne in the

Middle Ages, although there is debate about whether Harting confused export with import figures. However Pine Martens were still widespread but sparsely distributed throughout the UK and Ireland into the 19th century when increased persecution to support game-keeping caused its rapid decline. By 1915 martens were found in just a few remote areas of the UK. Small populations survived in Wales and in areas of northern England; relatively strong populations still lingered in the northwest Scottish Highlands (Yalden, 1999).

In northeast England the Pine Marten has a long history as an indigenous species; there is a 7th century reference to martens in the Welsh Cradle Song "Pais Dinogad" (Dinogad's smock), which refers to the River Derwent in northeast England (Morgan, 1993), but it was already regarded as being in decline when Mennell and Perkins (1864) wrote that "although the animal cannot be called common, it is widely distributed over both counties." They quote Wallis from a century earlier: "the late humane and lamented Edward Charleton, Esq. of Reedsmouth had a young one taken in that neighbourhood, which, by kind treatment, grew as tame and as familiar as his other house animals and continued with him two years, brisk and lively." This was not the only Northumberland marten kept as a pet: Mr Yellowley of South Shields had a marten in his possession which had been trapped at West Chirton House in North Shields in 1883. He eventually sent it to Bostock and Wombwells menagerie from whence its body was eventually returned to him for preservation (Yellowley, 1886).

By the end of the 19th century the Pine Marten was believed extinct or extremely rare within the region. *The Victoria History of the County of Durham* (Page, 1905), states that the last capture of one in that county was in 1882 near Bishop Auckland (Hoppyland). Millais (1905) records the trapping of a Pine Marten at Bardon Mill in 1905 as the last Northumberland record, and Milburn (1900) records a marten killed near Swainby on the edge of the Cleveland Hills in March 1900. Yalden (1999) states that by 1915 the Pine Marten was thought to survive in England, only in the Lake District, perhaps the Cheviot Hills and parts of Yorkshire.

Despite a status of being functionally extinct, sporadic anecdotal reports have continued of Pine Martens in the region throughout the 20th and 21st centuries, many of which, in recent years, have been catalogued and evaluated by the Vincent Wildlife Trust (VWT). Henry Tegner (1972) provides a good introduction to modern records with his account of the finding of a dead marten at Elishaw Bridge in north Northumberland in 1969, the skull of which was identified as a Pine Marten by the British Museum of Natural History and the sighting of a Pine Marten in Hamsterley Forest, Durham by "two independent and entirely responsible observers" in 1970. The Elishaw skull was deposited with the Hancock Museum in Newcastle upon Tyne. Simms (1973), the finder of the Elishaw corpse, concluded from the pelage colour that the marten was most probably of North American origin *Martes americana*; in his opinion, like the Mink *Neovison vison*, an escapee from fur farms. In 1993 a marten skull was recovered from a gamekeeper kill near Ingleby Greenhow in the Cleveland Hills (Jefferies and Critchley, 1994) and in 1994 Terry Coult was shown the corpse of a marten reported to have been shot in Hareshaw Linn, Bellingham, looking like a typical Scottish marten. The most recent record of a North East marten was in 2010 from Kidland Forest in the Cheviots, with scat collected by Kevin O'Hara from a marten den box.

DNA analysis of biological material including scats (faeces) can determine the genetic origin of a marten (described as its mitochondrial haplotype) and therefore its likely geographical pedigree. The VWT has organised scat collection searches in places where martens have been sighted across England and Wales, as well as the testing of preserved specimens.

Jordan *et al.* (2012) discuss the genetic history of martens from the British Isles using DNA analysis results; their findings suggest that the aboriginal English Pine Marten, haplotype ***i***, appears no longer to be present in England, becoming extinct after 1924, but it is still weakly represented in Scotland along with the much more abundant haplotype ***a*** Pine Marten which makes up the bulk of the existing and historical Scottish marten population.

The haplotypes of marten specimens collected in Northumberland and Cleveland show origins in Scotland (haplotype ***a)*** and in North America (haplotypes ***w*** and ***x***), suggesting that all are displaced animals, not the remains of an indigenous English population (Table 1).

Table 1. Confirmed Marten records from Northumberland and Cleveland with their haplotype.

County	Year	Haplotype	Record type	Recorder
Northumberland	1990s	W	Carcass	Colin Simms
Northumberland	1990	X	Carcass	Colin Simms
Cleveland Hills, North Yorks.	1993	A	Carcass	Charles Critchley
Northumberland	1994	A	Carcass	Colin Simms
Northumberland	1995	A	Carcass	Colin Simms
Northumberland	2010	A	Scat	Kevin O'Hara

The origin of these North East martens is puzzling: are they releases, escapees, or travellers from Dumfries and Galloway, the closest known Scottish population, or a combination of all. Jordan *et al.* (2012) record that Scottish martens were released near Peebles by the Scottish Society for the Prevention of Cruelty to Animals in 2009, which is only 70 km away from the Kidland scat.

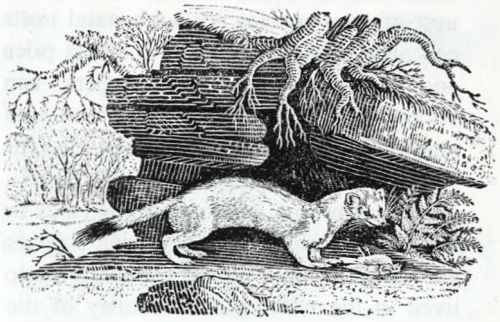
American martens and European martens are very closely related to the extent that they can interbreed and the presence of individual martens with mixed American and Scottish genetic material suggests a fur-farm input, and there were fur-farms in Northumberland which bred martens.

Current understanding is therefore that there is a confirmed marten presence in Northumberland with animals of Scottish and Scottish x American descent, and a single marten carcass from the Cleveland Hills of Scottish descent; whether this represents a self sustaining population or sporadic incursion is unknown. There is no physical evidence from County Durham, but like Northumberland and Cleveland there are many anecdotal records of sightings of martens. Birks and Messenger (2010) record 20th-century sightings suggesting breeding martens in both Northumberland and Durham.

The paucity of material for analysis advises caution in drawing hard and fast conclusions on the status of North East and English martens and there is a need for much more study before a full understanding of their status is achieved.

Terry Coult and Kevin O'Hara

STOAT *Mustela erminea*



Stoat by Thomas Bewick

Stoats have the typical long slender body of a Mustelid with short legs and a medium-short tail with a black tip. Fur is reddish brown to ginger above and white to cream below. In winter in Scotland and the north of England the Stoat can turn all white with the exception of the black tail tip (known as ermine); it can also partially turn, giving a piebald animal (Flintoff, 1935). The author's first ever encounter with a Stoat in ermine was in the late 1970s at Warden Law, Sunderland; since then they have been seen in most winters. A request for ermine sightings by Northumberland Wildlife Trust produced a total of 70 records in the winter of 2010/11, mainly in January and February and well distributed across the county.

Sexual dimorphism is pronounced in Stoats with males much bigger than females. Body length varies around 350 mm and weight around 300 g. Most Stoats die before their second birthday but they can occasionally live up to eight years (King, 1989).

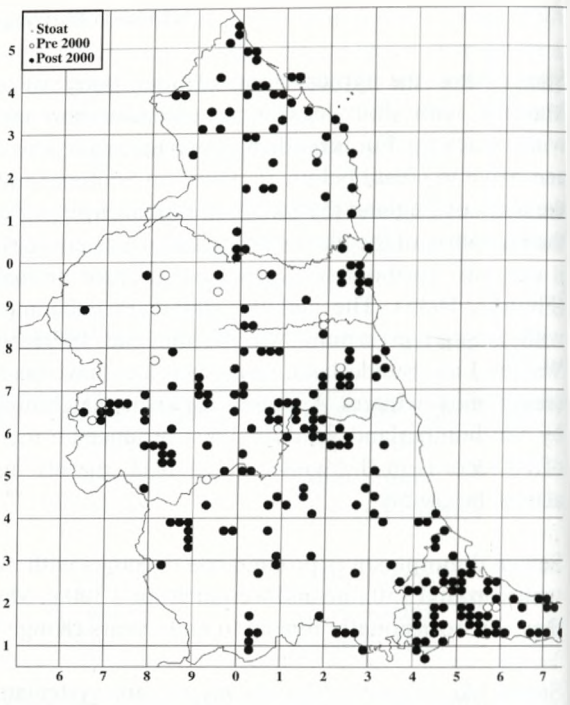
Stoats like Weasels *Mustela nivalis* are systematic if opportunistic hunters, mostly of small mammals with occasional birds and eggs (Harris and Yalden, 2008). Rabbit *Oryctolagus cuniculus* is the chief prey and will be hunted both below and above ground, even being pursued doggedly in the open over some distance before capture. Stoats are said to dance in order to mesmerise their prey, thus gaining a distance advantage before rushing the quarry. The author has only ever seen this once at a large Rabbit warren in Allendale. They are good swimmers and often hunt along watercourses, Terry Coult, (pers. comm., 2012) reports watching a Stoat hunt a Water Vole *Arvicola amphibius* by scent, not sight, holding the line even when the vole crossed the river.

Stoats are indigenous and may well have remained in the UK throughout the last ice age, living on the fringe of the ice sheets in southern England (Harris and Yalden, 2008). This would have given it an advantage over the Weasel when re-colonising the country and may explain its presence in Ireland. Stoat bones were recorded by Simms (1974) along with those of Wolf *Canis lupus* and Brown Bear *Ursus arctos* when excavating the Teesdale Cave.

The Stoat occurs throughout Britain and Ireland, living in a wide variety of habitats including urban areas and at any altitude with sufficient ground cover and food. Their larger size allows them to survive better than the Weasel in upland and cooler locations (Harris and Yalden, 2008). Mennell and Perkins (1864), commenting on the relationship with the Weasel state "in the uplands probably more abundant" and this is reflected in our current distribution maps. There are UK populations on many of the offshore islands, where they may have been introduced (Harris and Yalden, 2008), and they have been recorded on Lindisfarne (Perry, 1946).

Stoat home ranges vary depending on the distribution and density of prey. They have a typical Mustelid pattern, male territories encompassing smaller overlapping female territories; resident animals may defend their ranges when numbers are high but in the spring the system breaks down as males prospect widely for females (Powell, 1979).

There may be several dens within a range and these are usually made in the nest of prey species although natal nests can also be in stone walls or wood piles and, as Stoats are good climbers, can be at height in trees, buildings and roof voids, and are generally lined with the fur of their prey (Harris and Yalden, 2008). Their ability to climb sometimes leads to confusion with the Pine Marten *Martes martes*. One Stoat on the Cragside estate lived in the warmth and security of the rafters of the heated out-buildings during the winter of 2010/11, coming down to scavenge anything it could from the nearby homesteads including deer hung in larders.



Stoats have an unusual breeding strategy: rather than mating solely with mature females a male may mate with all female age classes, including kits in the nest, which may be only two to three weeks old. They do not give birth however until the following spring because implantation is delayed for 9-10 months, by which time females may have dispersed a considerable distance from where they were actually mated. This strategy contributes widely to the Stoat's success and widespread distribution (McDonald and Harris, 1998).

To compensate for high mortality rates large litters of between six to nine young are born. The female feeds them for up to 12 weeks by which time they are efficient self-supporting hunters (Harris and Yalden, 2008).

Food shortage is the main killer of young Stoats and although they are widely trapped as a predator of game birds, this appears to have little effect on overall numbers. The species occasionally falls prey to larger birds of prey, foxes and even cats (Harris and Yalden, 2008). There is little competition between Weasels and Stoats, as the bigger and more powerful Stoat is able to take larger prey.

From the author's experience notable hot spots for seeing Stoats include Allendale where they are often seen hunting along water courses for Water Vole. Druridge Bay in Northumberland has some highly visible Stoats responsible for periodically removing the Rabbits from the little islands at Hauxley nature reserve.

Like many Mustelids they are very inquisitive and they can often be enticed close to an observer by squeaking like a frightened Rabbit or rodent. The author once squeaked a whole family to his and his son's feet in Teesdale, the kits half climbing up our legs. The author's last encounter with a Stoat was on Prestwick Carr in March 2012. It was up in a willow tree where a broken bough contained a natal den.

Kevin O'Hara

WEASEL *Mustela nivalis*

Around 250 mm in length and weighing about 100 g the Weasel is the smallest British Mustelid. The body fur is ginger to russet brown with a cream belly. A Weasel's life span is short, with most of the Weasel population at any one time being under one year in age and only one in 80-90 young surviving over two years (Corbet and Harris, 1991).

Weasel by Joan Holding

The Weasel is widespread throughout Britain but absent from Ireland and many offshore islands, implying that it colonised Britain later than the Stoat *Mustela erminea* after the last glaciation. It is probably our most numerous carnivore; often seen crossing roads and lanes by drivers. Like its close relation the Stoat, the Weasel is found over a wide range of habitats including urban areas, frequently utilising hedgerows, stone walls and other linear features that have good supplies of small mammals (Harris and Yalden, 2008). The author has recorded them in such varied landscapes as the Pennines (Nenthead), in sand dunes (Druridge Bay and Seaton Carew), coastal marsh (Cowpen Bewley), former colliery spoil heaps (Murton and Herrington) and the embankments of the A19 at Sunderland.

Diet is mostly small mammals up to about the size of a young Rabbit *Oryctolagus cuniculus* but birds, bird's eggs, reptiles, amphibians and earthworms are also occasionally eaten (Harris and Yalden, 2008).

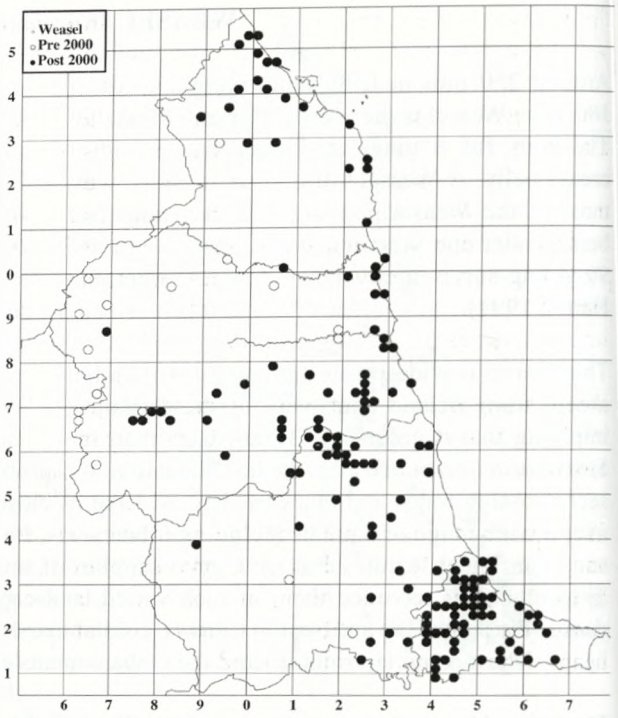
The Weasel specialises in hunting small tunnel-living prey such as voles and mice. Its small size means it can hunt them both above and below ground. Although they are mainly diurnal they will sometimes hunt at night. They do not hibernate and actively hunt under the cover of snow. Like its cousin the Stoat it will often take over the dens of its prey and Weasels will have several dens within their range (Harris and Yalden, 2008). The author has had a Weasel take up residence in his garden compost heaps to prey on the abundant mouse population around the nearby chickens. The removal of one compost heap recently revealed a den complete with mummified food reserves. They are good swimmers and the author once watched one catching voles and storing them as flood waters receded by the river Wear near St John's Chapel.

Weasels follow the typical Mustelid territorial pattern with exclusive male territories encompassing overlapping female territories. Weasel home ranges fluctuate greatly depending on the distribution and density of prey. Resident animals may defend their range when numbers are high and neighbours numerous, but in the spring the system breaks down as males prospect widely for females (Harris and Yalden, 2008).

In the UK Weasels are reported not to turn white in winter like the Stoat although it does so elsewhere in its range. According to Flintoff (1935) it does occasionally turn white in UK winters but this is open to debate. Mr W. Walton records an albino Weasel in upper Teesdale in *The Victoria History of the County of Durham* (Page, 1905).

Weasels normally produce one litter a year sometimes two if Field Vole *Microtus agrestis* numbers are high. Typically four to eight youngsters are born and are weaned at three to four

weeks; they can kill efficiently at eight weeks and split from the family group between nine and 12 weeks. In a good vole year females can be pregnant at three to four months old (Harris and Yalden, 2008).



Food shortage is the main killer of young Weasels as they must eat up to a third of their bodyweight a day. The author once followed Weasel tracks in the snow in Herrington, Sunderland for about 500 metres noticing how the animal followed the vole tunnels under the snow, surfacing often then disappearing again. Eventually the little Weasel was found curled up dead at the base of a tree: starvation was assumed to be the cause of death. Terry Coult (pers. comm., 2012) recalls seeing a Weasel in the open and behaving in an erratic manner near Langley Park, which on examination turned out to be infected with the nematode parasite *Skrajabingylus nasicola*, with significant damage to the skull. Weasels are trapped by gamekeepers as part of their predator control programmes but not specifically targeted as they are seen as less of a pest than the Stoat. The author has seen them on many a keeper's gibbet in Teesdale, Durham, Hexham and Corbridge. The gamekeeper's trap is the major limit on the population but the species occasionally falls prey to hawks, owls, Fox *Vulpes vulpes*, Mink *Neovison vison* and even cats.

There is little competition between Stoats and Weasels: as the Stoat is larger and much stronger it takes larger prey like Rabbit whilst its smaller cousin is an out and out "tunnel hunter" reaching small rodents the Stoat cannot. Weasels rarely venture into the open to hunt, sticking to cover to protect them from aerial predation and foxes (Harris and Yalden, 2008).

The Weasel is circumboreal in distribution, found around almost the entire northern hemisphere including large parts of the Arctic Circle, but excluding the larger islands such as Ellesmere and Greenland. It is sympatric with the Stoat for most of its range but extends further south in the Mediterranean and into North Africa. It occurs throughout mainland Britain but is absent from Ireland (Harris and Yalden, 2008).

Except in the uplands its distribution in the northeast of England is ubiquitous and it can be found from the Tweed to the Tees; it appears to be more abundant in lowland areas and nearer the coast than the Stoat. Recent records from the Wildwatch project in the North Pennines Area of Outstanding Natural Beauty (AONB) show 25 Stoat records to three Weasel records within the AONB boundary. The author did however come across a family party of Weasels by the roadside in the summer of 2004 near Nenthead, showing they are not completely absent from

the uplands. Our distribution maps post-2000 probably reflect the recording effort as opposed to actual distribution, as the species is much more widespread than is indicated.

An aborigine, its remains are common in cave deposits across Europe (Harris and Yalden, 2008) including the Teesdale Cave (Simms, 1974). Historically the species has always been abundant; Mennell and Perkins (1864) make only a one-line statement "this animal is very abundant throughout our district." Hutchinson (1840) records the unlikely incident of a pack of seven Weasels hunting a Brown Hare *Lepus capensis* by scent on Upper Houses Farm, Lanchester. Even more unlikely, in 1824 William Henderson describes how he and two other boys were hunted by a pack of at least 20 Weasels near Windlestone in Durham, only escaping by seeking refuge in the nearby village (Apperley, 1926).

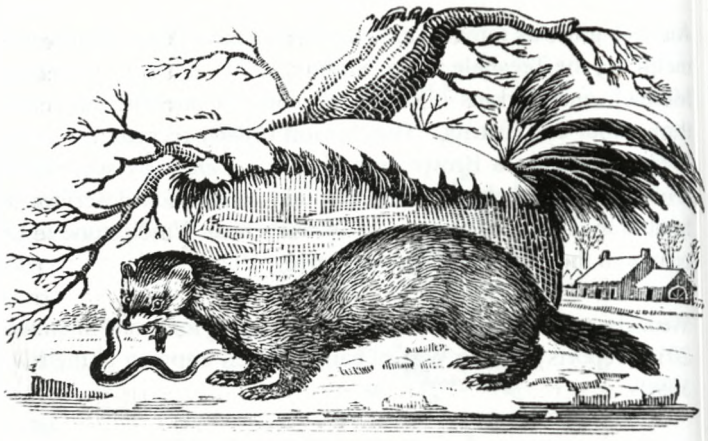
Weasels are often caught whilst surveying for small mammals and Don Griss (pers. comm., 2012) reports an irate Weasel caught when trapping in the ICI reed beds near Billingham in the 1990s.

The estimated British pre-breeding population is put at around 450,000, although this could vary considerably; actual populations are extremely difficult to predict as they are related to food supply (Harris and Yalden, 2008). The Weasel is still considered to be common but census difficulties and natural fluctuation in numbers make it hard to predict whether there is a conservation concern for the species.

Kevin O'Hara

POLECAT *Mustela putorius*

Polecats have the typical long Mustelid shape with a creamy under fur overlain by a rich dark brown guard fur. Ear margins are white and the white chin patch extends onto the muzzle and cheeks. The face has a distinctive dark mask around the eyes. There is a big variation between summer and winter coat colour with the lighter under coat more apparent in the winter, which may lead to mistaken identity with its domesticated form, the Ferret *Mustela furo* (Harris and Yalden, 2008).



Polecat by Thomas Bewick

Polecats show sexual dimorphism in size, males being much bigger than females. Body length varies between 450 mm for a large male to 318 mm for a small female, with an additional tail length of between 125 mm and 165 mm. Weight varies from 1930 g for a very large male to 500 g for a small female. In the wild Polecats probably live between four and five years (Harris and Yalden, 2008).

Opportunistic in their tastes, Polecats take a wide range of prey items, including small mammals, birds, amphibians and fish with Rabbit *Oryctolagus cuniculus* dominating in lowland England. They can be found over a wide range of habitats. Often associated with wetlands and riparian habitats they are also closely associated with rolling mixed countryside and lowland farmland. Areas with hedgerows, stone walls, farm buildings, good prey populations and plenty of cover are favoured. There is a strong relationship with farms and farm buildings in the winter months, for cover and available rodent prey, which may lead to secondary rodenticide poisoning, possibly inhibiting range expansion (Harris and Yalden, 2008).

Individual home range characteristics are variable according to season, habitat, prey availability, sex and social status. Breeding females settle into discrete home ranges; breeding males and juveniles are more mobile, with fluid home range boundaries with several den sites in each; Rabbit burrows are often used. Millais (1905) quotes Thomas Farrell, describing the dens of Polecats in northeast Northumberland as having two parts, one part lined for the rearing of young and the other a storehouse for food.

The Polecat is a seasonal breeder with one litter per year with between 5-10 kits born usually in May or June. Kits are born in secure dens with Rabbit warrens a favoured location. They are weaned at three weeks and independent between two and three months old (Harris and Yalden, 2008).

Mortality on the roads is often the first indication that Polecats have returned to an area. Their ferocity and smell protect adult Polecats from most predators although they are sometimes killed

by dogs and possibly foxes and large birds of prey. Most mortality in the UK is due to humans either through road kill or trapping (Harris and Yalden, 2008).

The Polecat is protected under the Wildlife and Countryside Act 1981 and in 2007 was added to the list of UK Biodiversity Action Plan mammals, protected as species of principal importance for the conservation of biological diversity in England under Section 74 of the Countryside and Rights of Way Act 2000.

The Polecat was formerly more widespread in the UK but now has a much restricted range following persecution in the 19th and early 20th centuries for game preservation. Its past distribution is evidenced by place names such as Foulmart (Polecat) Knowe (hill) and Foumart Law in Northumberland; the old English prefix "foul" referring to the unpleasant powerful scent it emits when frightened or angry. According to Harting (1886), during the Middle Ages Polecat skins were exported under the name of "sable" from Newcastle upon Tyne but there is debate over whether the text refers to importation rather than exportation.

It appears in early parish lists as vermin for which bounty was paid, for example in Durham in 1743, Witton Gilbert Parish paid out two shillings and four pence for three foulmarts, and in 1733 Stanhope Parish paid out for six foulmarts two shillings, two foulmarts eight pence, three foulmarts one shilling.

Mennell and Perkins (1864) state it was then still plentiful in both counties and quote Wallis: "it is found in Northumberland in stony hillocks, in thickets and furze, near villages and farm houses, and is usually called Fou'mart because of its intolerable scent". In Durham they state that "The Rev. G. C. Abbes tells us that a very fine Polecat visited his garden at Cleadon a few years ago, and was so bold and fearless that it came close to him when gardening, and suffered him to push it back with his rake when it interfered with his work" (possibly a Ferret?). Fawcett (1911) contains text by Thomas Gatiss including: "a Polecat was got in a quarry on Mountsett Fell by a quarryman in 1860 and another was shot on the Pontop Hall estates by Joseph Watson, woodman in 1872 or 1873." Both of these locations are near Dipton in north Durham. *The Victoria History of the County of Durham* (Page, 1905) suggests that the animal had only been exterminated from the county in the last 10 or 12 years, suggesting a late 19th-turn of the 20th-century local extinction. Yalden (1999) suggests that by 1915 the Polecat was probably extinct in the northeast of England.

However Bolam (1934) records some late North East Polecats, including a keeper's tale of Polecats being common enough in a place about 15 miles west of Bishop Auckland around 1901-02 for the keeper to have a large rug made from their skins (one wonders what it smelled like). He quotes Mr George Wright of Fourstones who claimed to have killed three in the autumn of 1917 whilst rabbit trapping at Broken Haugh, near Haydon Bridge. His latest records include one seen on the road at Brunton Bank near Stagshaw, Northumberland, in 1921 and a Polecat killed by a dog at Bishopley Junction in Weardale in December 1919 (Bolam, 1920). He believed this to be one of the last of the indigenous Polecats (due to the pungent smell and the animal's ferocity), but he does acknowledge the possibility of confusion with the domestic form of the Polecat, the Ferret, in these later records.

Commonly used for hunting rabbits, Ferrets can exist as feral populations and they can interbreed with Polecats producing a joining of the two forms of the same species, although selection in the wild strongly favours the Polecat phenotype. There are probably therefore many wild Polecats

carrying Ferret genes, but because of the close relationship between the two forms and the apparent dominance of the Polecat form, they are not a major threat to the Polecat's genetic integrity (Johnny Birks, pers. comm. to Terry Coult, 2012). Records of Polecat post-1900 must therefore be tempered with caution as by this time the indigenous Polecat, if still present, was most probably functionally extinct.

Re-introductions since 1970 have re-established the Polecat in parts of Scotland and England including Cumbria (Harris and Yalden, 2008). The Vincent Wildlife Trust (VWT) has monitored the spread of the Polecat and carried out genetic testing of Polecat corpses in an attempt to understand the spread of the Polecat and the role of the feral Ferret, in Polecat recovery. The Cumbrian population is the most probable source of the recovering Polecat population in the North East but is classed as having relatively low purity due to the abundance of Ferrety hybrids in the population (Birks, 2008). The Northumbria Mammal Group newsletter of Autumn/Winter, 1999-2000 (Gough and Hooton, 2000) records an early record from Lambley in Northumberland, found by Colin Simms in September 1997. A male Polecat killed near Staindrop in south Durham in 1998 (Birks and Kitchener, 1999) was found to be a first generation Polecat/Ferret hybrid and it is likely that many reported North East Polecats carry the Ferret gene.

Understanding of Polecat distribution is therefore clouded by the presence of dark feral Ferret populations and the unregistered reintroduction of Polecats to former parts of its range. Current understanding of distribution probably does not reflect the true distribution of Polecats; it is more likely an indication of limited recorder effort and the very recent interest in the recording of Polecats in the region.

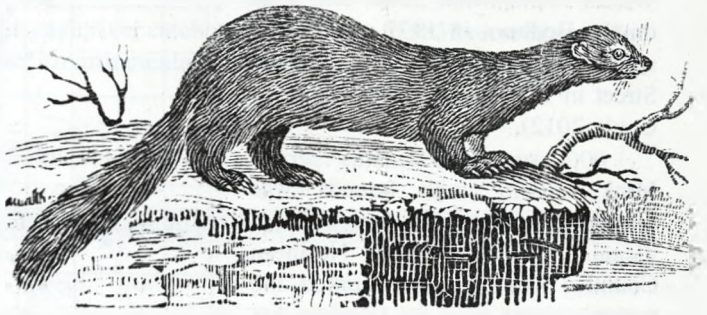
Today it appears the animal is making a welcome comeback. Kevin O'Hara recalls watching a large Polecat kill a Rabbit beneath Cauldron Snout in Teesdale in the early 1990s, and his recovery of a carcass from the road east of Haydon Bridge in 2004 was confirmed as a Polecat by VWT. Kits (young) have been recorded at Allenbanks in 2010 and at Bardon Mill, Fourstones and Corbridge in 2011.

Both Northumberland and Durham Wildlife Trusts continue to get a steady stream of reports and sightings from the region. Some of the more recent records have been photographs of an animal in a live Rabbit trap from Allendale in 2010, and in squirrel traps near Hexham and Haltwhistle in early 2012, and an animal on Waldridge Fell near Chester-le-Street in July 2012. A Ferret rescue centre at Prudhoe has also had several young suspected Polecat orphans which on maturing have been unmanageable and very, very smelly.

Terry Coult and Kevin O'Hara

AMERICAN MINK *Neovison vison*

The Mink is a medium sized, semi-aquatic carnivore native to North America. It belongs to the Mustelidae family. Mink are normally dark chocolate brown in colour usually with a white chin patch and white patches on the belly, chest and groin. Colours can vary due to breeding from mutated individuals on fur farms. In Northumbria Mink colours include chocolate brown and almost black but paler forms have also been observed by the author and also by Johnston (1974).



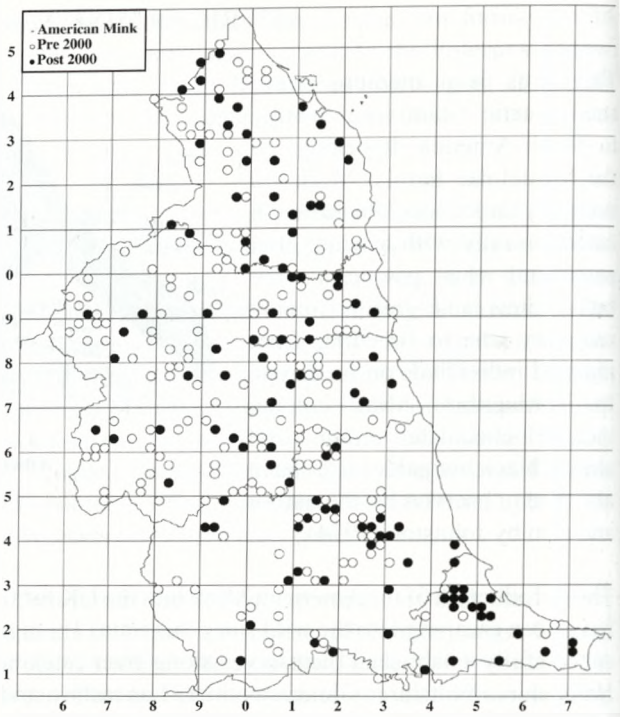
American Mink by Thomas Bewick

The introduction of the American Mink into the UK for fur farming began in 1929 and individuals have been escaping into the wild since this time (Thompson, 1968). By the 1970s, feral Mink had successfully established themselves along river catchments in virtually all counties particularly Hampshire, Wiltshire, Gloucestershire, Lancashire and Yorkshire (Dunstone, 1993) and have been breeding in the wild since this time. Under the Fur Farming (Prohibition) Act of 2000, England and Wales banned fur farming completely. All fur farms in England and Wales had to be closed by 1 January 2003. The last fur farm in Northumberland was Cornyhaugh Fur Farm in Ponteland which closed in 2003.

Mink appeared in Northumberland in the early 1960s when the first fur farm was established. Between 1962 and 1974 numbers of Northumberland fur farms fluctuated between two and six and Mink began to escape from this time. Johnston (1974) produced the only comprehensive, early account of wild Mink in Northumberland. The first Mink recorded in the wild escaped from a farm in Newbiggin in 1963. A few other Mink were recorded in 1965 from the same area and also from Ford and Alnwick. These escaped Mink were unlikely to have been breeding due to their scarcity and the widespread distribution of the fur farms. The first record of breeding in Northumberland was near Bedlington on the River Blyth in 1966: this Mink was located by otter-hounds. A trapping exercise was initiated by the Ministry for Agriculture Forestry and Food on the River Blyth and between 1966 and 1967, eleven Mink were caught. Mink were also recorded along the North Tyne although no fur farms were established in this area; the first record was at Nunwick Hall with Mink prints also recorded from Wark bridge to Corbridge. A trapping exercise during the same period caught 25 Mink. Mink were first sighted on the River Coquet at Warkworth in 1967; prints were observed at Guyzance bridge, Warkworth and Felton and four Mink were trapped on this river. Prints were found along the River Tweed in the Norham area and on the Till near the junction with the Tweed. Tracks were also found of a Mink along the River Aln near Alnwick in 1967 and on the River Wansbeck near Morpeth in 1968.

The history of Mink in Durham is not as well documented Some of the earliest records include a dead individual killed in a rabbit snare on the river Deerness in April 1977 very close to the fur farm in Langley Wood, Langley Moor, which operated for about five-six years and closed in the

late 1970s, a local farmer confirming that Mink had escaped from it. Bob Wilkin found Mink tracks and scats on the Bedburn in 1977 and a dead silver grey Mink near Chester-le-Street in 1983 (pers. comm. to Terry Coult, 2012).



Mink hunting with hounds was established after otter-hunting become illegal in 1975 and the Northern Counties Mink Hounds hunted the region's rivers until the Hunting Act of 2004 brought hunting with dogs to an end.

The density of Mink in an area can be related to the amounts of suitable habitats. In the UK, the Mink is normally associated with semi-aquatic habitats (Chanin, 1981; Birks, 1982; Dunstone and Birks, 1983), favouring eutrophic streams, rivers and lakes with abundant bankside cover (Birks, 1981). Mink dens are located near to the water's edge depending on the availability of suitable den sites (Halliwell and Macdonald, 1995). Dens occur within or beneath waterside trees, in rabbit burrows, amongst rocks or above ground in scrub and brush piles. Denser populations can also develop on undisturbed rocky coastal habitats, providing there is plenty of cover (Harris and Yalden 2008). Mink do venture into urban areas where there is suitable habitat and have been recorded in the ponds outside County Hall in Durham City (Terry Coult, pers. comm., 2012).

Mink have been successful at establishing breeding populations across the UK as they have been able to fill a vacant ecological niche. They are opportunistic hunters, taking a range of prey including both terrestrial and aquatic species. Concern has been raised about the effects of predation by Mink on native species such as Atlantic White-clawed Crayfish *Austropotamobius pallipes* (Armitage, 2001), waterfowl, nesting sea birds and Water Vole *Arvicola amphibius* (Ferreras and Macdonald, 1999; Craik 1995, 1997; Woodroffe *et al*, 1990; Barreto *et al*, 1998; Strachan *et al*, 1998). The Mink has been found to have a negative effect on the populations of some riparian species (Ferreras and Macdonald, 1999) and is thought to be a major contributory factor in the decline of the Water Vole in the UK (Woodroffe *et al*, 1990; Barreto *et al*, 1998) including in Northumbria. The intensification of agriculture and reduction in riparian habitat has enhanced the impact of Mink predation on Water Voles.

The Vincent Wildlife Trust undertook a comprehensive survey of Mink and Water Vole in Britain during the period 1996-1990 (Strachan and Jefferies, 1993), which showed that Northumbria supported medium to high densities of Mink (Strachan *et al*, 2003). The National Biodiversity Network (NBN) contains 208 Mink records between 1960 and 2011 for the region. Maps containing records for Mink can be downloaded for Berwickshire, Northumberland South,

Durham and northeast Yorkshire (including Teesside). Records of Mink are clustered along the Tweed and Till catchments, rivers North Tyne, Tyne and South Tyne, river Wear and river Tees.

The percentage numbers of records for each river catchment area using the 857 records provided during the period 1987-2000, by the Environmental Record Information Centre (ERIC) are shown in Table 1.

Table 1. The percentage numbers of Mink records from each river catchment area pre-2000

River Catchment Area	Percentage number of records
North Tyne	29.7
Coquet	15.4
South Tyne	15
Wansbeck	10.7
Blyth	8
Tweed	6
Aln	6
Wear	4
Lyne	2.5
Tees	1.8
Leven	0.9

The majority of records are from the North Tyne catchment area, followed by the rivers Coquet, South Tyne and Wansbeck catchments. The Leven and Tees catchment areas contained the fewest records. The percentage numbers of records for each river catchment area using 131 records provided by ERIC during the period 2000-2011 are shown in Table 2.

Table 2. The percentage numbers of Mink records from each river catchment area post-2000

River Catchment Area	Percentage number of records
Tees	28
Tweed	15.8
North Tyne	14.4
Wansbeck	12.2
Wear	6.5
Blyth	5.8
Leven	5.8
South Tyne	4.3
Coquet	2.9
Aln	2.9
Lyne	1.4

The river Tees catchment area held the greatest numbers of records of Mink followed by the Tweed, North Tyne and Wansbeck catchment areas. The Lyne catchment held the fewest records. The percentage numbers of records had increased post-2000 in the Tees, Tweed, Wansbeck, Wear, Blyth, Leven and Aln catchment areas, but had decreased in the North Tyne, South Tyne and Coquet catchment areas.

Differences may be due to changes in recording effort, the possibility that Mink may have been using a different area of their home range during surveys, a change in the distribution of Mink in the region or the numbers of Mink in the region declining. Proving that the numbers of Mink have actually changed in the region is difficult if not impossible. A survey commissioned by the Environment Agency in 2006 of Water Vole in the region also looked for Mink signs (E^3 Ecology and Durkin, 2006). Survey results suggested that the numbers of Mink signs from the 300 survey sites had reduced in 2006 compared to the numbers of signs found from the same sites during a national survey in 1989/1990 (Strachan and Jefferies, 1993); however statistical analysis of this data was not possible. The reduction of Mink signs could be as a result of increased Mink control or from an increase in Otter *Lutra lutra* presence in most of the catchments in the region. Mink are less adaptable to hunting in the water than Otters and so expend more energy in catching aquatic prey (Dunstone, 1993). Perhaps Otters are better at exploiting the aquatic environment compared to Mink and are possibly out-competing Mink in some areas? Perhaps Mink are exploiting terrestrial habitats more in areas where Otter presence has increased? Evidence to support these hypotheses would require further investigations.

Vicky Armitage

UNGULATES (HOOFED MAMMALS)

Ungulates are divided between two orders: the *Perissodactyla* (odd-toed ungulates), represented in Britain solely by the domestic or semi-feral horse, and the *Artiodactyla* (even-toed ungulates), of which there are extinct and extant northeast England representatives wild, feral and domestic.

Red Deer *Cervus elaphus*, Roe Deer *Capreolus capreolus*, Elk *Alces alces*, Aurochs *Bos primigenius* and Wild Boar *Sus scrofa* are all represented as indigenous ungulates in the post glacial, Mesolithic fauna of northeast England. In Britain, Elk probably became extinct during the Mesolithic era possibly persisting into the Bronze Age; Aurochsen (wild cattle) are present in the Bronze Age and may have lingered to the Roman period (Harris and Yalden, 2008). The extinction of the Wild Boar is clouded by attempted re-introductions but it seems likely that extinction in the wild occurred around the end of the 13th century (Yalden, 1999). Extinction in all cases was probably exacerbated by deforestation and hunting by humans. Red and Roe Deer survived the deforestation, the Red as an emparked or feral animal; the Roe is now common in the wild, including in some urban locations.

The Neolithic period, around 5000 BP, saw the arrival of farming and agriculture spreading from the Middle East through Europe and bringing with it domestic ungulates, initially cattle (descendants of the Near Eastern form of the aurochs, *Bos taurus taurus*), sheep, goats and pigs, with farmed livestock supplanting wild ungulates as a primary human food source. This period saw the beginning of the long transition of Britain's landscape from woodland to farmland, grassland, heather moorland and blanket bog (Yalden, 1999). Wild ungulates however were, and still are, exploited for food and recreational hunting. The Bronze Age residents of the Heatheryburn Cave, near Stanhope, utilised both wild and domestic ungulates for food and raw materials (Greenwell, 1894). In the 12th century the bishops of Durham organised great deer hunts (Stephens, 1907), and in the first half of the 19th century stag hounds were kennelled at Chillingham Castle and Raby Castle, for the ritual hunting of deer as sport (Whitehead, 1980). Deer are still stalked and shot across the region for sport and food.

Reindeer *Rangifer tarandus* probably became extinct in Britain early in the Mesolithic period due to climate change and woodland expansion (Harris and Yalden, 2008). It is not represented in the North East other than as a somewhat eccentric attempt at re-introduction. In 1786, for a bet, Sir Henry St George Liddell, of Ravensworth Castle, set off on a tour of Lapland, and when he returned he brought with him two Lap maidens, "for the amusement of his friends", along with a small herd of Reindeer. The Lap maidens were given gifts and eventually repatriated, and the Reindeer bred in the castle grounds but died out some years later (Clark, 1981).

Wild Boar persist in local memory with two separate legends of knights who gained fame and fortune by killing ferocious boars. Sir Roger de Fery killed the boar (brawn) of Brawns Peth (path), fancifully the origin of the name Brancpeth (Ferryhill Local History Society website, 2012), and Richard Pollard killed the Pollard Brawn at Bishop Auckland (Mysterious Britain website, 2012). Although only stories they serve to illustrate how the boar was once a wild beast to be reckoned with in a pastoral society.

In the 1980s and 1990s free-range farming of Wild Boar became fashionable in the UK and they duly escaped from captivity, establishing themselves as feral populations in the south of England. Locally they are reported to have been living in Chopwell Wood in Gateshead (Goulding, 2003)

and there are several local newspaper stories about escaped boar in the region. As yet there is no indication that they have become established locally. Currently one farm, in east Durham, contains American Bison *Bison bison*, which would make interesting escapees.

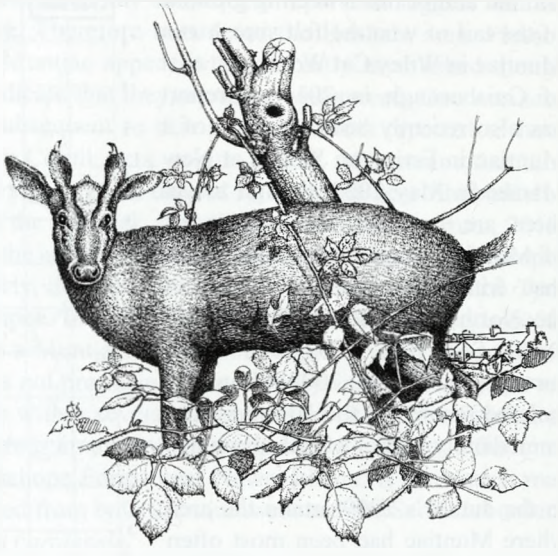
Further introductions of domestic and wild ungulates have taken place. Fallow Deer *Dama dama* were introduced to England by the Normans for hunting and as semi-domestic ornamental parkland animals. Feral Goats *Capra hircus* can still be found in the Cheviot Hills and the 20th century saw the introduction to England of the tiny Muntjac Deer *Muntiacus reevesi*, which is now spreading in our region.

Ungulates remain an essential resource for human exploitation; needs and fashions and how humans react to and exploit ungulates both wild and domestic is likely to contribute much to the shaping of the future landscapes of our region and of Britain.

Terry Coult

MUNTJAC *Muntiacus reevesi*

The Muntjac is the smallest species of deer in Britain, standing 45-50cm at the shoulder. They are also distinctive for their black facial markings and the prominent frontal glands under the eyes. The buck's antlers are only single, hooked tines on the end of a prominent pedicle. To the observer the feature most likely to be noted is their relatively long tail which is held erect when the animal is alarmed.



Muntjac by Terry Coult

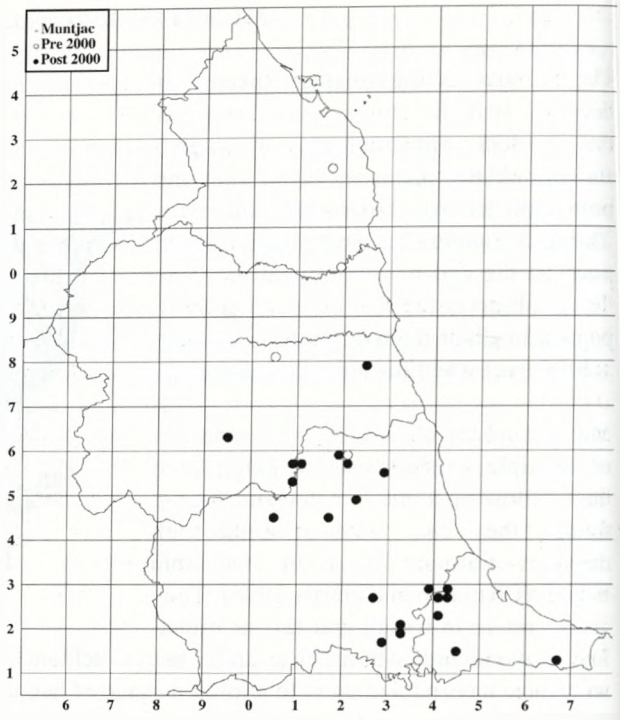
Muntjac are largely solitary with sightings of multiple animals usually being of a buck following a doe or a doe and young, though they can occur at quite high densities of around 30 per km^2 in suitable habitat (Chapman and Harris 1996). They are secretive in nature and favour broad-leaved woodland with a dense under storey, seldom venturing far from cover. However their small size has enabled them to exploit a range of habitats in parts of Britain, including suburbs. Muntjac are native to southern China and were first released into the wild in Britain in the woods surrounding Woburn Park, Bedfordshire in 1901 (Chapman in Harris and Yalden, 2008).

It would appear that Muntjac have only become established in the North East relatively recently. Lever (1977) shows Muntjac distribution as being southeast of a line that ran roughly from Bristol to just north of the Wash. A later review by Chapman *et al.* (1994) found that Durham, Cleveland and Tyne and Wear were three of only five counties in England without any Muntjac records. However the same study found records for seven 10 km squares in northeast Northumberland, mainly along the coastal strip between Druridge Bay and Bamburgh, plus an isolated record west of Morpeth. The study considered that all records north of the Humber must be the result of animals that had escaped locally rather than a spreading population from the south. There was also a confirmed record of a Muntjac that had been found beside the A1, 12 miles north of Alnwick, which was examined by Jack Charlton of the North East branch of the British Deer Society.

In 2009 the author summarised the situation with regards to Muntjac distribution in the North East as it appeared at that time (Bond, 2009). Subsequent records have confirmed that position, with some minor expansions on those areas listed in the article; however some additional areas of distribution have also come to light.

From a first sighting of the species at the then Teesside Airport in 1999 by a member of the British Deer Society, Muntjac have now been reported along the River Tees corridor between Sockburn and Yarm and down to Kirklevington. They have been established for some time along the eastern rural fringe of Darlington (Ian Smales, pers. comm., 2009) and the author has twice found their tracks there in the past year, at Barmpton and at Catkill Woods. They have been present to the south of Middlesbrough in the Nunthorpe/Guisborough area since at least 2008

(Kenny Crooks, pers. comm., 2009) and the author had a fleeting glimpse of the tail of what he felt sure was a Muntjac in Wiley Cat Wood, just east of Guisborough in 2011. A report has also recently been received of a Muntjac in Errington Woods at New Marske in May 2008, though as yet there are no corroborating reports of Muntjac from any of the woods that fringe the northern edge of the North York Moors. The British Deer Society's 2002-2007 deer survey (Ward *et al*, 2008) shows an isolated record for the 10 km square immediately east of Middlesbrough.



In the author's 2009 article the area where Muntjac had been most often reported was between the north of Stockton and Trimdon, in particular woods around the route of the Castle Eden Walkway, with two reports of road casualties in the same area in one month in 2008. This continues to be the case as they are now regularly reported in that area with the author finding a Muntjac track in Newton Hanzard plantation in August 2012.

A new area of distribution that has subsequently come to light is around Kirk Merrington and Spennymoor, where Steve Cooper has had several sightings since 2009. This is only around 15 km west of the established population along the Castle Eden Walkway and it will be interesting to see if subsequent reports show them to be in the intervening areas of Sedgefield and Chilton, although given the respective intervening habitats it is more likely that they would have spread from the Tow Law area. This is a similar distance to the northwest where there have been occasional Muntjac sightings for several years, possibly as the result of an introduction of six animals that occurred around the end of the 20th century at Love's Wood near Lanchester.

Further north, Muntjac are now well established throughout the Derwent Valley from Gibside to Shotley Bridge, based on reports from several correspondents. It is not known at what point they became established. A male Muntjac was seen by Steve Westerberg in Chopwell Woods in 1996 though Ian Smales, who was very familiar with deer populations in Gibside, notes that there was no sign of Muntjac there at that time. In Tynedale they have been reported from Wylam in the east as far as Hexham, where three have now been shot (Ian Smales, pers. comm., 2012). The sighting of a Muntjac on the A1(M) road verge near the Washington Service Station in 2007 remains the most easterly report in the north of County Durham that the author has received, though there is an unconfirmed report of one being shot on the Lambton estate. Given the spread of the above reports, it seems likely that Muntjac are now established throughout the area bordered by the A1(M) in the east, the A68 in the west, the A69 in the north and the A688 in the south.

Curiously, despite the cluster of reports in adjacent 10 km squares in northeast Northumberland referred to above, there do not appear to have been any subsequent reports to suggest that the species may have become established there. Therefore outside of the Hexham area, Plessey Woods is still the only other place where Muntjac appear to be currently established though there are some other sightings that might indicate that they are more widespread. One was seen at Wallington around the year 2000 and subsequent to that a Muntjac was reported to have been killed in the area by a gamekeeper (Jim Cokill, pers. comm., 2011). Also around that time there was an unconfirmed report of regular sightings on the old railway line near Shilbottle by a resident, and unconfirmed reports around the Alnwick area (John Steele, pers. comm., 2012) though as there are no subsequent reports to the author's knowledge these may have been escaped populations that have not persisted. Similarly, the report next to the northern end of the Tyne Tunnel can surely only be a release or escapee. Interestingly, the British Deer Society's 2002-2007 deer survey (Ward *et al*, 2008) shows a Muntjac record from approximately the southern end of the Tyne Tunnel, though again this is not promising deer territory and there are not even any Roe Deer *Capreolus capreolus* records within several kilometres of either site. Finally, as this is being written in September 2012, there is an unconfirmed sighting of a Muntjac from just south of the Scottish/English border at Kershope Forest near Newcastleton. If accurate it may mean that Northumberland is being colonised from both the southwest and the Scottish borders, as was the case with Grey Squirrels *Sciurus carolensis*.

The inconspicuous nature of Muntjac means that it is difficult to know what the true situation with their distribution is. As has been noted above, Muntjac do occasionally crop up in some odd places though that may just be a reflection of how much they are moved around and released. However Norma Chapman, who is a national expert on the species, points out that their inconspicuousness can lead to them being established in an area before people are aware of their presence (Chapman, 1991). Currently, it would appear that there are still large areas of the North East where they are absent and as of August 2012 there were still no records from any of the Forestry Commission's land holdings in the North East (Tom Dearnley, pers. comm., 2012). The British Deer Society repeated their 2002-2007 deer survey in 2011 and while no information is available at the time of going to press, it will be interesting to see if their survey fills in any of the current gaps.

As can be seen from the distribution map, Muntjac are widely, though patchily distributed across the North East at least as far as south Northumberland. The distribution of the records, particularly if confined to the more certain records, would fit with the hypothesis that the species distribution is based on expansion around a few centres of introduction, rather than a natural spread from the south as there appear to be no recent records from the southern limit of its distribution that were any nearer than Ripon or Ryedale (Ward, 2005; Oxford *et al*, 2007). However it would be hasty to conclude that they are not more widely distributed, particularly in the former counties of Durham and Cleveland. What can be assumed with a lot more confidence is that the species will continue its spread across the North East, either independently or aided by further introductions, and it would probably not be too rash to suggest that its presence will be fairly commonplace, at least as far north as the Tyne, within a decade or so.

Ian Bond

RED DEER *Cervus elaphus*

An indigenous species and the largest wild British land mammal, the Red Deer has a uniform dark red to brown summer coat and a dark brown winter coat, with a creamy white rump. The male (stag) carries wide spreading antlers during the autumn and winter which are cast in the summer, increasing in size with every year's re-growth; females (hinds) do not have antlers.

For most of the year hinds and stags live in sexually segregated groups. Late summer and early autumn is the rut, when stags will round up and defend a harem of hinds for breeding. By early winter the rut is over and calves are born in late May to June the following year.

Food consists of grasses and young shoots of trees and shrubs, and occasionally wild Red Deer cause damage to crops.

Red Deer by Terry Coult

Natural predators for adult Red Deer are long extinct. In the wild young calves may be taken by Foxes *Vulpes vulpes*, and in Scotland Golden Eagle *Aguila chrysaetos* and Wild Cat *Felis silvestris*.

There are currently no indigenous wild populations of Red Deer in Durham or Northumberland; however parkland herds or feral deer exist in both counties. Major wild populations occur in Scotland and southwest England with smaller populations scattered throughout England and Wales.

One particularly adventurous 1883 escapee from the Chillingham herd made it to Holy Island where it was captured by a fisherman who: "saw him and went in chase in a boat and got him by the tail and let the stag pull the boat to land and then lassoed and tethered [him] at Old Law" (Bolam, 1934).

The Forestry Commission occasionally records escapees of Red and Fallow *Dama dama* Deer within their Northumberland and Durham plantations and once in the mid 1990s a Sika Deer *Cervus nippon* in the Kielder Forest, presumably from the Jedburgh deer farm (Philip Spottiswood, pers. comm., 2012).

Prehistoric Red Deer remains have been found in the Whitburn Cave (Howse, 1880) and Moking Hurth Cave in Teesdale where they occur as a prey item amongst the bones of contemporary Wolf *Canis lupus* and Brown Bear *Ursus arctos* (Simms, 1974). The size of Red Deer has declined

since the prehistoric period probably due to anthropogenic influences including deforestation. Evidence comes from antlers and skeletal remains found in peat bogs, the most famous of which are the antlers found in Creswell Bog around 1883. Pringle Hughes (1898) who found the head reported its find amongst other antlers and the bones of Red Deer "one foot taller than the Red Deer now extant". Another such large head was found at Bolton Bog, near Broom Park, Alnwick (Whitehead, 1964).

Red Deer have long been an important human resource as food, raw materials (hide, antler, bone) and for recreational hunting. As a result their remains occur in archaeological records from the Mesolithic era onwards, for example a Neolithic antler pick from Durham City and a late Neolithic or early Bronze Age perforated antler mace from Newsham near Blyth (Huntley and Stallibrass, 1995).

Greenwell (1894) describes a Bronze Age dwelling in Heathery Burn Cave, Stanhope where Red Deer remains are present as a food item and as domestic items made from bone and antler. In the medieval period bones of both Red and the newly introduced Fallow Deer are found together for the first time in the North East and Huntley and Stallibrass (1995) consider them to be indicators of high status, well fed, secular and ecclesiastical settlements.

Leland records Red and Roe Deer *Capreolus capreolus* in the Cheviots in 1535-1543 (Toulmin, 1907) and Wallis (1769) states that there were forests at Cheviot, Rothbury, Reedsdale [sic], Eresden [sic], Lowes, Allendale and Knarsdale which formerly had Red Deer. Wallis (1769) saw Red Deer in Knarsdale himself, probably in the latter half of the 18th century, and Mennell and Perkins (1864) speculate that they may have persisted to the beginning of the 19th century. The exact date of extinction of wild Red Deer in Northumberland is not known.

The Boldon Book mentions the Prince Bishops of Durham hunting deer with great pomp and ceremony in the Forest of Weardale but by 1476 these hunts had ceased (Stephens, 1907); however some hunting continued into the 19th century with the Chillingham Staghounds kennelled at Chillingham Castle in the late 1830s and the Cleveland Staghounds at Raby Castle in 1844 (Whitehead, 1980). In Durham, the 1538 Return records 140 head of Red Deer in the Teesdale Forest, and Whitehead (1964) considers that at that time all the Durham dales were "tolerably well stocked with Red Deer". In 1673 the Teesdale herd was reduced to 40-50 animals due to a great snow and probably became extinct not long after this date (Whitehead, 1964).

By this time however some deer had been emparked including the herd in Raby Castle Park near Staindrop, which has an unbroken lineage since Norman times, with occasional infusions of new blood (Raby Castle Website, 2012).

The deforestation of Weardale was complete by about 1511, but by this time Red Deer were already emparked in the Bishop of Durham's two hunting parks at Stanhope and Wolsingham. Stanhope Park is reported to have contained about 200 Red Deer in 1575 but only 40 remained in 1595, and by 1647 neither Red nor Fallow Deer remained in Weardale (Stephens, 1907).

In Northumberland, Hulne Park near Alnwick was stocked with Red, Fallow and Sika deer in 1824, including a white strain of Red Deer from Germany. All of the Hulne Park deer were disposed of during the First World War and the Red Deer herd in Chillingham Park was disposed of around 1900 (Whitehead, 1964). Whitehead concludes that at the time of his writing in 1962

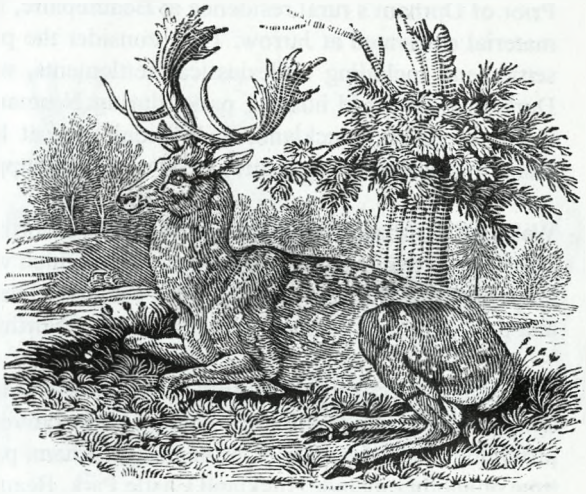
there were no Red Deer either wild or emparked in Northumberland. Chillingham Park is still without Red Deer (Sir Humphrey Wakefield, pers. comm., 2012) but Red Deer have been returned to Hulne Park and Lunn (2004) records them as present. Red Deer numbers in Hulne Park have been much reduced very recently and some deer have escaped, so that currently there is a very small population based on the park. Lunn (2004) also records another captive herd in Kielder Forest west of Wark. In Durham there was formerly a herd of Red Deer at Barningham Park near Barnard Castle which was reduced to just five stags and two hinds by 1892 (Whitehead, 1980) and which subsequently disappeared. There was a park herd of Red Deer at Whitworth Hall near Spennymoor from about 1981 to 2011 but they have recently been disposed of. The Raby herd thus remains the only park herd still extant in Durham.

There is currently a fashion for small-farm deer herds as farm diversification projects, novelty farms and for the venison market, and these can be found scattered across both Northumberland and Durham. Escapees from such small ventures and the still existing parks are likely to be the source of the occasionally reported, wandering Red Deer such as the stag and five hinds which occupied central Weardale throughout the summer of 2011, and the Rising Sun Country Park stag in North Tyneside in 2010-11. Escaped animals are subject to unregulated shooting and poaching with dogs and it is unlikely that they could establish viable feral populations.

Terry Coult

FALLOW DEER *Dama dama*

Fallow are the only British deer where the male (buck) has palmate (hand-like) antlers, which are cast and renewed annually each summer. Fallow Deer are intermediate in size between Red Deer *Cervus elaphus* and Roe Deer *Capreolus capreolus*, with males standing around 93 cm at the withers. Typical summer pelage is a pale rusty, fawn background (fallow) with white spots on the back and flanks; the winter coat is dull brown with the spots either indistinct or missing. The rump is white edged with black, and the tail is white with a black dorsal stripe. As a decorative, semi-domestic park animal, artificial selection of colour has taken place and white and black deer are found in some herds (Harris and Yalden, 2008).



Fallow Deer by Thomas Bewick

Fallow are a herding species living for the most part in sexually segregated groups for most of the year, coming together in the autumn for a few weeks to mate during the rut. After the rut mixed groups disperse with females (does) forming hierarchical groups led by a dominant doe and males establishing bachelor groups or remaining solitary. Most commonly, single fawns are born in June or July of the following year. Fallow are non-territorial and home ranges overlap extensively. Preferentially a grazer, Fallow Deer also browse various broad-leaved trees and shrubs and will take tree fruits such as acorns, beech mast and chestnuts in the autumn (Harris and Yalden, 2008). Natural predators for Fallow Deer are long extinct at the hand of man but young fawns may be taken by Foxes *Vulpes vulpes*.

Fallow Deer existed in Britain in previous interglacials but did not return naturally to the British Isles after the last glaciation, they were deliberately introduced by the Normans. Rackham (1986) speculates that the early 12th century would have been an appropriate time for an introduction into England of deer from the Normans of Sicily who had inherited Classical and Islamic traditions of keeping exotic park animals. He also states that by the 13th century the fashion for Fallow Deer had spread to Scotland, Ireland and Wales.

Early introductions were into "forests" which were large areas of land often wooded or, in Durham, moorland, which were set aside as hunting preserves, originally for royalty and latterly for the nobility, including in Durham the Prince Bishops, the latter's hunting park in Weardale being second only in size to the New Forest. The 1538-39 Return of royal game north of the Trent recorded 210 head of Fallow Deer in Teesdale forest (Whitehead, 1964). In 1647 it is recorded that Weardale forest had neither Red nor Fallow Deer, implying that Fallow had previously been present (Stephens, 1907), and Whitehead (1964) concludes that by the end of the 16th century Fallow Deer were extinct in the wild in Durham. By this time however deer from Marwood and Langley Chases in Teesdale had been emparked, including the ancestors of those still in the Raby Castle herd at Staindrop (Whitehead, 1964).

Huntley and Stallibrass (1995) record the presence of Fallow Deer bones in the excavation of a 15th century drain in the castle at Barnard Castle, in 13th/14th century material excavated at the Prior of Durham's rural residence at Beaurepaire, Bearpark near Durham City, and in medieval material excavated at Jarrow. They consider the presence of Fallow bones to indicate that the settlement, including ecclesiastical settlements, was of a high social status. The Bishops of Durham established hunting parks during Norman times at their country retreat of Auckland Castle in Bishop Auckland, in Weardale and at Bishop Middleham, along with the Prior of Durham's park at Beaurepaire; these would all supply meat for the ecclesiastical table.

Wallis (1769) states that there were forests in Northumberland at Cheviot, Rothbury, Reedsdale, Eresdon, Lowes, Allendale and Knarsdale, which were all formerly well stocked with deer, and that in the time of Henry VIII "There were 6000 head of deer, red, roe and fallow, in the forests and parks of the right honourable the Earl of Northumberland".

Over time, with changing fortunes and fashions, the larger hunting "forests" and parks disappeared and Fallow Deer became the archetypal decorative deer of the country house estate whilst still providing a useful supply of protein. In Durham, parks known to have held Fallow Deer at one time or another include Auckland Castle Park, Beaurepaire, Raby Castle at Staindrop, Streatham Castle Park near Barnard Castle, Wynyard Hall Park near Stockton on Tees, Ravensworth and Axwell Parks near Gateshead, Beamish Park near Stanley and Brancepeth and Whitworth Parks near Spennymoor (Whitehead, 1964). Of these only Raby and Whitworth still have Fallow Deer.

Apperley (1924) records hunting the Wynyard Hall deer in 1883 and 1885, with beagles, harriers and foxhounds, or by driving them to guns with deer-hounds. This herd was disposed of by the end of the 19th century (Whitehead, 1964).

In Northumberland herds of Fallow Deer were kept in the ancient parks of Warkworth Castle and Acklington prior to the Restoration. Near Alnwick are Hulne Park and Cawledge/Callie Park, both of which in the 16th century were stocked with Fallow. In 1512 the former was said to contain 879 deer and the latter 586. Both parks were destroyed after the Restoration of Charles II and the deer were confiscated to the Royal Parks (Whitehead, 1964). In 1824 Hulne Park was restocked with Fallow and Red Deer; Lunn (2004) noted that they were still present and the park still holds good numbers of Fallow today. Eslington Park near Whittingham west of Alnwick had Fallow Deer until about 1900 and Carham Park near Coldstream once had a Fallow herd (Whitehead, 1964). There is a still extant herd of Fallow Deer in and around Billsmoor Park in the Simonside Hills, the park being created in the early 19th century by Mr Orde of Nunnykirk (Hodgson, 1832), reputedly on the winnings from the famous racehorse Beeswing which he owned. Chillingham Park near Wooler still has Fallow Deer and Sir Humphry Wakefield (pers. comm., 2012) reports that: "there must be 100-200 Fallow in the woods around, and they come and go in the Wild Cattle park".

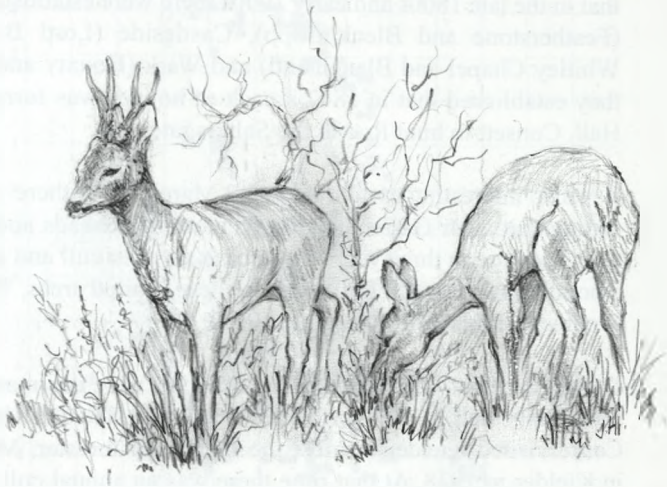
All of the parks record Fallow escaping at various times, sometimes travelling long distances and turning up in unexpected places; the deer at Chillingham are free to come and go as they please into and out of the park. Vagrant animals are subject to unregulated hunting and shooting and it would therefore be difficult for viable feral populations to become permanently established.

Terry Coult

ROE DEER *Capreolus capreolus*

While there are currently six species of deer living wild in the UK, the Roe Deer and Red Deer *Cervus elaphus* are the only genuine native deer species.

It is known that the Roe Deer has been with us since time immemorial. Richard Prior in his book *The Roe Deer - Conservation of a Native Species* (1995) stated that Roe Deer first appeared in the middle Pleistocene and that Roe remains dating back some 400,000 years BP were discovered in Norfolk. This however appeared to be an isolated finding and evidence of continuous occupation can only be traced back from the post-glacial epoch some 9,500 years BP.



Roe Deer by Joan Holding

In Norman times Roe were protected under the Forest Law of William I (1087), whereby those guilty of taking a stag, Roe buck or a boar were liable to judicial blinding. However by 1338 the Court of Kings Bench had ruled that Roe were not a "Beast of the Forest" (reserved for royalty and the nobility to hunt) but rather a "Beast of the Warren" (having the same status as rabbits). From that time on Roe were fair game for a population to whom meat was a treat, and a treat in short supply (Prior, 1995).

Roe were caught by a variety of means. In addition to traps (tread traps which will hold an animal by the foot) they were driven into funnels made of hedge, stone or netting to be killed by arrows or dogs (Prior, 1995).

It has generally been accepted that by 1800 Roe were extinct in England and Wales and survived only in Scotland: the websites of both the Forestry Commission (2012) and the British Deer Society (2012) shows that they hold such a view. There is however evidence that such an assumption, in relation to the northeast of England, could be wrong.

Peter Carne (2000) in his book *Deer of Britain and Ireland - Their Origins and Distribution* sets out a range of evidence which suggest that Roe survived continuously in the northeast of England. Cowen *et al*, (1965) refer to the poem *The Battle of Otterbourne* which records Roe Deer in Northumberland in 1388 (Scottish dialect version). Cowen *et al.* (1965) references a footnote to the above poem in Percy (1765) which records Roe Deer in the Hexham area in the reign of George I (1714-1727). Millais (1906) in the *Mammals of Great Britain and Ireland* refers to the fact that a few Roe remain at Naworth and Netherby in Cumberland and Northumberland (Millais, 1906 in Carne, 2000).

In 1963, G. A. Cowan (the Master of the Braes of Derwent Foxhounds and a renowned local naturalist) together with Henry Tegner (a nationally known writer on wildlife, especially Roe)

and Viscount Ridley of Blagdon (an estate with a well-established Roe population) carried out a census of Roe in the North East (Cowen *et al*, 1965). In doing so they were able to establish that in the late 1800s and early 1900s there were established Roe populations around Haltwhistle (Featherstone and Blenkinsopp), Castleside (Lord Bute's Plantation), Slaley (Dukesfield, Whitley Chapel and Blanchland) and Wark (Houxty and Park End). Perhaps most importantly they established that in 1847 a pack of hounds was formed by a Mr Richardson of Woodlands Hall, Consett to hunt Roe in the Saltersgate area.

It is also interesting to note that on 2 March, 1948 there was an article in the *Evening Chronicle* stating that a Mr Garrie stalking Dilston, Allenheads and Minsteracres (near Slaley) had killed over 550 Roe in three years. Assuming an even cull and a stable population, this would indicate a population of over 1,000, even in these limited areas. There is some doubt however about the accuracy of this article (Tegner, 1955).

During the First World War timber supplies were decimated and subsequently vast areas of new forest appeared in the North East, including Kielder, Harwood and Kershope. In 1970, Peter Carne visited Kielder to meet the then head forester, McCavish. McCavish had started work in Kielder in 1938. At that time there was an annual cull in the forest of some 400 deer and an estimated population of 1200. Yet by 1970, six full-time rangers in Kielder were culling some 1200 Roe a year (Carne, 2000). This would indicate a resident population of some 6,000/7,000 animals, and indications are that this figure continues to rise.

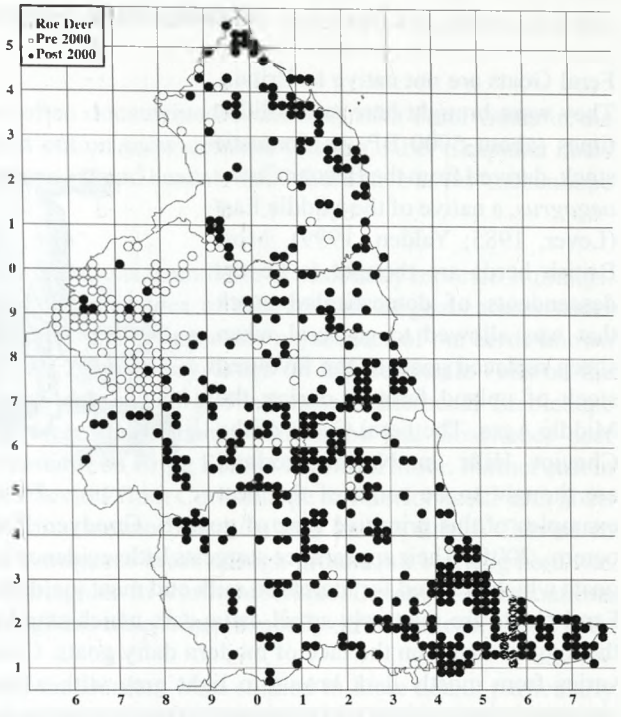
In 2007, the *Great British Deer Survey* published by the British Deer Society (2012) shows the presence of Roe in virtually every 10 km square in the North East, including all of Northumberland, Durham and even the large conurbations of Newcastle, Gateshead and Middlesbrough.

Recently, Dr Karis Baker (2011) of the Department of Biological and Biomedical Sciences at Durham University carried out a study of the genetic history of the British Roe Deer population. As part of that research, Dr Baker was supplied with Roe tissues from the Kielder, Hexham and Consett areas. She concluded that the deer present were very probably part of the native stock and were not descendants of introduced stock. As part of her study Dr Baker took DNA and other samples from Roe bones found in a number of locations including The Chesters on Hadrians Wall and near Stanhope. It now appears to be established that Roe from more southern areas of the UK are a mix of deer translocated from Scotland and Europe (especially Germany).

Roe Deer, being solitary animals of woodland, are notoriously difficult to count (unlike the larger herding species such as Fallow and Red). While distribution surveys can be treated as accurate, population figures are only estimates. Latest estimates indicate that the overall deer population of England, Scotland and Wales could exceed 1.5 million. It is thought that approximately one third of these, some 500,000, are Roe. How many of these are in the North East? The answer is unknown. However what is known is that the population explosion of the 1960s and 1970s has expanded south through Durham, Yorkshire and into the Midlands. In the North East the Roe is ubiquitous.

In this expansion the Roe has been helped by its adaptability. Although by preference an animal of the forest and the woodland edge, they can and do survive in almost all landscapes: the forest, the open hills of the Cheviots, the sand dunes of the coast, and the suburban gardens of Darras Hall and Stocksfield. Given that they have colonised every 10 km block of the North East, an increase in numbers will surely now only be limited by the availability of habitat and disturbance.

While they are generally tolerant of non-threatening interference in their lives (the farmer and the shepherd going about their daily business), they are greatly affected by the significant disturbance arising from vastly increased recreational use of the countryside. The disturbance provided by dog walkers, joggers, cyclists and others, especially in the hours of dawn and dusk, is pushing more and more of our Roe population into clusters in thick cover. Given that both bucks and does are territorial this may well serve to limit population increase.



Roe are helped in their successful survival and expansion by embryonic diapause (delayed implantation). After mating by the buck in late July or early August and subsequent fertilisation of the egg, the embryo floats free in the uterus and does not become attached to the maternal caruncular ridges until December/January. Only then does the embryo genuinely begin to develop. Parturition takes place in May. The large majority of does have two *corpora lutea* which is a rough indication of the number of fertilised eggs: in other words Roe are generally capable of consistently producing twins. Weather conditions, the pressure of predators (Foxes *Vulpes vulpes*, Badgers *Meles meles* and even large birds of prey) together with food supply will dictate the survival rate. In softer areas of the south survival may well average close to two, while in the harsher areas of northern Scotland it may fall to 0.75 (Prior, 1995). The author's personal view is that here in the North East we fall in the middle ground between these two figures.

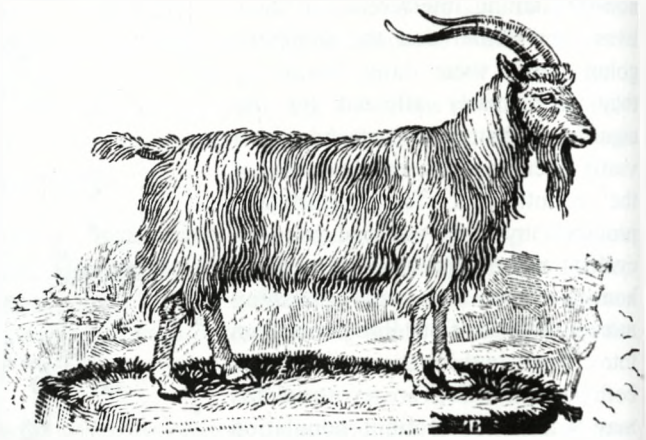
It is probable that the explosion of Roe numbers in the North East is largely based on three factors:

i. The vast increase in suitable woodland.
ii. The changes in farming policy leading to a year-round supply of food.
iii. The lack of large predators, although to a large extent man has taken up this role. Roe stalking has a large number of dedicated amateur stalkers (in addition to a handful of professionals) whose job is to keep the population in balance.

Estimating the number of Roe Deer in the North East can only be a guess. If there are 500,000 nationally, do we have 5%, 25,000? Given that the population of the Kielder area could amount to approximately a half or more of this figure (based on known cull figures), it might well be that this is a reasonably accurate guess.

Ian Smales

FERAL GOAT *Capra hircus*



Feral Goat by Thomas Bewick

Feral Goats are not native to Britain. They were brought here in Neolithic times (about 5000 BP) as domestic stock, derived from the Bezoar *Capra aegagrus*, a native of the Middle East (Lever, 1985; Yalden, 1999). Most British herds are thought to be the descendents of domesticated stock that was allowed to go feral when sheep replaced goats as the favoured stock of upland farmers during the Middle Ages. The Feral Goats of the Cheviot Hills in Northumberland are thought to be some of the best examples of this primitive type of goat (S. Goodyer, British Feral Goat Research Group, pers. comm., 2005). Their appearance suggests little evidence of cross breeding with modern domestic goats which are bred for increased milk and meat yields and finer quality coats. Primitive British Feral Goats are relatively small, have ears which stand upright, horns in both sexes, and lack the toggles found on the face of modern dairy goats. Coats are long, coarse and shaggy. Colour varies from mostly dark brown to light grey with white patches. Each animal has different, characteristic markings on its body and face that make it relatively easy to identify individuals. Annual growth rings on the horns can be used to age the goat.

Feral Goats are well established in a number of locations in Britain and Ireland. "Wild" populations are found mainly in hilly areas: the Burren in the west of Ireland, Snowdonia in Wales, Lynton in Devon, some of the Scottish Western Isles including Jura, Mull and Rum, the north of mainland Scotland, the Southern Uplands and Dumfries and Galloway, and the herds that straddle the Scottish/English Border including Northumberland. In addition to the "wild" populations there are several small actively-managed herds which have been established relatively recently for conservation grazing purposes such as at Cheddar Gorge and Windsor Great Park. The Forestry Commission established a Wild Goat Park at Craigdews in Dumfries and Galloway as a visitor attraction. There are thought to be between 5,000 and 10,000 Feral Goats spread amongst 45 populations in the UK (Smith, 2005). This number will continue to change through time as populations are managed with some conserved, others removed and new ones created.

The long association of parts of Northumberland with goats is evident from place names such as Goatstones in the North Tyne and Ad Gefrin (now Yeavering Bell) which means "place of the hill of the goats". It is unlikely that we will ever know the origins of most of the herds that have existed in the region but there are some interesting theories. For example, it has been suggested that the north Cheviot goats are the descendants of goats liberated by the monks of Lindisfarne in the 16th century when the monastery was dissolved. An alternative theory is that the goats' ancestors were animals left to go feral when the Victorian cult of drinking whey from goat's-milk in nearby Wooler went out of fashion. The restorative drinking of goat's-milk was also suggested as the reason why many goats were found in Upper Coquetdale, particularly around Rothbury in the 19th century (Mennell and Perkins, 1864). Possibly one of the main reasons why goats were allowed to continue to roam in the hills long after they were kept to provide milk, meat or skins, was because hill shepherds thought favourably of them. It was believed that amongst their

attributes goats could calm sheep, lead sheep safely to shelter, and could kill adders (Tegner, 1961; McDougall, 1975).

Over the last 100 years naturalists have often documented encounters with Feral Goats in the region. For example, in May 1915, whilst out on snow-covered Cheviot, Abel Chapman notes the presence of "nine wild goats - two carrying broad heads – 1000 feet above us on Auchenhope Cairn" (Chapman, 1924).

It is difficult to know the extent of local populations from these occasionally reported sightings. Fortunately some authors have attempted to get an idea of the presence of goats across wider areas during the same time period. Whitehead (1972) provides a gazetteer of the herds known to him, including several in Northumbria: Christainbury Crags on the Bewcastle Fells on the Cumbrian border; on the Northumberland side, goats at Plashetts, Kielderhead, Emblehope and Catcleugh; Callerhues at Blakelaw near Bellingham; Whickhope and Goatstones near Simonburn in the North Tyne Valley; Hareshaw, on Brigg Fell, to Nunwick Moor. Further east in Northumberland herds were noted in the Cheviots from Cottonshope to Cheviot itself, with goats being present on the southern (Harthope Linn) and northern (College Valley) side of Cheviot. In addition to the herds on these relatively contiguous areas of high ground, an outlying herd was reported at Thrunton Woods south of Whittingham in Northumberland. Lever (1979) reconfirms the presence of goats in these areas, although his table is based mostly on Whitehead's 1972 data.

During the 1970s and 1980s the goats of the Borders were studied in more detail, particularly the Kielderhead herd and College Valley population in the Cheviots (McDougall, 1975; Bullock, 1982; Smith and Bullock, 1993; Gough, unpublished data, 1998). The numbers recorded during the aforementioned studies are given in Table 1:

Table 1. Numbers of Feral Goat in the North East

Population	Year	Total	Source of data
College Valley	1972	26+	McDougall, 1975
	1977-1980	13-14	Bullock, 1982
	1992	34	Smith and Bullock, 1993
Kielderhead	1972	68	McDougall, 1975
	1977-1980	54	Bullock, 1982
	1992	65+ (c.100?)	Smith and Bullock, 1993
	1998	86+ (c.120?)	Gough, unpublished data

A single billy was present on Simonside, near Rothbury, for a few years from around 2006, but has since disappeared. It is not known where he came from or how he got there. It is possible that he could have wandered from the herds in the Cheviots in Upper Coquetdale, or he may have been deliberately released on to Simonside. He became popular with walkers and regularly helped them eat their sandwiches! (A. Dewhirst, pers. comm., 2012)

It appears that the distribution of herds in Northumbria has changed markedly in the last 100 years with fewer, less widespread herds present today. Afforestation after Word War II appears to have played a major role in this with goats being culled to enable the establishment of commercial softwood plantations. Graham (1993) laments the culling of goats on Christainbury Crags for forest expansion during the 1960s. Whitehead (1972) noted that several herds, including those at Kielder and Thrunton, had already been severely reduced in size for this reason.

Today most of the herds mentioned by Whitehead (1972) are no longer present. In 2004 Lunn noted just three populations of goats in Northumberland. These three populations still exist in the Cheviot Hills on land close to the Scottish Border:

i. The Upper Coquetdale herd centred on The Border land next to the Pennine Way from Wedder Hill to Beef Stand and Mozie Law and the western flanks of Windy Gyle within Northumberland National Park. Occasionally goats are seen as far south as Fulhope Edge (Gough, unpublished data).

ii. The north Cheviot population centred around Yeavering Bell and Newton Tors above College Valley in Northumberland National Park. Goats are not usually seen on the Cheviot Massif itself, except at times of high numbers in neighbouring populations. Billies have been seen occasionally on this ground, probably attempting to disperse between populations (Gough, unpublished data, 1998).

iii. Kielderhead National Nature Reserve (NNR) and Whitelee NNR goats are located between Deadwater and Whitelee (Tom Dearnley, pers. comm., 2012), being mainly centred on the ground between Graymare's Knowe, Limestone Knowe, Carter Pike, Girdle Fell and Oh Me Edge (Gough, unpublished data, 1998). This is an area where McDougall (1975) also recorded goats.

These remote areas are upland sheep farms designated for landscape and wildlife conservation. Most of the ground is farmed predominantly for hill sheep. There is relatively little conflict between this extensive livestock production and the goats as there is ample hill grazing for both. However, damage to walls, inbye grazing and crops can be an issue, particularly in the north Cheviots around Yeavering Bell and West Kirknewton. In recent years some gardens in West Kirknewton have suffered damage from goats coming in during spring. Conflict also arises on land where woodland establishment is the aim. Many of the organisations and landowners involved in managing land in the Cheviots with goats, including the Forestry Commission, Ministry of Defence, Northumberland National Park Authority, Northumberland Wildlife Trust and private land owners, including College Valley Estates, have put substantial resources into monitoring the populations of goats on their land in order to inform management decisions. Table 2 gives the approximate numbers in autumn 2010.

Table 2. Estimated Feral Goat populations in autumn 2010

Population in Oct. 2010	Total Goats	Source of Data
Kielderhead and Whitelee	45	Forestry Commission census by Rangers and volunteers walking transects
Upper Coquetdale	170	Author's discussions with shepherds
North Cheviots (Inc. College Valley Newton Tors and Yeavering)	139	North Cheviot Goat Management Group census by two Newcastle University students photographing all goats

Different techniques were used to collect the data in Table 2, so they are not comparable, nor are they completely accurate. The Kielderhead and Whitelee data are likely to be an underestimate (T. Dearnley, pers. comm., 2012). The north Cheviot data for Yeavering and the Newton Tors area is thought to be accurate given the 22 days of survey effort. The Upper Coquetdale figures may be an over-estimate as some double counting may have occurred where the same group of goats grazes on more than one farm. Given the large area and rugged terrain that the goats inhabit population counts are not easy. Counting from a low flying helicopter can be effective (A. Miller, pers. comm., 2006), but cost is usually prohibitive. So it is not possible to give an exact number,

but it would appear that the overall number of Feral Goats in the Cheviot Hills (on the English side of the Border) is between 300 and 500 individuals.

The Forestry Commission (FC) and Northumberland Wildlife Trust (NWT) wish to keep goats as a feature of the Kielderhead and Whitelee Moor NNRs, but at sufficiently low numbers to minimise damage to young trees on both the English and Scottish side of the Border (T. Dearnley and S. Lowe, pers. comm., 2012). In the late 1990s a deer fence was erected along the Border at Kielderhead to keep the goats on the English side of the Border. Scottish forestry operations were becoming less tolerant of goat damage and the resulting culls were threatening the long term persistence of the population. FC was advised by David Bullock to keep the population above 75 individuals. Subsequent Population Viability Analysis by the author using the model Vortex (Gough, unpublished data, 1998) suggested the population would need to be at least 120 individuals to ensure long term survival. The FC on the English side of the Border would like to see the population greater than 100 (T. Dearnley, pers. comm., 2012), but numbers are also influenced by FC policy north of the Border, and at present FC in Scotland are still regularly culling goats.

In Upper Coquetdale there is little conflict between the goats and livestock farming or the military training that takes place there. However, as more new native woodland is planted in the area to enhance the habitat for species such as Black Grouse *Tetrao tetrix* there is the potential need to manage the goats more proactively. Consequently Northumberland National Park Authority (NNPA) and the Ministry of Defence are hoping to organise a census and develop a management plan for the goats in Upper Coquetdale. Since 2005, monitoring and management has been undertaken for the north Cheviot population (Yeavering, Newton Tors, College Valley) through a partnership involving local landowners and farmers, NNPA, the British Feral Goat Research Group, and more recently Newcastle University. This North Cheviot Goat Management Group aims to maintain a viable population of goats in the area which is managed to minimise negative impacts on newly-planted woodlands, inbye fields and walls. The Goat Management Plan (Smith, 2005), commissioned by NNPA, provides the basis for management. The objective is to keep the goat population at between 130 and 170 individuals. When the population exceeds the upper limit, as it did when the plan was drawn up, the goats are rounded up and the appropriate number of each sex and age class are re-homed by the British Feral Goat Research Group.

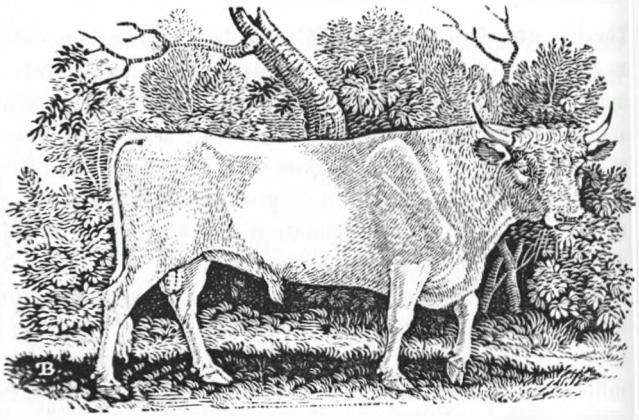
Goats from this population have gone to assist with conservation grazing projects in Dumfries, Durham, Cheddar Gorge, Lynton in Devon, Portland, Windsor Great Park and Wiltshire. Some have also gone to goat breeders who specialise in the primitive British feral goat and will not cross-breed them with more modern breeds of goat (S. Goodyer, pers. comm., 2012). Only very occasionally has it been necessary to cull "problem goats" such as those that have been found regularly grazing the new woodland plantings or inbye fields. NNPA has given funding to landowners for additional fences to protect woodlands, drystone walls and inbye fields. This has helped to reduce the need to remove goats.

Newcastle University is currently undertaking GPS tracking of a small number of goats in the north Cheviot population (Yeavering, Newton Tors, College Valley) and data is in the process of being analysed (R. Bevan, pers. comm., 2012). It is hoped that advances in remote tracking technology and possible future analysis of population genetics will increase our knowledge of the ecology of Feral Goats in the region.

Mary Gough

CHILLINGHAM CATTLE *Bos taurus*

The Chillingham herd has inhabited Chillingham Park at least since 1646 and possibly much earlier. They were made famous by Thomas Bewick and Sir Edwin Landseer in the 18th and 19th centuries. Bewick's woodcut of the Chillingham Bull (shown here) was described by Simon Schama as "an image of massive power ... perhaps the greatest ... icon of British natural history, and one loaded with moral, national and historical sentiment as well as purely zoological fascination" (Schama, 2002, p. 126).



Chillingham Cattle by Thomas Bewick

The appeal of the Chillingham herd has been mainly due to their wild state but they have also attracted a great deal of speculation regarding their origin. Another mystery has been how they could have survived prolonged inbreeding. Modern DNA techniques can probably give some answers for both these questions, and it is already clear (Visscher *et al*, 2001) that genetically they are exceptionally uniform and lacking in genetic variation. Apparently, harmful recessive genes have been purged from the population, a process known to be theoretically possible, but not previously demonstrated in a wild mammal. The genetic uniformity is from long exposure to inbreeding and to genetic bottlenecks such as that of early 1947 when severe winter weather reduced the herd from around 40 to 13 (eight cows and five bulls).

Originally the property of the Earls of Tankerville and their forebears, since 1973 they have belonged to the Chillingham Wild Cattle Association. The owners have always been very aware of the special attention that this unique herd requires and today the herd is, numerically at least, in a stronger position than for many years. In addition there is a reserve herd, established in the early 1970s in northeast Scotland, which numbers between 24-36 animals. Cell cultures and sperm (obtained from casualty animals) are stored in liquid nitrogen to provide a backup "frozen herd".

From the low point in 1947, the herd increased fairly steadily to about 45 in the early 1970s. A period of instability, with herd numbers varying between 48 and 68, appeared to end in about 1985 with herd numbers then being fairly constant, though with a gentle decline, to 39 in 2001. Since then, and apparently in response to the removal of a flock of 300 sheep, numbers have risen to the current total of about 100. However there are probably only 20 or 30 proven breeding females in the herd and it is clearly important, though very challenging, to find out more about the processes underlying changes in numbers in the herd.

With a height at the shoulders of about 110 cm these are small animals. Their general body conformation is that of late medieval cattle prior to the era of agricultural improvement, being relatively long in the leg and short in the body; this proportionality, coupled with their impressive horns (carried by both sexes) makes them appear larger than they actually are. Their white coloration and red ears make them very distinctive.

In the early 20th century animals from Chillingham contributed to other parkland herds of horned white cattle (Whitehead, 1953) and these were ultimately combined to form the White Park breed which is a much larger animal with, essentially, the body conformation of a 19th-century beef breed. None of these other parkland herds have the same history of unbroken residence in an ancestral range.

No bulls are castrated. Cows calve all year round, though a tendency to conception earlier in the spring, as a response to climate warming, has become evident (Burthe *et al*, 2011). Bulls compete for matings during all seasons and display, dominance and fighting behaviours are very prominent in the life of the herd. Traditionally a "king bull" system was said to operate and while this may well have been the case at some times, it is not always evident, and bulls appear to exhibit a degree of home-range behaviour, while cows and young animals roam the 134 ha Park as a single herd, or as smaller sub-herds.

Between 1977 and 1982 the average age of cows at calving (generation interval) was 7.2 years. The mean time between calvings was about 450 days, the 280 days gestation period implying that on average cows conceived nearly six months after calving. The removal of the sheep flock would be expected to promote herd growth as a result of reduced nutritional competition. Equal numbers of male and female calves are born but survival rates of males are lower at all ages, so herd sex ratios have usually been female-biased. This has changed recently with the current sex ratio of the herd being approximately 50:50. Also indicative of improved nutrition is better body condition of individual animals. Prior to the removal of the sheep the usual weight for a mature animal in winter (recorded at autopsy as thin, but not emaciated) was 300 kg for bulls and 280 kg for cows, but a bull culled for welfare reasons in 2012 (battle damage) was found to weigh 400 kg.

Maximum ages attained by bulls and cows are probably 9 and 12 years respectively though the lack of ear tagging means this cannot be verified. Calving problems, at approximately one in 70 pregnancies, were much rarer than in commercial cattle perhaps partly because age at first calving was usually three or four years (Hall and Hall, 1988). Age at first calving is probably declining now (a heifer, euthanized for welfare reasons in January 2012, was showing an ovarian follicle at 10 months of age) and this could result in an increase in difficult births.

Mortality of young calves, particularly during the first 30 days, can be quite high in a bad winter and sometimes abandoned calves have been removed and taken to the reserve herd, but these efforts are often unsuccessful. Normally the cow calves away from the herd and she visits the calf periodically to suckle it. After some days the calf will follow its mother back to the herd and other cows are usually very interested in the new arrival. The traditional story of the new calf being inspected and either accepted or rejected presumably arises from this behaviour though outright "rejection" by other cattle has seldom, if ever, been reliably recorded.

Hay is taken to the herd in the winter, the date that feeding starts depends on the evident appetite of the animals. Now that sheep are no longer kept in the Park forage is relatively abundant until winter is fairly well advanced. Apart from hay feeding little intervention is practised though individuals are sometimes euthanized on welfare grounds (Hall *et al*, 2005). Autopsies are performed if there is any doubt about cause of death but the cattle are apparently free of the notifiable infectious diseases. Given their genetic uniformity, which would tend to make them relatively susceptible to disease, this freedom is probably due largely to their isolation and the biosecurity measures in force.

The herd gives the opportunity of observing the behaviour of cattle relatively free of human interference and it is one of the very few such herds anywhere in the world and the only one to have been studied in detail. In the past observers have been able to identify animals individually (they are not ear-tagged) and it is clear that the detailed behaviour patterns of bulls and cows differ markedly. For example periods of grazing and ruminating tend to be shorter for bulls than for cows during daytime but not at night. These sex differences are apparently because bulls have to be permanently on the lookout for rival bulls or for cows coming into season (Hall, 1989).

Chillingham cattle are far more vocal than husbanded cattle and bulls have distinctive calls (a repeated, high pitched hoot, not reported in cattle elsewhere) and lowing sounds, while cows perform the familiar "moo" call (Hall *et al*, 1988). Both sexes spend a lot of time scratching against objects and this behaviour, when performed by bulls, may have a social display function. Bulls also paw the ground and rub face and neck in the earth. These behaviours can be seen throughout the year, the intensity being greatest when a cow is in season. Some behaviour, notably the cow-cow mounting so frequently observed in oestrous dairy cows, are of vanishingly rare occurrence at Chillingham.

Mechanisms underlying change in numbers are not easy to elucidate because the small herd size means random factors can be important. Also, hay feeding shelters the herd from many of the effects of a harsh winter. Some mortality and fertility factors may respond to the size of the herd (in the period 1953-1985 mortality rates of adults increased as herd size increased: Hall and Hall, 1988), while there may also be an effect of winter weather, in that the North Atlantic Oscillation index appears to influence overall herd growth rate (calm, dry and cold winters may be favourable, while windy, wet and warm winters may be detrimental: Hall, in preparation). However, with reliable herd records dating back to 1945, it should be possible to find which factors have been most important, though as is normal with wild populations, prediction of numbers will probably not be reliable.

Removal of the sheep has enabled conservation of the Park as a complete environment to be managed more than was previously possible. The Park, the surrounding woodlands, and the cattle are now all the property of the Chillingham Wild Cattle Association, after a period of separate ownerships. With generous support from individuals, trusts and support received from the DEFRA Higher Level Stewardship Scheme, the biodiversity and cultural value of the Park is being protected and enhanced as the only parkland environment in Britain inhabited by an eponymous breed, and with both trees and pastures in relatively good condition. More information and news about the herd and park can be obtained from the Chillingham Wild Cattle Association.

Stephen Hall

BATS

There are eight species of bats known to be present and breeding in the region, Whiskered Bat *Myotis mystacinus*, Brandt's Bat *M. brandtii*, Daubenton's Bat *M. daubentonii*, Natterer's Bat *M. natttereri*, Noctule *Nyctalus noctula*, Common Pipistrelle *Pipistrellus pipistrellus*, Soprano Pipistrelle *P. pymaeus* and Brown Long-eared Bat *Plecotus auritus*. Nathusius' Pipistrelle *P. nathusi* are also now known to be present in south east Northumberland in all months from March to October although breeding has yet to be proven. There are a few but increasing numbers of records for Leisler's Bat *Nyctalus leisleri* (although the status of this bat in the North East is not yet understood) and occasional records of other species of bats, both historical and recent.

The Durham and Northumberland Bat Groups were established in the 1980s and were among the first bat groups in the country. They continue to be very active with thriving memberships. A Cleveland Bat Group existed up to the mid-1990s. Following its demise, bat work in the former Cleveland area was gradually taken up by both Durham and North Yorkshire bat groups but as this is not either group's core area it has meant that the south Cleveland area in particular has been relatively little surveyed for bats.

Both the remaining bat groups have been involved in long term studies of bats in the region. Durham Bat Group has been studying the bats at the field centre in Middleton-in-Teesdale since 1984 when a total count of 320 bats of all species was recorded. This building is known to support roosting Whiskered Bats, Brandt's Bats, Common Pipistrelle, Soprano Pipistrelle and Brown Long-eared Bats. Counts of emerging bats have been undertaken in most years and the numbers of each species have fluctuated, with 127 Common Pipistrelle and 42 Whiskered/ Brandt's Bats counted in 2010.

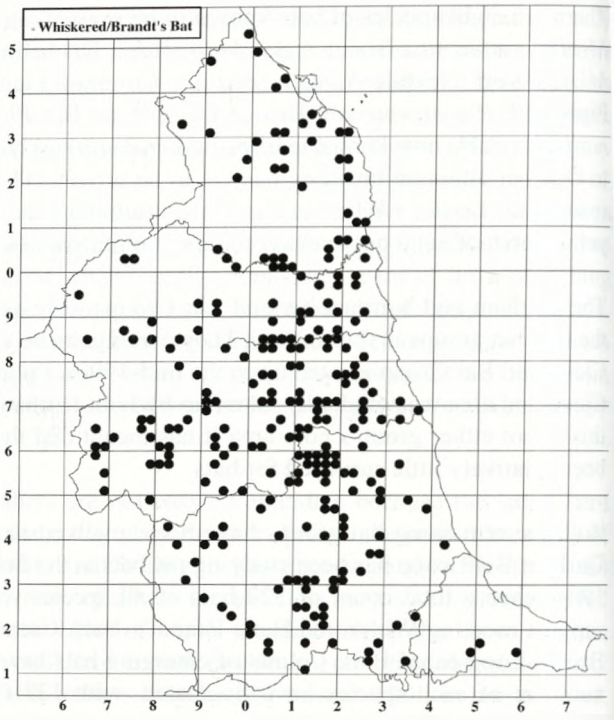
Another long term study has been carried out since 1985 by John Steele of the Northumberland Bat Group, at Brinkburn Priory. A count of 419 bats in June 1986 of what were then thought to be Daubenton's Bats, made it one of the biggest roosts of that species in England at the time. However numbers have declined to an average of approximately 160 animals, a mixture of Daubenton's Bats and Natterer's Bat which have now been established as breeding at Brinkburn. Common Pipistrelle, Brown Long-eared bats, Whiskered/Brandt's Bats and Noctule have all been recorded roosting within the priory.

The maps which accompany the bat accounts are more a reflection of survey effort than a true reflection of the species distribution. All bat species are European protected species and commercially driven surveys to comply with legislation are now recording bats across the region and when the data is passed on, are adding to our current knowledge of bat distribution. Bats are a difficult group to identify with certainty in flight; current bat detectors and sound analysis software are helpful in this but some species still cannot be reliably identified in this way. With changing technology and increased survey effort, our knowledge of bat distribution is also constantly changing.

The records shown on our maps do not differentiate between a known bat roost, a foraging or flight record or a record of a downed bat which has come into care. With this coarse level of detail this publication is not intended to be used for commercial bat consultations, and it is recommended that the county bat groups are consulted for up to date records.

Tina Wiffen

WHISKERED BAT *Myotis mystacinus*



The Whiskered Bat is one of the small *Myotis* species of bats, three of which occur in Britain and two are known in the region. Brandt's Bat *Myotis brandtii* is very similar to Whiskered Bat: indeed Brandt's Bat and Whiskered Bat were only separated in 1970 and so any historical data referring to Whiskered Bats could be either Whiskered Bat or Brandt's Bat. Whiskered Bats and Brandt's Bats, while very similar morphologically, have been shown by genetic studies to be more closely related to other *Myotis* species than to each other (Agirre-Mendi *et al*, 2004; Niermann *et al*, 2007). Alcathoe Bat *Myotis alcathoe*, the third small *Myotis* bat, was identified in 2001 in Greece and was confirmed as breeding in Britain in 2010. Alcathoe Bat has been recorded in the North York Moors but not yet in the North East. This is a cryptic bat species and with increased survey effort it is possible that it will be found to be present in our region as suitable habitat is likely to be available.

Whiskered Bats are small *Myotis* bats, distinguished from Daubenton's Bats *Myotis daubentonii* and Natterer's Bats *Myotis nattereri* by their smaller size, small feet, shaggy dorsal fur and a short calcar which is half the length of the tail membrane. Whiskered Bats have a long pointed tragus with a straight or concave outer margin. The face, ears and membranes of Whiskered Bats are dark brown or black, usually darker than Brandt's Bat, and the fur is dark or reddish brown, sometimes with golden tips. Differences in the teeth are widely used to separate Whiskered Bat and Brandt's Bat: in Whiskered Bat the cusp on the interior angle of the fourth premolar is lacking or smaller than the third premolar, whereas in Brandt's Bat the cusp is obvious and often reaches the same height as the third premolar. This can be seen with the bat in the hand but is hard to determine and dentition can even differ between either side of the bat's jaw (Harris and Yalden, 2008). Penis shape is also helpful in separating male Whiskered Bats and Brandt's Bats: Whiskered Bats typically have a thin, straight penis whereas Brandt's Bats have a club-shaped penis. However this method of identification is uncertain, as a recent study showed that whilst all Whiskered Bats had a thin, straight penis so did 30% of Brandt's Bats; only 70% had a club-shaped penis (Harris and Yalden, 2008).

Whiskered Bats use buildings for summer roosts, using small crevices such as behind cladding and they are known to hibernate within caves and disused mines. Tree roosts are rarely used. The adult males seem to be solitary and the females form maternity colonies to give birth and to raise their young. Maternity colonies usually comprise 20-60 females, rarely up to several

hundred (Dietz *et al*, 2009). Roost sites can change frequently (every 10-14 days) and in roosts that are occupied for longer there is a high turnover of individuals (Dietz *et al*, 2009). Whiskered Bats emerge within half an hour of sunset and are known to hunt along regular flight paths when foraging. Whiskered Bats forage in edge or cluttered habitats favouring open areas with patches of woodland or hedges and damp areas; they also use woodland for foraging and will hunt along streams and over water bodies. They have a level flight, often not far above ground level and they are also seen to forage in the tree canopy layer. The echolocation calls of Whiskered Bats and Brandt's Bats cannot be reliably separated.

The maximum known age for a Whiskered Bat is 23 years (Harris and Yalden, 2008) with an average life span of three and a half to five years (Dietz *et al,* 2009).

Bolam (1926) notes that the only published record for County Durham for a Whiskered Bat is mentioned by Mennell and Perkins (1864), simply recorded as "Shotley Bridge (?Darlington) W. Backhouse". Bolam notes that the identification of this specimen was not quite accepted at the time, "a scepticism which subsequent knowledge has proved to be quite unfounded, the Whiskered Bat having now been found to be one of the commonest species in County Durham". Bolam found the first specimen of Whiskered Bat for Northumberland lying dead on the grass at Houxty, near Bellingham, on 24 May 1915. He went on to say that this bat was then proven to be numerous in that area as well as Redesmouth, Sidwood, Beaufront and Stocksfield (Bolam, 1926). Current knowledge of Whiskered/Brandt's Bat suggest that this bat is neither currently widespread nor numerous in the region.

As detailed above, Whiskered Bat and Brandt's Bat are very difficult to separate reliably and the similarities between the two species mean that the existing records need to be treated with care; in the absence of further information the records should all be considered as Whiskered/Brandt's Bats rather than identified to species level. As a consequence, all specific records referred to in this account are supported by identification criteria.

Whiskered/Brandt's Bats have a central to western distribution within County Durham and a small number of hibernacula are known to the west of the county. Whiskered/Brandt's Bats are fairly uncommon in Cleveland with few known roosts and are so far unrecorded in the borough of Hartlepool (Ian Bond pers. comm., 2012). Whiskered/Brandt's Bats are known from two sites in Middlesbrough.

In Northumberland there are records of Whiskered/Brandt's Bats spread throughout the county with more records from the southeast section of Northumberland, along the east coast and in the Tyne valley, although it is likely that this reflects survey effort rather than bat distribution. The largest known Whiskered/Brandt's Bat roost in Northumberland is of 275 bats in Haydon Bridge.

Recent advances in DNA identification techniques have allowed bat droppings to be tested to determine the species of bat present. There have been limited local studies done using this technique, the largest of which was an MSc project undertaken by Helen Jameson in 2010 when droppings were collected from suspected Whiskered/Brandt's Bat roosts (Jameson, 2010). Bat droppings were collected from 18 sites and 15 samples were DNA tested. Of these, 13 samples produced definitive results: nine samples were Brandt's Bat, one was Whiskered Bat, one was Natterer's Bat and two were Daubenton's Bat. These findings did not reflect the previous understanding of the relative abundance of these small *Myotis* bats in the survey area. "The most

commonly encountered species was *M. brandtii* which DNA analysis confirmed was present at nine (69%) of the sampled roost sites, despite having only been confirmed previously at three (23%). From DNA analysis alone, *M. mystacinus* was confirmed as present at only a single site (8%), whereas it had previously been confirmed at seven (54%)" (Jameson, 2010). Selected bat roosts in County Durham that were believed to have been Whiskered Bat roosts were found to have Brandt's Bat present at the time of this DNA analysis study. This suggests that Brandt's Bat may be more widespread than previously thought and Whiskered Bat less widespread, although further investigation is required to confirm this. Of the roosts identified in Jameson's study the Whiskered Bat roost was in Escomb, Durham and five Brandt's Bat roosts were in Durham and four in Northumberland.

In Northumberland, one site in Hexhamshire is a confirmed Whiskered Bat maternity roost; a female bat which came into captivity was identified by the author on teeth and a DNA test confirmed the species. A single Whiskered Bat, confirmed by DNA, has been found roosting in Cockfield, County Durham.

Whiskered Bats were caught and tracked as part of a National Trust project at Gibside in 2009-10. The bats were identified in the hand using morphological characteristics. This study confirmed male Whiskered Bats roosting singly or in pairs and also found a maternity roost of around 20 individuals. Five individual Whiskered Bats were radio tracked and a total of eight different Whiskered Bat roosts were found. Of the 70 bats caught during the two year project 16 were identified as Whiskered Bats, suggesting the Derwent Valley holds a good population of these bats. Subsequent catching at this site by the author has confirmed the presence of Brandt's Bat, based on dentition and a bulbous penis shape.

Tina Wiffen

BRANDT'S BAT *Myotis brandtii*

Brandt's Bat is one of the small *Myotis* species of bats. They are very similar to Whiskered Bats *Myotis mystacinus* and this is discussed in detail in the account for Whiskered Bat.

Brandt's Bats have lighter brown fur than Whiskered Bats and older Brandt's Bats can have gold tips to their fur. The face, ears and membranes of Brandt's Bats are brownish and the lower part of the tragus and the ear, including inside the auricle near the base, is paler. Brandt's Bats have a convex outer edge to their long pointed tragus. The maximum known age for a Brandt's Bat is 41 years (Harris and Yalden, 2008); this is the oldest recorded age for a bat, discovered from ringing studies in Central Siberia.

Brandt's Bats roost in trees and buildings but have also been found using bridges and bat boxes; if the roosts are in buildings they are usually close to woodland edges, although two of the three known Brandt's Bat roosts in the Tees Valley are in suburban houses in Darlington and Guisborough. Like Whiskered Bats, adult males seem to be solitary and the females form maternity colonies to give birth and to raise their young. Maternity colonies usually comprise 20-60 females and usually less than 100 animals. Brandt's Bats hibernate in disused mines and caves and a study has shown that male Brandt's Bats hibernate for longer than male Whiskered Bats, until May and March respectively (Harris and Yalden, 2008). Brandt's Bats also choose drier hibernation sites than Whiskered Bats.

Brandt's Bats tend to have a lower wing loading than Whiskered Bats which may allow them to be more manoeuvrable in flight within a cluttered environment (Harris and Yalden, 2008). Brandt's Bats are more strongly linked to forests than Whiskered Bats and forage within woodland, on moorland and in damp areas including damp woodland (Dietz *et al*, 2009).

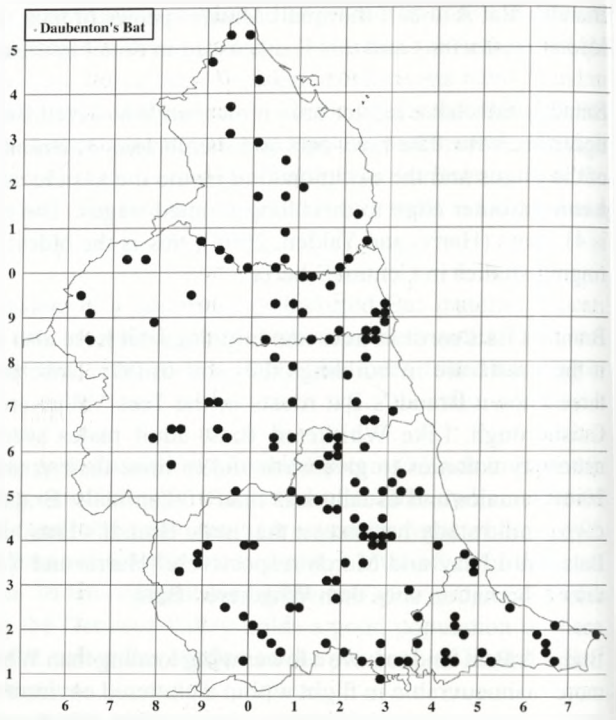
A recent MSc project has suggested Brandt's Bat to be more widespread in Durham than previously realised (Jameson, 2010). The known Brandt's Bat roosts have a westerly distribution within the county and the largest count of a known Brandt's Bat roost was of 300 individuals near Lanchester in 2011.

Durham Bat Group has been monitoring the field centre in Middleton-in-Teesdale in June since 1984 and this site has held varying numbers of Whiskered/Brandt's Bats. Jameson (2010) confirmed Brandt's as present by DNA anlaysis of droppings, though an earlier series of DNA samples taken from the Field Centre by Lene Berge had found both Whiskered and Brandt's to be present (Noel Jackson, pers. comm., 2012). The highest count was 271 bats in 2005 with the lowest counts of 42 in 2009 and 2010.

In Northumberland, four Brandt's Bat roosts were confirmed by the same MSc project. These roosts are in central and northern Northumberland, with two along the river Wansbeck corridor (Jameson, 2010). In 2011 Brandt's Bats were caught by the author in Gosforth Park, on the northern outskirts of Newcastle, foraging within woodland but in a suburban setting. These bats were identified by dentition and by penis shape: the male bats caught all had a bulbous penis which currently identifies them as Brandt's Bats.

Tina Wiffen

DAUBENTON'S BAT *Myotis daubentonii*



Daubenton's Bat was first described in 1817 by the German naturalist Heinrich Kuhl (1797-1821). The name commemorates the French naturalist Louis-Jean-Marie Daubenton (1716-1799). Daubenton's Bat is one of the medium sized *Myotis* species found in the UK. It has a body mass of 7-15 grams, a wingspan of 240-275 mm and a forearm length of 33-42 mm. The dorsal fur is a uniform red brown, with pale ventral fur. The face is pink with bare skin present around the eyes. Daubenton's Bats echolocate at between 32 and 88 kHz, with a peak frequency of around 45 to 55 kHz. On a bat detector calls are heard as a rapid series of regular clicks, with many texts likening this to a machine-gun-like burst.

Daubenton's Bats feed almost exclusively over water and their diet consists mostly of *chironomid* midges with other insects such as caddisflies and mayflies also taken. Rivers and still waters are both utilised and studies on foraging behaviour on an upland river in northern England have revealed a preference for foraging on stretches of river where the water surface is smooth and both banks are lined with trees (Warren *et al.*, 2000). Flight is fast and direct with the bats foraging within the first one metre of airspace above the surface of the water. Insect prey is taken out of the air, or from the surface of the water. The latter method involves the use of their large hind feet and the tail membrane. The prey is then quickly transferred to the mouth. Daubenton's Bats usually feed within three km of their roost sites but have been recorded following canals for up to 15 km (Altringham, 2003).

Daubenton's Bat roosts are normally found close to water and summer roosts are found in tree holes, bridges, tunnels, caves, mines and cellars. Buildings are also used. Hibernation roosts are often underground in caves, mines and cellars. This species will aggregate with others and mixed roosts with Natterer's Bat *Myotis nattereri*, pipistrelles and Brown Long-eared Bats *Plecotus auritus* have been recorded. Studies undertaken on the roosting habits of Daubenton's Bats have shown that the different sexes tend to roost in different sites. Male bats show a tendency to roost at higher altitudes where foraging conditions are more challenging, with female roosts located at lower altitudes (Russo, 2002). Further research undertaken in the Yorkshire Dales suggests that male Daubenton's Bats feeding at higher altitudes have been excluded from the better feeding grounds at lower altitudes by females and dominant males (Senior *et al*, 2005).

Daubenton's Bats are widespread and common throughout the UK with an estimated breeding population of around 560,000. However the accuracy of this estimate is questionable with Harris *et al.* (1995) estimating a combined breeding population for England, Scotland and Wales at 150,000. The remaining 410,000 comes from a separate population assessment for Northern Ireland (Bat Conservation Trust, 2012). Latest trend data for this species suggests the UK population is stable and possibly increasing in some areas (Bat Conservation Trust, 2012). This is despite the loss of, and damage to, wetlands and waterways. The species becomes rarer in northern Scotland and is believed to be absent from Shetland, Orkney and many of the Western Isles.

Mennell and Perkins (1864) described what is likely to be the earliest record of Daubenton's Bats in the northeast of England. The record dates from 1839 of a bat taken from Auckland St Andrew, Durham and subsequently preserved at Durham University. The bat was erroneously identified, by the Rev. L. Jenyens, as a distinct species and named *Vespertilio oedilis*. However, a later inspection by Keyserling and Blasius suggested that the characteristics of the specimen used to distinguish it from Daubenton's Bats were the parts most likely to be distorted when the specimen was dried and stuffed. Keyserling and Blasius concluded that there was not enough evidence to separate the specimen from Daubenton's Bat. A further examination by Rev. Jenyens convinced him that it was a white variety of Daubenton's Bat.

George Bolam (1926) wrote several accounts of Daubenton's Bats from the region between 1880 and 1920. His earliest account is from a site one or two miles north of Berwick-upon-Tweed, which may or may not be north of the Border. He recalls that his then young brothers brought home a fishing creel full of bats taken from an old willow tree in 1880, which could be the earliest roost record for the region. The following morning 15 were described as "available for inspection" and all were Daubenton's Bats. Eight were adults and the others were described as unfledged young in varying stages of development. This confirms that it was a breeding roost. Bolam described Daubenton's Bats as being well distributed and not uncommon throughout the district where suitable conditions prevail. He states that this species was found in most such places investigated in Northumberland. He recalls bats being found at Alston, Tweedside (both sides of the border), Tillside, and the River Aln. His account also details the measurements of various specimens from Seaton Delaval and Chopwell, dated 1917, and from Houxty dated 1920.

Current field records of Daubenton's Bats are numerous throughout the region and our maps unsurprisingly show a pattern of distribution along all of our major water courses from the River Tweed in the north to Easington Beck on the Cleveland/North Yorkshire border. Records exist from the upper reaches of the rivers, such as upstream of Kielder and Cow Green reservoirs, down to the east coast at Alnmouth, Lynemouth, Castle Eden Dene and the Tees Barrage. However the current distribution maps clearly show that the middle reaches of the rivers hold the most records. There do appear to be some gaps in the distribution, notably the absence from many of the smaller water courses in the Hartlepool area (Ian Bond, pers. comm., 2012). Sightings of Daubenton's Bats are not restricted to large water bodies; several members of the Durham Bat Group, including the author, have witnessed Daubenton's Bats feeding over a small isolated pond near Butterwick, Sedgefield. With the exception of seasonally dry ditches this pond lies over one km from any other water courses and two and a half km from the nearest major water bodies of Crookfoot and Hurworth Burn reservoirs. Radio tracking undertaken near Morpeth in May 2012 revealed Daubenton's Bats feeding over a pond approximately one km from the nearest river. The bat was caught feeding over the pond and eventually found roosting in a church almost eight km away (T. Wiffen, pers. comm., 2012).

A trip along any of the region's major waterways is likely to reveal the presence of Daubenton's Bats, with anglers frequently encountering them when fishing into the late evening. One record, which could probably be attributed to this species, comes from an angler night fishing above the Rose Tree Bridge at Shincliffe around 2007. The angler, known personally to the author, stated that a bat bumped into the side of his head and attached itself to his scalp, screeching in his ear as he tried to remove it. Perhaps there is a little truth behind the old wives' tale after all! In the moments leading up to the incident, which left him rather shaken, he reported that numerous bats were seen near the remains of an old bridge and flying along the stretch of river.

The first modern recorded roost in the region was from the Durham/North Yorkshire border at Croft-on-Tees. The roost was found under the A167 road bridge in 1985. Since then a further 15 roosts have been identified across County Durham including one in a bridge over the River Leven near Yarm. Further south a hibernation roost has been recorded in a tunnel at the Boulby potash mine in South Cleveland. Roost sizes vary from single bats to a count of 118 in 2004 from a road bridge at Piercebridge. Maternity roosts of 71 bats and 85 bats were discovered via radio tracking by the National Trust at Gibside, Gateshead, in 2009 and 2010. One roost was found in a bridge over the river Derwent and the other in a relatively modern house.

In Northumberland 11 roosts are known with modern records dating back to 1986. Northumberland can certainly claim the largest known roost in the region with a count of 419 from Brinkburn Priory. This roost was the subject of a study by Newcastle University into the effects of a music festival on the emergence behaviour of breeding bats. The study revealed that while the festival did not significantly affect the numbers of bats emerging from the roost, it did impact upon the time of emergence; with bats leaving up to 47 minutes later on festival nights (Shirley *et al*, 2001).

Roosting sites vary. The majority of known roosts in County Durham are found in bridges, but in Northumberland the majority are known from buildings, including dwelling houses. A single roost is known from a bat box. The Boulby roost in Cleveland is located within a tunnel. This variation in roosting sites appears to be consistent with the national picture although very few tree roosts are known from our region. It is unclear whether this is due to roost selection by the bats or whether it is down to surveyor effort: bridges and buildings are generally easier to locate and survey than tree roosts.

The majority of the known roosts in the North East are summer roosts. Only four hibernation sites are known: three of these are from upper Weardale and one is from Boulby. Surveys in upper Teesdale between 1997 and 1999 revealed high numbers of Daubenton's Bats in August. The possibility that this was part of a migratory pattern to upland, underground hibernation sites cannot be ruled out.

Daubenton's Bats are currently considered to be widespread in our region. The records appear to show that the species was also widespread in the late 19th and early 20th centuries. There is currently no reason to suspect that the national trend, showing a stable population, is not being reflected in the northeast of England.

Barry Anderson

NATTERER'S BAT *Myotis nattereri*

The Natterer's Bat was first described in Germany in 1817 and was named after an Austrian naturalist called Johann Natterer (1787-1843). Natterer's Bat was first mentioned in Britain in 1837 (Barrett-Hamilton and Hinton, 1921) though evidence has been found in Neolithic strata (10,000-5,000 years BC) in Dowel Cave, Derbyshire (Yalden, 1986). Natterer's Bat is found throughout the country up to the Great Glen fault in Scotland with a higher density to the south. They are considered widespread and fairly common in Northumberland and widespread but less common in Durham.

Natterer's Bat is a medium sized *Myotis* bat with broad, pointed wings and long light-brown fur on the upper side and white or nearly white beneath. It has a long narrow ear with a sharply pointed, straight sided tragus. The face and snout are pink to light-brown and the wing membranes are mid-brown. The bats have a quiet echolocation when foraging and are quiet in the roost and so are often unobserved by roost owners. The bats emerge when it is nearly dark and they are near-invisible against buildings and vegetation. Natterer's Bat is an agile flyer with the ability to hover and manoeuvre around foliage to glean its prey; it could be described as the harrier of the bat world with a good turn of speed when needed, often seen when a pair of courting bats are flying fast in tandem.

A wide range of prey species are eaten as the bat can take non-flying prey such as harvestmen, spiders, weevils and earwigs by gleaning them from foliage as well as catching diurnal flies such as dung-flies, crane-flies and blow-flies when at rest or disturbed. Sheltered semi-natural deciduous woodland associated with waterways are the preferred foraging area, but semi-natural deciduous woodland can suffice. Natterer's Bat has also been seen foraging low over ruderal plants, such as docks, in an open field margin close to Darlington. This versatility of foraging habitat types is an important factor, allowing this species to be widespread. Natterer's Bats are thought to fly up to four km and occasionally six km from their roost to foraging areas (Smith and Racey, 2002).

The first historical record noted for Natterer's Bat in the North East was reported in the Tyneside Naturalists' Field Club publication in 1867 where they stated "We can only record one instance of the capture of this species, but so little attention has been made to the bats of our district that this and other species may probably be more generally distributed and less rare than is usually supposed." The record was for a tree in Hoffal Wood, Durham by W. Backhouse (Mennell and Perkins, 1864).

George Bolam (1926) states that prior to his records no reports of Natterer's Bat were known in Northumberland with the closest in Carlisle and Yorkshire, and two suspect records from Dalkeith and Argyllshire in 1880 and 1858 respectively. Bolam first recorded the Natterer's Bat in 1916 close to Alston both in flight and as a casualty (brought in by a cat), casualties proving the most accurate way of identifying bats at the time, though observation was also used as Bolam noted the differences in the flight between Whiskered Bat *Myotis mystacinus* and Natterer's Bat. Other sightings of Natterer's Bat on the wing were also noted within a short distance of Alston by Bolam.

When the Durham and Northumberland Bat Groups were first formed in the 1980s, more records for Natterer's Bats were identified, but the quantity of records was low and the *Distribution Atlas of Bats in Britain and Ireland 1980-1999* (Richardson, 2000) showed their distribution in the

region to be sparse and scattered. However the 21st century has seen the number of Natterer's Bat records increasing as legislation was enforced and redundant or historic buildings that are also used by this species were surveyed prior to conversion or renovation. This increase in survey effort along with additional methods of bat identification has identified many more roosts and increased what we know of the distribution of the species in the North East.

In northeast England an average sized maternity roost is approximately 23-35 adult bats, based on Northumberland Bat Group Records, but a large roost is known in a church in North Yorkshire with about 150 bats. Natterer's Bat is versatile when it comes to roosting sites, but crevices are the favoured choice and they roost frequently in trees. Table 1 summarises roost types where maternity roosts have been identified by the author in northeast England, with a bias towards buildings. Natterer's Bats may use loft spaces as daytime roosts or before they emerge at dusk, however generally they will exit from an eaves/ridge crevice and commute directly to the closest sheltered feeding area. Mean emergence times for these roosts were 22 minutes after sunset for first emergence up to 42 minutes after sunset for the last bat to emerge, based on 20 roosts with counts throughout the season. Two further roosts had first emergence before sunset, but both these roosts were adjacent to excellent woodland foraging areas. Previous research has quoted first emergence times at 31 minutes with median emergence at 60 minutes, but these results are worldwide with no latitude or dates mentioned (Jones and Rydell, 1994).

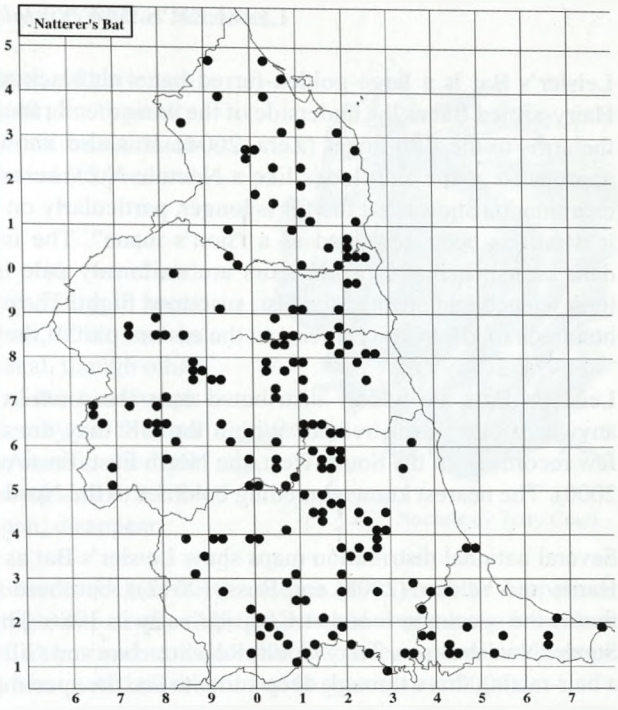
Table 1. Roosting Positions and Types for Natterer's Bat in northeast England

Building Type	No.*	**Crevice Type**	No.*	**Roost Exit Type**	No.*
House – traditional large built buildings	10	Below the ridge tile and above the ridge board	11	Open doorways	7
Barn	10	Crevices in stonework/ rubble fill	3	Ridge	6
Outbuilding	4	Between stone slates	3	Eaves	5
Farmhouse	3	Between stone wall and woodwork	3	Gable Apex	4
Church/Chapel	3	Lintel crevice	1	Miscellaneous	4
Castle	1	Hanging from the ridge board	1	Masonry Crevice	2
Tree	1	Tree crevice	1		
*** based on 32 roosts**		*** based on 23 roosts**		***based on 28 roosts**	

The most common place that Natterer's Bat has been observed roosting in the North East is beneath stone ridge tiles where droppings are seen filtering through a gap between the ridge and sarking boards. When this type of crevice is used in barns or outbuildings the bats often exit through open doorways. Roosts of Natterer's Bats can also be found on any side of the building including the north side, where cooler roosts are located. Maternity roosts are also known in bridges, churches and bat boxes in the region. Natterer's Bats often roost in the same buildings/roof spaces as other species especially Brown Long-eared Bats *Plecotus auritus* and Daubenton's Bats *Myotis daubentonii*.

One population of Natterer's Bat is known to use Belsay Castle during warm summers though they appear to seek alternative accommodation in wet cold summers such as those of 2009-2011. The castle roost is between the ceiling timber and stonework of the Great Hall with

the exit some distance away via a garderobe. Cooler crevices in stonework and vaulted rooms are used as transitional/hibernation sites. An alternative summer roost is a south-facing masonry crevice in a blocked doorway of a nearby house and this roost is usually active when the bats are absent from the castle as they have been in recent years. A local culvert also has evidence of explorative Natterer's Bat and may also be used as a swarming/ hibernation site.



Hibernation roosts are sought in structures where low temperatures remain constant such as culverts, castles, icehouses, caves and mines or wall cavities, and are usually in tight crevices where predators cannot reach them. Very few hibernation sites for Natterer's Bat are known in Northumberland and Durham. Natterer's Bats are also known to travel to swarming sites in autumn probably for mating purposes, as high gene diversity has been identified (Rivers *et al*, 2006). Distances between swarming sites and summer roosts have been shown to be about 24.8 km for Natterer's Bats (Parsons and Jones, 2003).

Natterer's Bats are found frequently throughout Northumberland with 100 recorded roosts; however records in Durham are sparser with fewer maternity roosts and only scattered records of occasional or foraging Natterer's Bats. The distribution in Northumberland becomes sparser in the industrial areas in the southeast and in the upland areas above 244 metres in the west. These parameters may also explain the distribution in Durham, as both counties have low levels of ancient semi-natural woodland compared with the rest of the country and both have a good proportion of land above 224 metres. This species of bat may also be under-recorded due to tree roosts being rarely identified.

Ruth Hadden

LEISLER'S BAT *Nyctalus leisleri*

Leisler's Bat is a large golden-furred bat with black skin. This species is also known as the Hairy-armed Bat as the underside of the wing membranes are furred along the body and up along the arms to the fifth finger (Zera, 2004). It is also known as the Lesser Noctule, a particularly appropriate name as it looks like a Noctule *Nyctalus noctula* but is noticeably smaller. Closer examination shows that the fur is longer, particularly on the back and over the shoulders, giving it what has been described as a "lion's mane". The individual hairs of Leisler's Bat have a dark base, whereas Noctule hairs are uniformly pale brown (Zera, 2004). Leisler's Bats are long winged and adapted for fast, sustained flight. They are known to migrate over distances of hundreds of kilometres, at least in the eastern part of their range (Hutterer *et al*, 2005).

Leisler's Bats are widely distributed over the southern half of Europe but are not common anywhere other than Ireland. Within the UK they are concentrated in southern England with few records from the South West, the North East, East Anglia, Scotland and Wales (Richardson, 2000). The nearest known breeding colonies to the North East are around Wakefield.

Several national distribution maps show Leisler's Bat as present in the North East (for example Harris and Yalden, (2008) and Russ, (2012)), but there are only two unequivocal records. The first is the specimen found at Cragside early in 1986. The bat was originally identified by John Steele; Noel Jackson, Terry Coult, Rob Strachan and Gill Hinchliffe all crammed into a Mini for a hair-raising drive through deep snow to see the specimen. However while the bat's identity is certain its provenance leaves some room for doubt as it was found in a wardrobe that had been brought up from southern England. The second record is from February 2012 when Tina Wiffen and Helen MacDonald identified a Leisler's Bat which had been found in a bath in Wallsend near to the Rising Sun Country Park. This bat was successfully rehabilitated and released where it was found.

There have also been a small number of bat-detector records of varying levels of confidence, mainly in Northumberland. There are recordings from the Rising Sun Country Park in 2011 that were indicative of Leisler's Bat, as was a recording of a single bat commuting up the river at Wallsend in June 2003. Claire Snowball's May 2009 recordings from Havannah Nature Reserve near Newcastle Airport also fit the very probable category with John Drewett's observations at Piercebridge at least a good possibility based on his experience of bat work. Analysis of data from the *Bats and Roadside Mammals Survey 2006* (Russ *et al,* 2006) undertaken by Durham Bat Group in 2006 suggested Leisler's Bats around Darlington and near Hamsterley Forest but follow-up visits failed to detect them in both cases. Similarly there have been a number of records based on the occasional bat pass recorded on a remote detector but many of these are at best questionable. To put this into context, no member of Durham Bat Group considers that they had even "probably" encountered Leisler's Bat in County Durham or Cleveland.

In conclusion, there is so far no record of a breeding population or even anywhere where Leisler's Bats are regularly present. On the basis of proven or very likely records, we could conclude that Leisler's Bat is just a slightly more regular visitor to the North East than other vagrant species. However, we know that several insect species have colonised the North East in recent years and it may only be a matter of time before Leisler's Bat breeds in the region as well. Indeed an alternative explanation for the records is that we may be on the cusp of that colonisation process.

Noel Jackson

NOCTULE *Nyctalus noctula*

The Noctule is one of the larger British bats, with a length of 3.7 to 4.8 cm and a wingspan of 32 to 40 cm. Typically they weigh around 28 to 35 grams but can be as much as 40 grams. Its fur is dark yellowish-brown (Corbet and Southern, 1977).

Noctule by Terry Coult

This species is normally associated with woodland habitat and with river valleys, roost sites being in most cases in old woodpecker holes (Boonman, 2000) and in rotten trees. Roosts in buildings are unusual, though other structures may be used, as in the case of the Lockhaugh Viaduct in the Derwent Valley. It is generally the first bat on the wing in an evening, often being seen in the light of the setting sun and sometimes appearing as the Swifts *Apus apus*, which have a similar wingspan, disappear.

Noctule prey consists mainly of larger insects such as beetles (Jones, 1995) and the deep dives observed in hunting contrast with the high and steady flight of animals commuting from their roosts to their hunting areas. Noctules may travel considerable distances to feed; in Europe commuting ranges of up to 26 km have been noted (Gebbard and Bogdanowicz, 2004).

The Noctule is widely distributed throughout Europe up to 60° N, though it is virtually absent from Spain, Portugal and southern France (Schober and Grimmberger, 1989). It is widely distributed in England and Wales, but scarce in Scotland. It is absent from Ireland, where its congener, Leisler's Bat *Nyctalus leisleri*, is widespread. In the UK the data from the National Bat Monitoring Programme Field Survey suggests a slight increase in population from the index year of 1999 to 2009, but the trend is not significant.

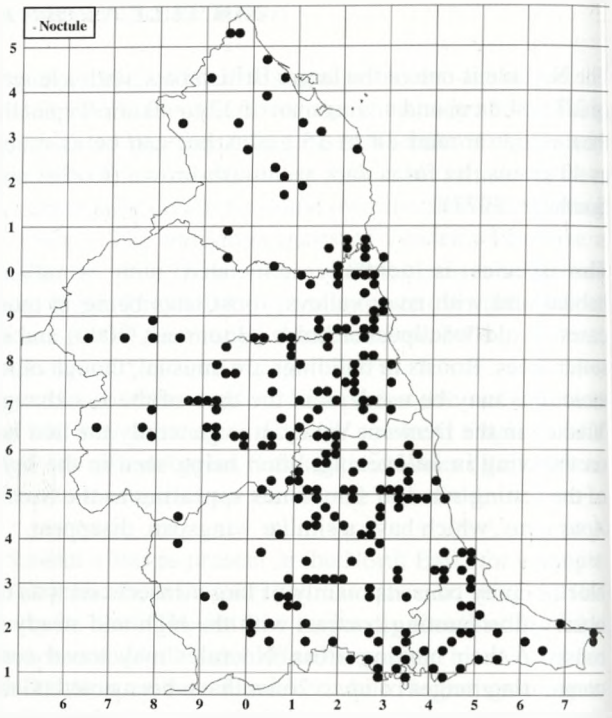
The earliest known occurrence of Noctule in the North East is a "fine specimen" taken at Cleadon in 1836 and presented to the Natural History Society by W.A. Swinburne. This appears in Mennell and Perkins (1864) as a Serotine Bat *Eptesicus serotinus*, but the identification was subsequently corrected by W.D. Roebuck in 1884 (Bolam, 1926). Bolam regarded it as a "rare accidental visitor". He also recorded two sightings from the Tyne Valley (June 1914 and October 1923), but regarded these as fitting into a pattern of migratory vagrancy.

The Noctule may well be under-recorded in the North East, in part because it rarely roosts in buildings occupied by humans. Car transect surveys in Durham have located Noctules in locations in open countryside well away from known roosts. Our map shows a wide distribution, particularly along the river valleys, with occurrences as far west as OS grid references NY66 and NY68.

Most recorded roosts number below 50, although separate sites in the Riding Mill area were counted at 130 and 64 in 1985. Since Noctules do move from one site to another during the breeding season these two counts may refer to the same colony.

More recently, on 2 May 2011, a colony of 69 was counted out of an Oak tree *Quercus robur* in Gosforth Park Nature Reserve. Three days later there were about 30 in that tree and a similar

number in a Birch tree *Betula pendula* elsewhere in the reserve. By 12 May there were again 69 in the oak, but on 19 May there were five in the birch and none in the oak (T. Wiffen, pers. comm., 2011). In late May 2012 over 40 Noctules were foraging over Bothal Pond. One was caught and radio tagged by Northumberland Nathusius' Project and led observers to a roost in a Beech tree *Fagus sylvatica* a little over two km away. An emergence of 49 was counted on the first night and 54 the second. The following day only 26 emerged and did not include the tagged bat, which was re-located on the fifth day in a pine tree some 5.5 km from the first roost; 37 bats were counted out of the pine, but there were then none in the original beech tree (T. Wiffen, pers. comm., 2012).



Tree roosts are typical, but there is a count of 52 in a manor house near Snod's Edge in May 1986. This site is also associated with an unexplained piece of behaviour when the main part of the colony arrived from elsewhere and entered the roost about 35 minutes after sunset (Strachan, 1986). Lockhaugh Viaduct has been monitored regularly by John Durkin since 1985, the maximum count of 44 being achieved in 1992, though 4-10 is more usual and in some years the species has not been found (J. Durkin, pers. comm., 2012). There is an intriguing January 2010 report from a member of the public of a bat which appeared to be a Noctule alighting on the disused Lands Viaduct near Cockfield, crawling up the brickwork and "investigating holes and cracks" (N. Jackson, pers. comm., 2010).

Hibernation normally remains undetected, but in January 1986 an Elm tree *Ulmus minor* was felled on farmland on the outskirts of Darlington, knocking a hollow branch off a neighbouring Beech. Twenty-one Noctules fell with the branch; two died, but the remaining 19 were cared for and hand-fed for just over a week before being returned to the site in a hibernation box which was strapped to the tree. When the box was re-checked in May there was one dead bat inside, but 47 live Noctules in the Beech tree. By late June they had moved on.

Other hibernation records come from Fenwick, near Matfen (one found on the ground in January 2008), the Hart to Haswell Tunnel (singles in March 2005 and in February 2012) and from Croft Bridge (singles in March 1989 and in winter 1989/90).

The Hamsterley Forest bat box scheme provides evidence of use, with Noctules found in seven out of 22 years, 1987 to 1996 and 2000 to 2011. On one occasion, in July 2000, nine were present in one box, while two males were found together in July 2006. Other occurrences were of single occupancy of boxes and there are a number of other occasions over the years when droppings thought to be from Noctules have been found.

Evidence of movements between roosts and feeding areas is provided by an observation in May 2008, when at least 41 Noctules were around the Houghton Gate area (Evans, 2008). A follow-up visit three days later showed fewer bats, but they were leaving Lambton Park, which contains mature woodland, and heading just west of south. This direction would lead in an almost direct line to three areas where feeding has been noted in the past (Durham Bat Group records). In the 1950s and 1960s large numbers were reported feeding over the North Tees marshes, where there is no suitable roosting habitat, but numbers are much reduced in recent years. They seem to arrive late here when little light remains, but may commute down Greatham Creek and may also arrive from other directions.

Insect prey varies over the course of the summer. Cockchafers *Melolontha melolontha* may be popular when available. In a note on Cockchafer emergence from grassland which had once been an ancient lawn at Ryhope, one observer recorded that "they were being munched in their hundreds by a bunch of Noctules" (Lupton, pers. comm. to Durham Bat Group, 2011), while on 27 May 2009 at Crimdon Dene Noctule feeding was associated with "large beetles flying around and ... one ... was positively identified as a cockchafer beetle" (J. Jones, pers. comm., 2009). On 6 August 2007, 50-75 Noctules were noted in a "ball" about 10 metres across feeding on "hairy legged juicy flies" just above head height in the Druridge Bay area (R. Hadden, pers. comm., 2012). On 27 June 2011 six Noctules were noted feeding on ghost moths at a fairly low level over a small plantation on Cowsley Lane, near Lanchester.

In the North East most other feeding groups are relatively small, though 50+ were watched over the surface of the river at Wylam Bridge on 25 May 2007 (R. Hadden, pers. comm., 2012), and over 20 have been noted at Drinkfield Marsh, Darlington and at Crimdon Dene (I. Bond, pers. comm., 2012.). In 2008 24 were recorded commuting along Thorpe Bulmer Dene, which connects to Crimdon Dene, but numbers were lower when the survey was repeated in 2011. John Durkin's maximum for Shibdon Pond is 16 (pers. comm., 2012) There is a mid-November record of several feeding over Stapleton Pond, about one km south of the Durham/North Yorkshire county boundary, around noon on a mild day (I. Bond, pers. comm., 2012.).

Near Witton-le-Wear on 31 August 2010 several Noctules were foraging, but "quite a bit higher and moving across from the south to the north were a group of what were definitely Noctules. There were about 10 bats flying in a fairly tight group and their flight was not as purposeful as you would normally describe commuting. They were not foraging and it looked like there was some interaction between bats within the group." (Gilchrist, pers. comm. to Durham Bat Group, 2010).

What appears to have been a Noctule carrying a young bat in loops over a 10 metre stretch of stream in Billingham Beck Country Park was recorded and photographed by Ian Forrest in 2008 (Bond, 2008).

There are fewer large roost counts in the North East now than there were in the 1980s and 1990s. There is some anecdotal evidence of lower numbers feeding at two sites in northwest Durham, though this could be governed by changes in prey abundance. There are also fewer Noctule roosts reported but there is a much more widespread distribution of recent field records. In the additional light of the fairly stable trend suggested by the National Bat Monitoring Programme it is difficult to draw firm conclusions on the health of our population of Noctules.

David Sowerbutts

COMMON PIPISTRELLE *Pipistrellus pipistrellus*

Common Pipistrelle is by far the commonest bat species throughout most of northeast England, although literature from before 2000 is confused by Soprano Pipistrelle *Pipistrellus pygmaeus*. Species separation was first suggested on the basis of their echolocation by Jones and Parijs (1993) and was confirmed by the analysis of mitochondrial DNA by Barratt *et al.* (1997). However, it took some while for North East bat workers to become confident in the separation of this pair of species.

Common Pipistrelle by Terry Coult

Common Pipistrelle pelage is grey-brown often, but by no means always, with a darker "bandit mask" through the eyes. This contrasts with the more uniform rufous brown fur of Soprano Pipistrelle. Observations of rescued bats held in captivity show that there are small differences between the summer and winter coats with the summer coats being greyer. This affects young bats as they moult at the end of their first winter and it is harder to separate juveniles of the two pipistrelle species on pelage as a result. Common Pipistrelles have uniformly dark skin whereas Soprano Pipistrelles often show some pink skin on their faces (Schofield, 2002).

The Common Pipistrelle is a small bat with a forearm length of between 28-35 mm (Corbet and Southern, 1977). Weights vary over the course of the year, ranging from over seven grams at the start of hibernation to 3.7 grams for males and 3.9 grams for females at the end of hibernation (Stebbings, 1968). As a general rule, healthy Common Pipistrelles in the North East in summer will have a weight of around six grams and anything less than five grams in a rescued bat is regarded as an indicator for special care.

Common Pipistrelles are generalised feeders on small insects which makes them very adaptable (Swift, *et al*, 1985); where they feed in the same area as Soprano Pipistrelles they resource partition with the Soprano Pipistrelles foraging over the taller trees and the Common Pipistrelles foraging through scrub and underbrush (Vaughan *et a*l, 1997; Swift *et al*, 2001).

Common Pipistrelles require warm locations for their nursery colonies and so are very strongly associated with domestic houses and other heated locations (Swift, undated). It has been observed that Common Pipistrelle colonies are smaller than Soprano Pipistrelle colonies (Barlow and Jones, 1999) but this may be a result of differences in roost type and availability in the areas where these two species are found rather than any specific ecological difference *per se.* Certainly numbers of individuals present in a roost should not be used as a criterion for species identification.

Common Pipistrelle is widespread across the whole of Britain and has always been considered to be the commonest bat in our region. Gill (in Page, 1905) says "This species is common throughout the region" and George Bolam (1926) suggests that it "ought probably to be regarded

as the commonest and most universally distributed bat in our counties". However, it is clear that both authorities had rather limited amounts of data and their accounts are based more on specimens obtained than observations of nursery roosts and hibernacula. When Durham Bat Group was founded in 1983, they found more about roosts of Whiskered/Brandt's Bats than pipistrelle and for a short while were convinced that species distribution and abundance was different in the north of the UK from that further south. However, as they started to collect information more systematically, it was clear that Common Pipistrelles were by far the most abundant species in the region.

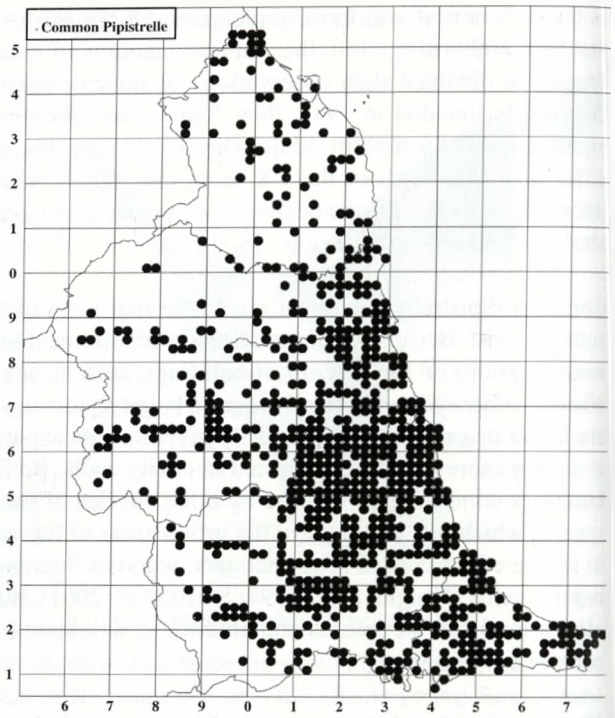
Common Pipistrelle can occur anywhere that has suitable foraging within flying distance of a suitable roost. Because of the small space requirement for a nursery roost, pipistrelles can exploit roost locations on the exterior of buildings, such as boxed soffits and behind weather-boarding, whereas other species generally require larger spaces in the roof void. When Common Pipistrelles are found in a roof void it is usually juvenile bats exploring from the main nursery roost, which is usually more likely to be located in cavity walls. Both pipistrelle species can exploit post-war buildings which cannot be used by other species of bats, but Common Pipistrelles are the only species which can be found in the urban areas of the region, presumably because they are able to forage effectively in urban habitats, whereas Soprano Pipistrelles have more specific habitat requirements (Vaughn *et al,* 1997; Swift *et al*, 2001). Support for this hypothesis is given by the almost total lack of records and absence of any known roosts of other species in the urbanised parts of our region.

If the typical bat habitat across all our region's bat species is lowland riparian deciduous woodland, Common Pipistrelles thrive in some fairly atypical places. Two nursery colonies spring to mind. The first is Killhope in Weardale, where there is a thriving colony at an altitude of about 500 metres making use of bat boxes in a coniferous plantation. The second is on the now defunct Redesdale Camp at 240 metres on open moorland, but with a coniferous plantation to the south. The camp comprised many prefabricated buildings but with one stone-built boiler house for the showers, which contained a Common Pipistrelle maternity roost. Paul Lupton reports that he persuaded the army from turning off the boiler and believes that their ecologist was trying to fit a heating system in the roost. It is interesting to note that Wardaugh (1992) suggests that there is a strong association with areas below 100 metres in Cleveland and North Yorkshire, which is certainly not the case north of the Tees.

There is evidence to support the suggestion that Common Pipistrelles have a requirement for a high temperature profile in their nursery roosts (Avery, 1991). Wardaugh (1992) noted that the entrance to bat roosts in Cleveland tended not to point north but that the relationship was only just statistically significant. This is likely because the orientation of the entrance is not necessarily an indication of the location or warmth of the roost site. Ruth Hadden (pers. comm., 2011) has stated "I would say from observation that Common Pipistrelles prefer warmer buildings and are one of the bats, in Northumberland, with the closest link to occupied houses. It is rare to find them roosting in cold barns or farm buildings. They are more likely to be in villages wrapped round someone's Aga flue." The importance of artificial heat in the cold of the north country is undoubtedly important to Common Pipistrelles. Many roosts use the warmth of modern housing and there are several examples of nursery roosts exploiting direct sources of heat.

There was one particularly adventurous colony in Low Westwood in the Derwent Valley which accessed its cavity wall roost through the concentric air vent and exhaust of a combined boiler. The adults navigated this considerable hazard without trouble but when the juveniles started to

fly, several chose the wrong opening and were cremated as a result. Some ingenious work with mesh saved the roost and prevented unwanted cooking smells in the kitchen.



Common Pipistrelles will sometimes travel considerable distances from the entrance hole to the roost site. In one case in Rowlands Gill, the owner of a modern timber-framed bungalow was disturbed by animal noises from behind a radiator. When the roost was investigated the entrance was traced to a point where a few inches of the insect exclusion grill was missing. The bats were travelling some 30 metres around two sides of the building, between the brick skin and plasterboard lining, to get to the hot spot.

One of the largest known bat roosts in the region was a colony of 633 pipistrelles located above the bathroom extension of a terraced house in Gainford. The weight of the droppings made the ceiling collapse whilst the unfortunate owner was in the bath! The roost had long since moved on before the two species had been separated taxonomically. The largest roosts in the region definitely known to be Common Pipistrelle are a roost of 375 at Monk Hesleden in Durham and of 365 at a house in Wooler in Northumberland.

There have been suggestions that there is a difference between the mean sizes of roosts definitely identified as Common Pipistrelle across the region. However, this is not the case. Taking roosts of more than 10 bats, the mean size is 80 (n=74) north of the Tyne and 82.3 (n=66) to the south. It has been noted that relatively large roosts are found on the Magnesian Limestone plateau in County Durham, many in very modest housing in villages such as Wingate. This area is highly cultivated and very well-drained so there is little open water and it is relatively devoid of trees. The available roost sites are thus highly clustered in the pit villages.

Common Pipistrelles are the only species known to have used woodcrete Schwegler bat boxes in the coniferous plantations of Hamsterley Forest whereas seven other species are known to use the wooden boxes. However, nursery use has never been proven. The numbers of bats present has never been higher than 20 and would seem to indicate non-breeding bats and post-breeding dispersal. This further indicates that the bats breed elsewhere and that bat boxes cannot be regarded as mitigation for the loss of a building roost for Common Pipistrelles.

Durham Cathedral has a very important and venerable Common Pipistrelle colony located above the mediaeval timber ceilings of the cloisters, which is only now becoming understood. Bat workers have only had access to the roost after dark since 2010 and it has now become clear that it is a major breeding site which requires daily attendance by bat workers to rescue young bats.

Sue Charlton runs the scheme and says that there are a few downed bats in July but there are several casualties a day from the second week in August through into September. The cloisters are also a hibernacula and a post-breeding gathering site for what is thought to be an extended colony of Common Pipistrelles with roosts dispersed over the old buildings of the Durham peninsula.

There are many places where single male Common Pipistrelles have been found in autumn along with a small number of females, but the woodland around the mine workings in Slit Wood, Westgate (Weardale) is one of the few locations where males have been specifically observed singing and holding territory.

Little is known about the hibernacula of pipistrelle species because they do not gather in caves like other bat species. The Common Pipistrelle roost in the drive-through carriage archway at Raby Castle was one of the few pipistrelle hibernacula known prior to 1983 (Robert Stebbings, pers. comm.,1983). Bats are inactive during hibernation, so clues around the roost entrance, such as droppings or bat activity at dusk or dawn are largely absent.

There is currently a healthy debate about how Common Pipistrelles spend the winter. Ian Bond has noticed that the majority of Common Pipistrelles found in hibernation are one or two individuals. John Drewett has observed that Common Pipistrelles will frequently hibernate in relatively exposed locations where the temperature will fluctuate a lot. Veronica Howard has found two Common Pipistrelles hibernating in a hanging basket. Ian Bond has also observed a Common Pipistrelle at the Hart to Haswell railway hanging out of a tree hole on a sunny winter day as if sun bathing, and conjectured that it might be using the sun's rays to raise its body temperature, thus saving energy.

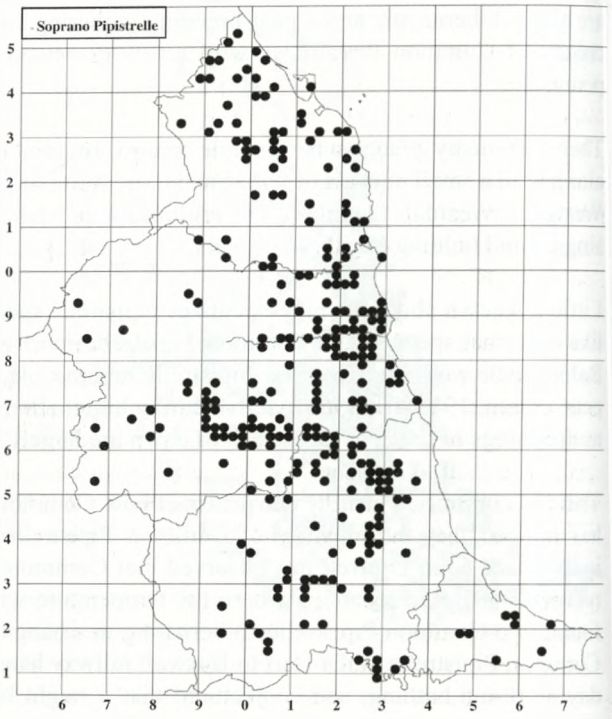
We do know of a number of cases where a cavity has been opened by accidental damage or to effect building works revealing hibernating bats. When the pipes burst at Prudhoe Castle one Christmas, the plumbers were disconcerted to find a pile of drenched Common Pipistrelles. David Boyson found hibernating Common Pipistrelles whilst repairing a section of dry stone wall at Greenleighton above Fontburn Reservoir in the mid 2000s but cautions that this is the only roost he has ever found in the many miles of wall he has repaired.

Wardaugh (1994) describes two hibernacula. One is "a hibernaculum which contained at least 20 animals (possibly far more) .... in a wall cavity above a timber window frame". The other is "a large, two-storey building, already known to be used as a nursery roost. Unfortunately the building had to be demolished, this being done in early spring, when it was hoped that no bats would be present. Nevertheless initial dismantling by workers was carried out with care and 11 pipistrelles (nine males and two females) were found behind facia boards." The winter of 2010/11 was characterized by prolonged heavy snow-fall, and as many houses suffered damage to fascias and weatherboarding the Durham Bat Group dealt with more winter rescues than ever before. These were all Common Pipistrelles and although the rescued animals were individuals, they did include some females.

So whilst the evidence is slim, it does seem likely that some Common Pipistrelles hibernate adjacent to their breeding roosts in secure locations with relatively stable temperatures such as cavity walls, whereas others disperse to roost in small numbers in more exposed locations.

Noel Jackson

SOPRANO PIPISTRELLE *Pipistrellus pygmaeus*



The Soprano Pipistrelle is one of three pipistrelle species found in the North East. It is similar in size to the Common Pipistrelle *Pipistrellus pipistrellus* and was only separated from it on the basis of their DNA in the mid 1990s (Barrett *et al*, 1997). Prior to that it had been suspected that there might be two species based on morphological characteristics and John Steele was recording pale and dark morphs at Chatton in 1989. Soprano Pipistrelle typically differs in appearance from the Common Pipistrelle in its coloration although many bat workers comment on gradations between the species in this respect. Soprano Pipistrelles also tend to have a strong musky smell though again this is not of itself a definitive characteristic as this smell is also occasionally apparent in Common Pipistrelles.

The other main difference between Soprano and Common Pipistrelles is, as their name suggests, in the frequency of their echolocation calls, with Soprano Pipistrelles generally having a peak frequency around 55 kHz, compared to 45 kHz for Common Pipistrelles though John Drewett and Graeme Smart have recorded pipistrelles with peak frequencies of around 60 kHz in Teesdale and Northumberland respectively. However there is some intraspecific variation depending on the environment that bats might be flying in and the pipistrelle that appears to have a peak frequency of around 50 kHz is a frequent source of frustration for bat workers. Consequently it isn't always straightforward to separate the two species in the field using the heterodyne recorders that have traditionally been used by bat workers. To take account of this degree of uncertainty, this account has been based on the comments of experienced bat workers from Northumberland, Durham and North Yorkshire Bat Groups rather than taking isolated field records at face value.

In Europe the Soprano Pipistrelle is found in more northerly latitudes than the Common Pipistrelle (Dietz *et al*, 2009). In Britain the relative frequencies of the two species vary between different parts of the country (Swift, 2001) and in parts of central Scotland it can replace the Common Pipistrelle as the commoner pipistrelle. However the suggestion that this is an effect of increasing latitude does not appear to be correct as Scott (2012) points out that it is the Common Pipistrelle that is the commonest in the Highland region. On the face of it, it might appear that a latitudinal cline is apparent in the North East with Soprano Pipistrelles being commonly reported throughout Northumberland, less frequently reported in central Durham and hardly reported in the southeast of our region. However immediately to the south the North Yorkshire Bat Group report Soprano Pipistrelles as being widespread and common in their area (Drewett,

pers. comm., 2011), and therefore the effects of latitude do not seem to be a significant factor in distribution across the North East region.

Research points to Soprano Pipistrelles being significantly associated with riparian habitats (Davidson-Watts *et al*, 2006). This is considered to be a noticeable feature in both North Yorkshire (John Drewett, pers. comm., 2012) and Northumberland (Ruth Hadden, pers. comm., 2012). Of the known roosts in the Durham Bat Group area, only around a quarter are further than one km from a river. Nevertheless there are confirmed roosts where the nearest watercourse is relatively minor, such as the Bedburn Beck through Hamsterley Forest or the Langley Beck at Staindrop; but it may be that in such situations the main factor is the proximity of large areas of mature woodland.

Evidence that the Soprano Pipistrelle is much more restricted in its distribution was provided by the results of a series of surveys carried out by the Durham Bat Group as part of the Bat Conservation Trust's *Bats and Roadside Mammals Survey* in 2006. This involved driving transects around four sets of roads in geographically distinct parts of Durham. The surveys recorded a total of 11 Soprano Pipistrelle passes compared to 208 passes of Common Pipistrelle, with the Soprano Pipistrelles only being encountered in two places; Neasham which is adjacent to the River Tees and in Weardale around Hamsterley Forest.

Nevertheless, Soprano Pipistrelle is not an uncommon bat in the region. In particular, it is regularly encountered in Northumberland and the Northumberland Bat Group had 73 known roosts on its database as of 2011. The largest count out of these roosts is one of 660+ bats in Riding Mill though that roost is known to split and move around houses in the surrounding area. Another roost of over 600 is known from Morpeth. Most of the Northumberland records are from the east of the county, though that probably reflects the distribution of bat workers, as a roost of over 100 bats is known from Kielder village in the extreme northwest of the county.

The Northumberland Nathusius' Project conducted surveys for Nathusius' Pipistrelle *Pipistrellus nathusii* using Anabat detectors across more than 20 sites in Northumberland in 2011. Both Soprano and Common Pipistrelles were found at all of the sites surveyed. Tony Martin has collected very large levels of Anabat monitoring data over a couple of years from a site in north Northumberland (east of Cheviot and in the upland fringe) and found that the numbers of Common and Soprano Pipistrelle passes there were about equal. He estimates that Soprano Pipistrelles would account for around 20% of bat passes in the wider rural Northumberland area. This is in line with an estimate by Ruth Hadden, the Northumberland Bat Group recorder, who considers that she encounters foraging Soprano Pipistrelles on around 25% of the field surveys that she undertakes in the county. Sam Talbot has calculated that around one third of the bat roosts that she has encountered as a Natural England bat warden in Northumberland have been of Soprano Pipistrelle. However, Soprano Pipistrelle roosts might give rise to more frequent requests for bat warden visits than other bat species due to their strong smell and tendency to form large roosts.

While the Soprano Pipistrelle features regularly on bat warden visits in Northumberland, this is not the case in Durham and Cleveland, particularly when it comes to rescuing individual bats that can then be identified in the hand. Noel Jackson, who has 30 years experience of bat work across the whole of County Durham, has only rescued two Soprano Pipistrelles in that time. Similarly in 15 years of bat work in south Durham and Cleveland the author can only recall rescuing Soprano

Pipistrelles on two occasions and then from the same area of Darlington. Taking into account that we will have rescued bats numbering well into three figures between us in that time, the ratio of Soprano to Common Pipistrelles would be lower even than the results of the *Bats and Roadside Mammals Survey* mentioned above.

Although apparently not as widespread as it is in Northumberland, the Soprano Pipistrelle can be encountered quite regularly in Durham though its distribution seems to be localised. The first record of Soprano Pipistrelle in Durham was by Noel Jackson at Barnard Castle in April 1997. It is now known to be present throughout the middle stretches of the River Tees with several roosts between Middleton St George in the east and Middleton-in-Teesdale in the west, with the latter being the most westerly record for the species in the county. Prior to the separation of the two species several large roosts, numbering several hundred bats, were recorded along the Tees near Darlington and it is thought that these are likely to have been Soprano Pipistrelles. To date the largest known roost in the Durham area is the one at Staindrop mentioned above, from which 600 bats were counted in 2011.

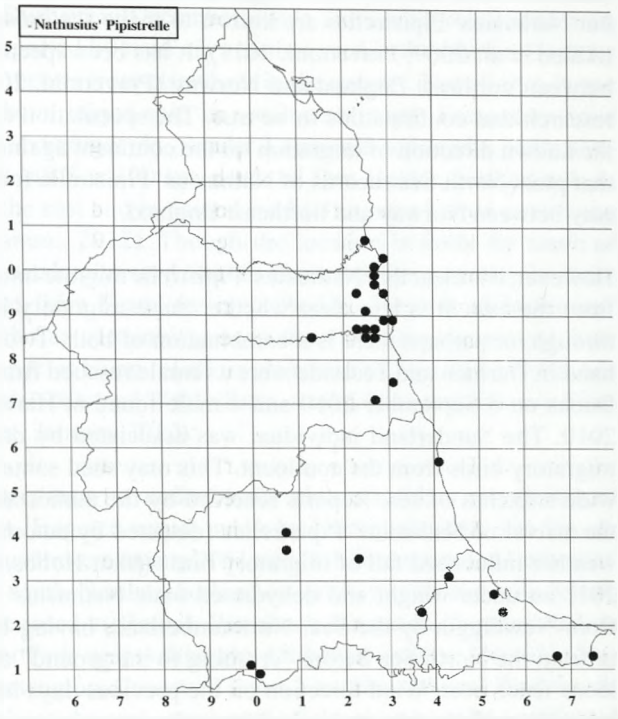
North of the Tees it occurs about four km upstream on the River Skerne at South Park in Darlington but then there are no confirmed records until the River Wear. It is regularly encountered in the central Wear Valley and also the Derwent Valley with several roosts known in both areas, including one of nearly 300 bats in the flat roof of a building in Blackhall Mill (Fran Mudd, pers. comm., 2012). On the Wear it is found as far east as the Wildfowl and Wetlands Trust, east of Washington. So far it has not been found as far west on the Wear catchment as it has on the Tees, with the most westerly roost on the Wear being at Witton-le-Wear with some field records a little further west on the River Gaunless. Soprano Pipistrelles do not appear to be present in upper Weardale or upper Teesdale though survey effort in those areas has been limited. On the Magnesian Limestone Plateau Natural Character Area, which is largely east of the A1(M), there are no known roosts and no confirmed field records. This is perhaps not surprising as this area is characterised by very low woodland cover and no sizeable watercourses other than the inter-tidal section of the Wear.

In the area of the former county of Cleveland there have been a few field records claimed though most of these are of one or two brief encounters in areas that have otherwise only turned up Common Pipistrelles, so they should perhaps be viewed with caution. The species is present in south Cleveland with field records around Nunthorpe and field and roost records at Kirkleatham. It may be more widespread but to put this into context, the author has carried out numerous bat surveys in Cleveland over more than a decade and has never encountered the species there. The paucity of Cleveland records may be due to avoidance of the large urban conurbation that forms the heart of the former county. It is worth noting that there are no records for the large urban conurbations of Sunderland and Tyneside; likewise Northumberland Bat Group has no records for central Newcastle.

On the other hand the species' affinity with water is perhaps underlined by what is surely the most unusual North East bat record, which was of foraging Soprano Pipistrelles (as well as an unidentified *Myotis* species) recorded over Coquet Island by Claire Snowball in 2011. Coquet Island is a mere 400 metres x 200 metres in area. It has no fresh water but it is surrounded by the North Sea, which separates it from the coast of Northumberland about one km away.

Ian Bond

NATHUSIUS' PIPISTRELLE *Pipistrellus nathusii*



Nathusius' Pipistrelle is one of three pipistrelle species known to be resident in the UK. A relatively uniformly coloured small brown bat, it is slightly larger and heavier than both the Common Pipistrelle *Pipistrellus pipistrellus* and the Soprano Pipistrelle *Pipistrellus pygmaeus*. Adults weigh between 6 and 10 grams and have longer wings than the other two pipistrelle species, though there is some overlap in forearm length with Common Pipistrelle (Dietz *et al*, 2009). Morphological characteristics are well described by Dietz *et al.* (2009) though the dentition characteristics described are not always definitive; a confirmed Nathusius' Pipistrelle in Northumberland in 2011 did not exhibit the upper jaw, first pre-molar alignment described (Tina Wiffen, pers. comm., 2011).

Nathusius' Pipistrelle echolocation calls are typical pipistrelle type calls which generally have a frequency of maximum energy (FmaxE) or peak frequency of 35 to 40 kHz. However, caution needs be exercised when identifying Nathusius' Pipistrelle by echolocation call alone in the field as there can be overlap with the FmaxE of Common Pipistrelle calls depending on the situation. A Nathusius' Pipistrelle rescued in Northumberland in 2011 and identified by morphology and DNA analysis was recorded shortly after being released from the hand calling with a FmaxE of 43 kHz. The author has also frequently recorded Common Pipistrelles emitting open habitat calls with a FMaxE of 40 kHz or slightly under 40 kHz. The continuing trend for the use of broadband bat detectors and recorders and computer analysis of the recordings is likely to increase the reliability of species identification from echolocation calls and may result in more verifiable records.

The Nathusius' Pipistrelle is often regarded in the UK as a species very closely associated with water bodies. Water bodies, including relatively small water bodies and wide slow-flowing rivers, are certainly utilised and in Northumberland offer the most reliable chance of encountering the species. However, in Europe the species is also regarded as a bat of deciduous mixed woodland and damp lowland forests, as well as riparian forests, and can also be found hunting in built-up areas, particularly during migration (Dietz *et al*, 2009), so we should not assume that the species will only be found at water bodies. Typical recorded diet consists entirely of flying insects, dominated by waterborne *diptera* but also caddis flies, aphids and lacewings (Dietz *et al*, 2009).

Long running ringing studies have demonstrated that the species undergoes long-distance seasonal migrations in continental Europe between breeding grounds in the north and east and

hibernation areas in the south and west. The longest known annual movement is 1,905 km (Hutterer *et al*, 2005). Major migration routes tend to be along the coast and major river valleys but Nathusius' Pipistrelles are known to make sea crossings of several hundreds of kilometres (Ahlen *et al*, 2009; Pravettoni, 2011). It has been speculated that Nathusius' Pipistrelle migrate between northeast England and Norway (Pravettoni, 2011), but the author is not aware of any research that confirms this to be true. The speculation may stem from an over-interpretation of the known direction of migration on the continent against a map published by Russ *et al*. (2001) that plots North Sea records of Nathusius' Pipistrelle found on ships, as a block of records mid-way between Norway and northeast England.

However, it is clear that Nathusius' Pipistrelle migrate into northeast England in autumn, generally from the east. It is less clear whether these migratory bats remain here for the winter or pass through, or perhaps there is a combination of both. Two Nathusius' Pipistrelle confirmed in the hand in Durham and Teesside were a female rescued from a Magpie's *Pica pica* beak at Hendon Docks on 8 September 2010 and a male found at Hartlepool Power Station on 24 September 2010. The Sunderland individual was associated by date with a weather-influenced "fall" of migratory birds from the continent. This may shed some light on how these bats migrate across wide stretches of sea. Reports received by the author about a site on the Kent coast also note the arrival of Nathusius' Pipistrelles (detected by automatic detectors) within hours of another weather-influenced fall of migratory birds (Matt Hobbs, pers. comm., 2012). On 17 September 2011 an under-weight and dehydrated male Nathusius' Pipistrelle of that year was recovered from Newbiggin-by-the-Sea, Northumberland, having been observed by bird watchers to fly in from the North Sea before "crashing to the ground" and then crawling down a gap beside a loose fence post. Wind direction on the previous days had been from the south or east making it highly unlikely that the bat had been blown out to sea from the UK. The bat was rehabilitated and released.

The first confirmed record of Nathusius' Pipistrelle in Northumberland is of an adult male found under the back door thresh of a house in the village of Throphill in December 2007. The bat was reportedly found when the householder went to investigate why the door thresh squeaked every time it was stood on! The season suggests hibernation in the county. Ruth Hadden also received a downed male from a vet in Northumberland in June 2008 but unfortunately the vet had taken no history when accepting the bat so the exact location of where it was found is unknown.

Durham's earliest accepted record dates from 1999 when Geoff Billington recorded Nathusius' Pipistrelle over the Tees at Cotherstone and near Bowes (Durham Bat Group, 1999). There is also a record from a small ornamental lake at Whitworth Hall near Brancepeth on 3 May 2000. While this was an identification by heterodyne detector in the field it is regarded as robust by Durham Bat Group because several members were involved in the observation of at least three bats foraging. There is another confirmed record of one bat at Wolsingham in July 2009 where a recording was taken. Nathusius' Pipistrelle has also been recorded in County Durham at Tunstall Reservoir in 2009 and in Cleveland at Crockfoot and Lockwood Beck Reservoirs in 2009, at Scaling Dam reservoir in 2010 and at Lockwood Beck Reservoir in 2011. All these were recorded in September as part of the annual Bat Conservation Trust's (BCT) Nathusius' Pipistrelle survey. Other "possible" Nathusius' Pipistrelle records come from Stewart Park, Middlesbrough in 2008 and Ormesby Hall grounds, Middlesbrough in June 2009.

Teesside boasts the earliest North East record with Wardhaugh (1994) reporting that a Nathusius' Pipistrelle was found at Teesport on 26 April 1991 though he notes that "it seems highly likely that

this animal arrived in Britain by ship". Arrivals of Nathusius' Pipistrelle into the UK by ship are probably not uncommon. Giles Manners recovered three Nathusius' Pipistrelles found in a load of timber in a yard in Shildon, County Durham in December 2011. The timber originated from near Hanover in Germany and was transported by road via a timber yard in the Market Harbour area of Leicestershire. There are similar reports from elsewhere in the country. Not all ship-borne arrivals of Nathusius' Pipistrelle may have joined ship in continental ports. Some may have joined mid-crossing as migratory birds sometimes do. Sander Lagerveld reported a Nathusius' Pipistrelle alighting on a boat in the North Sea 100 km north of Den Helder, Netherlands in September 2006. The bat arrived from the east and remained for half an hour before continuing to fly west (Sander Lagerveld, pers. comm., 2012). Though the location is fairly far south of this publication's area of interest, this anecdotal record further illustrates the potential for these bats making long distance sea crossings from Scandinavia to the UK. Records of Nathusius' Pipistrelle found on oil rigs in the North Sea certainly point to those bats having arrived there under their own steam. Records of the species being found on ships and oil rigs in the North Sea increased significantly between the mid-1980s and 2001 (Russ *et al*, 2001) and this trend has continued after 2001 (Russ, pers. comm., January 2012).

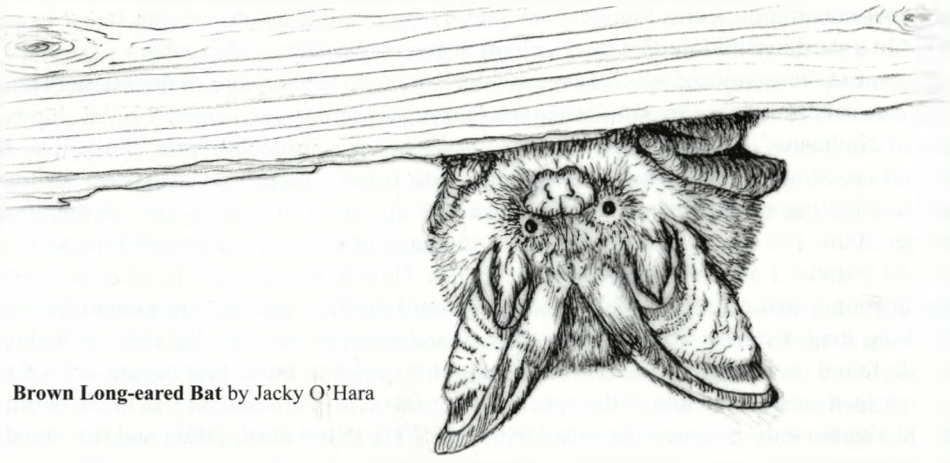
As well as an influx of migratory bats, there is undoubtedly also a resident population of Nathusius' Pipistrelle in the North East. Targeted survey work by Northumberland Bat Group, BCT and The Northumberland Nathusius Project during 2011 and 2012 has recorded Nathusius' Pipistrelle present in coastal areas of south Northumberland in every month between March and October. The species has been recorded at Bothal, Wansbeck Riverside Country Park at Ashington, Queen Elizabeth II Country Park near Ashington, Ladyburn Lake at Druridge Bay Country Park, Druridge Pools, East Chevington, Cresswell Pond, Low Hauxley and Warkworth. The species has been recorded throughout the year at several of these sites and co-ordinated surveys on one night in September 2011 found the species present at seven different sites up to 13.5 km apart at the same time. Whether this is a breeding population remains to be proven. Currently there are only two known maternity roosts in mainland UK, the nearest of which is in Lincolnshire, though Nathusius' Pipistrelles have been recorded in bat boxes in East Yorkshire in 2008 and 2010 (Russ, pers. comm., 2012).

The Nathusius' Pipistrelles in the North East may be part of a mixed gender breeding population, though to date this can not be confirmed. Equally, the possibility that there is a resident male population supplemented by females at certain times of year can not be discounted, though again neither can it be proven at present. That male Nathusius' Pipistrelles are present in autumn and at least attempting to mate in Northumberland is known. Social calls which are understood to be male mating calls were recorded in Northumberland in 2011 at several locations, including by the author near Bothal, by Hazel Makepeace at Ladyburn Lake, by Lee Miller at Queen Elizabeth II Country Park and by Tina Wiffen at Low Hauxley. Whether these attempts to attract a mate were successful is unknown.

It has been suggested that Nathusius' Pipistrelle is undergoing an expansion in range in response to climate change (Lundy *et al*, 2010). It may be that Nathusius' Pipistrelle has been under-recorded in the past or it may be that the species is becoming established in the region as this account is being published. While we still have much to learn about all bat species, perhaps Nathusius' Pipistrelle offers the greatest scope for new discoveries over the next decade or so?

Graeme Smart

BROWN LONG EARED BAT *Plecotus auritus*



Brown Long-eared Bat by Jacky O'Hara

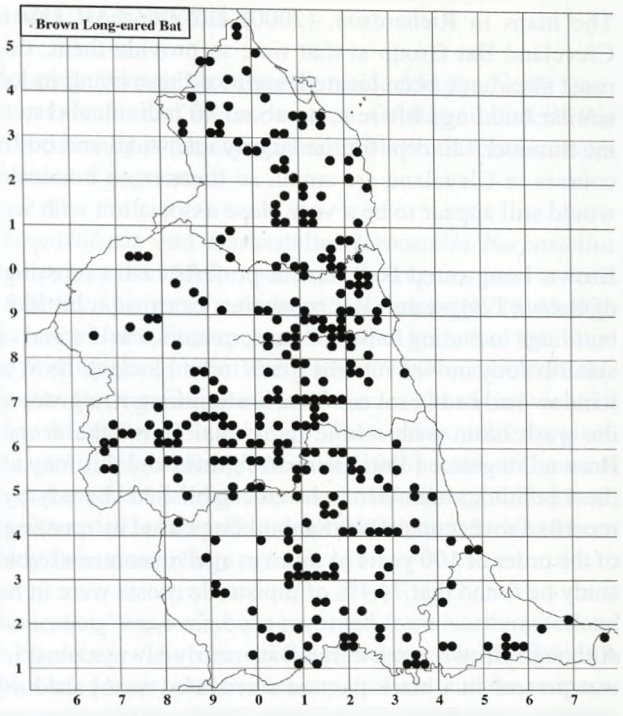
Brown Long-eared Bats are one of our most distinctive bats; they are a medium-sized bat with very long ears, which are at least 28 mm long and approximately 75% of their body length (Harris and Yalden, 2008). When they are active and their ears are erect they have a distinctive shape. Brown Long-eared Bats can also hold their ears partially erect, like rams' horns. They generally fold their ears and tuck them under their wings when at rest or hibernating leaving the long tragus projecting forward. The only similar species occurring in Britain is its close relative, the Grey Long-eared Bat *Plecotus austriacus* whose range is restricted to the very southwest of England. Brown Long-eared Bats were present in Britain in the Pleistocene and they have been recorded from Westbury-sub-Mendip, Somerset, in the mid Pleistocene and Dog Hole Fissure, Derbyshire, in the Mesolithic era (Harris and Yalden, 2008).

Brown Long-eared Bats emerge in low light levels or even complete darkness. Their echolocation calls are very quiet and the calls can be emitted by the mouth or through the nose. They have two main strategies for capturing prey: they either catch insects in flight using echolocation calls or glean prey from foliage or other surfaces by listening for movement. Around half the captures are of insects in flight and half by gleaning (Harris and Yalden, 2008). The proven maximum age for a female Brown Long-eared Bat is 30 years, with an average life span of four years (Dietz *et al.* 2009).

Brown Long-eared Bats in western Europe prefer to roost in buildings during summer and hibernate underground (Dietz *et al.,* 2009). Summer roosts have also been recorded from trees and bat boxes and they are known to use the same roost for generations. Nursery colonies comprise closely related females and these bats can inhabit a territory as small as approximately one km^2 over decades (Dietz *et al.* 2009). These figures are comparable to the data given by Harris and Yalden (2008) that Brown Long-eared Bats forage close to their roosts, within 1.5 km of the roost site and often within as little of 0.5 km. Brown Long-eared Bats are woodland specialists, foraging under tree cover but also around individual trees in parks and gardens and their roosts tend to have a strong association with tree cover.

The size of Brown Long-eared Bat colonies is generally smaller than for the other British bat species. Swift (1998) recorded colony size as averaging 20 bats in wooded valleys in central Scotland, with a maximum number of 47 bats. This is similar to that given for a range of studies (*Ibid).* In Northumberland the maximum colony size so far recorded is of 50 bats, from three

separate locations, but the largest colony recorded in Durham, of 114 bats from a cottage in Knitsley, is exceptional by most standards.



A small number of hibernacula are known to the west of County Durham and a single bat was found hibernating in the cellars of Gibside Hall in 2007; a summer roost of at least seven bats was found in the stables at Gibside in 2011. The largest hibernation roost so far recorded in the region is of 37 bats in a house at Haltwhistle. They prefer lower ambient temperatures for hibernation than most European bat species (Swift, 1998), which might explain why two Brown Long-eared Bats were found hibernating behind flaking bricks in a tunnel at Boulby, a very exposed location (Ian Bond, pers. comm., Sept 2012).

Mennell and Perkins (1864) and Bolam (1926) mention Brown Long-eared Bat, respectively describing it as "generally distributed and abundant in Northumberland and Durham" and "in our counties it seems to be everywhere common, though not noted anywhere as occurring in such numbers as either the Pipistrelle, Daubenton's or the Whiskered Bats". Bolam goes on to say it is occasionally seen around Alston "and it has been found as high up the valley as Skydes", where one was found hiding in a crevice in "Jackdaw Rocks" while the finder was looking for Jackdaw *Corvus monedula* nests. The fact that neither of these authors spent any time describing the Brown Long-eared Bat emphasises how well known the bat was at that time.

Brown Long-eared Bats are still considered to be one of our most common bat species; they are a more rural bat and avoid urban centres as can be seen on our distribution map. At the time the *Distribution Atlas of Bats in Britain and Ireland 1980-1999* was published (Richardson, 2000) the records for Durham were almost exclusively along the middle stretches of the Tees and Wear. Our current understanding of Brown Long-eared Bat distribution is very different: within County Durham the distribution of Brown Long-eared Bat does show a degree of apparent correlation with river valleys as in 2000, but this now also includes groups of records on the Browney, the Deerness and Bedburn Beck. However this may not be a true association, as it is possible that Brown Long-eared Bats show an association for the type of woodland that is mostly, but not exclusively, found along river corridors. In Northumberland Brown Long-eared bats are present throughout most of the county and the known distribution is strongly correlated to river corridors. They have been the second most frequently recorded species in Northumberland according to Northumberland Bat Group records (Ruth Hadden, pers. comm., Sept 2012).

The maps in Richardson, (2000) did not show any records for Cleveland as there was no Cleveland Bat Group at that time to provide them, though Wardhaugh (1994) stated "Eleven roost sites have been located, eight of these being in loft voids of sandstone or brick houses or similar buildings where up to about 30 individuals have been noted at a number of sites during the Summer." Except for the largely inter-tidal and built up stretch of the River Tees most water courses in Cleveland are small, so there is no noticeable association with water, though there would still appear to be a very close association with woodland.

Brown Long-eared Bats have a preference for roosting within older, grander buildings. A list of Brown Long-eared Bat roost sites can read a bit like a rural version of *Who's Who* with the buildings including halls, granges, manors, castles and churches. By contrast, in October 2003 a small colony moved into the gents toilet block at the Wynyard Woodland Park, Stockton, after a window had been broken. Clearly slumming it, a group of five bats hung high on the wall above the wash basin with a lone individual above the urinal (Ian Bond, pers. comm., Sept 2012)! Brown Long-eared Bats are roost faithful and this may also influence their choice of roost site as these buildings are older and well established. A study by Wardhaugh (1994) based on the eleven records above, concluded that buildings used by roosting Brown Long-eared Bats are "generally of the order of 100 years or more in age" in contrast to buildings used by pipistrelles; in the same study he found that 74.4% of pipistrelle roosts were in houses less than 25 years old.

Although Brown Long-eared Bats nearly always roost in older buildings a roost of at least four was present in a black painted corrugated metal shed during the summer of 2007 and the bats could be seen dropping out under from a corrugation just below the apex and were present all summer (author's own data, 2012).

Brown Long-eared Bats will also readily use bat boxes. In the Hamsterley Forest bat box scheme Brown Long-eared Bats have been found in 13 years out of 22, including examples of maternity roosts. The largest annual total was in 1992, when 18 bats were found in one box and 13 in another. Single Brown Long-eared Bats have also been found on at least three occasions in the Low Barns bat box scheme. Brown Long-eared Bats are encountered in Dormouse *Muscardinus avellanarius* boxes at Allenbanks, two males were found in the same box in July 2001 and a single bat (sex unknown) was found during checks this summer (2012).

It is not unusual for Brown Long-eared Bats to be found in a roost also used by other species. At Mount Oswald Manor, Durham, and at Hamsterley Hall, Common Pipistrelle *Pipistrellus pipistrellus*, Soprano Pipistrelle *P. pymaeus*, Natterer's Bat *Myotis natttereri* and Brown Long-eared Bat have been recorded using the same building, although the roost locations and exits have been different for each species. In the Allen Valley, in Northumberland, Brown Long-eared Bats have been recorded roosting in the same loft space as Common Pipistrelle, Soprano Pipistrelle and Natterer's Bat with all bat species forming separate clusters. In a tunnel under the Hart to Haswell Walkway in Hartlepool they use the same cracks in the ceiling as Natterer's bats, also in separate clusters but with both species as close as one metre apart. Brown Long-eared Bats have been recorded in the tunnel since 2001 and surveys have shown that at least a small number of individuals are present throughout the year (with a maximum number of 21 in September 2001), but due to the depth of the cracks the numbers could be significantly higher than those that are counted (Ian Bond, pers. comm., Sept 2012).

Tina Wiffen

VAGRANT BAT SPECIES

In addition to the nine species of bat that are known to be currently resident in the North East, certain other species may have occurred or have turned up on occasion. Of these, Leisler's Bat is given its own species account as there is currently some debate among North East bat workers as to whether it may be more than an occasional vagrant.

Both Lesser Horseshoe *Rhinolophus hipposiderus* and Barbastelle *Barbastella barbastellus* were present in Helmsley, North Yorkshire, less than 30 km south of the region, until at least the 1940s (Howes in Delaney, 1985). Neither species is mentioned in Bolam (1926) though that paper did record all six of the current nine North East species that were known at that time. However there are written references to both species in the North East. *The Newcastle Weekly Chronicle* on 31 January 1880 claimed that Barbastelles were taken in an old cavern or drift near to Twizel House, the seat of the late Mr Selby, 23 years ago. This seems unlikely given Barbastelle's current known distribution in Britain, although Millais (1906) states "The most northerly location where the species has occurred is the neighbourhood of Carlisle, Cumberland; the Rev. H.A. McPherson examined two examples in the collection of Mr Bond, which had been obtained near Carlisle by the late T.C. Heysham many years ago."

Millais (1906) also states that Lesser Horseshoe "has even been recorded from Northumberland and Durham" but unfortunately gives no details. The chapter on vertebrates in the Wildlife Trust's *The Natural History of Upper Teesdale* (Ashby, 1965) sums up the bats with the sentence "Of the bats, the Pipistrelle is common throughout the dale and the lesser horseshoe occurs up to High Force." The latter statement is almost certainly mistaken. Durham Bat Group has surveyed Middleton-in-Teesdale annually for almost 30 years without finding anything to corroborate the presence of Lesser Horseshoes and it is unlikely that such a distinctive and synanthropic species would have been overlooked.

Of other bat species, only two, Serotine *Eptesicus serotinus* and Parti-coloured Bat *Vespertilio murinus* are thought to have occurred in the region. Serotine has a distinctly southern distribution in Britain, with its core range being south of a line from Suffolk to South Wales (Hutson in Harris and Yalden, 2008) though a single male Serotine was taken near Rotherham in 1977 (Thompson in Delaney, 1985). In the 1980s Durham Bat Group members were aware of a small number of what were thought to be Serotine which occurred for a while along a tree line near Malton, west of Durham. The bats' calls were recorded but the group was unsuccessful in mist-netting them so their identity was not confirmed (Coult, pers. comm., 2012). A decade later, Geoff Billington (pers. comm., 2005) heard what he felt sure was a Serotine on a bat detector in Upper Teesdale, in the post-breeding period.

The Parti-coloured Bat record is more certain. One was found clinging to a wall, less than one metre above ground, at Seaton, near Seaham on 17 January 2011. The fact that it was found in the middle of the hibernation period suggests that it had been present in this country for a least a few months prior to that. The bat, a young male, was taken in to care but died a few days later. Its preserved skin is now in the possession of Durham Bat Group.

Parti-coloured Bats are a northern European species that are known to undertake seasonal migration and some 20 specimens have now been found in Britain or from oil rigs or ships in the North Sea (Hutson, 2008). A further three of these specimens have a tentative connection with the North East. A well-documented specimen (Stansfield, 1966) was collected alive from a

North Sea drilling rig called "Mr Cap", approximately 270 km east of Berwick-upon-Tweed, in 1965. The bat, an adult male, was taken into captivity but died shortly afterwards. Its skull and preserved skin have been stored in Sunderland Museum since then, though the bat thought to be this specimen is labelled with the date 17 August 1978 with no location given. While researching this specimen, the curator, Dan Gordon, came across another, uncatalogued Parti-coloured Bat in the Museum's spirit collection. The only information with this second specimen was that it was prepared on 21 October 1977 by a D. Cutts with the label stating "Nr Cap, 1965". Bearing in mind the label it may be that the uncatalogued specimen is actually the one referred to in the Stansfield paper. In either case the provenance of one of the bats is unknown but it is at least probable that it has some geographical connection with the North East given where it has ended up. A third specimen of Parti-coloured Bat was taken 160 miles "off Newcastle" in 2001 but went to Aberdeen and then to the Veterinary Laboratories Agency (Hutson, pers. comm., 2012).

Another bat, which has been mistakenly referred to at times as a Parti-coloured Bat, is in a collection in the Bowes Museum. It has been identified by Noel Jackson and Gill Hinchcliffe as a Hoary Bat *Lasiurus cinereus,* a North American species with the specimen's physical characteristics and circumstances described in detail by Jackson (1986). Hoary Bats are long-distance migrants and have colonised both Hawaii and the Galapagos Islands (Dietz et al, 2009). There are five European records of the species, all in autumn, its recognised migration period, of which one is from Britain, in South Ronaldsay, Orkney in 1847 (Harris and Yalden, 2008). While the identity of the bat in the Bowes museum is certain, its provenance is in some doubt. It was purchased in 1906 as part of a collection of birds from the widow of a Mr Carter of Teesdale who is believed to have collected and mounted the specimens himself. The Hoary Bat is in a case with five British bat species, all of which can be found in Teesdale today. However there are a small number of American bird species also in Mr Carter's collection, which raises the possibility that the bat was collected in America rather than its having first flown to Britain.

Just as tantalising, a possible record is given in Mennell and Perkins (1864) in which they refer to a Notch Eared Bat, *V. emarginatus* (now *Myotis emarginatus*) a single specimen of which had supposedly been taken in Long Benton (Newcastle) two years previously. It was apparently carefully examined and compared to figures of Bell and M'Gillivray and its large ears, "their length considerably exceeding that of the head", was remarked on. The Notch Eared Bat is found throughout France and Belgium (Dietz *et al*, 2009). It is not a long-range migrant but does frequently travel up to near 100 km (Hutterer *et al*, 2005). To date there are no accepted records for the Notch Eared Bat from Britain including the Channel Islands but it is a strong candidate for the next European bat species to turn up here (Hutson, pers. comm., 2012). Nevertheless if one were to turn up in Britain it is unlikely that it would be in Northumberland. It seems more likely that it was a case of mistaken identity of Natterer's Bat which it superficially resembles and of which only one record was known from the North East in Mennell and Perkins day. Unfortunately the specimen was not preserved so we will never know.

Ian Bond

SMALL MAMMALS

The small mammals section is an amalgamation of the orders of lagomorphs, rodents and insectivores. The most obvious unifying characteristic of the extant British members of these orders is that they are indeed all relatively small in size. However many of them do have other similarities such as a breed fast, die young, life history. They also include the species most readily encountered by people. Some of these disparate groups are even surveyed by the same methods; for example, small mammal traps which catch examples of both the smaller rodents and insectivores. Similarly, an analysis of owl pellets from most places in the region would likely reveal up to three insectivore and five rodent species.

Most of the species in this section are widespread in England and Wales, almost ubiquitous in some cases. Consequently there is not a great deal that can be said about their regional status, which is presumed to be similar to that nationally, and this is reflected in the shorter accounts for the shrews and certain rodents. For other small mammal species their regional status is also notable nationally; the Dormice *Muscardinus avellarius* in Allendale have long been an incongruous population that is isolated from Dormouse populations much further south, while for Harvest Mice *Micromys minutus* the Tees Valley is the most northerly place in Britain where the species is widespread. For some time the south of our region was the northernmost limit of the Grey Squirrel *Sciurus carolinensis* in England. Its regional conquest now seems to be complete though its corollary, the loss of the Red Squirrel *Scuirus vulgaris*, would appear to be still some way off, at least in Northumberland.

For many people, it is the species in this section that they are most familiar with: the squirrel or hedgehog in their garden or the rabbits and moles in the road verges. Consequently this section includes the best recorded mammals in the North East. Surely no species is easier to survey for than the Mole *Talpa europea*, or at least its most obvious sign of mole hills. This is reflected by the fact that records to date show it as being recorded in every 10 km square in our region barring two partial squares on the coast. Conversely this section also includes the most under-recorded species. Most people's reaction to a mouse is to report it to the local pest control office rather than the local Environmental Records Information Centre. If someone were lucky enough to glimpse a shrew, even if they were a mammal enthusiast, how often could they confidently tell whether it was Common or Pygmy without being able to fold its tail over its head to judge its relative proportions? Consequently House Mouse *Mus domesticus* and Pygmy Shrew could, in different ways, both claim to be the most under-recorded mammal species in our region.

That the distribution maps in this book reflect recording effort rather than the current distribution of a species is particularly highlighted in this section. Where research projects have concentrated on surveying a particular species they have in some cases, such as Water Shrew *Neomys fodiens* and Harvest Mouse, caused a re-evaluation of that species' status regionally. However this focus of attention could, if not put into context, give an exaggeratedly positive impression of a species' status. For example, the dots on the distribution maps for Red Squirrel show a much wider coverage post-2000 than pre-2000, the opposite of what was actually happening to the Red Squirrel itself in both numbers and distribution. A number of small mammals projects in the region have shown what can be achieved in evaluating a species' status and it will only be by expanding that recording effort that we will be able to improve on our current understanding.

Ian Bond

RABBIT *Oryctolagus cuniculus*

Rabbit by Thomas Bewick

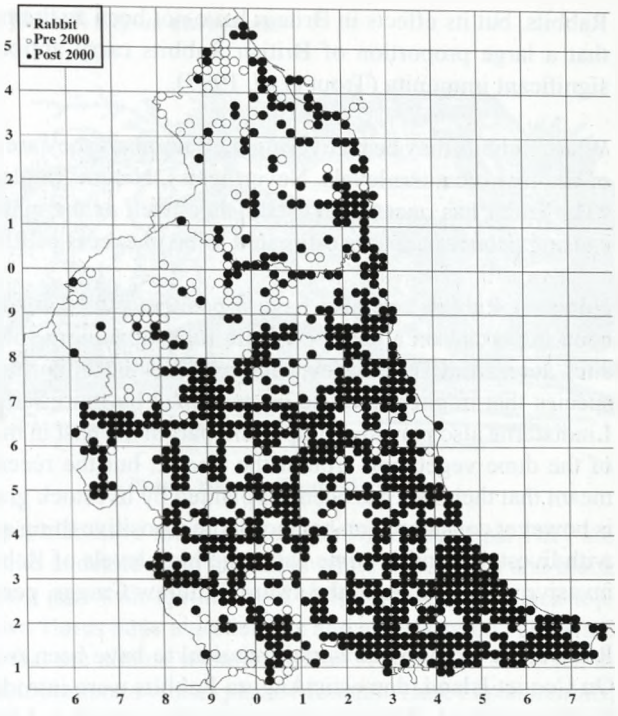
The European Rabbit is the only member of its genus and the progenitor of all domestic rabbits. The wild Rabbit weighs 1.2–2 kg and is predominately a uniform brown/grey colour with an orange nape. It has been bred domestically to produce animals of different sizes and shapes for over 1,000 years beginning in French monasteries between the 6th and 10th centuries. There are now 80 recognised domestic breeds exhibited in the UK with each having its own standards in size, shape, fur and colour. The Netherland Dwarf breed is disqualified in judging if it weighs over 1.134 kg, whereas the minimum weight for exhibiting British Giant Rabbits is 6.123 kg for does (British Rabbit Council website, 2012).

Rabbits are renowned for two things, their digging ability and their exceptional breeding rate. In fact the rabbit's scientific name translates as "a hare-like digger of underground passages" though the European Rabbit is actually one of only two out of 30 species of rabbit across the world to dig its own burrow (Lumpkin and Seidensticker, 2011). After the last glaciation the European Rabbit was confined to Iberia, but as early as Roman times it was introduced to western and central Europe as a source of fur and meat.

The Romans started to fence off areas of land in order to "farm" Rabbits, a practice known as cuniculture. This practice was continued when Rabbits were introduced to Britain, which was generally agreed to have been in the 12th century (Sheail, 1972). Substantial areas of land were cordoned off with large embankments and walls, known as warrens, in which Rabbits were contained to a large extent. Several of these were on islands or at least used the coast as a boundary to help confine the rabbits (Henderson, 1997). Sheail (1972) shows the distribution of place names in England containing the word "warren". There are 10 shown for the whole of the North East from Warrenby at Redcar in the south to Waren Mill near Bamburgh in the north: all but one are close to the coast. However the extent of warrens would have been much wider than those that left place names. For example on Lindisfarne a rabbit warren is recorded as far back as 1377, when it belonged to the See of the Bishop of Durham (Raine, 1852).

For several centuries Rabbits spread very little from the vicinity of warrens. Indeed Sheail (1972) records that "Bewick and other naturalists generally believed that wild rabbits were unable to fend for themselves and, without the protection of the warren, would soon be extirpated." It was not until changes in agricultural practices and greater game protection, from around the 1750s onwards, that rabbit populations started to increase significantly (Harris and Yalden, 2008).

The Board of Agriculture Reports for the 1790s show Durham as one of the few English counties with no reports of Rabbits though it notes several warrens on the Northumberland coast (Sheail, 1972). This is unlikely to have represented the actual situation and by 1864 Mennell and Perkins report "This species abounds everywhere in our district. The sand hills or links along our coast are an especially favourite locality, and at Bamborough and other similar places their numbers are prodigious. The Rev. H. B. Tristram informs us that the black variety is met with in Castle Eden Dene."



The Rabbit population continued to increase exponentially but while it was a valuable source of meat in the dark days of the World Wars, it nevertheless caused very serious problems for agriculture. It certainly seemed to have struck a nerve with Vesey Fitzgerald (1942): "The rabbit is a menace. It is a menace to agriculture. Up to the outbreak of war it was costing this country some millions of pounds annually … It is a menace to forestry and it is a menace to the interests of the game preserver. … Its value as a cheap … food and the value of its fur for clothing … cannot be weighed against the damage it does. It remains a menace."

Every effort was made to control and reduce Rabbit populations; however, it was not until the introduction of myxomatosis into Britain in autumn 1953 that any substantial reduction was achieved. Myxomatosis ran rampant through the wild Rabbit populations and before long perhaps 99% of Britain's wild Rabbits were dead. In the North East it will have no doubt had the same devastating effect. Tegner (1972) talks of a few recovering populations in Durham and Northumberland as if they had all but died out and Ashby (1965) makes a similar point about them recovering in Teesdale. However Rabbits must still have been widespread as the provisional distribution maps of British Mammals (Corbett, 1971), which had relatively poor coverage for most species, still shows them as present in around 20 10 km squares spread throughout much of the region for the period 1960-69, though with a notable absence from the Tees lowlands and much of upper Teesdale.

While myxomatosis continues to take a toll on Rabbits throughout the region, the emergence of less virulent strains of the disease has allowed Rabbit numbers to increase again. The National Gamebag Census recorded a significant increase in numbers over the period 1961-2009 with a rapid increase of around 109% from 1989-1995. This was followed by a significant decline from 1996 and then a stabilisation of numbers (Aebischer *et al*, 2009). It was postulated that the more recent decline was due to the introduction of Rabbit Haemorrhagic Disease (RHD), which first appeared in the UK in 1992. RHD is an extremely contagious and lethal disease in European

Rabbits, but its effects in Britain have not been as dramatic as myxomatosis, as it would appear that a large proportion of British Rabbits carry antibodies for a similar virus which confers significant immunity (Trout *et al*, 1997).

While Rabbits may be recovering their numbers they are still estimated to only be around 35-40% of pre-myxomatosis levels. Nevertheless, Natural England guidance note TIN003 (2011) states: "The rabbit has once again established itself as the major vertebrate pest of British agriculture, causing economic losses estimated to be in excess of £100 million annually".

However Rabbits can also have a positive effect: for example, their grazing and digging has been important on a localised scale for maintaining short swards and open areas in brownfield sites across the Tees Valley, thereby allowing opportunities for certain plant and invertebrate species that might otherwise be swamped by more rank vegetation. The Rabbit population on Lindisfarne also played an important part in the past in maintaining the nature conservation value of the dune vegetation around the Snook, but the recent decline in Rabbit numbers there has meant that their role has been supplanted by livestock grazing. This reduction in Rabbit numbers is however considered on balance to be a positive thing as grazing levels can be better controlled with livestock, and in some cases the high levels of Rabbit grazing were masking the spread of invasive plant species in the sward (Andrew Craggs, pers. comm., July 2012).

Rabbits are the only terrestrial mammal to have been recorded on the other North East islands. On Coquet Island, domestic Angora Rabbits were introduced in the 19th century by the Duke of Northumberland. While this domestic strain might not have persisted, there was a population of Rabbits there until the winter of 2004/05 when they died out (Paul Morrison, pers. comm., July 2012). On the Farne Islands the long-standing Rabbit population on Inner Farne was initially eliminated by the wardens in 1972 but was re-introduced in 1973 when it was realised that they were performing a useful function, which benefited the nesting birds. The restricted habitat on Inner Farne meant that numbers were kept low, with as few as ten over the winter period when they would supplement their diet by eating seaweed (Perry, 1978). In February 2008 wardens arrived on the island to find Rabbits lying dead, thought to be the results of a viral disease, though tests by the University of St Andrews found that these were the most inbred Rabbits that they had ever tested. This was the end of the current population on Inner Farne, though Rabbits still exist on the smaller island of West Wideopens, and a consultation is currently underway about re-introducing Rabbits to Inner Farne (David Steel, pers. comm., Sept 2012).

The Rabbit is one of the most ubiquitous and most recorded mammal species in our region. It has been recorded in all 10 km squares with the exception of four, part squares on the western border; a coverage only exceeded by Mole *Talpa europea*. Northumbria Mammal Group does not have any data on relative population sizes across the region but anecdotally Rabbit numbers seem to be particularly noticeable in the uplands to the west of the region based on road kill. However this may just be due to populations in those areas being concentrated near to roads and away from possibly less favourable areas such as extensive heather moorland. In the borough of Hartlepool, where the authors are currently based, it has been recorded in every tetrad including a small, isolated population around the former gun battery on the tip of Hartlepool Headland. It is likely that a similar situation exists across much of the rest of the lowlands in the North East.

Jonathan Pounder and Ian Bond

BROWN HARE *Lepus europaeus*

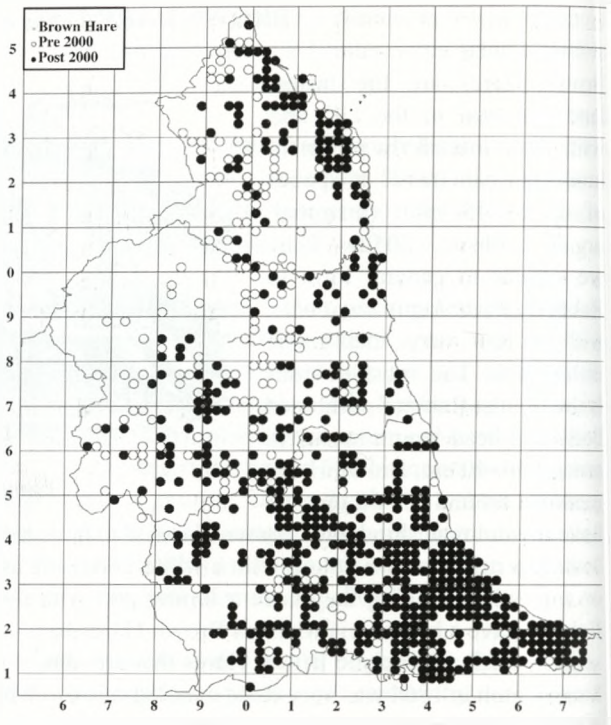
Brown Hare by Thomas Bewick

Brown Hares are the fastest land mammal in the UK and with their incredibly powerful hind legs can travel at speeds of up to 45 mph (mammal.org.uk website, 2012). They are similar in general form to Rabbits *Oryctolagus cuniculus*, with a few very identifiable differences. The most obvious is that whilst Rabbits' combined body and head length measures around 30–40 cm, Brown Hares measure around 52–60 cm and have much longer hind legs. Brown Hares also have much longer ears with black tips. They are usually a russet-brown colour with a white underside and the tail is white underneath and black on top; when running they have a loping gait with the tail held down showing its black top. Rabbits have a brown iris whereas Brown Hares have a golden iris and a black pupil. There are some records of leucistic Brown Hares that are almost white in colour. A specimen collected in Stannington in 1964 was very close in colouration to winter phase Mountain Hare *Lepus timidus*, which could potentially cause confusion.

Brown Hares prefer open areas such as grassland and arable habitats, where they forage nocturnally, but they will use nearby woodlands and hedgerows to provide cover during the day. Over their global distribution they are noted to use a wider variety of habitats including marsh and saltmarsh (Flux and Angermann, 1990) and it is worth noting that around Saltholme on Teesside (which is a large area of grazing marsh, criss-crossed by numerous shallow pools and creeks), hares have been observed to plough through shallow water and also to swim on several occasions. Vesey Fitzgerald (1943) claims that they swim well and "will do so apparently for pleasure". They do not use burrows as Rabbits do, but instead use shallow depressions to provide cover while they rest, and these dips are referred to as "forms". Brown Hares are most active during the early morning and at dusk, but in March they can be seen more regularly during the day as they conduct their traditional "mad March hare" boxing matches. These signal the start of their breeding season, although they are known to start breeding earlier in the year when the weather allows, so that "mad March hares" are spotted throughout spring/summer. Females produce up to four litters each year and because the young (known as leverets) are born in the forms rather than in safer burrows like Rabbits, they are born with fur and with eyes open. Leverets are also active almost immediately after birth, so they are able to escape from predators. Even so Fox *Vulpes vulpes* predation of leverets is the main cause of mortality (Jennings in Harris and Yalden, 2008). The home range of Brown Hares is roughly 300 hectares, and whilst generally solitary they will share this home range with other hares as they are not territorially aggressive.

Hares figure prominently in mythology across the world as animals of great guile and often associated with the supernatural (Carnell, 2010). On the North York Moors this took the form of the "Witch-hare", an animal that causes mischief whilst eluding its pursuers until such time as

some ritual makes it vulnerable. The tale ends with the hare being wounded by a dog or gun only to disappear into a building, and when the building is searched an old woman is found, out of breath and bearing the same wound (Rhea, 1985). This story is echoed in the tale of the Easington Hare, which frequented Castle Eden Dene and led greyhounds to their deaths before being tracked down and seized on the leg by a coal-black bloodhound, which had been given human milk to drink.



This close association with people and the attributing of supernatural powers may be in part explained by the hare's curiosity, as they will often approach or follow people, sometimes quite closely. When he was a student at Durham University, Kevin O'Hara had a pet leveret called Hartley which was found when still not weaned and which became a bit of a mascot. It eventually moved off, but often when Kevin was playing rugby a hare would appear and seemingly watch the match: that is if it was a hare! Their familiarity is reflected in a number of placename references in the North East, such as Harelaw near Wooler, Hareshaw Common, Harehope and Harewalls.

Brown Hares are widespread across central and western Europe including England and Wales but are absent from northwest Scotland (Jennings in Harris and Yalden, 2008). It is not known exactly when Brown Hares first appeared in Britain but due to the lack of evidence of the species at any pre-Roman site it has been assumed that they were introduced to Britain by the Romans around 2,000 years ago and quickly became widespread across lowland England and Scotland (Corbet, 1986).

Up to the 1920s numbers of Brown Hare were high and increasing, but after that they declined until the latter half of World War II. Numbers then appear to have increased steadily until 1960, although not returning to pre-1920 levels. The decline in Rabbit numbers in the late 1950s may have helped the increase in hare numbers as they filled the niche left by the rabbits (Barnes and Tapper, 1986). Between the 1960s and 1980s the population of Brown Hares dropped dramatically (Tapper, 1992; Hutchings and Harris, 1996). It is likely that agricultural intensification was a major factor in this decline, as it led to habitat fragmentation and destruction and the loss of some vital food sources. Increases in Fox numbers, combined with shooting, poaching and coursing may also have contributed to the decline (Hutchings and Harris, 1996). The National Hare Survey in 2001 estimated the current population of Brown Hares in Britain to be between 800,000 and 1,250,000.

In Northumberland and Durham the records of Brown Hare show a dramatic increase post-2000 which is largely due to increased recording effort. In particular, a Brown Hare public recording project in the Tees Valley has shown that they are very widespread there in suitable habitats. In fact a fairly accurate outline of the urban areas of Stockton, Middlesbrough and Darlington as well as the coastal towns of Hartlepool and Redcar shows up on the distribution map as the only areas where hares are absent. Brown Hare occur in good numbers around the industrial sites and grazing marsh areas of Teesmouth, in spite of the high numbers of foxes in those areas. This appears to have long been the case, with Gill (in Page, 1905) stating: "Mr Lofthouse states that they show a particular fondness for the reclaimed areas around the Tees." They are particularly evident at the RSPB's reserve at Saltholme where they are an advertised part of the wildlife tourism attraction.

They are regularly encountered in upland areas dominated by grassland habitats, for example in Teesdale and much of the Cheviot Hills. In-bye fields near upland farms are favoured at times, particularly when adjacent hills are snowbound for long periods. A group of 90 has been noted in this situation in the Breamish Valley near Wooler (John Steele, pers. comm., 2012). They also appear to be relatively common on the moorland edge along the A171, particularly around Birk Brow, at least if casual records of road kill are anything to go by. As can be seen from our distribution map, they are widespread throughout the lowlands even occurring on Lindisfarne. Twenty-three hares were counted as part of a farmland bird survey in 5 km^2 of mixed farmland/ woodland on the edge of the Cheviots (John Steele, pers. comm., 2012). This area was heavily keepered to reduce the number of foxes so may have resulted in artificially high numbers of hares, with a similar situation likely to occur in much of the Cheviots where grouse keepers legitimately control ground predators.

Flux and Angermann (1990) considered that Brown Hares were probably the most important game animal in Europe and they have been hunted by various means in the North East. The earliest reference to hunting the hare in our region is in 1766 when "some gentlemen were hunting on Gateshead Fell the hare and three hounds fell into an old pit hole and were drowned" (Page, 1905). Since then hares have been hunted with beagles and harriers and coursed legally and illegally with greyhounds and lurchers across the region. The Weardale Beagles were the last pack to hunt in County Durham, and at one time Brown Hares were regularly hunted along the military road in Hadrian's Wall country with a beagle pack that was kept in the area. Organised hare coursing was once popular, with numerous small meets organised across the region and persisting until recent years. Kevin O'Hara (pers. comm., 2012) remembers organised coursing events in the hills around Sunderland until the 1970s, when the construction of the A19 stopped them as its route went right through the main area near Doxford International. Many Durham miners had their own small scale events to try greyhound and whippet, and in some cases the "hare" was nothing more than a piece of rag tied to a string with an upturned old bicycle being used to wind in the string very quickly around the wheel frame. Hares were coursed illegally using greyhounds, whippets and lurchers either by day or at night with lamps. Despite the Hunting Act (2004) making this illegal it still occurs across the region.

Despite continued illegal persecution and also legitimate shooting which controls numbers locally, on balance it seems that the patchwork of land uses and habitats in the North East, and the control of foxes in certain areas, suits Brown Hares, as they are still widespread across the whole region and even common in places.

Rhia McBain and Ian Bond

MOUNTAIN HARE *Lepus timidus*

Mountain Hare by John Millais

The Mountain or Blue Hare is thought to be Britain's only native lagomorph. It may have survived in southern Britain during the last glaciation, when the ice sheet extended south over the whole of what is now the North East region and ended in the east more or less in line with the current political boundary on the northern edge of the North York Moors. It was certainly common in the warmer interlude (The Windermere Insterstadial) towards the end of the last glaciation, where it was larger than present day specimens and regularly hunted by Paleolothic humans (Yalden, 1999). Post glacial remains of the species have been recovered from Teesdale Cave in Upper Teesdale and the North York Moors (Simms, 1975).

It is one of the most widespread hare species across the world, ranging from Scandinavia to the Pacific coast, although in Western Europe it is naturally occurring only in the Alps, Scotland and Ireland. Globally it inhabits tundra and open forest, but in Scotland it is principally associated with heather moorland (Flux and Angermann, 1990). Mountain Hares feed extensively on young heather. They therefore do well on grouse moors where the practice of burning heather encourages new growth. Mallon *et al.* (2003) estimated hares at a density of 60/km^2 in heather in the Peak District but only half that density in the grassland there.

It is smaller than the Brown Hare *Lepus europeaus* with relatively shorter ears and a more compact body form. Its coat colour varies seasonally being blue-grey in summer and often white in winter, and it lacks any black markings on the upper side of the tail. The latter is a useful distinguishing feature as pale Brown Hares have been recorded (see Brown Hare account).

Mallon *et al.* (2003) note that where Mountain Hare occurs in the Peak District it is found in different areas to Brown Hare. Mountain Hare are found on the moorland and Brown Hare in the valleys and farmland but interestingly, outside of the Mountain Hares range in the Peak District, Brown Hares are found on moorland. Nevertheless they consider that this may be due to different habitat preferences in the two areas rather than the Mountain Hare out-competing the Brown Hare. It has been postulated that the contracting distribution of Mountain Hare since the last glaciation might be mediated by the Brown Hare both through interspecific competition and hybridisation (Thulin, 2003). If this is the case it may be that there is little in the way of a vacant habitat niche for Mountain Hare in the North East, as the authors have observed Brown Hare on the top of Cheviot, the highest point in the North East, and also on heather moorland on the North York Moors.

In Scotland it is found chiefly in the eastern Highland region though it has been introduced to a number of places including The Borders. A survey of landowners and gamekeepers in 2006/07 (Patton *et al*, 2010) found that the hectad closest to the North East, where it occurred in more than 10% of the hectad, was grid square NT51 with between 40 and 70% of the area positive for Mountain Hare. The study did not present results for hectads with less than 10% Mountain Hare presence so may have missed hectads where the species occurs at low density closer to the border. On the other hand, a study by Kinrade *et al.* (2007) found Mountain Hare as close 15 km from Cheviot and only separated from it by moorland, and Tegner (1969) records a nearly all-white one, a road kill, above Liddle Water at Carter Bar on the Scottish/English Border in March 1966. In England and Wales it is known to have been introduced in the Peak District, Snowdonia, the Lake District and the Cheviots, though other than the Peak District all of the introductions are supposed to have died out (Hewson and Yalden, 1995).

The exact history of introductions to Northumberland is not known but they are believed to have stemmed from releases in the late 19th and early 20th centuries by a previous Duke of Northumberland (Tegner, 1972). Mennell and Perkins (1864) did not know of any records of the species in the North East though they noted that it inhabited Cumberland and Westmorland. They also reported a particularly unsuccessful introduction of Blue Hares to Castle Eden, recounted by Rev. H.B. Tristram, in which all of the hares were dead within a year. A letter in the archives of the Natural History Society of Northumbria from L. MacLean, ex-head keeper of the Duke of Northumberland, states that Blue Hares were turned down at Kielder in about 1902 and that the stock came from the Inverary Estate. There was also an introduction at Freemans Gap pond in Alnwick Park although this stock had become extinct by the time of writing. The letter notes that they were originally released to divert foxes away from the grouse.

In another letter, this time from Matthew Philipson of Haltwhistle to Ernest Blezard at Tullie House Museum in 1954, it is stated that there were "still a few Mountain Hare on the wild hills of north east Cumberland and up the western boundary of Northumberland. These are all descendants of the number brought from Inverness 50 years ago and released ... by Mr Munsay. Naturally they flourished on this mighty expanse of white moorland." (Tullie House Museum Virtual Fauna website, 2012). According to Philipson these hares were released at Smale, Falstone, which is just east of the current Kielder reservoir. It is likely that there were a number of other unrecorded introductions across Northumberland. Tegner (1972) states that "The blue or original hare, is still to be seen in the North Tyne valley, the northern Pennine range and occasionally in the Cheviots." In fact it is in the Cheviots where most of the subsequent records have occurred though the species appears to have always been thin on the ground. A keeper on Linhope ground in the Breamish Valley from 1958 to 1968 only saw one animal on Hedgehope in that time; a stuffed, possible Cheviot specimen is in his family (pers. comm. to John Steele, 2012). Similarly a Warden for the National Park from the mid-1970s to 1999 who has lived and worked in the Breamish Valley all his life, was aware of them in small numbers in the area until the 1963 winter snows when he feels they disappeared.

Mallon *et al.* (2003) state that the introduced population in Northumberland died out in the 1970s. This may have been the case as there appear to be no records for most of that decade other than Tegner who was probably referring to the late 1960s. However they were seen by a forester on the Lint Lands near High Bleakhope when planting Uswayford Forest in 1979 (pers. comm. to John Steele, 1989) and by the 1980s they were "definitely present in the Cheviots" (Ian Douglas, pers. comm. to Ian Bond, 2001). Meanwhile back in the Kielder district in the

late 1980s, Mountain Hare were a regular though not common feature among the prey items at a raptor's nest, though it is possible that these had been brought in from across the Scottish border (Martin Davison, pers. comm., 1980s).

The 1990s again seem to draw a blank for records and the Institute of Terrestrial Ecology's *Atlas of Mammals in Britain* (Arnold, 1993) shows no records for the North East. *The Red Data Book for Northumberland* (Kerslake, 1998) states "It was formerly present, certainly until the mid 1980s, in the Harthope Valley. There have been recent unconfirmed sightings. More research is required." It was not until April 2000 that there was another definite record, when Kevin O'Hara saw one in upper Coquetdale, just round the corner from Linshiels; it was half way through the moult.

It is not until recent years that there has been more than the odd isolated record, again mostly around the Cheviots. The Head Keeper for Lilburn Estate (covering Cheviot, Harthope Valley, Commonburn, Threestoneburn, The Dodd and Ilderton) has been on the ground since 1995 and had not seen any until 2010, when on a grouse drive on his neighbour's ground at Linhope he saw one animal come through the grouse butt line. His beat keeper saw two animals together near the trig point on Cheviot as recently as December 2011. One was seen by a shepherd in winter 2010/11 on the edge of Cheviot and they have occasionally been reported to Northumberland National Park staff in recent years. A small number were also seen in 2011 around Hedgehope Hill in the Upper Breamish. The only 21st century record from the west of Northumberland appears to be by Martin Davidson from Kielder Village around 2007.

Further south there have been a number of unconfirmed reports. There is a recent report from Allendale (Martin Kitching, pers. comm. to Ian Bond, 2012) and a single, unconfirmed report of a white hare being taken in Upper Weardale in the 1970s (Kevin O' Hara, pers. comm. to Ian Bond, 2011). There is nothing to suggest that these are more than just isolated cases; there is no history of a population in either of those locations. Ashby (1965) considered that the Mountain Hare occurred on higher ground in Teesdale, which may be the case as more recently there are occasional, reliable-sounding reports from Cross Fell around the border between Cumbria and Upper Teesdale (Terry Coult, pers. comm. to Ian Bond, 2012). In the very south of our region there never appear to have been any records of Mountain Hare in the North York Moors National Park (Oxford *et al*, 2007; Delaney, 1985): this in spite of it being the largest expanse of heather moorland in England.

Clearly there is not currently a thriving population of Mountain Hare in the North East nor does it appear that there has been a continuous population since the first introductions. Given that it occurs not far north of the Scottish border, certain records, particularly in the Cheviots, could possibly stem from dispersing individuals. Records elsewhere are likely to be the result of a number of unrecorded releases, probably of small numbers of individuals. Nevertheless it would seem that in 2012 the Mountain Hare has a presence in the Cheviots and long may that continue.

John Steele and Ian Bond

RED SQUIRREL *Sciurus vulgaris*

The Red Squirrel is the only species of squirrel native to the UK and Western Europe. It is about half the size of its congener, the Grey Squirrel *Sciurus carolinensis*, with mean head and body length 220 mm, mean tail length 180 mm and weight ranging from 239-435 g (male) and 220-355 g (female).

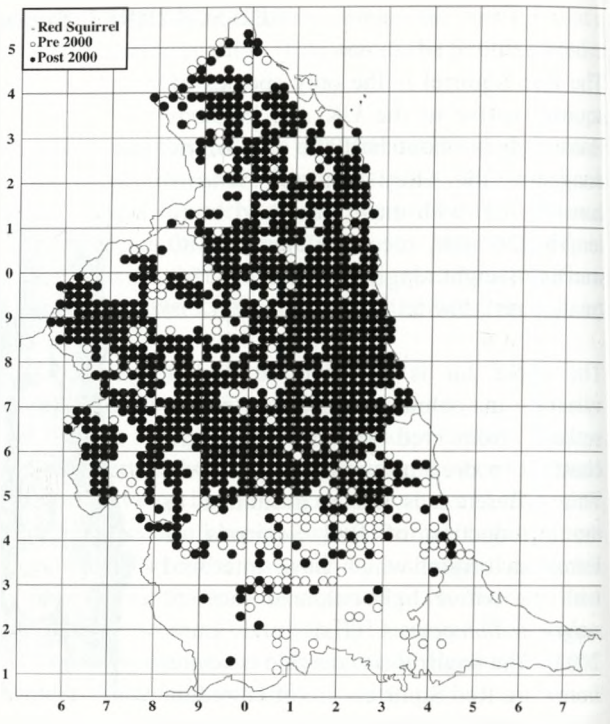
Red Squirrel by Terry Coult

The upper fur is uniformly dark but variable in colour, according to the season, from red brown or bright chestnut to deep brown or grey brown. This difference is partly attributed to the introduction of Red Squirrels of European origin, which have interbred with the native light-coloured race, *S. vulgaris leucocorus* (Hale and Lurz, 2003). The squirrel's underside is white. Immature Red Squirrels are often redder than adults (Barrett-Hamilton and Hinton, 1910-1921). Body fur moults twice a year, in spring and autumn, with the hairs being longer in winter than in summer. The bushy tail is dark brown in the autumn and bleaches over the summer, moulting only once a year in the autumn. A characteristic feature of a Red Squirrel in winter pelage is the long dark ear tufts, which thin or disappear during the spring and summer. The total British population estimate is 161,000 (Harris and Yalden, 2008).

The Red Squirrel is diurnal, does not hibernate, swims well should the need arise, has two litters per year, produces up to six kittens per litter (average three) and can live up to six or seven years in the wild (mean three years; up to 10 years in captivity). Red Squirrels spend an average of 70% of their foraging time in trees. The population density is 0.5-1.5/ha for both deciduous and coniferous forest.

Fossil records indicate that the first recognizable tree squirrel (*Protosciurus*) probably evolved about 34 million years ago and the first tree squirrel in Britain, White's Squirrel *Sciurus whitei*, evolved during the Pleistocene in the Cromerian period, 780,000 to 450,000 years ago (Holm, 1987; Harris and Yalden, 2008). White's Squirrel seems to have been the ancestor of the Red Squirrel: it was present in the coniferous woodland which covered Britain at that time but appears to have died out during the Ice Ages. *S. vulgaris* appeared at the end of the last Ice Age, 7,000-10,000 years ago (Holm, 1987). The earliest British fossil record dates from the Mesolithic period, 8,710 BP (Harris and Yalden, 2008).

Records of the existence of Red Squirrels in northern England begin in the 1st century AD, with museum specimens of squirrel carvings (Shorten, 1962). The squirrel is part of the coats-of-arms of some northern county families, and is on the 8th century Bewcastle Cross. Its skin



"was known in commerce in Berwick in 1377; the skins however may have been imported" (Barrett-Hamilton and Hinton, 1910-1921). Red Squirrel populations have fluctuated throughout the centuries through disease or bad weather. During the 15th and 16th centuries the national need for timber as fuel for industry, agriculture and war resulted in extensive deforestation and neglect of woodlands. This, plus a series of bad winters, resulted in rapid declines in squirrel populations, almost to the point of extinction in some areas. Then, during the 19th century, large forests were planted to replace those ancient woodlands and there were various Red Squirrel re-introductions. So, with plenty of suitable habitat, Red Squirrels multiplied again until they reached "peak numbers" (Holm, 1987). Barrett-Hamilton and Hinton (1910-1921) state that they "were common in all woodland localities of Great Britain, except only those in which numbers are kept in check by persecution". In 1889, 2,281 Red Squirrels were shot as timber pests by the Commissioners of the New Forest, and in 1903 the Highland Squirrel Club proudly announced the destruction of 82,000 Red Squirrels in the first 30 years of the club's existence (Holm, 1987).

Red Squirrel distribution in the North East may reflect the national pattern. In 1864 Mennell and Perkins wrote about squirrels in Northumberland: "Red Squirrels are abundant in many parts of our district, especially about Riding Mill, Hexham and Shotley Bridge, and in the woods north of Morpeth, but are not by any means universally distributed." They cite the Reverend Bigge who wrote: "the red squirrel appeared a few years ago at Matfen, Cheeseburn Grange and Dissington," suggesting that they were extending their range at this time. Records in the regional database for 1879 confirm their presence at two of these Northumberland sites.

In County Durham, a Mr Hutchinson (cited by Mennell and Perkins, 1864) wrote in 1840: "Squirrels some few years ago were not known in this County. They were first introduced by Salvin of Burn Hall, and have increased and extended to most of the wooded parts." By 1864 Mennell and Perkins found them "common in some areas of Durham County, for example, St John's, Weardale, but not others". The first Red Squirrel record on the regional database for County Durham was near Stanhope in 1879. From various reports around 1900 Temperley (1953) suggests that the squirrels' local distribution actually fluctuated, but that they were "normally present at Gibside and in Chopwell woods" at that time.

As the Grey Squirrel began to establish itself in Britain around the turn of the last century (see Grey Squirrel account) some naturalists quickly became aware of the potential threat to the Red Squirrel: "... should it (the grey squirrel) gain a good footing here, as seems not unlikely, it

will prove most probably to be a most formidable rival for our native species to face" (Barrett-Hamilton and Hinton, 1910-1921).

In 1953 Temperley conducted the first co-ordinated Red/Grey Squirrel survey across Northumberland and Durham. Red Squirrel presence was confirmed in all the woodland areas surveyed in Northumberland. They were also in many gardens and houses where they apparently came indoors regularly for food and were often kept as pets (Pitt, 1946).

However, in County Durham Temperley's surveyors found them "generally scarcer than they had been in earlier years", having "declined of late years", and said that "The best populations were to be seen in the Forestry Commission plantations at Hamsterley and Bedburn." Some people attributed this loss to the bad winter of 1946/47, but others disagreed. One surveyor was quoted as saying "I have also seen specimens with skin trouble similar to mange in foxes, but not often."

From the 1960s onwards, the regional database gives an interesting insight into Red Squirrel distributions (and probably observer effort, as awareness began to be raised). In the 1960s, records were few and far between (17 records overall) but Red Squirrels were to be found in areas with suitable habitat across Northumberland and most of Durham except the southeast. Through the 1970s and 1980s numbers of recorded sightings increased (106 and 240 respectively), with many more records coming in from the west of County Durham than the east.

Research into the decline had been sporadically ongoing since Middleton's ground-breaking paper in 1930. From the early 1980s onwards it began to intensify. A comprehensive summary can be obtained by referring to Harris and Yalden (2008) and it is now well established that the presence of the Grey Squirrel is instrumental in the decline of the Red Squirrel.

Grey Squirrels displace reds in two ways: by the transmission of squirrelpox virus (SQPV), to which they are immune, but which is fatal to reds (for further information see, for example, Bruemmer, 2010), and through interspecific competition for food and habitat which reduces female fecundity and juvenile recruitment (Wauters *et al*, 2002; and for review see Harris and Yalden, 2008).

Our distribution map shows a lack of Red Squirrels in southeast Cleveland pre-2000. The Environmental Records Information Centre (ERIC) does not have records for that area before 1974 because the land was part of the North Riding of Yorkshire at that time. However, a distribution map for Red Squirrels in Yorkshire, (Tonkin, 1985) showed that there had been no records of Red Squirrels in the area just south of the Tees since 1955. Arnold's distribution atlas of 1993 shows that they may not have been there since 1959. County Durham's ecologists were also noticing a loss of Red Squirrel populations, especially in the south of the county. In Cleveland, north of the Tees, the species was reported in the woodland complexes of Wynard up to the early 1980s (John Pickard, pers. comm. to Ian Bond, 2001). It hung on much longer in the Thorpe Bulmer Dene complex between Hartlepool and Easington where the last report was in November 2005. The previous year the gamekeeper covering those woodland areas claimed to have culled 120 Grey Squirrels and blood tests on some of those proved that they carried SQPV (Ian Bond, pers. comm., 2012). Red Squirrels seem to have also disappeared from east Durham at around this time, with the last sighting in Castle Eden Dene in August 2004 (ERIC database, 2012). The database also records that a poxed corpse from Peterlee was sent for post mortem in June 2005.

When Grey Squirrels arrived in Northumberland (first ERIC record is 1989 in Hexham) the decision was taken to try to save its population of Red Squirrels. Conservation strategies were initiated: The Red Alert North East programme was set up in 1991 (founded by Lord Ridley) and immediately conducted the first Red Squirrel survey, using records from the public which resulted in more than 1,200 records in the first year. Co-ordinating with Red Alert North West (1993) and the "Red Squirrels in South Scotland" project (1994), the Wildlife Trusts continued to use this initiative to promote public awareness by talks, surveys, habitat management and liaising with landowners (Stewart, 1997). In support of this, local governments wrote Biodiversity Action Plans for Red Squirrel conservation.

Further strategies were initiated, using the latest research undertaken by Peter Lurz at Newcastle University and John Gurnell at the University of London. This resulted in 16 key Red Squirrel reserves being identified across Northumberland to be managed for Red Squirrels (later increased to 17). The "Save Our Squirrels Project" which ran from 2006-2011, funded by the Heritage Lottery Fund, carried out habitat management and squirrel conservation activities with landowners and managers in the reserves and surrounding areas. Volunteer Red Squirrel conservation groups were established, under the umbrella of Northern Red Squirrels.

In April 2009 the conservation effort went national with the formation of the Red Squirrel Survival Trust (RSST), under the patronage of HRH Prince of Wales. The RSST launched Red Squirrels Northern England (RSNE) in February 2011. It is a partnership project between RSST, Natural England, the Forestry Commission and the Wildlife Trusts and is the largest, most ambitious Red Squirrel conservation project yet launched. RSNE aims to safeguard and extend Red Squirrel populations and limit the impact of Grey Squirrels on Red Squirrel populations in northern England. Two hundred and seventy tetrads across Northumberland, from Slaley and the Derwent Valley northwards, have been identified and 80 woodlands are being monitored bi-annually. Employed staff are carrying out Grey Squirrel control by trapping. The objective is to confirm that, with sufficient effort, it is possible to retain a Red Squirrel population if Grey Squirrels are consistently removed (Nick Mason, pers. comm., 2012). The results of the first RSNE monitoring survey are shown in Figure 1 (over page).

In 2012 Red Squirrel distribution north of the River Tyne is still widespread in suitable habitat. In County Durham and Teesside the species is extinct except for populations at St John's Weardale, where a Red Squirrel was photographed in November 2011; Pow Hill, where a Red Squirrel was unfortunately shot in August 2012 (T. Coult, pers. comm., 2012); the National Trust estate at Gibside, latest sighting 14 April 2012; and Ruffside, with probable small populations remaining at Killhope and Harbour House (T. Coult and H. McDonald, pers. comm., May 2012).

The Red Squirrel is protected by the Wildlife and Countryside Act (1981) Schedule 5 and 6 (as amended). For details of legislative protection, a summary of UK BAP status and recocommended actions, survey methodology and impact assessment see Gurnell and Lurz (2012).

Veronica Carnell

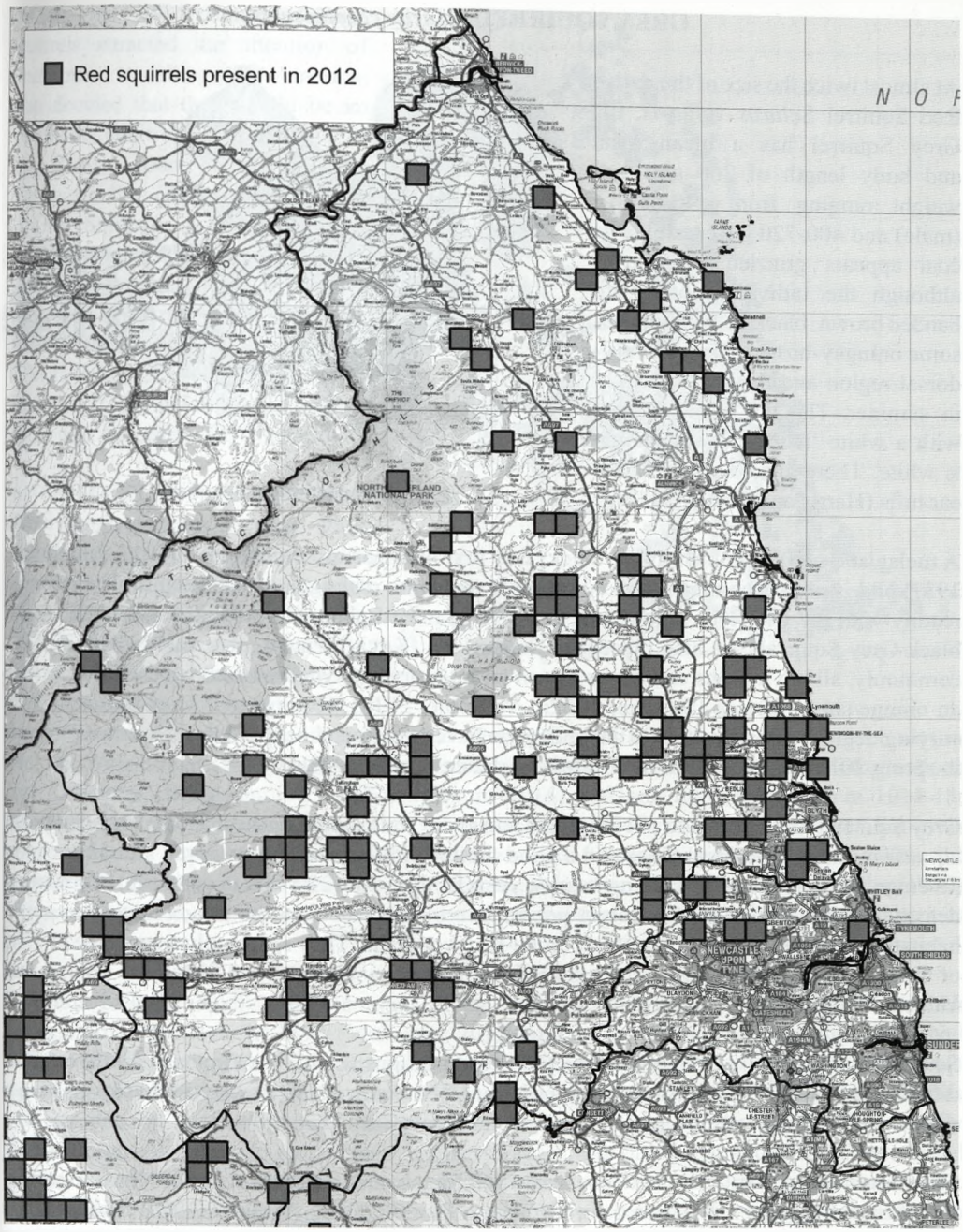


Figure 1. Map of results for Red Squirrel from the first bi-annual squirrel monitoring survey in Northumberland, March-May 2012 (courtesy RSNE).

GREY SQUIRREL *Sciurus carolinensis*

At almost twice the size of the native Red Squirrel *Sciurus vulgaris*, the Grey Squirrel has a mean head and body length of 260 mm and weight ranging from 440-650 g (male) and 400-720 g (female). The coat appears grizzled silver-grey, although the individual hairs are banded brown, black and white, with some orangey-brown along the mid-dorsal region and flanks, especially in summer. The tail is silver-grey with a white 'halo'. The underside is white. There are no conspicuous ear tufts (Harris and Yalden, 2008).

Grey Squirrel by Terry Coult

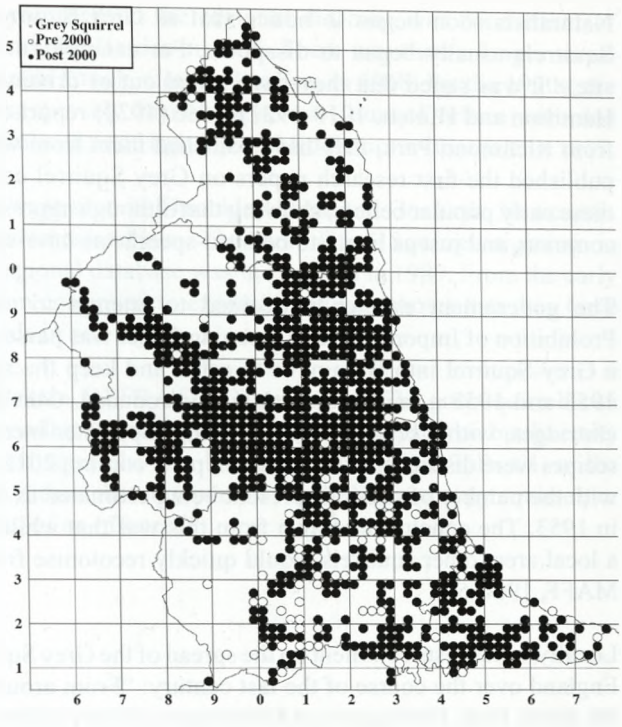
A melanistic morph, uniformly jet black, was first reported in Letchworth in 1912 (Middleton, 1931) and is now becoming fairly common in the south of England. Black squirrels interbreed readily with the wild-type colour and they live in mixed populations of grey and black. Dark/black Grey Squirrels are also present in Sunderland (Kevin O'Hara, pers. comm., 2012). Less commonly, albino morphs can occur as can an intermediate colour, which is brown-black with an orange/tan underside (Shorten, 1962a; McRobie, 2012). Examples of Grey Squirrels with varying degrees of orange/tan on the underside have been found near Prudhoe, Northumberland, in spring 2012 (Northern Red Squirrels Newsletter, Spring 2012).

Grey Squirrels are diurnal, do not hibernate and swim well should the need arise. They can breed all year round with mild weather and a good food supply, produce up to seven kittens per litter (average three) and can live for up to nine years in the wild (20 years in captivity). Population density can be up to more than eight per hectare in oak woodland but much lower in conifer habitats, varying with the proximity of broad-leaf woodland. They spend only an average of 14% of their foraging time in trees. The total British population estimate is 2.52 million (Harris and Yalden, 2008).

Squirrels can generally be identified by their feeding signs (Stehli and Brohmer, 1965) but it is difficult to reliably distinguish between Grey and Red Squirrels in this way and direct sightings are recommended to confirm presence to species level (Gurnell *et al*, 2012).

Grey Squirrels are native to the dense hardwood forests of the eastern states of North America, from Ontario and New Brunswick in Canada to Florida, USA. Anthony (1928) distinguishes two sub-species in the squirrel's native range. *S. carolinensis carolinensis*, the Southern Gray Squirrel, is the smaller of the two and inhabits the southern part of the species' overall range as far north as the lower Hudson Valley. *S. carolinensis leucotis* is "larger and grayer, and apt to occur in black or melanistic phase, with various degrees of intergradations occurring". Its distribution is more northern, including Pennsylvania and southern Ontario (Laidler, 1980). Shorten (1962a) states that there are actually five sub-species of Grey Squirrel in North America, but these two sub-species are probably the only ancestors of the Grey Squirrel in Britain.

During the 19th century "gray" squirrels attracted the attention of gentlemen travelling in America, who decided that they would be an "aesthetic addition to the fauna of the British countryside" (Laidler, 1980). Laidler (1980) cites records of Grey Squirrels in Britain as early as 1828, but says these seem to have disappeared. All authors agree that the first recorded successful introduction was in 1876, when Mr T. V. Brocklehurst released four Grey Squirrels from the USA into Henbury Park, near Macclesfield, Cheshire.



In 1889, Mr G. S. Page released five Grey Squirrels into Bushey Park, Middlesex, but this introduction was apparently unsuccessful, so he tried again, importing 10 squirrels from the USA in 1890 which were released at Woburn Abbey, Bedfordshire, by the 9th Duke of Bedford. The offspring of these squirrels were subsequently introduced into eight areas of England, one of which was in Malton, Yorkshire in 1906, where 36 animals were released. There were two more introductions into Yorkshire (Bedale in 1913 and Bingley in 1914) and one into Darlington in 1914-15, though the sources of these animals is unknown (McRobie, 2012; Laidler, 1980). Grey Squirrels continued to be imported and translocated into new sites across Britain until at least 1929, and probably up to 1937, with 32 recorded introductions altogether (McRobie, 2012). Laidler (1980) suggests that it almost became a 'fad'. In common with other wild fauna, they were also kept as pets.

Populations grew rapidly. Three animals of the Canadian sub-species were released at Loch Long, Argyll and Bute in 1892 (McRobie, 2012) and by 1915 the resulting population had "expanded their range to 300 square miles, an average increase of twelve square miles each year" (Laidler 1980). Watt (1915), cited in Barrett-Hamilton and Hinton (1910-1921), describes the introduction into Woburn as "an embarrassing success, because they increased so rapidly that it became desirable to reduce their numbers, and it was stated that about 1000 were killed during a recent winter, and 300 in one week". Watt also comments on their destructive nature: "As regards habits, the grey squirrel, like the native brown squirrel, has many offences laid to its charge … It is very destructive to the upper shoots of Scot's Pines, … causes much trouble in the kitchen garden, among the aviaries and poultry runs, and in the woods of deciduous trees, and they also raid the gardens for small fruit, … and dig up crocus bulbs. … They are inveterate destroyers of eggs and young birds. In the Zoological Gardens they have been observed taking birds eggs, or, if the young are hatched, they pull them out or destroy the nests." Meanwhile, the squirrels released in Malton "multiplied and spread so rapidly, and were found to be so destructive that most of them have been got rid of after three years constant warfare" (St Quintin 1914, in Barrett-Hamilton and Hinton, 1910-1921).

Naturalists soon began to notice that as Grey Squirrels became established in an area Red Squirrels usually began to disappear. For example, at Kew (another Woburn-sourced release site) "it was stated that they have killed out or driven away all the native squirrels" (Barrett-Hamilton and Hinton, 1910-1921). Mee (1922) reports: "they have driven out our red squirrels from Richmond Park, they have banished them from woods and gardens." Douglas Middleton published the first research papers on Grey Squirrel ecology in 1930 and 1931 and dismissed these early popular beliefs, showing that although aggressive encounters did occur, they were not common, and just as likely to be intra-specific as inter-specific.

The government eventually decided to attempt to control the spread. The Grey Squirrel Prohibition of Importation and Keeping Order was passed in 1937, which made it illegal to bring a Grey Squirrel into Britain, or to catch and keep the species as a pet. Subsequently, between 1953 and 1958 a bounty system was introduced. Gun and shooting clubs received subsidised cartridges, with a bounty of one shilling (5p), later increased to two shillings per tail. Squirrel recipes were distributed (Bob Wilkin, pers. comm., 2012). Overall the system was unsuccessful, with the number of squirrels present being estimated as roughly the same in 1958 as it had been in 1953. The conclusion drawn from this was that while they could be removed this way from a local area, other squirrels would quickly recolonise from surrounding areas (Shorten, 1962b; MAFF, 1960-62).

Locally, naturalists comment on the spread of the Grey Squirrel and decline of the Red in northeast England over the course of the last century: "From around 1950 it was usual to see squirrels in the South Park, Darlington, and they were all Grey" (Griss pers. comm., 2012). Several surveys have been conducted and reports published. A single Grey Squirrel was recorded in Alnwick in 1930 (Lever, 1977) and another in Gosforth in 1945 (Strong, 1945), but neither of these animals seems to have reappeared. In 1953 Temperley conducted the first squirrel survey across Northumberland and County Durham. He mentions the Darlington introduction and states that Grey Squirrels began to colonise Raby Park, Staindrop, just before or during World War II, where "attempts were made to exterminate them, but ... without success". They were seen occasionally in other areas: north of the Tees around Stockton, and south around Middlesborough. Apart from these, all surveyors, from both County Durham and Northumberland, reported an absence of Grey Squirrels in their area.

In 1965 Ashby stated that the Tees still "formed the approximate boundary between the zone occupied by the grey squirrel to the south and the red squirrel to the north. ... In the dale itself, most of those seen below Middleton in recent years have been grey squirrels and most of those above have been red". But by 1972 Tegner was reporting that "Grey squirrels have seemingly crossed the Tees into south Durham as they have been recorded in the county." He implies that they were still rare, and up until 1977, according to Lever, "the principal areas of grey squirrel distribution were still considered to be south of the River Tees".

Davis (1979) conducted another survey in 1977/1978 across "Northumberland, Tyne & Wear, Durham and Cleveland". His results highlighted the continued spread of Grey Squirrels, finding that they had been present in every hectad in the southernmost areas of County Durham and Cleveland since at least 1959 (see also Arnold (1993) who agrees with this statement). From there they had spread north, particularly into western County Durham by 1971, and had spread further north by 1977/78; however he found no evidence of Grey Squirrels in Northumberland.

The first Grey Squirrel sighting to be recorded on the regional database was "one count of deceased" at Gilsland Bridge on the Cumbrian Border in 1905. There was then a long interval until the next record, which was just west of Crook, County Durham in 1968. By the 1970s, the database records that Grey Squirrels were sparsely distributed across County Durham; recorded in Teesside by 1975 and at Washington/Fulwell and High Force, Middleton-in-Teesdale in 1977.

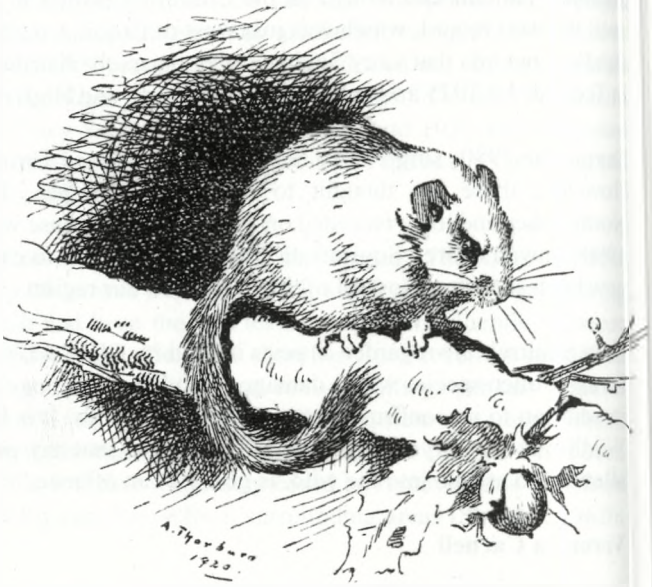
During the 1980s single Grey Squirrels were seen in Throckley Dene and Gosforth, Newcastle. However, these are thought to be releases/escapes. The first Grey Squirrel sighting in Northumberland to be recorded on the regional database was in Hexham in 1989. From the early 1990s onwards Grey Squirrel distribution continued to expand. Our map shows that they have now been seen in almost all of the hectads in our region.

Grey Squirrels are regarded as pests in Britain. DEFRA (2012) states that "The grey squirrel is an invasive alien species which damages woodlands and may have negative impacts on biodiversity in addition to its confirmed impact on red squirrels. It is listed under Schedule 9, Part 1, of the Wildlife & Countryside Act 1981. This means that any person who releases a grey squirrel, or allows it to escape into the wild, is guilty of an offence."

Veronica Carnell

HAZEL DORMOUSE *Muscardinus avellanarius*

The Hazel Dormouse is a distinctive native British mammal but is uncommonly observed due to its rarity and nocturnal habits. Nationally, it has declined in both numbers and distribution over the last 100 years, with recent surveys suggesting it has become extinct in about half its former distributional range, including six counties where it was reported to be present by Rope (1885). There are also fewer than 10 known sites north of a line between the Wirral and the Wash (including recent reintroductions). The most northerly location is along the river Allen, near Hexham in Northumberland, with at least three more sites in Cumbria.



Hazel Dormouse by Archibald Thorburn

Dormice are now either absent or very thinly distributed in most midland counties, although they have been found in a few widely separated areas in every county of Wales, except Anglesey. Although still uncommon, the dormouse appears to be relatively widespread in the southern English counties, but even here it has a very patchy distribution.

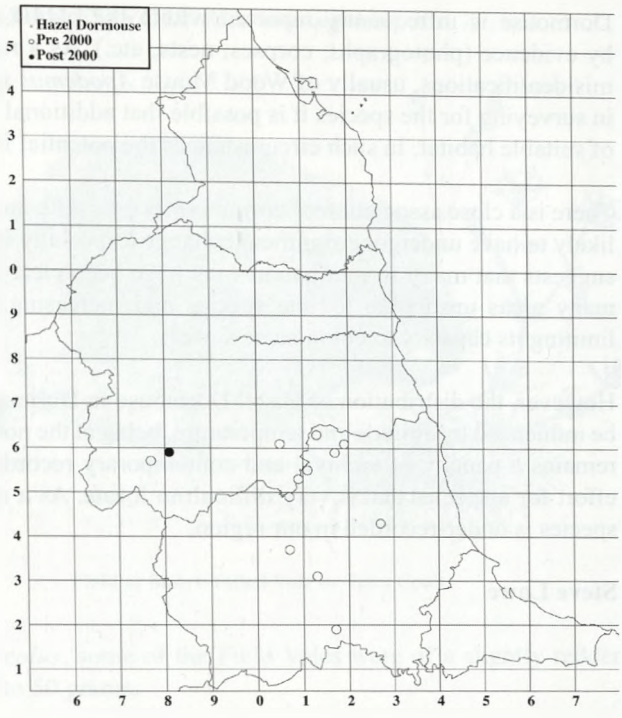
The Hazel Dormouse is easily overlooked, even where present, as it is rarely caught in traps or by predators, spends much of its active time high off the ground and at least a third of the year in hibernation, making it even more unlikely to be recorded by the casual observer.

It is associated with deciduous woodland, but also occurs widely in species-rich hedgerows and scrub. Their specialised feeding requirements mean they are never as numerous as other woodland rodents. They are also especially sensitive to weather and climate with habitat deterioration and fragmentation combining to make them highly vulnerable to local extinction.

The history, status and distribution of the dormouse in the North East is extremely poorly recorded, although distribution maps from recent national surveys show Northumberland as the northern limit of the species distribution. The most comprehensive account of the status of Hazel Dormouse in our region was produced by Coult (2001), in which the author states "Contrary to national survey results the locally published records suggest that the dormouse once had a distribution, which encompassed all of the main river valleys within County Durham. Records exist for the valleys of the rivers Derwent, Tyne, Wear and Tees, with records extending into the twentieth century in the valleys of the Tyne and Derwent. The oldest dated record is from the Derwent Valley, the 'near Ebchester' specimen, in Mennell and Perkins was collected in 1829."

Records for Northumberland are sparse with only the Tyne Valley at Stocksfield and the Allen Valley providing published records. The extract from Bolam's diary (1921) provides a history of records stretching from 1914 to the present for those sites in the Allen Valley where dormice

were found during the Mammal Society Survey in 1975-79.



The preparation of this account involved a comprehensive search of archival material for records of dormouse and these were found to be infrequent, suggesting that the species has always been uncommon in our region.

Most recent national surveys (Great Nut Hunt 1994 and Victorian Nut Hunt 1997) failed to produce evidence of dormouse across Durham, although the latter produced three, closely-related sites in Northumberland, which were subsequently included as part of the National Dormouse Monitor Scheme. This scheme recorded dormice occupation of nest boxes until 2006. No evidence was recorded in 2007 and 2008, at which point checking appears to have ceased. However, a recent check of nest boxes in the area (2012) produced a single unoccupied nest (formed principally from woodrush) which was thought to be fashioned by a dormouse. It is interesting to note that this site is close to the earliest Northumberland record at Whitfield (Bolam, 1921).

A number of recent unverified records have been reported in woodlands close to Stocksfield and Wylam. This area coincides with one reported in Cowan (1975) and subsequent reports made by reliable field naturalists. This suggests that additional field-work may be worthwhile in this area, which retains good quality broad-leaved woodland.

The most recent Durham record, albeit unverified, was at Lockhaugh, Rowlands Gill from D. Smith in 2001. Subsequent survey of nest boxes placed there (and at Hareshaw Linn, Northumberland) by the reporter failed to produce any evidence of occupation.

Records for Cleveland are also extremely limited. The species is listed in the appendix of Graves (1808) but this does not specify a location. Rope (1885) lists it from several places along the northern boundary of what is now the North York Moors National Park, from Pinchinthorpe to Grinkle Park, and reports that Mr T.H. Nelson considered it not numerous near Redcar. Rope also cites a record from Headlam, close to Darlington, of a pair of dormice that frequented a peach tree until one of them drowned in a bottle of beer hung on the tree to catch wasps. Cleveland has not been included in any of the recent national surveys, presumably due to a lack of contemporary records. However, nest tubes have more recently been erected in two woodlands (Cow Close and Hagg Wood) where the species is remembered by local naturalists from the 1970s (Kenny Crooks, pers. comm., 2010), although these have not produced any new evidence to date.

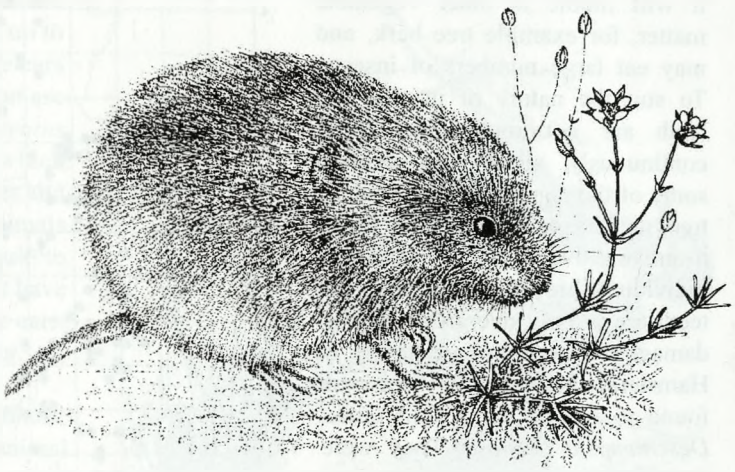
Dormouse is infrequently reported within the region and records are not usually supported by evidence (photographs, corpses, nests, etc.). As a result many records are considered to be misidentifications, usually of Wood Mouse *Apodemus sylvaticus*. However, given the difficulty in surveying for the species it is possible that additional isolated populations may occur in areas of suitable habitat. In such circumstances the potential for re-introductions may be considered.

There is a close association of dormouse records with ancient woodland sites, many of which are likely to have undergone significant change, especially in recent years. Certainly Dobson (2000) suggests that many former haunts may have been clear-felled during both World Wars, making many areas unsuitable for the species and increasing the fragmentation of habitat, severely limiting its capacity to colonise new areas.

However, the distribution of Hazel Dormouse in Durham and Northumberland is most likely to be influenced by altitude and temperature, being at the northern edge of its range in the UK. There remains a paucity of archival and contemporary records for the species and limited recording effort for a species that is very difficult to locate. As a result, there is a real possibility that the species is under-recorded in our region.

Steve Lowe

FIELD or SHORT-TAILED VOLE *Microtus agrestis*



Field or Short-Tailed Vole by Terry Coult

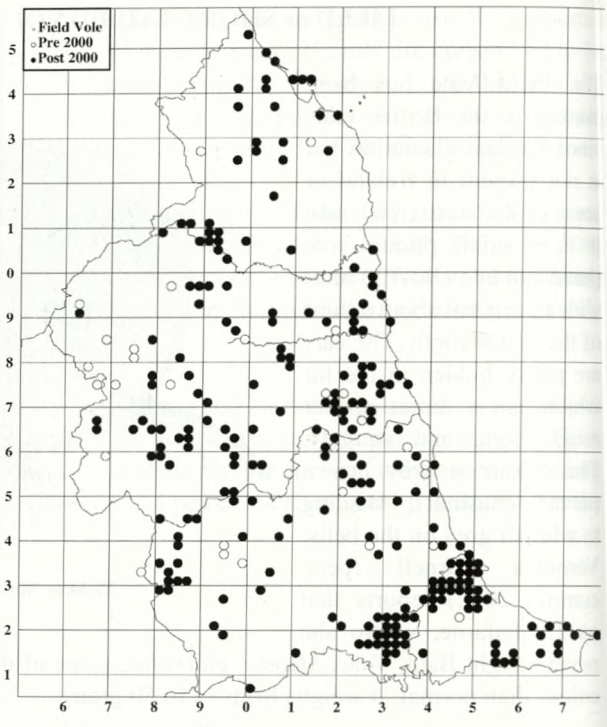
The Field Vole has been present in the British Isles since the last glaciation but is not present in Ireland or some of the western islands. It is a small plump vole (head and body 90-120 mm) with a short tail about a third of the body length. The ears are partly hidden in the fur which can at times appear rough, long and straggly. The colour is grey brown (never chestnut), shading to whitish grey on the belly. Veronica Carnell (pers. comm., 2012) reports that on Lindisfarne, where she never caught Bank Voles *Myodes glareolus*, some of the Field Voles were of a slightly redder colour than normal. It weighs from 14 to 50 grams.

The Field Vole's main habitat is rough grassland, but includes young forestry plantations until the ground cover becomes too thin due to it being shaded out by the tree growth. Sparse populations also inhabit woodlands, hedgerows, dunes, moorland etc, but it does not do well on arable land. It has been found on grasslands in the Cairngorms up to 1,300 metres. Their numbers on grassland are related to the grazing level; where grazing is so heavy that no litter layer can develop, numbers will be low due to the lack of material in which to construct surface runs.

They can persist in surprisingly small areas of habitat. When small areas of North Cemetery in the centre of Hartlepool were left uncut it was found that Field Voles were present. As there is no suitable habitat in the surrounding area they must have always been present, perhaps living among tufts of longer grass in an otherwise well-manicured cemetery (I. Bond, pers. comm., 2012). Similarly, works to clear developing vegetation from a small, artificial, shingle island, created for terns in a lake at RSPB Saltholme, found Field Voles present and breeding. To access the island they must have swum a distance of 30 metres then scaled half a metre of vertical revetment board. That this was not an isolated incident was demonstrated when the island was cleared again in a subsequent year (Chris Brown, pers. comm., 2010).

Field Voles are nocturnal, with their main activity at dawn and dusk. Home ranges are based on the nest, which is normally placed at the base of a tussock of grass and is almost indistinguishable from it. It is the centre of a maze of surface runs and burrows in which food stores may be placed. Breeding begins in February and goes on until September. There are several litters per season and up to nine young per litter. The young are ready to mate themselves at the age of six weeks. At the end of the breeding season maturation will be delayed to the following spring. Few, if any, animals over-winter more than once and most of the winter population are of immature animals.

Its main food source is the stems, leaves and roots of grasses but it will nibble at other vegetable matter, for example tree bark, and may eat large numbers of insects. To suit the nature of its diet the teeth are not rooted and grow continuously, which may explain some of the damage it can cause to trees as it has to wear its teeth down to prevent over-growth. Occasional individuals are found in which the teeth are grossly overgrown due to damage. In a study carried out in Hamsterley Forest, Field Voles were found to ignore Wavy Hair Grass *Deschampsia flexuosa*. They were found to prefer grasses that had dead leaves etc. around their base (Gordon Simpson, pers. comm., 2012).



The voles tunnel into the litter and pull the more succulent grasses into their tunnel out of sight of aerial predators. Numbers of voles vary on two levels. There is a four-yearly cycle in numbers. Food and climatic conditions may affect numbers within this cycle but the real reasons for it are not fully understood. In the past, combinations of the cycle, good breeding seasons and ample food supply have produced plague years when vole numbers increased to enormous proportions, for example in south Scotland in 1892. As a result of this predator numbers also increase. During the "plague" years the voles can do a lot of damage causing a serious loss to agriculture. These plagues finish with a vole population crash, but the predator numbers may stay high for a year or so afterwards.

The presence of Field Voles can be indicated by the signs of feeding (small pieces of shredded grass etc.) and droppings, found in the surface runs. They are not readily caught during small mammal trapping: only eight of the 358 small mammals trapped by Veronica Carnell were Field Voles (V. Carnell, pers. comm., 2012).

Field Voles are common in the North East, but as with all small mammals our distribution maps do not show just how common. Our records tend to show the distribution of observers but the dense clusters of records in the boroughs of Darlington and Hartlepool are probably more representative of the situation across much of the North East. Nevertheless the distribution of records shows Field Voles to be at least present in almost all of the 10 km squares in the region. As with the Bank Vole, an indication of the numbers present can be obtained by examining owl pellets. The Field Vole is the preferred prey of Barn Owls *Tyto alba* and Short-eared Owls *Asio flammeus* and 1103 of the 1307 prey items identified from Long-eared Owl *Asio otus* pellets from Urlay Nook were Field Vole. If large numbers of shrew remains are found in pellets it is probably a sign that vole numbers are low.

Don Griss

BANK VOLE *Myodes glareolus*

The Bank Vole is small (head and body 88 to 101 mm) with a tail up to half the length of the body. The ears are not as large as in the mice but are larger than the Field Vole *Microtus agrestis*. It has a chestnut back which gives way to greyish on the sides and whitish underneath. Young animals are greyer and may be difficult to separate from the Field Vole but have a longer tail and slightly larger ears. There is little variation in colour.

Bank Vole by Joan Holding

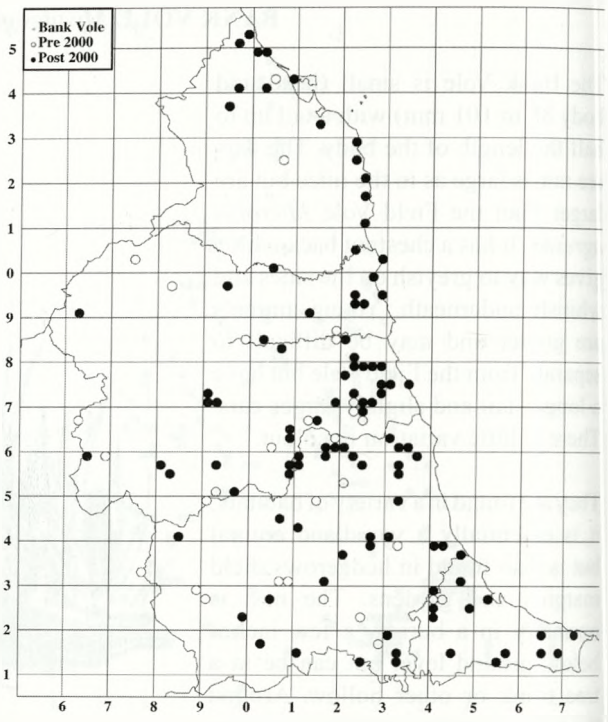
They are found in a variety of habitats; it is essentially a woodland animal but is also found in hedgerows, field margins and gardens. The nest is normally in a burrow a few inches below ground level but can be in a tree trunk or other hollow. Around the nest it forms a system of burrows and tunnels in the field layer and so requires good cover and litter layer. It climbs freely and will use bird's nests as feeding platforms.

Diet is mainly shoots, leaves, berries, nuts, seeds and fungi but can contain various insects and other invertebrates including snails. Burton (1968) says that up to a third of the diet can be invertebrates and even small birds and shrews can be eaten. When feeding on hazelnuts it leaves a distinctive hole in the shell with no teeth marks on the outer surface. This distinguishes it from Wood Mouse *Apodemus sylvaticus* which does leave teeth marks on the outer surface. Dormice *Muscardinus avellanarius* leave angled teeth marks on the cut surface of nuts, the other two leave vertical marks. Bank Voles do occasionally venture indoors and raid human larders.

Bank Voles start breeding in early spring and continue until the autumn. Up to five litters per year of three to six young can be born. Females born in the early part of the season can breed the same year. The breeding season can be lengthened by increased temperature and increased food supply but can be shortened in seasons of high population density. There is no indication of cyclical population changes like those of the Field Vole, but populations do vary, particularly in association with food availability. Good autumn seed crops can see larger numbers through the winter and affect the population until the following autumn.

Predation on voles is heavy, particularly by owls and Weasel *Mustela nivalis*, but other species are also important, for example Stoat *Mustela erminea*, Fox *Vulpes vulpes*, Domestic Cat *Felis catus*, Kestrel *Falco tinnunculus*, Carrion Crow *Corvus corone*, Rook *Corvus frugilegus* and Grey Heron *Ardea cinerea*. Bank Vole remains in owl pellets can be separated from Field Vole

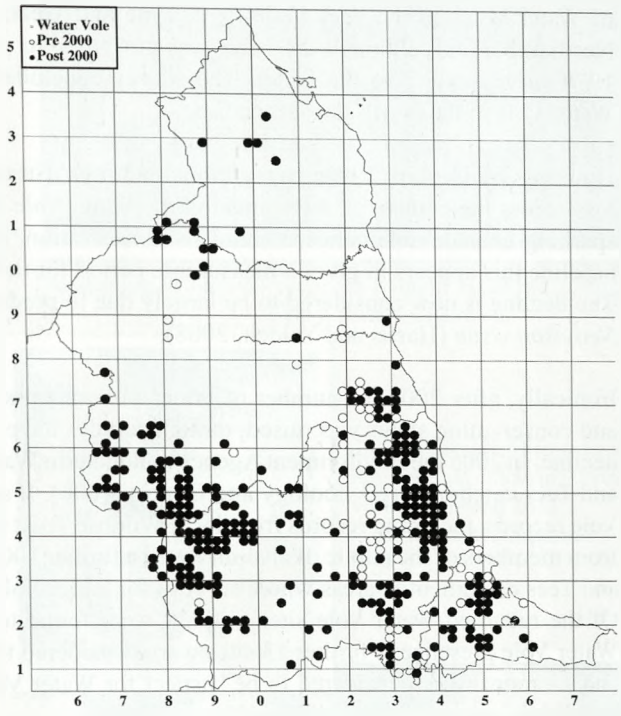
remains by the presence of an extra lobe on the upper second molar tooth in the latter, and the zigzags of the teeth are also more rounded than those of the Field Vole (Yalden, 1977). Wet weather is thought to have some advantage for Bank Voles, which makes them less likely to be heard and therefore less likely to be taken by owls (Flowerdew, 1993).



In the North East our map of records shows Bank Voles to be widely distributed across the region though most records are from the east of the area. This is believed, in the main, to be an effect of observer distribution, but in the extreme west, where they will avoid the uplands and open country, a thinner distribution is probable. More widespread live trapping or examination of owl pellets would probably show a better spread of records. They are perhaps the species that is most readily caught in Longworth traps and made up almost half of the 358 small mammals caught at various sites in the North East by Veronica Carnell (V. Carnell, pers. comm., 2012). They made up just over 6% of the total number of prey remains from 671 Long-eared Owl *Asio otus* pellets from Urlay Nook, the same proportion as Wood Mouse *Apodemus sylvaticus*, though the latter is a much more frequently recorded species, probably due to its closer association with human habitations. Outside the North East it is found generally throughout the country, but was missing from Ireland until it was accidentally introduced there probably in the 1920s from Germany (Shore and Hare in Harris and Yalden, 2008).

Don Griss

WATER VOLE *Arvicola amphibius*



Most people's first discovery of a Water Vole is through Kenneth Grahame's *The Wind in the Willows*; the character Ratty is in fact a Water Vole. The Water Vole is often known locally as a water rat, and at a casual glance does have some similarities in appearance with a rat, leading to some cases or misidentification and persecution. Although a little smaller than a rat, it is Britain's largest vole with a typical head and body length of around 190 mm and a weight of around 220 g. In Britain the Water Vole spends much of its time in and around an aquatic environment with its burrows seldom more than two metres from a bankside. Here it feeds on the wide range of vegetation types which form its staple diet and it uses the water to escape most of its natural predators; its characteristic "plop" sound, made as it dives into the water to escape predators, is one of the classic signs of a Water Vole (Harris and Yalden, 2008).

The Water Vole in the UK is known to form two distinct groups (clades) with those in Scotland forming a separate phylogenetic clade from those in England/Wales. Comparison of mitochondrial DNA variation with Water Vole populations across Europe indicates that the Scottish clades derive from an Iberian source, whereas the English/Welsh ones derive from an eastern European source. Initial analysis of the DNA from droppings in museum collections had shown that those from Northumberland, Windermere and Scarborough clustered with the England/Wales samples while one from Berwick clustered with the Scottish samples (Piertney *et al*, 2005).

In 2008 the Environment Agency ran a survey to collect samples of Water Vole droppings from across the North East for DNA analysis to try and refine and update the Piertney study. Droppings were collected from a variety of locations across Northumberland, Durham and Cleveland and including the North York Moors National Park. The droppings from all of the sites across the North East and North Yorkshire proved to belong to the Scottish clade (Fiona Morris, pers. comm., 2011).

Water Voles are historically common across much of the North East with the majority of the pre-2000 records coming from Tyne and Wear, Durham and the Tees Valley. *The Provisional Atlas of the Mammals of the British Isles* (Arnold, 1978) documented the distribution of Water Voles in the North East and highlighted the Tees Valley, Tyne and Wear and north Northumberland as areas containing Water Voles. This work involved 35 surveys and produced 30 positive site records.

In 1986 Peter Davis coordinated a Water Vole survey of the North East (Davis, 1986) of 85 sites and recorded positive records in 69 sites. This highlighted an expanded 10 km distribution of Water Voles in the Tees Valley and Tyne and Wear, with a reduced number of records for Northumberland, although the latter was attributed to poor recorder response compared to the 1978 survey as a possible factor. The survey concluded there was no change in status of the Water Vole in the North East at the time.

However by the late 1990s two national surveys (Strachan *et al*, 2000) had calculated a site loss across the country of 94%, making the Water Vole Britain's fastest-declining mammal and sparking considerable concern about its conservation. Using the 1978 and 1986 surveys as a baseline this appears to gives a measurable period for the beginning of the Water Vole's decline. The decline is now considered to be largely due to predation by the introduced American Mink *Neovison vison* (Harris and Yalden, 2008).

Ironically, after 2000 the number of Water Vole records has increased dramatically as its legal and conservation status was raised, though surveys have nevertheless highlighted its continuing decline. In 2006 the Environment Agency conducted a Water Vole survey in the Northumbria Area and Tees catchment (E3 Ecology and Durkin, 2006). It surveyed 265 sites with previous Water Vole records, including records from local Wildlife Trust surveys and suspected sightings records from members of the public. It also surveyed a further 100 new sites across the Northumbria Area and Tees catchment in areas where surveys for Water Voles had not previously been undertaken. Of the recorded Water Vole sites only 39 were found to have positive signs indicating active Water Vole presence; a further 13 sites were considered to have old signs of Water Vole activity, and 14 more were considered to be suspect for Water Vole presence. Therefore only 14.7% of previously occupied sites still held Water Voles.

The "re-survey" identified a number of key areas for Water Voles: 7.7% of positive sites were situated within the catchment of the River East Allen at Allendale; 12.8% within the catchment of the River East Allen near Allenheads; 7.7% within the catchment of the South Tyne River near Alston; 17.9% in the Tees catchment near Langdon; and 7.7% in the vicinity of Houghton-le-Spring. Of the "new search" survey sites, five were found to have positive signs indicating active Water Vole presence, a further four sites were considered to have old signs of Water Vole activity but no longer to be active, and a further one was considered to be suspect-active for Water Vole presence

The results of this survey are mirrored elsewhere on a finer scale. In Hartlepool, where Water Voles have perhaps been surveyed more than in any other borough in the region over the past 15 years, the number of sites has gradually decreased. In 2002, 10 sites where Water Voles were known to have been previously recorded were surveyed, with Water Voles signs being found at all sites (Parker, 2002). A re-survey of the same sites in 2006 found signs at seven of those 10 sites (Glister, 2006) and by 2009 this had decreased to five of the same sites (Slaughter, 2009). This decline appears to be continuing with only two subsequent records to 2012, both of which appear to have been transient individuals (Ian Bond, pers. comm., 2012).

The situation appears to be similar in much of the Tees Valley. In the borough of Darlington, where the species was widespread in the late 1990s, there have been no confirmed records for several years (Ian Bond, pers. comm., 2012). In Stockton there is a positive record for the Hartburn Beck from 2012 and three records from the Lustrum Beck from 2010, whilst in East Cleveland Water Voles are only thought to exist now on the Chapel Beck in Guisborough: but the

Red Squirrel *Sciurus vulgaris* Blagdon, Northumberland 2012 © Maria Schusler

Hedgehog *Erinaceus europaeus* Rainton Meadows, County Durham 2009 © Hilary Chambers

Grey Squirrel *Sciurus carolinensis* with unusual colouring, Prudhoe, Northumberland 2011 © Northern Red Squirrels

Water Vole *Arvicola amphibius* Killhope, County Durham 2012 © David Gibbon

Field Vole *Microtus agrestis* found during vegitation clearance, Teeside 2009 © Chris Brown

Bank Vole *Myodes glareolus* Far Pastures, Gateshead 2010 © northeastwildlife.co.uk

Harvest Mouse *Micromys minutus* along the Hart to Haswell Walkway, Cleveland 2009; the most northerly record since 2000 © David Young

Wood Mouse *Apodemus sylvaticus* Seaton Delaval Northumberland 2011 © Olive Taylor

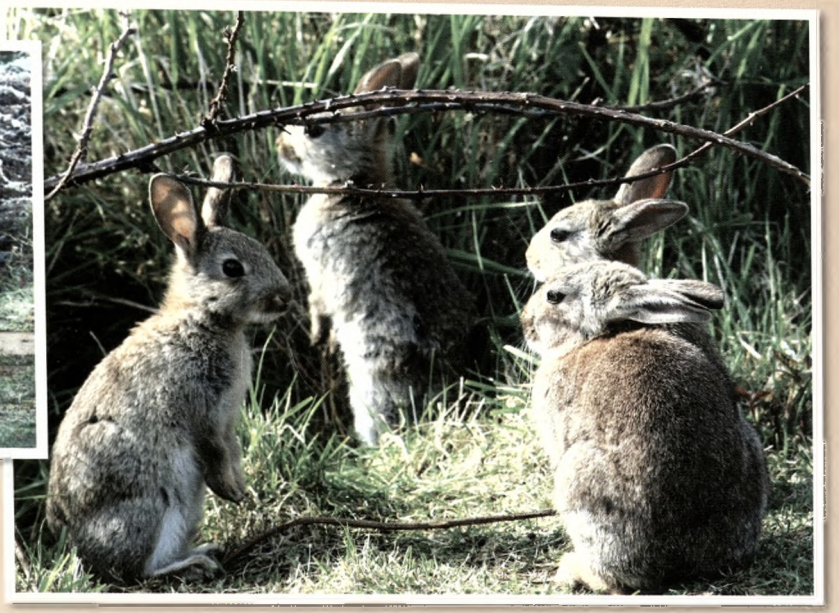
Common Rat *Rattus norvegicus* near Rainton Meadows, County Durham © northeastwildlife.co.uk

Mole *Talpa europaea* "murder rail", near Haltwhistle, Northumberland 2011 © James Littlewood

Common Shrew *Sorex araneus* Harwood Forest, Northumberland 2010 © John Steele

Water Shrew *Neomys fodiens* Gosforth Park, Newcastle upon Tyne 2005 © Mark Houghton

Fox *Vulpes vulpes* in a Gosforth garden, Newcastle upon Tyne 2008 © Bob Wilkin



Rabbit *Oryctolagus cuniculus* Seaton Carew, Hartlepool 2009 © Hilary Chambers

Brown Hare *Lepus europaeus* Salthome, Teeside 2012 © Martyn Sidwell

Otter *Lutra lutra* River Blyth, Northumberland 2006 © Kevin O'Hara

Badger *Meles meles* south Northumberland 2010 © Kaleel Zibe www.kaleelzibe.com

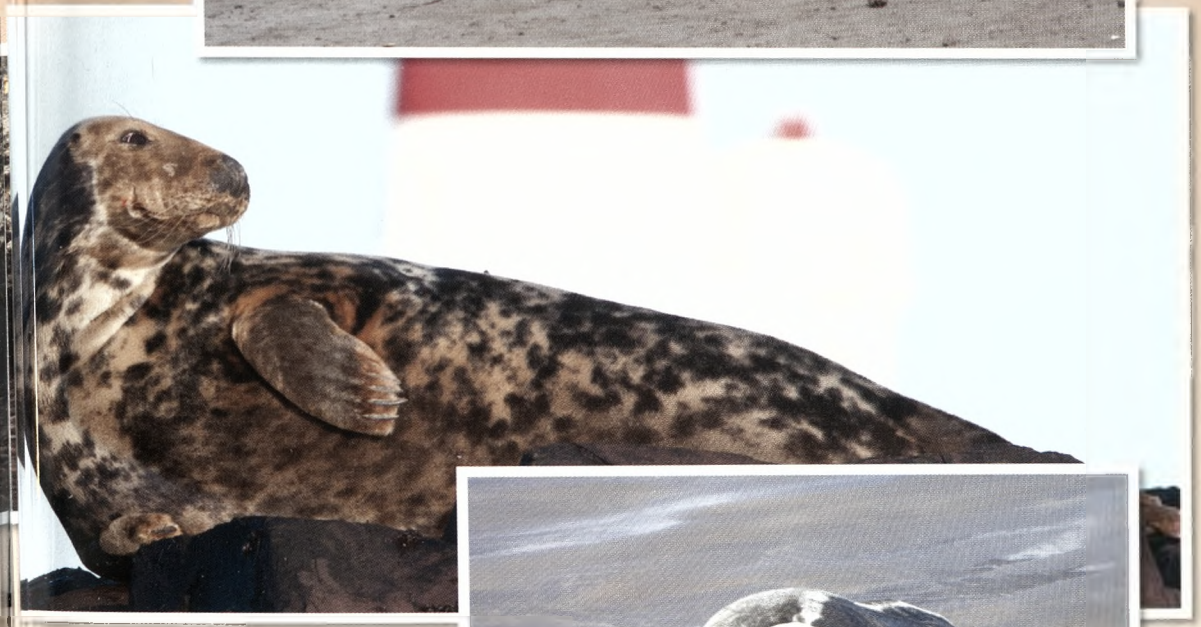
Stoat *Mustela erminea* Hauxley, Northumberland 2011©
Keith Cochrane

Weasel *Mustela nivalis* No
Gare, Hartlepool 2009
© Ian Forrest

American Mink
Neovison vison
Northumberland 2010
© Kevin Ohara

"Rocky the Racoon" *Procyon lotor*
on the loose in Sunderland 2012
© Rick O'Farrell

Harbour Seals *Phoca vitulina* Greatham Creek, Teeside 2008
© Ian Forrest



Grey Seal *Halichoerus grypus* Farne Islands, Northumberland 2010
© Martin Kitching/
www.northernexperienceimages.co.uk

Bearded Seal *Erignathus barbatus* Beadnell, Northumberland 2011
© Joanna Mitchell

White-beaked Dolphin *Lagenorhynchus albirostris* off the coast of Northumberland 2007 © John Carnell

Minke Whale *Balaenoptera acutorostrata* off the coast of Northumberland 2012 © Martin Kitching/www.northernexperienceimages.co.uk

Sperm Whale *Physeter macrocephalus* stranded at Marske-by-the-Sea, Cleveland May 2011 © Ian Bond

Beluga *Delphinapterus leucas* caught in Salmon nets at South Shields in June 1903 © NHSN

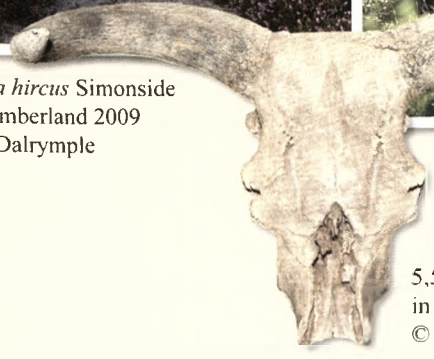
eDeer *Capreolus capreolus* Gosforth Park,
ewcastle upon Tyne 2012 © Olive Taylor

Red Deer *Cervus elaphus* Rising Sun Country Park, North Tyneside 2011
© Shaun Morrison

Fallow Deer *Dama dama* Whitworth Park, County Durham 2012
© Terry Coult

Feral Goat *Capra hircus* Simonside Hills, Northumberland 2009
© John Dalrymple

Chillingham Bull *Bos taurus* Chillingham Park, Northumberland 2011 © Stephen Hall



5,500 year old skull of an Auroch *Bos primigenius* found in Haughton Strother Quarry, Northumberland in 2009
© David Noble-Rollin/Jane Lamb

Brandt's Bat *Myotis brandtii* Malton, County Durham 2012 © Terry Coult

Parti-coloured Bat *Vespertilio murinus* Seaham, County Durham 2011 © Ian Graham

Common Pipistrelle *Pipistrellus pipistrellus* in the care of Northumberland Bat Group 2012 © Ruth Hadden

Brown Long-eared Bat *Plecotus auritus* Wallington, Northumberland 2011 © Ruth Hadden

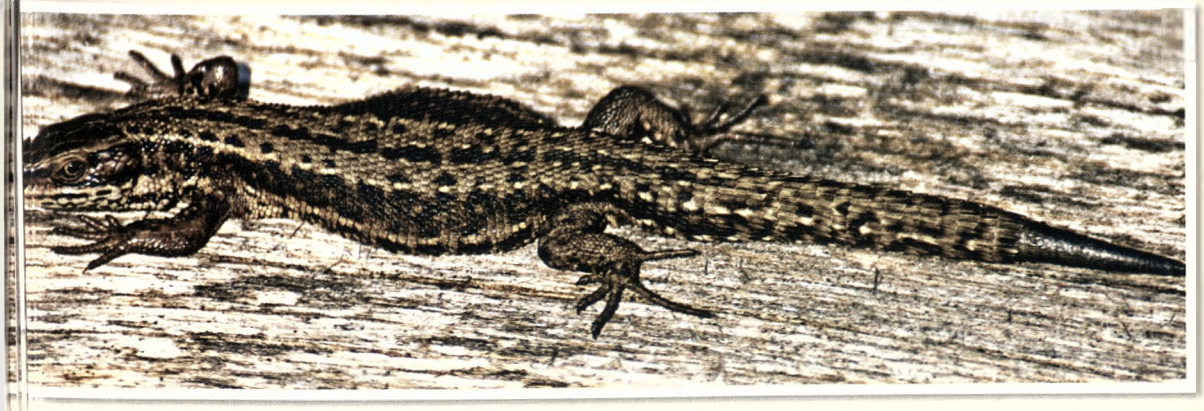
Leisler's Bat *Nyctalus leisleri* Cragside, Northumberland 1986 © Terry Coult

Common Toad *Bufo bufo* Hetton Bogs, County Durham 2010 © northeastwildlife.co.uk

Common Frog *Rana temporaria* Bensham Allotments, Gateshead 2012 © James Littlewood

Alpine Newts *Mesotriton alpestris* Eaglescliffe specimen on left; typical form on right, 2011 © Ian Bond

Great Crested Newt *Triturus cristatus* Malton, County Durham 1987 © Terry Coult



Common Lizard *Zootoca vivipara* with injured tail at Holystone, Northumberland 2010 © Kevin O'Hara

Male and female Smooth Newts *Lissotriton vulgaris* Saltholme, Teeside 2011 © Dave Pearce

Slow Worms *Anguis fragilis* Harthope Valle
Northumberland 2010
© Andy Young

Grass Snake *Natrix natrix*
Gibside Estate, Derwent
Valley 1989
© Terry Coult

Adder *Vipera berus* Upper Coquet Valley, Northumberland 2010 © Paul Drummond

species' continuing existence on all of these watercourses is probably tenuous (Kenny Crooks, pers. comm., 2012). The populations on the urban becks in Middlesbrough appear to remain healthy though these are small, isolated habitats. It may be that the only place remaining in the Tees Valley where a population is likely to be viable in the long term is on the North Tees Marshes around Saltholme and Cowpen Marsh, extending as far as Cowpen Bewley Woodland Park, where there are many interconnecting ditches, reedbeds and other water bodies.

Our distribution map shows a cluster of post-2000 records in East Durham though these were largely small, isolated colonies. There is very little current information on the status of these colonies but it is anticipated that many of them will have subsequently disappeared. A Water Vole survey in 2001 in the City of Sunderland found 17 positive Water Voles sites from a total of 83 surveyed and a subsequent survey in 2007/08 revisited and expanded on this survey and highlighted Rainton Burn and the River Don as containing good Water Vole populations. Together with records from South Tyneside this highlighted the River Don as a continuing stronghold for Water Voles.

Unfortunately this situation is not repeated north of the Tyne. A Water Vole survey of the Borough of North Tyneside in 2002 (O'Hara, 2005) found that Water Voles were present at 13 of the 53 sites surveyed (25%), and as a result of this a large amount of practical improvement work was carried out to safeguard the population's survival. However it appears that all colonies have now been lost from the urban areas of North Tyneside and Newcastle in the past 10 years including well-known sites such as Gosforth Park and the Ouseburn, with the last remnants disappearing from the streams and ditches around the Rising Sun country park in Wallsend in the last five years (Kevin O'Hara, pers. comm., 2012). The continued presence of Mink appears to have been the main factor, but in urban areas the urban sprawl and associated high rat presence has had a major impact on fragile and isolated colonies.

The situation is little better in much of the rest of Northumberland where it was once widespread and was even recorded from Lindisfarne (Perry, 1946). Populations in the north of the county, including in and around Wooler, have also disappeared although there are still unconfirmed reports of their presence further up on Wooler Common, and new populations were found at Berwick Moor, east of Chillingham, in 2009 which are still present, if elusive (Kevin O'Hara, pers. comm., 2012).

As lowland Water Voles have declined in number, upland areas have been found to contain significant populations. In 2006, Northumbria Mammal Group worked with the Northumberland Wildlife Trust on the "Researching Ratty" project, which aimed to locate populations of Water Vole in upland areas of Northumberland, where it was considered very rare but still surviving in some of the more remote areas. The project focused on three main areas: Otterburn in the southern Cheviot range; Allendale and the upper south Tyne in the North Pennines Area of Outstanding Natural Beauty (AONB); and areas around Haltwhistle in the west of the county. It implemented 72 Water Vole surveys at those locations, identifying 26 sites displaying positive signs of Water Vole presence.

Further survey work by the Environment Agency and the North Pennines AONB Partnership has identified strong and connected colonies in the upper reaches and tributaries of the rivers Tees, Wear, South Tyne and East Allen. Other areas which contain Water Vole colonies, but which do not appear to be quite so densely populated, include Lunedale and Baldersdale, the Cumbrian

fellside around Melmerby, the very highest tributaries of the rivers Derwent and Devil's Water, the top of the West Allen and lower tributaries of the South Tyne, which were only discovered in 2011 (Andy Lees, pers. comm., 2012). These surveys were not able to detect a growth or decline in either numbers or range. However the latest and most comprehensive surveys by the North Pennines AONB Partnership between 2008 and 2011 failed to find evidence of Water Voles in the Plenmeller and Halton-lea-Gate areas of the South Tyne valley where they had been recorded between 2004 and 2006.

The continued presence of Water Voles in the upper reaches of North Pennines rivers and streams is probably a reflection of the well-connected habitat and the low number of terrestrial predators in some areas. Anecdotal evidence from some gamekeepers suggests that mink made a sudden appearance around 1999, particularly in the Tyne catchment, and that this may have led to the demise of Water Vole populations downstream of the current populations. Certainly there are anecdotal accounts of Water Voles in these areas from as recently as the 1990s. Very few mink are reported now and intensive gamekeeping in and around grouse moors keeps down the numbers of common predators such as Stoats *Mustela erminea* as well as any invading mink.

Recent research (Webb, 2011) discovered that the two factors which best predict the presence of Water Voles on individual watercourses in the North Pennines are the width of the water course and its rate of flow. Water Voles tolerate a range of flow rates in narrow streams, but only slower flows in wider watercourses. This is borne out by experience which shows that Water Voles in the North Pennines are found predominantly on narrow watercourses and can be found at high altitude and on steep slopes (over 45 degrees). They are less frequently encountered on main rivers, but where they are this tends to be in areas where colonies are dense and/or where flows are slower. The smaller mining reservoirs (for example those above Allenheads) are also often good places to find Water Voles.

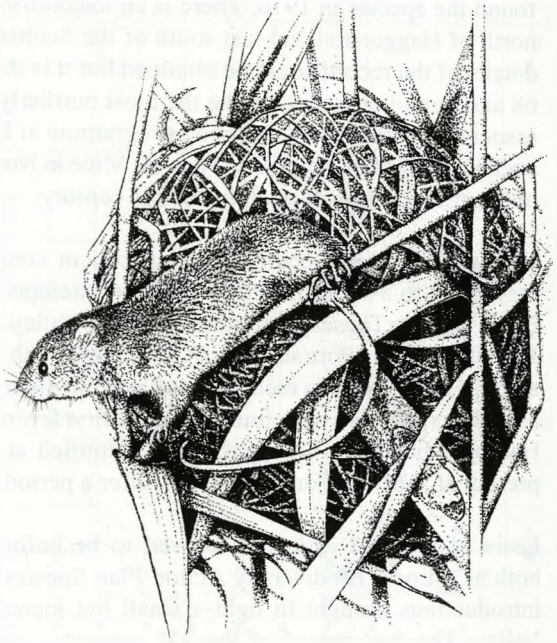
The existence of Water Voles away from water courses is an intriguing possibility in the North Pennines. There are a number of records of Water Voles caught in mole traps hundreds of metres from the nearest water course and they are frequently found using underground stone drains or "cundys". Droppings can sometimes be found in wet rushy vegetation some distance from streams. Whether or not Water Voles are frequently living away from open water is an unanswered question, but the current survey technique of following watercourses to look for signs will certainly be skewing the results.

In order to try to combat the continued loss of Water Voles across the North East a Regional Water Vole Steering Group has been set up, currently chaired by the Environment Agency, to investigate ways to conserve this species. This includes the possibility of captive breeding and/or translocation. Concerted efforts such as re-introductions and, crucially, mink control, may hold out some hope of maintaining the species in its few remaining outposts or perhaps even of limited expansion. Almost everywhere else in the region, and certainly in the lowlands, it appears to be currently teetering on the brink of extinction.

Jonathan Pounder

HARVEST MOUSE *Micromys minutus*

The Harvest Mouse is Britain's smallest rodent and the only British mammal with a prehensile tail. It differs from other British mice in having a blunt nose and small ears, more reminiscent of a vole, and in adults the dorsal fur is a distinctly ginger colour, contrasting with the white belly. Its small size and prehensile tail allow it uniquely to inhabit the "stalk zone" (the shoots and leaves typically of monocotyledonous plants) and its most readily noticed field sign is its nests, woven into the living leaves of the plants. Traditionally it has been associated with arable crops but it is probably originally a species of wetlands and associated habitats, and certainly in the North East almost all recent records have been from rank grassland or wetlands. In winter it becomes more terrestrial and will utilise the burrows of other small mammals or move into stacks in barns and very occasionally into other outbuildings (Harris, 1979).



Harvest Mouse by Terry Coult

In Britain it has a mainly southern and eastern distribution (Trout and Harris in Harris and Yalden, 2008) where it appears not to be uncommon in the right habitat. For example a search of likely habitats in Essex by a single surveyor confirmed their presence in 19 new tetrads in nearly four hours (Dobson, 2001)! Further north its recorded distribution is patchy with Howes (1985) only having six Yorkshire records north of Northallerton.

In the North East the species appears to have been very infrequently encountered, even historically. Mennell and Perkins (1864) note: "We have but few recorded localities for this species in our district, but among these, one is worthy of note from its great elevation: Mr. Wm. Backhouse has taken it at St. John's, Weardale, 800 feet above the level of the sea" (at grid ref. NZ069339). Similarly Gill (in Page, 1905) states: "The harvest mouse appears to have been very rarely noticed in the County of Durham and is doubtless scarce, though I have lately seen it myself a very short distance north of the Tyne."

This seems to have continued to be the case in the intervening period. A handful of records have come to light from the 1960s based on the memories of farmers and gamekeepers. So far these have all been from the Tees lowlands, roughly both north and south of Darlington, and from High Spen in the Derwent Valley near Gateshead. Harris and Larding in their 1974 survey of Harvest Mice in Britain found only four records from the North East plus one just south of the region at Hutton Rudby (Harris, 1979). Records continued to be scarce up to 2000 with only six accepted records in the last two decades of the 20th century. These were: Lockhaugh Sewage Farm, some three km from High Spen, in 1985; Castle Eden Walkway in Stockton in 1986; Prestwick Carr,

Northumberland in 1998; Boulby in south Cleveland in the 1990s and Earsdon Hill Farm, near Morpeth in 1996 and again in 1997. This last site was the same place as Harris and Lording had found the species in 1976. There is an unconfirmed record of Harvest Mouse from Ladythorne, north of Haggerston and just south of the Scottish border, from 1997. Unfortunately no further details of the record could be obtained but it is the only known claim of a record in Vice County 68 and would consequently be the most northerly record in England if proved. Other than those associated with a re-introduction programme at East Chevington near Druridge Bay, there have been no confirmed records of Harvest Mice in Northumberland or indeed anywhere substantially north of the Tees Lowlands in the 21st century.

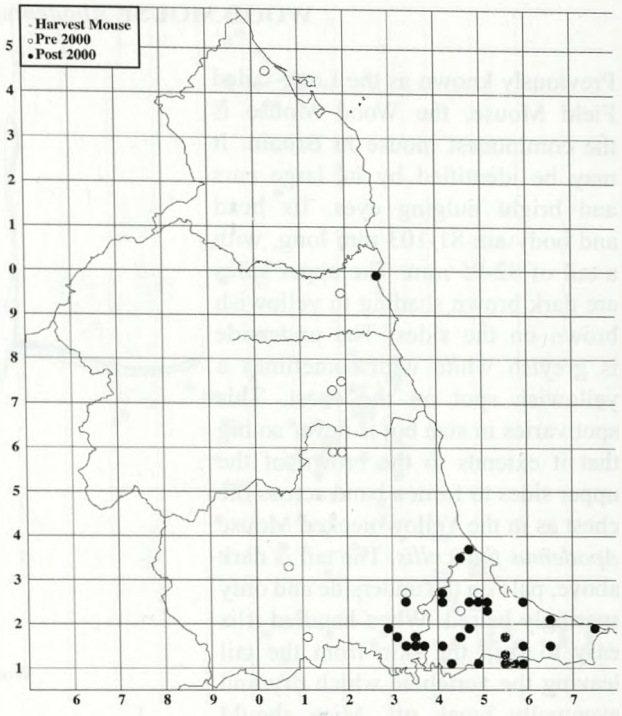
The lack of recent records and consequent concerns that the species might be extinct in the region led to a series of re-introduction attempts in the early 21st century which are detailed in Bond (2010). These occurred in the Tees Valley at Cowpen Bewley Woodland Park, Wynyard Woodland Park, Portrack Marsh and Teesmouth Brine fields with an unrelated re-introduction attempt being made in reed beds at East Chevington. Initially all attempts appeared to have failed as no Harvest Mice were found after the first few months following the releases, but subsequently Harvest Mice have been positively identified at four of the sites and are also believed to be present at the fifth, Portrack Marsh, after a period of several years.

Fears of regional extinction proved to be unfounded as subsequent attention on the species both as a Local Biodiversity Action Plan Species and through publicity associated with the re-introductions brought to light a small but increasing number of records throughout the Tees Valley. The first record of the 21st century occurred when a small number of Harvest Mice turned up in a stable at Pinchinthorpe near Guisborough in 2003. As the habitats immediately surrounding the barn were not thought suitable for Harvest Mice it was postulated that they had come in with the bedding which had come from Boozebeck about eight km further east. In the same year two records came to light near Great Ayton. While, technically, outside the region in North Yorkshire, it is just four km from Pinchinthorpe, so the mice in the stable may have been from the surrounding area. The following year the author found two Harvest Mouse nests between Darlington and Stockton and the species was also recovered from Long-eared Owl *Asio otus* pellets near Eaglescliffe. Further records have continued to trickle in and the species is now known to occur from around the Boulby area in the extreme southeast of the region, where there are records spanning two decades, as far west as the north of Darlington. Notably there are records in at least seven separate sites between the north of Darlington and Stockton which suggest that the species is widespread though possibly localised in that particular area.

Bond (2010) describes all of the known North East records, including historical and unconfirmed ones, up to 2009. At that point 16 contemporary records had come to light, all in the Tees Lowlands, including three from Great Ayton, with a further two records slightly further afield at Seamer and Hutton Rudby. Subsequently a further six records have come to light, each of which adds a little to the story of Harvest Mice in the North East.

A Harvest Mouse that was rescued from a cat at Beaumont Hill in Darlington extended the known contemporary distribution west by around another two km. A ginger coloured mouse seen clinging to a plant stem at Saltholme was eaten by the local Weasel *Mustela nivalis* in front of a group of RSPB staff. The location was about two km from the release site at the Brine fields some six years previously, so it is feasible that the mice had dispersed that distance in the intervening period; although it is also possible that there had been an existing population in that

area that had not been detected by the pre-release small mammal surveys. A sighting of a Harvest Mouse on top of some rank vegetation at Druridge Pools in 2009 is very likely to be the result of the introduction that took place on that spot.



In the protracted period of snow in winter 2010/11, a Harvest Mouse was found in the offices of the Tees Valley Wildlife Trust at Margrove near Boozebeck. While human habitations have been noted as being very occasionally used by Harvest Mice, the habitats immediately surrounding the Trust's offices are allotments, pasture and woodland rather than more typical habitat. This may indicate that Harvest Mice have at least reasonable powers of dispersal across unsympathetic territory. It also confuses the picture of where the mice in the barn at Pinchinthorpe came from; they could clearly have come from Boozebeck but might also have crossed the intervening ground between the barn and a disused railway line.

Perhaps the most significant recent records have been two on the border between Hartlepool and Easington, which were the first confirmed records on the Durham Magnesian Plateau. The finding of two Harvest Mouse nests at Thorpe Bulmer in 2010 was the first record in Hartlepool since Gardner (1921) saw one run out of its nest in *Phragmites* reeds at Greatham around 150 years earlier, whilst the one that was photographed on the Hart to Haswell Walkway near to Benridge Lake was the most northerly, naturally occurring Harvest Mouse record so far in England in the 21st century.

Ian Bond

WOOD MOUSE *Apodemus sylvaticus*

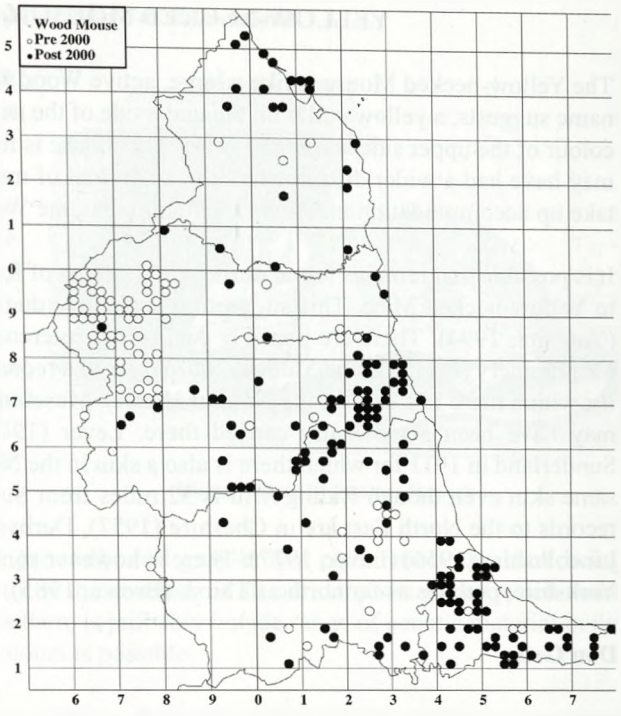
Wood Mouse by Terry Coult

Previously known as the Long-tailed Field Mouse, the Wood Mouse is the commonest mouse in Britain. It may be identified by its large ears and bright bulging eyes. Its head and body are 81-103 mm long, with a tail of 82-95 mm. The upper sides are dark brown shading to yellowish brown on the sides. The underside is greyish white with sometimes a yellowish spot on the chest. This spot varies in size but is never so big that it extends to the brown of the upper sides to form a band across the chest as in the Yellow-necked Mouse *Apodemus flavicollis*. The tail is dark above, pale on the underside and only sparingly haired. When handled it is easy to strip the skin from the tail leaving the vertebrae which dry and eventually break off. Mice should therefore be held by the scruff of the neck and only steadied by the base of the tail. Juveniles are a greyer brown above and greyish white below and could be mistaken for House Mice *Mus domesticus* especially when seen inside buildings. Various colour variations have been found as well as piebald and semi-hairless individuals. In our region, jet black Wood Mice have been found at Cowpen Bewley Woodland Park, a completely cream coloured individual at Hartburn, and a sandy-brown individual on the dunes at Lindisfarne. It was postulated that the latter might possibly be a local adaptation to its environment; however, Flowerdew and Tattersall (in Harris and Yalden, 2008) point out that Wood Mice can become paler and sandy coloured with age.

It is distributed all over Britain with distinct island forms developed where isolated from the mainland. The British population is thought to have developed from two roots, one originating in France, which repopulated Britain as the ice retreated, and the other from Scandinavia. These latter may have been introduced in hay brought by the Vikings and now populate many of the islands of north and west Scotland (Flowerdew and Tattersall in Harris and Yalden, 2008). There are unlikely to be any altitudinal limits to its distribution in the North East as it has been recorded on the summit of Ben Nevis (Perry, 1981).

Wood Mice are principally nocturnal woodland animals but are very adaptable in their habitat use and inhabit woodlands, gardens, grassland, arable land and even sand dunes and heather moorland, though above the tree line numbers decline except where cover is available, for example dry stone walls. Habitat use and home range size varies with the type of habitat and the food supply available within that habitat. Activity also varies; mice in sand dunes have to work harder for a living than those in a corn field. Their burrow systems are sometimes complicated and are probably occupied by successive generations.

They are very opportunistic as regards food. Their diet consists of seeds, buds, stems, nuts and fungi as well as invertebrates such as caterpillars, centipedes and worms. Exceptionally they have been known to eat vertebrates such as frogs and to feed, and even nest, in beehives, where they have also been found stung to death and encased in wax (Burton, 1968). For those living in sand dunes invertebrates are the main food source. Wood Mice climb well and often use old birds' nests as stores or feeding platforms. This habit of storing food means that when, as often happens, they collect newly sown peas or bulbs from gardens the damage is greater than would be expected from so small an animal, though these stores are sometimes the work of more than one animal (Burton 1968).



Wood Mice do not usually live for more than one winter. They breed throughout the summer, having several litters of from two to nine young, but normally not during winter when the older adults usually disappear from the population. However, winter breeding can occur if unusually large reserves of food can be utilised. One item of behaviour worth mentioning is that when disturbed while feeding the young, females will leave the nest with the young still holding on to the nipples.

Some years ago a study was carried out on small mammals in Hamsterley Forest by a South American graduate, F. Fernadez, for a PhD at Durham University. He marked Wood Mice in a clear felled area at High Acton Currick. A farmer's wife at Mayland caught a ringed mouse and sent it to Gordon Simpson of the Forestry Commission who was helping in the study. The mouse had travelled a distance of 5.1 km. Fernandez retrapped another Wood Mouse, west of the forest, which had travelled over 1.75 km (Gordon Simpson, pers. comm., 2012).

Although a good candidate for the most ubiquitous mammal in the region, it is also one of the most overlooked. One of the few historical mentions is by Mennell and Perkins (1864) who merely state that "This species is abundant throughout our district." Similarly *The Victoria History of the County of Durham* (Page, 1905) sums them up as "common". Our record maps show the effect of under-recording very well. The pre-2000 records show the results of concentrated trapping and recording in and around Forestry Commission lands during the late 1980s and the 1990s. It is probable that the same effect could be obtained in any area within the region if sufficient trapping effort was put into it.

Don Griss

YELLOW-NECKED MOUSE *Apodemus flavicollis*

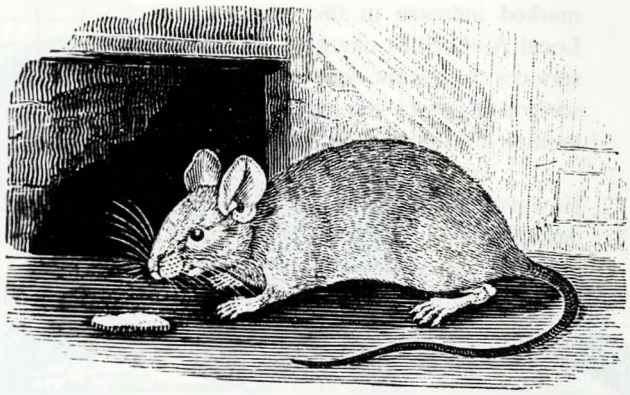
The Yellow-necked Mouse is like a large, active Wood Mouse A*podemus sylvaticus* with, as the name suggests, a yellow collar on the underside of the neck. This collar stretches from the brown colour of the upper side across the chest. The mouse is found in southern England but in the past may have had a wider distribution. It is an animal of mature woodlands but is more inclined to take up accommodation in human habitation than the Wood Mouse.

It is possible that remains found during excavations of Roman buildings in South Shields belong to Yellow-necked Mice. This suggestion was made due to the size of incisor teeth found there (Younger, 1994). There are possibly two recent references to it in the North East. Marsh and Montgomery (in Harris and Yalden, 2008) refer to a record from Riding Mill in Northumberland, for which there is a skin in the Natural History Museum (NHM). They suggest that the animal may have been accidentally carried there. Lever (1977) refers to an animal obtained near Sunderland in 1911 for which there is also a skin in the NHM. It is possible that these refer to the same skin even though Riding Mill is 32 miles from Sunderland. Apart from these the nearest records to the North East are in Cheshire (1957), Derbyshire (1950), Leicestershire (1950) and Lincolnshire (1956) (Lever, 1977). There is however some evidence that they may be present in Yorkshire, perhaps as far north as Thirsk (Brown, 1985).

Don Griss

HOUSE MOUSE *Mus domesticus*

This is the typical mouse of human habitation. After the last glaciation it was found in the Middle East, associated with the earliest agricultural settlements. It spread through the Mediterranean arriving in Western Europe during the Bronze Age and had reached Britain by the Iron Age (Harris and Yalden, 2008). In this region it has been recorded from the late 3rd or early 4th century from a Roman granary in South Shields, where it formed 30% of the total number of small mammals recovered (Younger, 1994).



House Mouse by Thomas Bewick

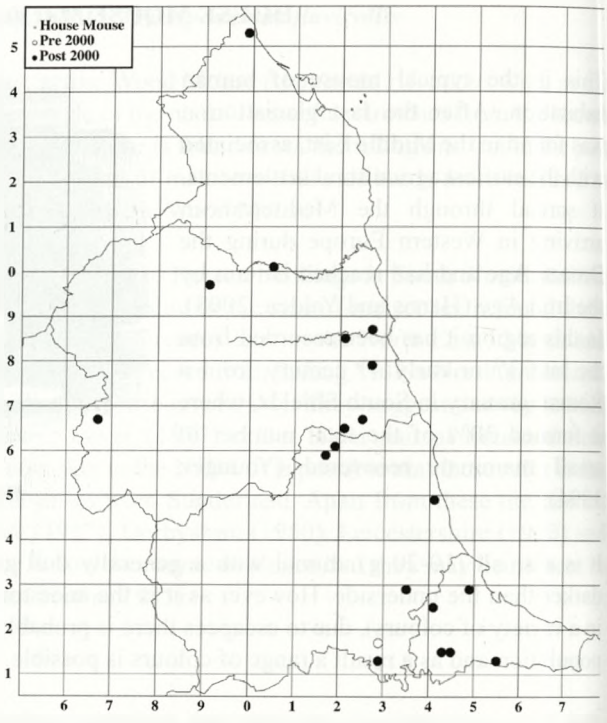
It is a small (10-20 g) animal with a generally dull grey-brown colouration, the back being darker than the underside. However as it is the ancestor of all our domestic mice (which come in a variety of colours), due to escapees there is probably a wide range of genetic material in the population and as a result a range of colours is possible.

The eyes are bright and ears large but neither as noticeable as in the Wood Mouse *Apodemus sylvaticus*. The tail is approximately the same length as the body and slightly thicker and more scaly than the Wood Mouse and less likely to shed the skin when handled. House Mice can breed throughout the year, except when living outside when they do not breed during the winter. Litters are of five to eight young which are sometimes reared communally with two or more females sharing a nest. In ideal conditions 10 or more litters can be raised in a year. The young can breed themselves at six weeks.

The natural habitat is thought to be rock crevasses but in Britain it is mainly found around buildings. It will extend into gardens and hedgerows but in competition with Wood Mice will probably not prosper. Competition with Wood Mice is believed to have led to the extinction of House Mice on St Kilda after the human population left the island (Harris and Yalden, 2008). On the Isle of May in southeast Scotland, where Wood Mice are not found, House Mice live away from buildings in cracks in the cliffs and in stone walls as they do on Skokholm Island off southwest Wales. Individuals of both of these island populations are 15% larger than on the mainland but are genetically different from each other (Flowerdew, 1993).

Though modern farming practices and domestic appliances have somewhat reduced the habitat, it is still a pest in farm buildings where its major competitor and predator is thought to be the Brown Rat *Rattus norvegicus*. Modern methods of pest control involve laying poison and maintaining it until all signs of infestation have ceased. The operator need never see the cause and species responsible. A side effect of this is that strains of poison-resistant rats and mice have developed and are difficult to eradicate. A second effect is that whatever is causing the infestation is not seen and not identified so no record is available. The National Pest Technician Association's 2010/11 Rodent Survey recorded a 2%, like for like, increase in mouse infestations from 2009/10 to 2010/11 with both figures being similar to that for 2001/02 (NPTA, 2012). The survey is

based purely on Local Authority pest control services, and given the marked increase in the number of Local Authorities charging for such services in recent years, it would seem to suggest a significant increase in mice infestations.



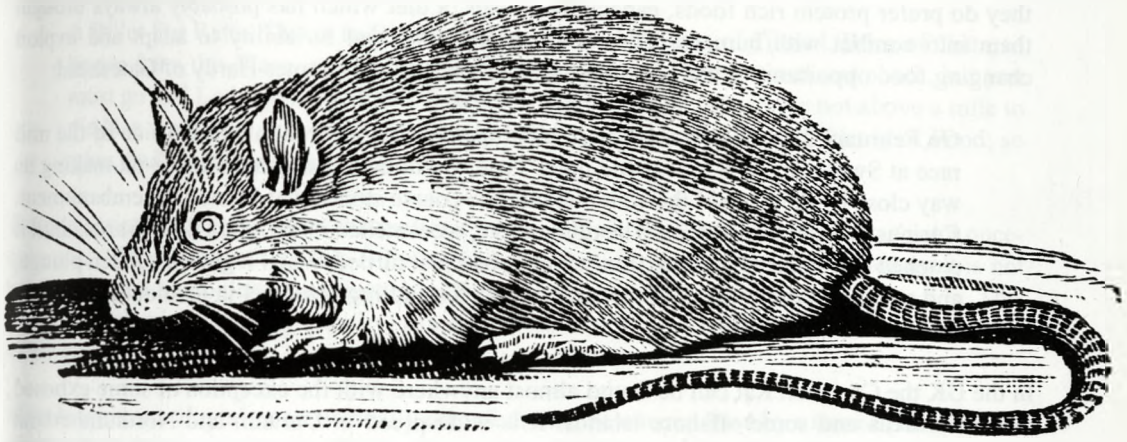
However, while the House Mouse is described as the mouse of buildings, it cannot be assumed that all mice found in buildings are House Mice. Indeed where mice are found in domestic garages and garden sheds, particularly in winter, they are very often found to be Wood Mice (Derek Abbey, pers. comm., 2011). This also applies to farm buildings, for example hay barns, which can also host Wood Mice and even Harvest Mice *Micromys minutus*.

One characteristic of common animals is that they become so familiar that they are ignored and as a result are not recorded. For example our distribution maps show them as the only widespread small mammal not present on Lindisfarne, though they are known to be present there (Andrew Craggs, pers. comm., 2012). This has happened to such an extent with the House Mouse that in the years before the turn of the present century only one record was held on the Environmental Records Information Centre database. This was in Cleveland in 1977 at Lovell Hill Ponds in the extreme southeast of the region. Similarly, Arnold (1993) records them in less than 20 hectads throughout the region. There has been no improvement since then and large areas of the North East, particularly in the western uplands, have no records, though it is extremely unlikely that the mice are absent. The recent records are mainly concentrated around the large areas of human population in the east, suggesting that they are more a record of interested observers than of the mice themselves.

Historically, authors have tended to make little mention of the small mammals, their interest being more towards beasts of the chase and the larger predators. In his list of fauna in *The History and Antiquities of the Parish of Darlington* published in 1854 (republished in 1973 by Patrick and Shotton), W.H.D. Longstaffe mentions "the usual rats and mice". He does however list Common Shrew *Sorex araneus* and Water Shrew *Neomys fodiens*. *The Victoria History of the County of Durham* (Page, 1905) has a section on the mammals by E.L. Gill who goes no further than saying "Very common about habitations everywhere".

Don Griss

THE COMMON RAT *Rattus norvegicus*



Common Rat by Thomas Bewick

Disease-carrying vermin, habitué of sewers and other filthy places, promiscuous, a despoiler of food, the shudder-inducing nightmare of so many horror films: or, a remarkably successful, wonderfully adaptable, world-colonising rodent, able to live almost anywhere and eat almost anything, an affectionate pet and as a laboratory animal indispensable to medical research. Everyone knows the Common Rat and few wild animals have so intimate a place in human perceptions.

Once called the Norway Rat in the mistaken belief that it entered the UK from Norway (hence the scientific name), the Common Rat is thought to have its probable origin in the steppes of Central Asia, spreading out and colonising Europe including the British Isles in the 18th century (Harris and Yalden, 2008). The first Common Rats reached Britain around 1720 in Russian ships from the Baltic and by 1776 it was recorded in Selkirk in Scotland (Twigg, 1975). As it spread it supplanted the UK's only other rat, another non-native, the Black Rat or Ship Rat *Rattus rattus*. By the second half of the 19th century the Common Rat was living up to its name with descriptions such as "swarms in all the reclamation embankments constructed by the Tees Commissioners" (Lofthouse, 1887).

There is no need to describe the morphology of the Common Rat: TV and film have made it one of the best known mammals in the world. Male Common Rats tend to be bigger than females with a head and body length of around 280 mm and weighing around 500 g: the tall tales of rats the size of cats just aren't true. The bare, scaly tail is usually a little shorter than the body length and is a useful aid to identification. Otherwise known as the Brown Rat they are generally grey brown in colour above and grey beneath (Harris and Yalden, 2008).

Common Rats are colonial rodents, living in territorial clans, each clan having a home range and a system of burrows and dens used for shelter and breeding. Breeding can be continuous throughout the year in sheltered environments with good food sources, but is limited to summer

and autumn in less productive and harsher environments. Rat populations can reach very high numbers in late summer and early winter but adult mortality is high with few rats reaching one year old, and by the spring numbers are usually much reduced. Rats will eat almost anything but they do prefer protein rich foods, especially cereals, a diet which has probably always brought them into conflict with humans. The rat's catholic taste and its ability to adapt and exploit changing food opportunities are well illustrated in a tale told by James Hardy of Gateshead:

> On February 24, taking a walk with a companion, as we went along the side of the mill race at Swalwell, near Newcastle upon Tyne, we noticed a common house-rat making its way close by the edge of the water among the coarse stones that formed the embankment. Curious to know what it could be doing there, we watched its progress downwards, until it reached the outlet of a drain, into which it had just turned, when it gave a sudden plunge, and as quickly reappeared in the stream with a middling-sized eel in its mouth. (Harting, 1892, in Twigg, 1975).

In the UK the Common Rat can be found almost anywhere with the exception of some exposed mountain areas and some offshore islands. It is widespread in Durham and Northumberland occupying habitats from the coast to the upland moors, but is likely to be common only where humans provide all-year-round food and shelter. Away from the human resource, occupation of the wider countryside may be limited to the summer months including the early autumn when harvesting cereal crops in arable areas. Our post-2000 distribution map is probably limited by observer bias but the indication of an abundance of Common Rats around the urban conurbations of Teesside and Tyneside, places where rats can find food, shelter and places to breed all year round, may well be an accurate one.

Rats and humans must always have been in conflict primarily over food, although they are a human food item themselves in some parts of the world. More recently rats were also recognised as a vector of disease in humans. The history of rats and humans is a long one described mostly in terms of vermin control with trap and poison.

Rats were included in the 1566 Act for the "Preservation of Grayne" with a bounty of one penny for three dead rats, to be paid by the churchwarden of the parish. The rat referred to in the Act would be the Black Rat and possibly also the Water Vole *Arvicola terrestris*, still commonly referred to as the Water Rat. Historically rats rarely actually appear in the churchwardens' lists of vermin paid for and this may well be because there was already a long established tradition of professional and domestic rat control (Lovegrove, 2007). The Common Rat is exempt from the Hunting Act 2004 and can still be legally hunted with terriers and ferrets; unfortunately the ignorance or carelessness of the hunters often extends the prey species to include the Water Vole.

As agricultural pests rats are supreme, and inventing ways to get rid of them was and is a perpetual challenge. Before modern traps and poison, anything would be tried to get rid of rats and attempts at the charming away of rats as in the "Pied Piper of Hamelin" story was resorted to. In 1953 the journal *Folk-lore* printed a letter recounting a tale told to the writer by an Irish farming lady of an itinerant rat-man who visited their farms to rid them of rats. His method was to play a tune through the infected steadings and stackyards, placing a written incantation in the rat holes as he went. As a result the lady informant assured the letter-writer that the rats gathered together in a body and left that place (MacGregor, 1955). The same technique was formerly employed in Northumberland: Neasham (1893) records a Mr Dand of Hauxley Cottage showing

him a letter to quit, written to rats. The letter on a sheet of quarto paper was "To all the Ratts in the house, Barns, Biers, stabls and Outhouses belonging to Robert Milburn of Ulgham". The body of the text reads:

> A Billet For Ratts. This is to Discharge you all, in the Name of Tibract, Price of Catts, to begon from this Place, as you are bad Neighbours, and Disturbers of our peace; but you must go and Lodge with William Tweedy of Ulgham Park, which are not above a mile to the Nor west from this place. There you will have good quarters, and Plenty of Food; so adue, bad Neighbours, adue.

The postscript to the letter gives instructions for use and shows that this attempt was not a once-only one: "Be shour you Lay this Billet wheare the Ratts Resorts. After it is sealed up it is not to be look'd on by no person, as they may likely taked [take it] from the place you lay it in. This has been well tried in sindry [sundry] places." What is not recorded is whether music was part of the process.

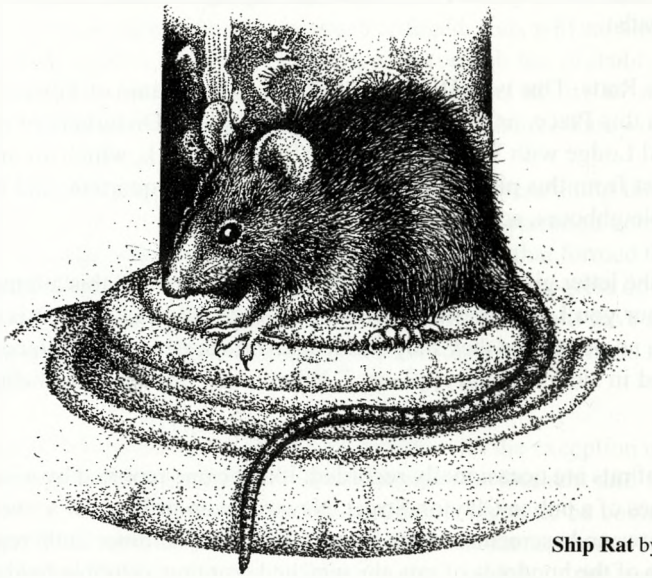
Mass migrations of rats are occasionally recorded, like the one reported by a scared policeman in 1976 to the habitués of a pub in Clayton Street, Newcastle upon Tyne, of a river of rats migrating across the road between basements; or the horse rider in late summer 2008 reporting the strange and dreadful noise of the hundreds of rats she watched crossing a stubble field and heading in the direction of Kirkheaton (Ruth Hadden, pers. comm., 2012).

Rats were also a threat as a vector of Weil's disease or leptospirosis, a disease of agricultural workers, sewer workers and - more pertinent to the northeast of England - coal miners, with miners at risk of illness and occasionally death (Broom, 1951). Drift mines allowed Common Rats to walk in and colonise the piles of waste rock, subsisting on the food of the pit ponies stabled underground and on discarded scraps of the miners' food. Particularly in wet mines, rat urine would spread the disease which was contracted by miners through abrasions and cuts (Twigg, 1961). Even deep mines were not always free from rats but here, once they were in, the rats would starve if food sources were removed. Robert Stephenson MP of engineering fame recounts the tale of Walker Colliery, near Killingworth, where rats depending on pit pony food for their existence had reached great numbers. When the pit closed for the miners' holidays the ponies were brought to the surface and the rats deprived of their food. On re-opening the pit after the holiday the first man down the shaft was attacked, killed and eaten by the starving rats (Bell, 1874).

Improved hygiene and the introduction of effective anticoagulant poisons in the 1950s gave humans a temporary upper hand in the war with rats, but there is now evidence that some rat populations have developed resistance to anticoagulants through an inherited trait (Harris and Yalden, 2008) and it seems that the Common Rat is likely to continue to live up to its name.

Terry Coult

SHIP RAT *Rattus rattus*



Ship Rat by Terry Coult

The Ship Rat's more common name of Black Rat can be misleading as it may be brown in colour, while the Common (or Brown) Rat *Rattus norvegicus* can on occasion be black. The two species are similar in appearance but the Ship Rat has proportionately larger ears and eyes and a longer, thinner tail than the Common Rat, with the effect that the differences in general appearance are similar to that between the Wood Mouse *Apodemus sylvaticus* and the House Mouse *Mus domesticus*.

It is much more agile than the Common Rat and in the period when both species could regularly be found together in buildings, the Ship Rat was typically found in attics and roofs, leading to its third common name, the Roof Rat, whereas the Common Rat was found in basements and sewers (Buckland, 1858). It should of course be borne in mind that it was the only rat in Britain until the introduction of the Common Rat in the 18th century.

Originally from the Deccan Peninsula in India the Ship Rat is more suited to warmer climates than that of much of Britain, and in this country it has been confined almost exclusively to buildings with the exceptions of colonies on the islands of Lundy and the Shiants (Twigg, 1993).

It was thought that the species had been introduced into Britain during the Crusades but it is now known to have been present since the early Roman period (Yalden, 1999). Its history in the North East is equally long: excavation of a Roman granary in South Shields found that Ship Rats made up as much as 10% of the individuals of the small mammal fauna associated with the location of the granary (Younger, 1994).

There is some evidence that it died out in Britain, or at least became rare and localised, in Anglo-Saxon times, though it was back by medieval times and widespread enough to be the vector for the Black Death in the late 1340s (Yalden, 1999). Its subsequent history in the North East appears to have been only patchily recorded. There are medieval records from the monastery at Jarrow, though its bones were found to co-occur with those of Common Rats, which leaves some

question as to the stratographic integrity of the deposits. Its bones have also been found in drain deposits dating to the 15th century from the Great Hall at Barnard Castle, and later, in the 17th century from a pit in Blackgate in Newcastle (Huntley and Stallibrass, 1995).

In a paper in the *Transactions of the Natural History Society of Northumbria* Dr Embleton (1854) compared the anatomy of the two species of rat, obtaining his specimens from Stockton "which is, as far as I know, the only locality in our district where the black rat is yet to be found." To this, Mennell and Perkins (1964) add: "where, as in many other places in our district, the species still lingers, though in constantly diminishing numbers." From various references at the time, it would seem that the species' distribution was somewhere between that of one location and many places. Middleton (1879) states: "The animal lingers in one old building at Stockton-on-Tees (NZ/41) and there is clearly a possibility of it being re-introduced in many seaport towns through the agency of ships." Likewise, Clarke and Roebuck (1881) describe it as: "Extremely local, appearing to occur only at Stockton-on-Tees (NZ/41), where it is not unfrequent [sic] in one or two old buildings". Faber (1879) on the other hand states "Last year [1878] I caught two in my own house and a neighbour caught three in his stables ... I also (Last year or the year before [1878 or 1876]) saw a man carrying one in a trap .... and which I heard had been caught in a warehouse in the town. Mus rattus is certainly not confined to "one old building at Stockton-on-Tees (NZ41)."

Black Rats were also to be found, at least sporadically, on Tyneside, about which Embleton (1884) states "Mr Gurney's specimen therein noticed must have been from Gateshead, though it is quite probable that it had migrated from Newcastle, or escaped from some ship. The Black Rat has not been recorded from this town [Newcastle] because probably it has not been sought for ... We know the Black Rat exists in some old premises in the Close, a narrow street in Newcastle-upon-Tyne, by the river side, above the bridge, where it appears to have been for some time, and that it has been seen at times on board ships laying at the Quay." A few decades later it was still being encountered, with T. Russell Goddard (1926) reporting "In December 1925, Mr J. Alaric Richardson sent up to the Museum a wire cage trap containing four rats caught the previous night in a warehouse at Elswick Leather Works. Three of them were the typical form of the Black Rat, Rattus rattus rattus and the fourth Rattus rattus frugivorous."

This same pattern, of Ship Rats being confined to relatively small numbers in ports along the North East coast, continued throughout the 20th century. In 1939, Colin Matheson published the results of his investigations into the numbers of Black Rats killed on ships entering seaports in England and Wales and within docks, quays, wharves and warehouses in those seaports from 1925 to 1937. This was based on a questionnaire sent to the Medical Officer of Health of the Port Health Area of each "approved port" in Great Britain and Ireland. Of the 22 replies received, two were from Middlesbrough and Sunderland. In Middlesbrough around 10 to 20 Ship Rats were killed on ships each year from 1929-1937. In the adjacent docks 216-456 were killed each year from 1934–1937 though in the preceding six years numbers killed were generally in single figures. In Sunderland the average number killed on ships was slightly higher, though the number killed in the docks was less than 20 per annum.

Some 20 years later, another questionnaire sent to every local authority in the UK by Bentley looked at the status of Black Rats in 1951 compared to 1956. It found that most authorities reported a complete absence of Ship Rats. Nevertheless in 1951 it was still the case that Ship Rats were regarded as "always present somewhere in ... Newcastle; South Shields; Hartlepool and Middlesbrough" (Bentley, 1959). By contrast, in Stockton and Sunderland, more than five

infestations had been recorded but the species was not thought to be permanently established, whilst both Eston and Thornaby had seen fewer than five infestations. Only in Middlesbrough and Hartlepool was the Black Rat present outside of the immediate port area but in those cases its status was thought to be precarious. By 1956 the species' hold in the North East had diminished to the extent that it was absent from Stockton and there were fewer than five infestations at South Shields, whilst at Hartlepool it could still be found at the docks but no longer outside of them.

Further work by Bentley (1964) found that the Black Rat's toehold on the North East had become even more precarious and in 1961 there were no infestations from either Newcastle or Hartlepool and just a single Black Rat reported from Middlesbrough. However a later questionnaire by Twigg (1992) found that there had been an increase in records for the period 1985-89 with Black Rats being occasionally found and exterminated on ships on Teesside and West Hartlepool, and while not usually found on shore, two rats were found in a cargo of bananas that had reached a market in Gateshead.

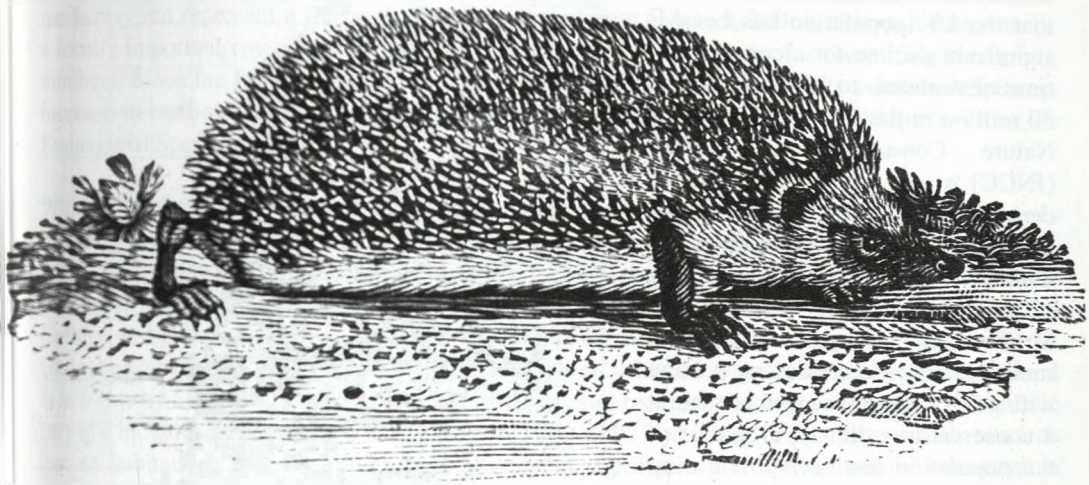
Also around this time, Mr Graham Wood, Director of Tyne Port Health Authority (pers. comm. to T. Coult, 1989) claimed that typically two ships a year with Ship Rats would be dealt with, mostly Russian factory ships. In 1988 some 55 Ship Rats were killed. One of the authors received six Ship Rats (mostly of the brown form) that had come from a batch of 25 that had been killed on a Japanese ship, which had docked in Teesport in June 1992. The ship's last port of call had been Burma.

In 2011 one of the authors contacted North East Local Authority pest control officers to see if any of them had encountered Ship Rats in their area. Responses were received from the boroughs of Redcar and Cleveland, Middlesbrough, Hartlepool, Sunderland, South Tyneside, North Tyneside, Newcastle and also the Port of Tyne. While the period of search was not stated and probably just related to the length of time individual officers had been in post, none had come across Ship Rats. However the pest control officer working for South Tyneside Council knew of a problem with Ship Rats at Seaham Docks about five years previously and another comparatively recent occurrence at Sunderland Docks, though both instances were dealt with by private contractors and both were thought to originate from incoming ships.

All of the above documented references to Ship Rats in the North East, and others not cited in this account, relate to its presence in ports or port towns. The only inland place in the North East where it appears to have been recorded is Durham City. Canon Tristram knew of a colony in the vicinity of Durham Cathedral when he was at school in Durham in the 1830s, which had been there "since time immemorial". The last specimen was supposedly taken in 1879 but a Mr J. Cullingford reported that one was taken near the town in the 1890s (Page, 1905). However James Rackham (pers. comm. to T. Coult, 1988) was brought a mummified Ship Rat carcass that had been found on an internal ledge within the Cathedral, which he considered to be unlikely to have been any older than a few decades. He also recalled a rat which had been found in Dun Cow Lane as being of this species, though he was not prepared to state this as an authoritative identification. Around 1960, when he was a student at Durham University and waiting for a date outside what was then the Regal Cinema, Gerry White found a Ship Rat dead in the gutter. Uncharacteristically unprepared for scraping up dead rats he had to leave it there, but nevertheless was absolutely certain of the identity of what is possibly the last North East Black Rat record outside of a port town.

Ian Bond, Colin Howes and Terry Coult

EUROPEAN HEDGEHOG *Erinaceus europaeus*



European Hedgehog by Thomas Bewick

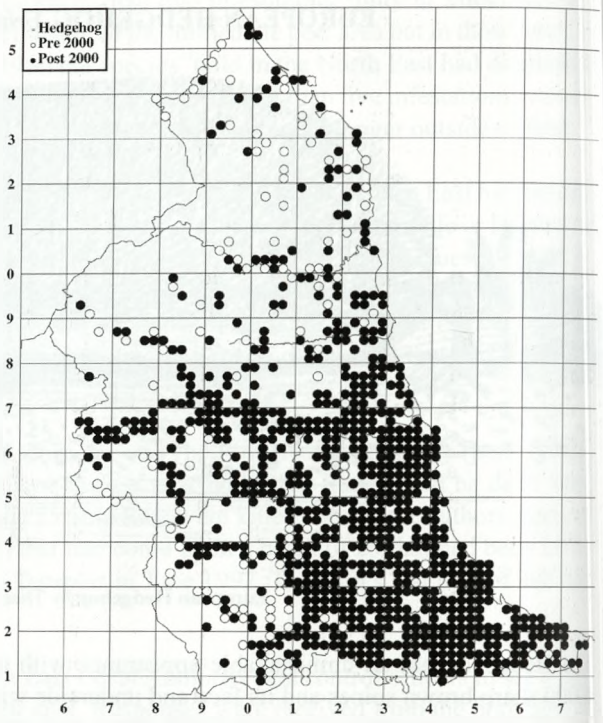
The Hedgehog has an unmistakable appearance with its back and flanks covered with around 6,000 sharp brown spines and its face and underside with coarse grey-brown fur. Depending on age, adult body length can range from 20-30cm, with weight reaching up to two kg in the autumn when hedgehogs are at their heaviest. The average life expectancy in the wild is around two to three years with over half dying in their first year, although some can live for five years or more.

Hedgehogs are nocturnal and largely solitary, with the exception of mothers with young. Litters of four to five hoglets are born typically between May and September with young born later often dying as they are too small to survive hibernation, at the start of which juveniles need to be at least 450 g to ensure fat deposition is adequate. Hedgehogs hibernate from November to March to conserve energy, although the length of this period is weather dependent. During winter they wake on average once a week in order to forage, during which body temperature is raised from 5°C to 30°C, a process taking several hours. Once active in the spring they may re-enter hibernation during a cold snap.

Diet consists predominantly of ground-dwelling invertebrates including earthworms, beetles, caterpillars and slugs, with approximately 70 g of food being consumed per night, during which Hedgehogs will travel one to two km over home ranges of 10-30 ha. Hedgehogs are not territorial and radio-tracking studies have shown that there can be considerable overlap between foraging areas. During the day they rest in nests lined with leaves, grass and twigs, although if the climate is warm enough they may sleep under wood piles, pine needles or bushes and foliage. Hedgehogs use many day nests and each can be frequented by many individuals.

Hedgehogs are present throughout the UK, with the exception of some Scottish islands, in almost all lowland habitats where there is sufficient nesting cover. They are particularly abundant where woodland edges and hedgerows are in close proximity to grassland. With the decline of these traditional habitats, parks, gardens and brownfield sites in urban areas are becoming increasingly important.

Although there has never been a full national survey, it is generally accepted that the UK population has been in significant decline for a considerable time. Estimated to number around 30 million in the 1950s, a 1995 Joint Nature Conservation Committee (JNCC) study based on hedgehog densities per habitat type indicated that the population had fallen to 1.5 million (Harris *et al*, 1995).



More recent surveys in urban and rural areas show a continuing decline with a 2011 report suggesting that, at a conservative estimate, a quarter of the population has been lost during the last 10 years (Wembridge, 2011). Hedgehog populations can fluctuate from year to year due to the weather and the subsequent availability of prey and also whether conditions are suitable to allow a second litter to be raised. Nevertheless, nationally the survey evidence indicates a continual average decrease of several per cent per year. The current population is unknown due to the inherent difficulties in surveying a nocturnal creature.

This decline can be attributed to several factors, all with varying degrees of contribution. Land use change resulting in the spread of urban landscapes and a move towards more intensive agriculture has led to the loss and fragmentation of suitable habitat. With the development of larger, arable fields to increase agricultural productivity, hedgerows, rough field edges and permanent grassland have been lost, limiting the availability of nesting sites and reducing the Hedgehog carrying capacity. Within urban areas tidier, more sterile gardens with impenetrable boundaries have removed hibernation sites and restricted the extent of wildlife corridors for this mobile species. Small populations have become increasingly isolated and vulnerable to local extinction. In addition, the use of agricultural and garden pesticides has reduced the insect food supply and may also result in secondary poisoning through the food chain.

As there are now fewer areas for Hedgehogs to take refuge in it is thought that Badgers *Meles meles* are presenting an increasing problem. Although Badgers are a natural predator of Hedgehogs, usually the two can co-exist where the habitat provides sufficient cover, for example in Gosforth Park Nature Reserve in Newcastle upon Tyne. Studies in suburban habitats indicate that the probability of Hedgehog occurrence declines towards zero in areas of high Badger density, with Badger presence limiting the ability of hedgehogs to move between patches of habitat (Young *et al*, 2006). It is not known as to what extent this is an issue in the North East where there are few populations of urban Badgers.

Having spines reduces the requirement for Hedgehogs to run for cover, a habit which has not aided Hedgehogs in the age of the motor vehicle. However it has been suggested that overall roads may not represent a major threat to the population (Morris, 2006), although they can be a locally important cause of mortality and therefore a key technique for measuring Hedgehog numbers. Since the first national survey in 2001 a decline in road casualty records despite an increase in traffic reliably indicates a downward trend in the population (People's Trust for Endangered Species, 2011).

Within the North East, records indicate that the population is concentrated in lowland areas including urban gardens, away from the less favoured upland habitats such as heather moors, which tend to have fewer areas for nesting and a decreased number and variety of invertebrates. However, Hedgehogs are occasionally found on higher ground with recent sightings in the College and Harthope Valleys, Northumberland. A further record of note is from 2009 when a Hedgehog was sighted foraging on Holy Island, which is linked to the Northumberland mainland at low tide by a causeway. A large number of Hedgehog records have been generated from public surveys including a Durham BAP survey in 2006-2007, which will skew the results towards human habitations. Road kill sightings have been significant and are noticeably important in determining the extent of Hedgehog distribution but these also skew the distribution of records, though some trends still emerge. For example Ian Bond (pers. comm., 2012) has noted that in the Tees Valley, Hedgehog road kills are concentrated on the perimeters of villages or hamlets and are very rarely encountered on stretches of road through the open countryside between them. This could suggest that the wider countryside may currently be of less value for Hedgehogs.

Francesca Leslie

MOLE *Talpa europaea*

The Mole is one of our most recognisable mammals, not often seen above ground but distinctive when it is encountered. It has unmistakable broad, spade-shaped forelimbs which are pink as is the snout. It has short dense fur with a velvety texture which has no lie and therefore is unaffected by the Mole moving forwards or backwards through its tunnel system. Moles have very small eyes which are almost hidden within the fur and they tend to carry their short tails erect. Old names for the Mole include moldwarp, want and taupe. Moldwarp is Anglo-Saxon in origin: molde is from soil and weorpan to throw or turn up.

The most distinctive feature of the Mole's lifestyle is the molehill, the conical spoil heap formed when a Mole is excavating permanent tunnels. The soil is pushed up into a hill through a vertical or sloping tunnel from below; there is no opening in the molehill to the surface.

Moles have many benefits: they create tunnels which turn over the soil and help to aerate it, which can improve drainage; they also eat invertebrate pests. Moles feed predominantly on earthworms but insect larva are also important at different times of the year. Earthworms are the main food in winter but only make up around 50% of the diet in summer. Food is found by foraging along the tunnel system, taking prey that is within the tunnels or in the tunnel walls.

A local conservation benefit was seen at Haughton Castle, Northumberland, where *Alchemilla micans*, a rare member of the lady's mantle family, has been found growing directly on top of molehills in old pasture land. Moles are thought to have brought seeds to the surface that have lain dormant for many years and the soil of the molehills has proven an ideal site for the plants to germinate. This discovery, made in 2010, is only the second site in the UK where this plant is known to grow (*The Journal*, 5 October 2010).

One unexpected benefit of molehills made the news recently. At Whitley Castle in west Northumberland, Moles burrowing in the old Roman site of Epiacum have brought artefacts to the surface with the soil. The site is a scheduled ancient monument and no digging or excavation is permitted, but the Moles have brought several finds to the surface, including a piece of Samian ware pottery and a jet bead (*The Journal*, 21 April 2012).

Moles are regarded as agricultural pests. Molehills can provide ideal conditions for invasive plants to establish, the soil from the molehills can get caught in farm machinery and Moles

are still removed from hay meadows as the soil thrown up in molehills can contaminate hay and silage causing listeria in over-wintering livestock fed on the affected bales. They can also damage crops with their underground runs, and molehills are not welcome on golf courses and lawns. Dead Moles are often seen hung on wire fences, or on murder rails, once they have been removed from farmland, especially from hay fields. Displaying dead Moles in this way allows for an accurate record of Moles killed. Mole catchers tend to be paid per Mole and in this way both parties know the true number killed. The profession of Mole catcher is an old one, dating back to the time of early parish enclosures (Lovegrove, 2007). The profession still exists today and an advert for a Mole catcher was seen recently in Longhorsley. Very few parish records record the numbers of Moles killed and these are not a full reflection of the numbers taken, as many Moles will also have been caught on private estates and paid for by land owners. However, the practice of removing Moles from a small area is ineffective, as when a resident Mole is removed, the territory will be taken over by neighbouring Moles, sometimes within a few hours.

Moles build a nest, often called a fortress, below ground at depths of up to one metre, but in areas of low lying land which are prone to flooding or in areas of thin, poor soil Moles will construct a more permanent fortress above ground level. Moles usually only build one nest and it can be situated anywhere within the tunnel system but is usually away from the range boundary. The nest is lined with dry grass, leaves or even paper, all collected from above ground. The main nest can contain a large store of decapitated earthworms to act as a food reserve during periods of flooding or hard frosts. The home range for a female Mole is 1,300-2,100 metres^2 and the male range is 2,700-3,400 metres^2, increasing to around three times that size during the breeding season.

Male Moles are generally larger than females; a study of Moles from Suffolk found males had a mean of 143 mm head and body length with females having mean length of 135 mm. This study also found the mean weight of males was 110 g and of females 85 g (Harris and Yalden, 2008). While this study showed differences in the mean lengths and weights the range is such that size alone should not be used for distinguishing between the sexes. Moles moult twice, in spring and in autumn and the winter coat is longer than the summer fur.

Male and female Moles are solitary for most of the year; in the breeding season males will tunnel over extensive areas searching for females. Female Moles generally have one litter a year and the average litter size is four, with a range of two to seven. Gestation is about four weeks. The young are mostly born in April and May. They leave the nest at around four weeks and explore their mother's tunnel system where they are tolerated for a few weeks before the young disperse to find territories of their own (Godfrey, 1962). Moles live for around three years but there is a high juvenile mortality in the first year.

Moles can vary in colour: while the majority are black, colours including cream, apricot, rust coloured, grey, silver grey and albino have been recorded. This variation in coat colour is "more frequent than in other British mammals, but no figure for frequencies [are] available." (Godfrey, 1962). A possible explanation for this might be that because Moles spend so much time below ground pale coloured individuals are not predated as readily as they are in other species. Mennell and Perkins (1864) note that cream Moles are "not unfrequently met with" and they also record that a superstition exists in County Durham that the capture of a white Mole on a farm is said to foretell the death of the head of the household. They relate the story that "the Reverend G. C. Abbes tells us, in illustration of this, that the son of a small farmer near Sunderland,

himself a man of middle age, and tired of waiting for his inheritance, offered a considerable reward to the Mole catcher if he could succeed in trapping a white Mole on the farm; after some little time the man brought the desired animal, and received the reward, accompanied with the following threat Deil tak ye! if ye catch anither white Mole on this farm I'll smash your heed! No wonder! for the next white Mole would be the herald of the son's own end." Coloured Moles are not uncommon locally, and have been recorded from several locations in Northumberland and Durham; there is a known population in Coquetdale mainly around Rothbury to Thropton with 10 records, the earliest of which is from Lord Armstrong of Cragside in 1921. There is still a strong coloured population in this area today (John Steele, pers. comm., 2012). Cream Moles are still newsworthy: one was trapped in 2011 at Black Hill Farm near to Hexham and the story was featured in the *Hexham Courant* on 12 March 2012.

The Mole has colonised many different habitats where the soil is deep enough to allow the construction of their tunnel systems. Moles evolved as creatures of deciduous woodland but they have taken advantage of pasture and arable land. They occur in lower densities on moorland, in dune systems and in coniferous plantations, perhaps limited by the availability of prey.

The Mole is distributed throughout mainland Britain and has colonised the islands of Skye, Mull, Anglesey, Wight, Alderney and Jersey, but is absent from Ireland, Man and the outer Scottish islands. Moles have been recorded from the early Pleistocene and were present at Thatcham, Berkshire and Steely Cave, Derbyshire, both Mesolithic sites (Lovegrove, 2007).

The Mole is recorded by Selby (1855) in the *First Report on the Fauna of Twizell. The Victoria History of the County of Durham* (Page, 1905) lists Moles "as abundant here as elsewhere. Varieties of a cream or silver-grey colour are by no means uncommon, and I have records of such from many parts of the county. These varieties often have a more or less brilliant tinge of orange on the under-side and flanks. Several instances of this have been reported from Winlaton by Mr. Thos. Thompson, and a silver-grey Mole with the orange tinge was sent to the Newcastle Museum in 1903 from the Woodlands, Consett, by Mr. W. B. van Haansbergen."

Moles are widespread throughout the region, with most of the records relating to molehills. There are records for most areas where there are recorders and obvious gaps in the data may be more related to lack of recorders than lack of Moles. Moles do seem to be absent from urban centres, probably because of the lack of accessible land and no connectivity to more rural areas, although molehills have been noted on the outskirts of the Newcastle conurbation. There is a gap in Mole distribution in the area around Hartlepool headland. This is a built-up area with little greenspace and is not connected to the wider open countryside, and Moles have been looked for in this area for some years without success (Ian Bond, pers. comm., 2012). Moles also seem to have taken advantage of road verges, which is reflected to some extent in the pattern of the dots on our distribution map. Moles seem to be absent from the Northumberland uplands, but this may be the result of a lack of recorder effort rather than a true absence. The highest location a Mole has been recorded from in Northumberland is in the Bizzle Corrie on the north flank of The Cheviot at approx. 550 metres (John Steele, pers. comm., 2012). They are also quite widely distributed at approx. 500 metres above sea level around Widdybank Fell and Langdon in Durham (Ian Bond, pers. comm., 2012) and may well prove to go higher still should any mammal recorders venture there.

Tina Wiffen

COMMON SHREW *Sorex araneus*

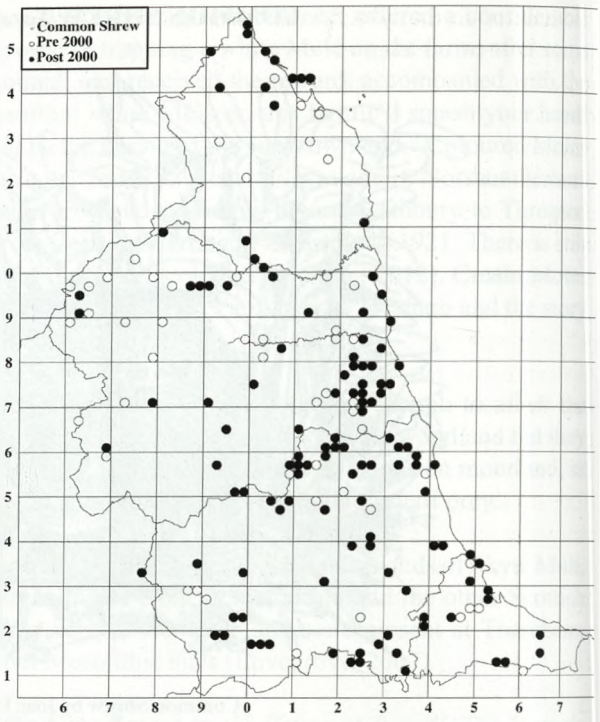
Common Shrew by Joan Holding

The Common Shrew is believed to be the second commonest mammal in Great Britain, with an estimated population of around 41.7 million. It is small and brown with a contrast between the upper and undersides. The flanks are a different shade to the back giving it a tricoloured appearance. They sometimes have white ear tufts, similar to Water Shrews *Neomys fodiens*: Veronica Carnell caught one such individual in Gosforth Park, Newcastle upon Tyne. The head and body are 48-80 mm and the tail 24-44 mm. Weight is from 5-14 g. The tail is a little over half the length of the head and body (cf. Pygmy Shrew *Sorex minutus*) and does not have a distinctive fringe of hair along the underside as does the darker coloured Water Shrew.

It is found in a wide variety of habitats in which there is a litter layer where it can form covered runs to escape observation. It also uses the burrows and runs of other small mammals such as mice and voles and is thus often difficult to detect. Most common in grasslands, it is quick to colonise field borders and other areas of recovering vegetation. In Britain it is found to elevations of around 1,000 metres in the uplands, most frequently in stable scree but occasionally in heather. Population density varies from as low as five to as high as 90 per hectare, with variation depending on vegetation type and season. A line of eight Longworth traps set at roughly five metres apart along the base of a wall in Blanchland in the North Pennines, in March 2012, caught Common Shrews in five traps on the same night, the remaining three traps catching Bank Voles *Myodes glareolus* (I. Bond, pers. comm., 2012).

During the summer they can often be heard squeaking in vegetation. This is because they live solitary lives and when they meet may fight or become involved in a squeaking "duel". The young are born between May and September in litters of three to nine in a large concealed nest of grass and leaves. In the latter stages of rearing the young the female may need to eat

up to 120% of her body weight per day (Churchfield, 1986). Shrews are short-lived, normally over-wintering as immatures which are smaller (seven g) and greyer than the adults. They moult in autumn and spring. Moulting individuals can easily be recognised as the autumn moult starts at the tail and moves along the body to the head, giving the animal a peculiar parti-coloured appearance. In the spring the moult goes in the reverse direction.



Shrews are active hunters, using scent, touch and hearing to locate their prey. Their eyes are very small and probably not very efficient. Prey consists of insects, spiders, crustaceans, worms, etc. Its high metabolic rate means it must eat about 70% of its own body weight per day (Churchfield, 1986). This rate of activity causes tooth wear, which is one of the causes of death (Harris and Yalden, 2008).

Numbers are highest in summer but fall rapidly during October and November. There are two reasons for this fall, firstly the death after breeding of the adults and secondly the high mortality of inexperienced juveniles establishing winter ranges. They are preyed on by a wide range of birds, but while mammals may kill them some, such as cats, will not eat them, being put off by the scent glands on the flanks. Shrews rank as the second or third preference as food for owls, behind rodents (mice and voles). They may be taken when rodent densities are low. Out of 1,307 prey items identified from a total of 671 Long-eared Owl *Asio otus* pellets from Urlay Nook, only one was from Common Shrew, less than 0.1% (A. Love, pers. comm. to Alistair McLee, 2004). However this can vary depending on other factors such as the species of owl and the type of habitat that they hunt over. Barn Owls *Tyto alba* that hunt over closely cropped and tussocky grassland will typically take a higher proportion of shrews (Taylor, 1994). For example, of 39 prey remains recovered from Barn Owl pellets from a roost near Greatham surrounded mainly by pasture, six (15%) were from shrews; and from young woodland plantation near Darlington, around one quarter of the 33 prey remains were Common Shrew (I. Bond, pers. comm., 2012).

Their comparative abundance and high death rate cause them to be frequently found dead on footpaths and other open places, although this can be because they have been abandoned by cats or other predators. It was however at one time believed to be because they could not cross a human track. They were also thought to be so sensitive that they died of shock. They are however much more robust and can develop a trap habit if caught in Longworth traps, returning for a further feed of blow fly pupa in spite of the handling procedures. It should be noted that it is now illegal to trap shrews without a licence.

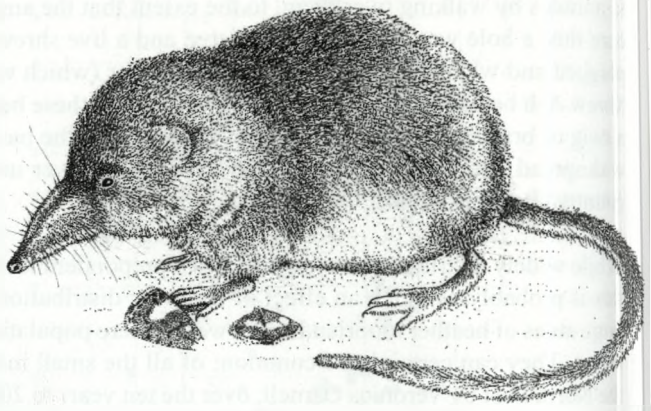
Though not normally injurious to man or his animals, shrews were once subject to a particular form of cruelty because of the superstitious belief that they were venomous and caused damage to animals by walking over them, to the extent that the animals could lose the use of a limb. To cure this, a hole was bored in an Ash tree and a live shrew was placed in it. The hole was then plugged and when the shrew had died of hunger (which wouldn't take very long) the so called Shrew Ash became imbued with the power to cure these beasts. All that was needed was to draw a twig or branch from the tree several times across the back of the sick animal. This belief was widespread and Shrew Ashes, which kept their power until they died, were found across the country (Brockie, 1886).

While widely distributed, our map shows a preponderance of records in the eastern lowlands but this is probably as much an effect of observer distribution as that of the shrews. However the large areas of heather moorland in the west, where population densities are low, might have some effect. They can certainly be common: of all the small mammals caught in Longworth traps in the North East by Veronica Carnell, over the ten years to 2012, almost one quarter were Common Shrews (V. Carnell, pers. comm., 2012). Historically within the North East small mammals are not widely mentioned but *The Victoria History of the County of Durham* (Page, 1905) refers to the Common Shrew as abundant, a situation that has almost certainly not changed despite the lack of records.

Don Griss

PYGMY SHREW *Sorex minutus*

The Pygmy Shrew is Britain's smallest mammal weighing only 2.3-5 g and measuring 40-55 mm head and body with a tail 30-46 mm. It is brown in colour grading to a paler underside. The tail is hairier and appears thicker than that of the Common Shrew S*orex araneus* and at about two thirds of the head and body length it is relatively longer. It may be of some help in separating the two species to remember that while the Pygmy Shrew may reach five grams in weight, this is the weight at which the Common Shrew leaves the nest.



Pygmy Shrew by Terry Coult

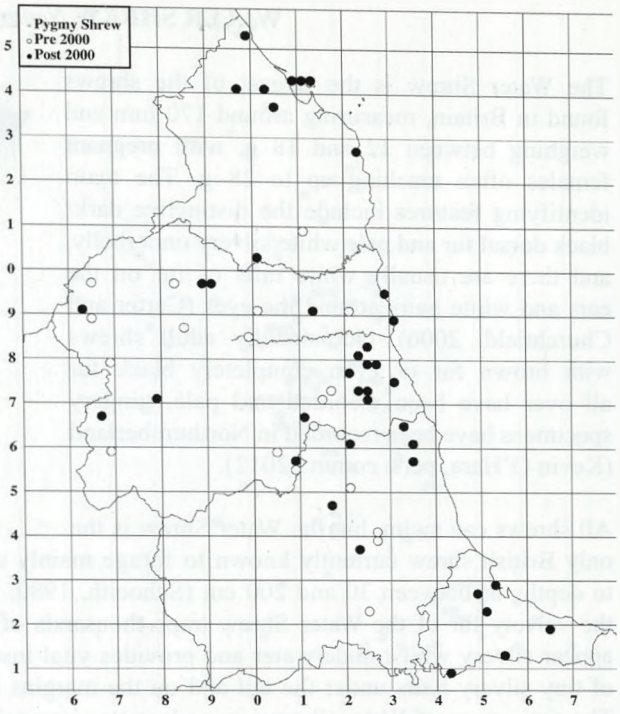
The Pygmy Shrew is distributed over mainland Britain and many of the islands, in a wide range of habitats wherever there is a litter layer to conceal it and through which it can burrow. They also use the burrows of other animals, but it is not as subterranean as the Common Shrew. It is generally less numerous in all habitats than the Common Shrew except on moorland and blanket bogs. They seem to fare better than the Common Shrew in wet and dry habitats. Millais (1906) records a Pygmy Shrew that was brought in by a cat to the observatory on top of Ben Nevis.

Pygmy Shrews are difficult to catch using Longworth traps because of their light weight. It is difficult to set the trap to respond to such weights and not trip at other slight disturbances. To illustrate this, they were a mere 4% of the total number of small mammals caught in Longworth traps in the North East by Veronica Carnell, the same percentage as Water Shrew *Neomy fodiens* (V. Carnell, pers. comm., 2012), though the latter is almost certainly a much less common and more habitat-restricted species. Where they are successfully trapped, they form about 4% of small mammal captures in deciduous woodland, 5-38% in grassland, and in pitfall traps in northern England on moorland and blanket bog have formed 80-90% of the catch (Churchfield and Searle in Harris and Yalden, 2008). Anecdotally they are often drowned in pitfall traps set for invertebrates though unfortunately this by-catch is often not recorded. Their presence can often be deduced by finding droppings in unsprung traps.

Though smaller, they have a larger home range (500-1800 metres^2) than the Common Shrew's (900 metres^2). The breeding season extends from April to October and litters of one to nine (normally four to six) are born in similar conditions to the Common Shrew. The young are around 0.25 g at birth and become independent at around 2.5 g. They over-winter as immature animals and die before the following winter.

Their food preferences are similar to Common Shrew but probably because of their size they choose smaller, less well-armoured prey and take more from the surface rather than burrowing in the soil. This is possibly the ecological separation that enables both Pygmy and Common Shrew to share the range. That they can do so without conflict is interesting. Harrison Matthews (2009)

suggests that the Pygmy Shrew is fast enough to respond to approaching Common Shrews so that though it knows the Common Shrew is present the Common Shrew is not aware of the smaller animal. This however discounts the sensitivity of their noses and the presence of the scent glands. That the smaller animal would appear on the menu of the larger if caught is probable unless they find them unpalatable, as cats apparently do. Veronica Carnell reports catching both species in the same trap and that both were uninjured (V. Carnell, pers. comm., 2012), though in this situation easier sources of food (bait) would be present.



Within the North East it is referred to in *The Victoria History of the County of Durham* as follows: "Only one record a specimen in Newcastle Museum taken by W. Backhouse at St. Johns Wolsingham but probably not as scarce as lack of records suggests" (Page, 1905). In Longstaffe's History of Darlington (1854) it is not mentioned though the other two shrew species are.

Modern records, though less numerous than for Common Shrew, show a similarly widespread distribution. However it has only been recorded in 28 10 km squares in the North East, post-2000, which is not a great improvement on the 21 10 km squares from which it was recorded in the 1993 *Atlas of Mammals in Britain* (Arnold, 1993). This is probably an indication of observer coverage and, in terms of the comparison between the coverage of records and the species' likely distribution, it is probably the most under-recorded mammal in the North East.

Don Griss

WATER SHREW *Neomys fodiens*

The Water Shrew is the largest of the shrews found in Britain, measuring around 170 mm and weighing between 12 and 18 g, with pregnant females often reaching up to 28 g. The main identifying features include the distinctive dark/black dorsal fur and pale white/silvery underbelly, and there are usually white tufts of fur on the ears and white hairs around the eyes (Carter and Churchfield, 2006). Occasionally adult shrews with brown fur or even completely black fur all over have been recorded and pale, gingery specimens have been recorded in Northumberland (Kevin O'Hara, pers. comm., 2012).

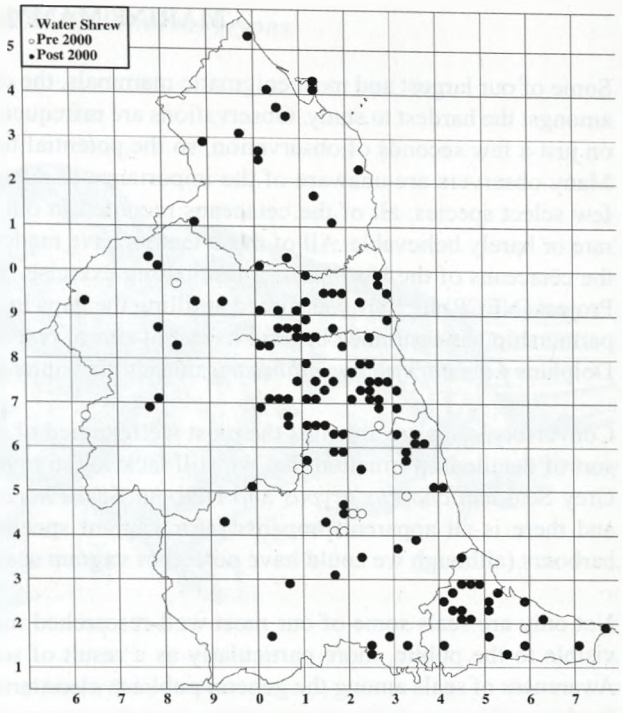
Water Shrew by Joan Holding

All shrews can swim, but the Water Shrew is the only British shrew currently known to forage mainly underwater. In the wild most dives are to depths of between 30 and 200 cm (Schoelth, 1980; Churchfield, 1998). Whilst swimming, the velvety fur of the Water Shrew traps thousands of tiny air bubbles which makes the fur appear silvery whilst underwater and provides vital insulation. It has a very distinctive fringe of tiny silvery hairs under the tail and on the margins of the feet, which aid it in swimming. The main prey of Water Shrews is underwater invertebrates although they are known to eat terrestrial invertebrates such as earthworms and beetles. It has venomous saliva making it the only venomous British mammal.

Water Shrews appear to be particularly associated with fast flowing, unpolluted rivers and streams but they will use a wide range of wetland types. Their burrows in the bank sides are approximately 2 cm in diameter; the size of the burrow is important because Water Shrews use the burrows to squeeze excess water from their fur after swimming before grooming themselves. A maximum of 3.2 per hectare have been recorded in water-cress beds in southern England but this is probably an underestimate (Churchfield, 1984). They usually have a home range of between 20-30 metres^2 on land and 60-80 metres^2 in water (Illing *et al*, 1981).

It is a very difficult species to survey due to its secretive behaviour and discrete field signs. Its specialised habitat means that it is not encountered in small mammal trapping as frequently as the other shrew species. The local Environmental Records Information Centre has less than 20 records for the period prior to 2000. This is approximately the same as the number of 10 km squares shown for the region in *The Atlas of Mammals in Britain* (Arnold, 1993), though these are not all the same records. After 2000, records for this species have increased significantly with the total now standing at over 100 records across the region. This is largely down to an increased focus on mammal recording, including two surveys specifically targeted at this species: the bait tube surveys run by the Mammal Society and a joint project between Northumbria Mammal Group and Northumberland Wildlife Trust called "Researching Ratty". The "Researching Ratty" project in particular added greatly to our knowledge of Water Shrew distribution. It found that the species was quite commonly encountered with results reflecting survey effort and volunteer distribution, which supports the idea that the relative paucity of records across much of the region is down to under-recording. In particular it found a good number of records around the Ponteland, Morpeth and Wallington waterways as can be seen from our distribution map. It

also found them at higher altitudes, for example up the River Rede as far up as Byrness and Catcleugh. Another significant factor in the increase in records is the number of Water Shrews that are caught as by-catch in Great Crested Newt surveys where Water Shrews are often found in bottle traps set for trapping and then releasing newts; unfortunately more often than not the shrews die in the traps.



The distribution of records, outside of the "Researching Ratty" surveys in Northumberland, shows a particular concentration around the North Tees Marshes and surrounding area though they are also widely distributed across the Tees Valley. Other small clusters of records centre around places with a history of natural history recording such as the Wildfowl and Wetlands Trust at Washington, Joe's Pond next to the Durham Wildlife Headquarters at Rainton Meadows and the National Trust's Gibside site. There are relatively few records in the west of the region though this is a common trend in all small mammal records, but the fact that there is at least the occasional record from there indicates that there is no ecological barrier to them in that area. They are not necessarily dependent on running water as they are one of the species caught in small mammal traps on Lindisfarne, which has no running water but just a single Lough with ditches running from it to the sea. There is a report from Lindisfarne of Water Shrew using a garden pond, complete with fountain (Veronica Carnell, pers. comm., 2012).

The increase in records post-2000 has also resulted in more records involving multiple animals with one sighting of up to five Water Shrews. However this is still some way short of an account in *British Mammals* (Harrison Matthews, 2009) which claimed to report "a 'mass migration' of water-shrews in which some hundreds of the animals are said to have been seen swimming, packed close together, upstream in a narrow drain running through a pasture to join the river in Upper Teesdale".

At the turn of the 20th century the distribution of Water Shrews was described as "not by any means a rare animal, but would appear to be of local distribution" (Barrett-Hamilton and Hinton, 1910-1921) and "fairly common in England and Wales, as well as in Scotland" (Millais, 1906). However, whether or not the poor number of records we have now show a population decline is difficult to determine because it has been an under-recorded species, but now more recording is being done we are starting to get a better idea of their actual distribution.

Rhia McBain

MARINE MAMMALS

Some of our largest and most enigmatic mammals, the cetaceans (whales and dolphins), are also amongst the hardest to study. Observations are infrequent and identification often has to be based on just a few seconds of observation, so the potential for misidentification is almost boundless. Many observers are unaware of the importance of submitting their sightings and, apart from a few select species, all of the cetaceans recorded in our waters are best described as rare, very rare or barely believable. All of these factors have made the compilation of species accounts for the cetaceans of the North East a fascinating exercise. The creation of the North East Cetacean Project (NECP) in 2009 was aimed at filling the gaps in our knowledge and this groundbreaking partnership has continued beyond its initial aim of researching the distribution of White-beaked Dolphins *Lagenorhynchus albirostris* during the winter months.

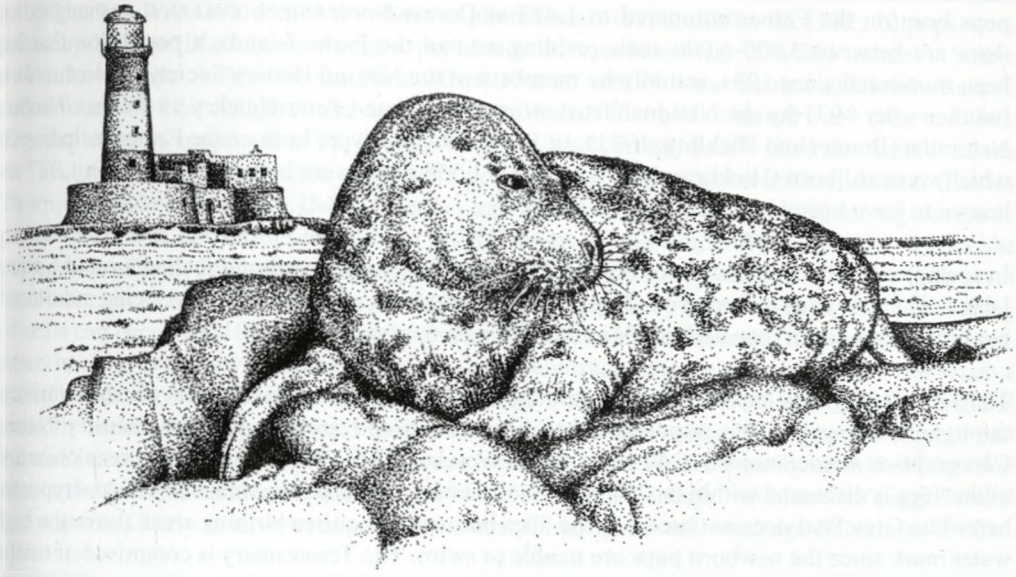
Conversely, seals are amongst the most well-studied of our mammals and we have access to the sort of detailed information that we still lack for so many species of mammal. Our colonies of Grey Seal *Halichoerus grypus* and Harbour Seal *Phoca vitulina* have been intensively studied and there is an apparent propensity for vagrant species to arrive on our beaches and in our harbours (although we could have no end of vagrant seals that pass by unobserved).

Not only are seals some of our most well-researched mammals they are also perhaps the most visible to the public, more particularly as a result of seal-watching trips to the Farne Islands. Awareness of seals among the general public is also starting to build further south on the Tees as guided walks to seal observation hides give the opportunity to view the animals in regular haul-out locations. In this way it could be argued that seals contribute to the local economy in a way that few other mammals in the North East do.

The accounts of marine mammals would not have been possible without a few individuals and organisations who really deserve recognition beyond our acknowledgements list: Andy Tait, wildlife cameraman and cetacean obsessive, for inspiring the author to begin searching for White-beaked Dolphins back in 2003; Mark Newsome, county recorder for the Durham Bird Club and diligent seawatcher, who has produced an invaluable annual cetacean report for County Durham for several years; Steve Lowe for digging out some obscure accounts of cetaceans in our waters, all of the NECP partners (MARINElife, Northern Experience Wildlife Tours, Natural England, Northumberland and Tyneside Bird Club with support from the Durham Bird Club, the Northumberland Sea Fisheries Committee (now the Northumberland Inshore Fisheries and Conservation Authority) and the North Sea Wildlife Trusts) and the Cetacean Strandings Investigation Programme (which is jointly funded by DEFRA and the Devolved Administrations in Scotland and Wales) for providing a comprehensive database of strandings from 1989 to 2010.

Martin Kitching

GREY SEAL *Halichoerus grypus*



Grey Seal by Terry Coult

Other than a small population of Killer Whale *Orcinus orca* in the Outer Hebrides, the Grey Seal is the largest living carnivore in the UK. The worldwide population of Grey Seal, which occurs in the eastern and western Atlantic Ocean and in the Baltic Sea, is thought to be in the range 290,000-300,000 animals (Seal Conservation Society (SCS), 2012). Approximately 38% (111,300) of the world's population is thought to occur in UK waters, the majority of these (88%) breeding in Scotland, around the coasts of the Outer Hebrides and Orkney (Sea Mammal Research Unit (SMRU), 2011). In England the main breeding populations are centred around Donna Nook in Lincolnshire and the Farne Islands in Northumberland.

The Grey Seal is the larger of the two resident seal species with adult males measuring up to 2.7 metres in length and reaching weights over 300 kg. This species is distinctively different from the other resident species, the Harbour Seal *Phoca vitulina*, in having a long 'roman' nose and nostrils which are close together and vertical.

On the coast of northeast England Grey Seal pups are generally born in October and November. They have creamy-white fur (or 'lanugo'), unlike Harbour Seal, which are born with a pelage which is something akin to that of the adult. Females only give birth to one pup but in October 2012 twins were reported on the Farne Islands for the first time (David Steel, pers. com., 2012). Grey Seal pups are not able to swim soon after being born, unlike the Harbour Seal, which influences the choice of nursery site (or 'rookery') that Grey Seals make. Pups are nursed for approximately three weeks after which they are weaned and left to fend for themselves. They moult up to four weeks after being born and within two weeks of this they enter the sea, often dispersing widely from the colony (SCS, 2012) with one or two newly independent young occurring as far away as Teesmouth in December/January.

The main breeding populations in England are focused on the North Sea coast almost equally divided between the Farne Islands and Donna Nook in Lincolnshire. In 2010 there were 1,499 pups born on the Farnes compared to 1,417 at Donna Nook (Steel, 2011). It is thought that there are between 3,000-6,000 seals residing around the Farne Islands, a population that has been monitored since 1951, initially by members of the Natural History Society of Northumbria but then after 1971 by the National Trust when it appointed Peter Hawkey as the first Warden/ Naturalist (Bonner and Hickling, 1971). In 1952, 496 pups were born on the Farnes including 20 which were stillborn (Hickling, 1962). In 2011, 1,555 pups were born there of which 1,077 are known to have been successful (Steel, 2012).

In spring, a smaller population of around 500 Grey Seals is to be found loafing around Coquet Island. The first pups recorded on Coquet Island were born in 2010, with three being monitored, but breeding was not repeated in 2011 (Paul Morrison, pers. comm., 2012).

The Tees estuary now supports a non-breeding population of 30-40 Grey Seals which are present throughout the year. This population has been monitored annually by the Industry Nature Conservation Association (INCA) since 1989 (Woods, 2012). The history of seal recolonisation of the Tees is discussed within the Harbour Seal account in this publication and so is not repeated here. The Grey Seal does not breed on the Tees because it requires birthing areas above the high water mark since the newborn pups are unable to swim. The Tees estuary is comprised of tidally inundated mudflats and sandflats that are more suited for the breeding population of Harbour Seal which occurs there (Woods, 2012).

In terms of other sightings, Grey Seals are known to occur in the River Tyne as far inland as Newburn some 15 miles up the Tyne, where they are noted to haul out on both the mudflats and the various concrete boat ramps in the Newburn bridge area (James Littlewood, pers. comm., 2012). Sightings seem to coincide with the upstream movement of Salmon *Salmo salar*. This indicates that Grey and Harbour Seals in the North East will follow food many miles inland. Grey Seals have also been observed by INCA to exhibit such behaviour on the Tees, where they are regularly seen as singletons in the water at the Tees Barrage. This site is at the maximum extent of tidal flow on the Tees, some 16 km from the estuary. There are also occasional but regular sightings of Grey Seals hauling out on beaches in the Hartlepool and Redcar areas, which are situated on the northern and southern sides of the Tees estuary respectively.

The Farne Islands were one of first colonies in this country where seals were marked. Colour dyeing was first used on the Farnes in 1952 to obtain some idea of the colony size by counting the number of pups born (Hickling, 1962). In the 61 years of research to date there have been major fluctuations in the population. The 1,499 pup births on the Farnes in 2010 represented an 11% increase on the previous season and an almost 6% average increase on the period from 2005 to 2010 (SMRU, 2011). There have been a number of culls between 1962-1983 which killed a total number of 3,122 pups and 1,999 females. The short term effect of the culls was a decrease in pup production in the following few years and then stabilisation around the mid-1980s, with a gradual return to pre-1970 numbers. The short term decrease in the number of pups and females on the Farnes following culls could coincide with increases in nearby populations (such as Isle of May in eastern Scotland) as a result of females leaving the Farnes to avoid the culling. On days where higher numbers of seals were found hauling out on Lindisfarne less were found hauling out around the Farne Islands sites which suggests that this is a single population.

Other issues which have led to fluctuations in the population historically include the exploitation of seals for oil and meat from medieval times. In 1769 John Blackett leased the Farne Islands and he and his son William are known to have exploited seals unmercifully. In 1772, 72 pups were killed by William Blackett implying a population of approximately 250-300 animals (Selby, 1841). Just off Snook Point on the Farnes there was an area of water known as Bloody Bay, so called because of the slaughter of a large number of seals that had occurred there (Perry, 1946). This exploitation continued at apparently low (but unrecorded) levels until the middle of the 19th century when the seals were effectively given a level of protection by Archdeacon Charles Thorp, the lessee during the 1840s (Mennel and Perkins, 1864); however initial legislation to protect seals was not introduced until 1914 (Thompson and Duck, 2008). In UK waters the persecution of seals is currently managed by the Conservation of Seals Act (1970) which gives seals a limited amount of protection and places controls on the circumstances in which the killing of seals can occur. Aside from this activity there are recorded instances of seals coming to harm when in close proximity to fishing vessels. One memorable case was recorded in 1956 when a male Grey Seal lying out on the Longstone on the Farne Islands had been accidentally caught in a net. In freeing the trapped animal fishermen applied a rough cotton bandage to an injured part the seal's neck which remained in place for at least two years. Another easily identified large bull seal in the Farne Islands area was seen in May 1959 with a rough "necklace" of jagged metal that was most likely to have been acquired whilst foraging around wreckage (Hickling, 1962).

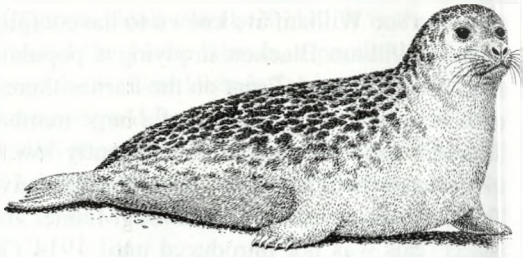
In addition to anthropogenic effects there are occasional visits to the waters of northeast England by Killer Whale which is known to predate seals. On 7 September 1960 there was a larger than normal count of at least 2,200 seals on the Farne Islands but on 22 September the count had dropped to 917. There were no differences in tides between these counts and there were no visitors to cause disturbance but eventually a pod of Killer Whales was sighted in the area and thought to be to blame (Hickling, 1962).

Despite the threats faced by this species it does seem to be increasing in number. Latest estimates by the SMRU at the University of St Andrews suggest that the pup production rate increased by 6% in Orkney in 2010 and that this rate continues to "rise rapidly in the North Sea" (SMRU, 2011). This is in contrast to the Harbour Seal, which has suffered steep declines in its main breeding sites in Scotland in comparison with data from the 1990s (SMRU, 2011). The reasons for this are not yet fully understood, but it is postulated that the larger and more robust Grey Seal is out-competing the Harbour Seal for ever scarcer food reserves. Grey Seal has a similar diet to that of Harbour Seal and is also known to be able to forage further away from its home base. Grey Seal also seems to be much less susceptible to diseases such as Phocine Distemper Virus (PDV) which decimated the large Harbour Seal population of north Norfolk and south Lincolnshire (The Wash) in 1988 (Anderson, 1990) and to a lesser extent in 2002.

Rhia McBain and Robert Woods

HARBOUR OR COMMON SEAL *Phoca vitulina*

The Harbour Seal is much smaller than the Grey Seal *Halichoerus grypus*, with male Harbour Seals weighing up to 170 kg and reaching 1.5 metres in length. In appearance the Harbour Seal has a smaller, more rounded "dog-like" head, with smaller nostrils which are further apart and more horizontal than those of the Grey Seal.



Harbour or Common Seal by English Nature

The Harbour Seal is the most widespread of the northern hemisphere pinnipeds, existing as five subspecies in the temperate and sub-arctic coastal areas of the North Atlantic and North Pacific (Seal Conservation Society (SCS), 2012). The worldwide population estimate for Harbour Seal is around 350,000-500,000 animals (Thompson and Härkönen, 2008), while the UK population in 2010 was estimated to be 36,050, of which 79% reside in Scottish waters, 16% in England and the remainder in Northern Ireland (Sea Mammal Research Unit (SMRU), 2011).

In English waters, Harbour Seals mainly use the east coast and are known from regular haul-out sites between Sussex on the south coast and then along the east coast from southeast Kent to north Northumberland. By far the largest population of Harbour Seals occurs around The Wash in Lincolnshire and Norfolk. In 2010 it was estimated that out of the 4,200 Harbour Seals resident in England 3,100 use The Wash (SMRU, 2011). In this context the proportion of the total UK (and England) population using the northeast coast of England is very small. The largest known population of Harbour Seals along the coastline from the Tees to the Tweed is in the Tees estuary, where there is a breeding population of around 70 to 80 animals.

Harbour Seal has lived at the mouth of the River Tees for many hundreds of years and it is estimated that the population in the early 1800s was as high as 1,000 animals (Lofthouse, 1900). This population had declined rapidly by the mid-1800s. As the industrial use of the estuary increased, large areas of habitat were lost due to land reclamation, and an increase in the volume of shipping using the river led to further habitat loss due to dredging. Industrial pollution led to a drastic reduction in fish populations and the final demise of the resident seal colony. By the 1930s seals had totally disappeared from the Tees estuary.

The mid 20th century saw old-style steel and coke plants being replaced by newer, less polluting works. In the late 1960s and early 1970s there began a concerted effort by regulators, statutory authorities and industry to reduce the pollution load. Eventually Harbour Seals began to reappear and by the mid-1980s there was once again a resident population of seals. Teesmouth is thought to be the only known estuary in Europe where Harbour Seals have re-colonised as a direct result of environmental improvements.

The Tees Seal population today is focused upon Seal Sands, which is an area of tidally inundated sand and mudflats. Seals haul-out here over the low tide period and move between different areas of the sands as they become exposed and inundated as the tide ebbs and flows. They often move along Seaton Channel to the mudflats at Greatham Creek where they haul out most often, though not exclusively, at high tide. The story for the Harbour Seal population today is positive, with a slow and steady increase in the number of adults observed at the peak season in August when the

seals gather for their annual moult. The number rose from 23 in 1989 when monitoring by the Industry Nature Conservation Association (INCA) first began, to the current maximum of 88 in August 2012 (Woods, 2012).

Pup births generally occur in the last week of June and the first week of July at Teesmouth. The first pup birth recorded for this colony was in 1989. This pup and singletons in 1991 and 1993 were born live and at full-term, but all died within a few days (Wilson, 1994). In 1994 two seals were born and survived. Subsequently there has been a steady rise in birth rate to the current maximum of 18 pups in 2012. It is generally accepted that newborn pups should form between 20-25% of the population for a healthy and balanced population (Reijnders, 1981; Helander and Bignert, 1992). This is now almost the case at Seal Sands.

In 2004 the Tees Valley Wildlife Trust reported that seals were starting to use other areas along the Tees. A few animals had started to haul-out on intertidal mudflats at Billingham Beck, 14.5 km upstream of the Tees estuary (Gibson, 2005). Numbers of Harbour Seal hauling out here are small, usually around 10 individuals at peak season. Several Harbour Seals are also regularly seen in the water at the Tees Barrage, which is the now the maximum extent of tidal flow on the Tees, 16 km from the estuary. Individual seals are regularly reported hauling out in random locations along the coast near Hartlepool to the north of the Tees estuary and at Redcar and Saltburn to the south.

In addition to the Tees there are occasional sightings of seals using both the River Wear and the River Tyne, often some miles inland. Anecdotal records exist of seals being seen as far as the tidal limit of the River Wear at Cox Green (R. Ball, pers. comm., 2009), but the most unusual observation on this river is of a single Harbour Seal seen at Chester-le-Street in December 2011 (E. Haswell, pers. comm., 2011), some 21 km from the sea and around 3 km upstream of the tidal limit.

Ornithologists from the Gateshead Birders Group have reported Harbour Seals in the River Tyne at all times of the year since 2003 (Environmental Records Information Centre (ERIC), pers. comm., 2012). Occasional observations are from as far west as Clara Vale near Ryton, which is about 1 km east of the tidal limit of the Tyne at Wylam Bridge and 40 km from the sea; from Stella Haugh (Pinnock, 2012) and Newburn Bridge (R. Ball, pers. comm., 2009) a little further downstream and there are more regular sightings further downstream at the "timber beach", Dunston (ERIC, pers. comm., 2012).

Further north along the coast there is a small resident population of Harbour Seal at Holy Island in north Northumberland (A. Craggs, pers. comm., 2012). The seals are known to haul-out regularly here on exposed sandbars at Fenham Flats among a larger population of Grey Seals. A maximum of nine adult Harbour Seal were seen at this location in August 2010. There is also an unconfirmed report of two pups.

Dietary studies of Harbour Seals living in the Tees estuary indicate that they are opportunistic feeders, taking advantage of the seasonal abundance of available prey, preferring the gadid species Cod *Gadus morhua*, Whiting *Merlangius merlangus*, and Poor Cod *Trisopterus minutus* (Smurthwaite, 2006). They will also prey upon benthic fish such as Flounder *Platichthys flesus* and crustaceans such as Shore Crab *Carcinus maenas*.

Robert Woods

VAGRANT SEAL SPECIES

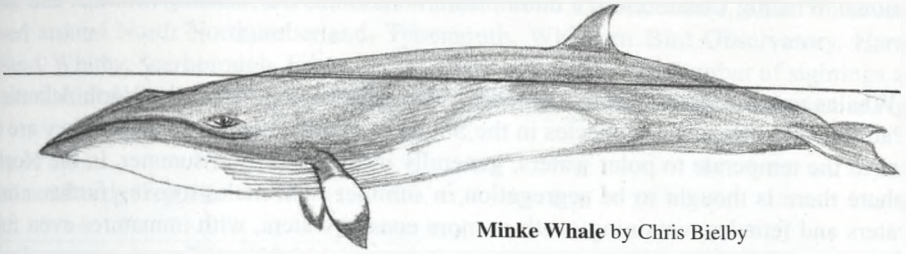
Occasionally there are reports of seals which are vagrant rarities on the coast of northeast England. This includes two Arctic species, the Bearded Seal *Erignathus barbatus* and Harp Seal *Phoca groenlandica* and the Hooded Seal *Cystophora cristata* from the North Atlantic.

A Bearded Seal was resident around Hartlepool Dock for about two weeks in January 1999 (Gibson, 2005), while there was a further sighting of this species at Beadnell Bay in May 2011 (J. Mitcham, pers. com. to Natural History Society of Northumbria, 2011).

A juvenile Hooded Seal and its mother were seen around jetties in the Teesmouth area in 2004. The juvenile seal was tended by the RSPCA but later died (Gibson, 2005). More recently, in December 2011, the British Divers Marine Life Rescue treated a Hooded Seal on the beach at Saltburn. Harp Seal have been recorded off Holy Island, Northumberland in September 1995 (Frankis *et al*, 1997) and more recently on Blyth beach in January 2008 (Revell, 2008). Perhaps the most unusual record is of a "sea-lion" which was reported from the Farne Islands (Tegner, 1972). Sea-lion species are native to the Pacific Ocean and the seal in question was referred to as 'American' so was possibly the Californian Sea-lion *Zalophus californianus*. The origin of the single specimen seen is not clear but it is highly unlikely that it swam from the Pacific. This species is that which was once widely kept in circuses and zoos, one of which is more likely to have been the source.

Robert Woods

MINKE WHALE *Balaenoptera acutorostrata*



Minke Whale by Chris Bielby

The Minke Whale, also called the Lesser Piked Whale or Lesser Rorqual, is a relatively small rorqual whale and the most frequently seen around the seas of northeast Britain. It has a streamlined body up to around 9.8 metres long and weighs up to 10 tons. The snout is sharply pointed and there is a single, sharp rostrum ridge leading to a triangular-shaped rostrum. A relatively tall sickle-shaped dorsal fin is situated almost two thirds of the distance along its back. The upperparts are generally dark grey-brown with paler underparts and usually 62 white rorqual grooves on the throat and belly (Watson, 1981). Paler areas reach up the sides behind the shoulder to form a vague chevron above the flanks, while the flippers have dark upper surfaces with conspicuous broad white bands. The fluke (tail) is dark, concave and with a median notch. Their mouth contains 230-360 creamy-white baleen plates, each about 30 cm long (Carwardine, 1995).

Minke Whales usually surface showing their lower jaw and head with a low indistinct blow up to about two metres, followed by a shallow rolling action revealing the back and the large dorsal fin before the sleek body slips smoothly back into the sea, with the flukes staying submerged at all times. Normal speed is around five-seven mph but they can reach 17 mph if pressed (Hoyt, 1984). In normal feeding mode, there are usually three or four blows but sometimes up to eight at intervals of less than a minute before the deep dive in which the whale's back arches much more steeply before the dive, but still without showing the tail flukes. The period at the surface is usually about three seconds and in calm seas it is often possible to plot where the next blow is likely to occur due to the even spacing of the "footprints" left by the previous dives. Dives typically last 3-12 minutes but can be up to 20. When feeding on surface-shoaling fish like Herring *Clupea harengus*, Minke Whales frequently lunge feed, rolling on to their sides with mouths agape to scoop up the fish. Their flukes and white-banded flippers may well show under these circumstances together with their white chin and rorqual grooves (Carwardine, 1995).

Minke Whales are generally solitary but are occasionally found in small groups of two to three, rarely more when in productive feeding areas. They breach quite frequently, leaping almost vertically and nearly clearing the water before falling sideways back into the sea. During these breaches the white throat and belly together with the white-banded flippers can be very conspicuous, as is the relatively slender streamlined profile of the whale with its pointed snout. Active feeding is often accompanied by flocks of birds which frequently serve as a cue to their presence. They may sometimes be inquisitive around boats, even spy-hopping to get a better view (Leatherwood *et al*, 1976; Carwardine, 1995).

Minke Whales become sexually mature at three to eight years old when about seven metres long. Females give birth to a single calf every one to two years after a gestation of 10-11 months and lactation of four to six months. The newborn calves are 2.4 to 3.5 metres long. They can live for about 50 years if they avoid the attentions of the whaling nations, including Norway and Iceland,

which have targeted this species for commercial as well as for "scientific purposes" despite the International Whaling Commission's moratorium on commercial whaling (Shirihai and Jarrett, 2006).

Minke Whales are widespread in the Northern Hemisphere, mainly in the North Atlantic and North Pacific with different sub-species in the Southern Hemisphere and Pacific. They are most abundant in the temperate to polar waters, generally moving north in summer. In the Northern Hemisphere there is thought to be segregation in summer with males moving further north in open waters and females remaining south in more coastal waters, with immatures even further south. It is thought that the Atlantic population is around 185,000. Off north western Europe, surveys in the Bay of Biscay suggest Minke Whales seem to prefer the shallower waters of the continental shelf to the deep water canyons or abyssal plain (Walker and Cresswell, 2008).

Around Britain there are several "hotspots" for sightings of Minke Whales in summer, including especially around the Western Isles and the northwest coast of Scotland, but also around the Moray Firth. Sightings off the coasts of Northumberland, Durham, Cleveland and North Yorkshire are becoming annual but are still infrequent, and in the North Sea the southern limit of its range seems to be the southern Yorkshire coast (Reid *et al*, 2003; Carwardine, 2003).

Although never common in the North Sea reported sightings of Minke Whales have become more regular in recent years, partly due to the increased survey activity from commercial ferries as well as sea-watching activity by birdwatchers from headlands and bird observatories. However it may be that changes in migratory patterns of prey species in the North Sea, possibly due to the effects of climate change, are also causing genuine increases in the cetacean population. Other factors to be considered include the increase in interest and willingness to report sightings by the general public, as well as the improvement in optical equipment and expertise of observers.

There are 13 relatively recent records of strandings of Minke Whales in our region together with a further four records of unidentified and decomposed *Mysteceti* whales which may also have been Minke. These have mainly occurred during the summer months, with later records often relating to animals that are severely decomposed and have been dead for some time. One whale showed signs of entanglement in discarded fishing gear, a common hazard. Most large whales which strand have little hope of survival as their own body weight results in suffocation and effective crushing which releases toxins into their blood-stream which cause irreparable damage. Similarly, their body mass is so great that the heat generated by their normal metabolic processes becomes lethal as there is insufficient cooling effect when they are out of water. In the North Sea many stranded whales also show signs of emaciation due to starvation, which ironically leads to dehydration as whales need to metabolise fresh water from their food. This means that whales which strand have a very short window of opportunity to be refloated before irreparable damage occurs and under current practice (British Divers Marine Life Rescue, pers. comm., 2012) they would be euthanized to prevent further suffering. It is thought that gently sloping beaches and mudflats can confuse whales' sonar navigation systems leading them to strand, but loud noises from shipping, sonar and seismic surveys have also been linked to strandings in many species.

Records are sparse prior to 2000, reflecting the lack of observers and facilities to record sightings rather than a definite absence of Minke Whales in our region. Apart from stranded individuals, one live sighting involved two animals actively feeding approximately five miles east of the Farne Islands on 12 September 1993, viewed at very close range from a chartered boat on a birdwatching cruise (author's own observation).

The majority of post-2000 records emanate from headlands where there is a lot of birdwatching activity and also where dedicated cetacean watchers tend to concentrate. This "observer bias" is based around North Northumberland, Tynemouth, Whitburn Bird Observatory, Hartlepool Headland, Whitby, Scarborough, Filey and Flamborough Head. The number of sightings and the number of animals reported are given in Figure 1 with the number each month given in Figure 2.

Figure 1.
Annual numbers of reports

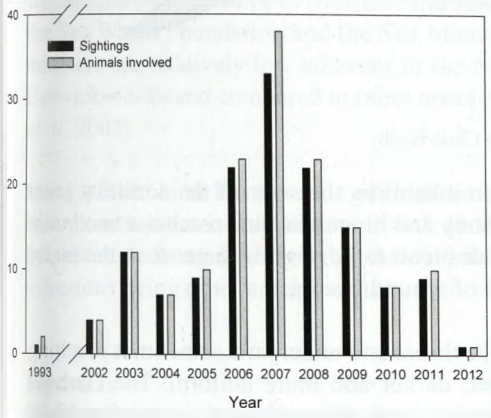
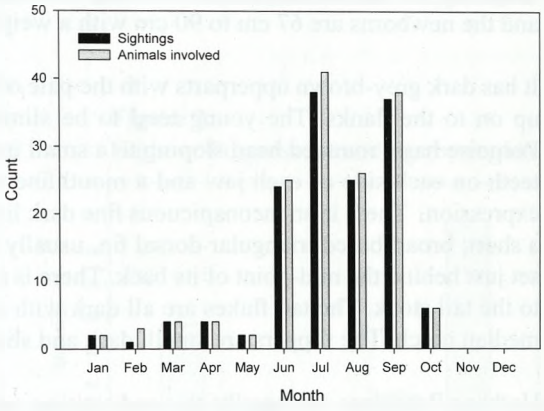


Figure 2.
Distribution of sightings according to month

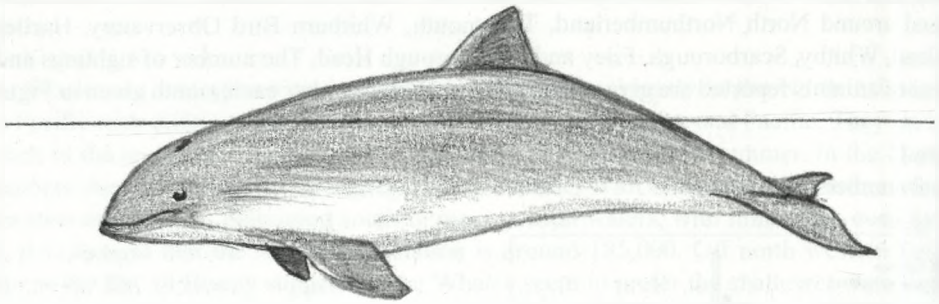


The records suggest that Minke Whales are migratory and appear off the North East coast mainly in the summer months with records concentrated from June to September (Figure 2). This observed trend of seasonality is probably accurate as it is free from the "observer bias" of some distributional data, as seawatching is a pursuit which continues throughout the year, and is not concentrated during the summer months.

Following a peak in records in 2007, numbers have declined steadily towards the 2005 level; however recent surveys to the south of our region have revealed larger numbers of Minkes possibly associating with returning shoals of Herring to the North Sea. It seems likely that they follow the shoals of smaller fish into the North Sea where they have been seen feeding with accompanying flocks of seabirds. An old name for Minke Whale was "Herring Hog" which suggests the fishermen were well aware of their feeding habits. A perceived increase in abundance in recent years may be a result of changes in the migratory habits of their prey species, which may also be responding to observed changes in the species and timing of plankton abundance in the North Sea, probably as a result of climate change.

Chris Bielby

HARBOUR PORPOISE *Phocoena phocoena*



Harbour Porpoise by Chris Bielby

The Harbour Porpoise is the most common cetacean inhabiting the seas off the northeast coast of England. It is compact and robust with a rotund body and blunt head and reaches a maximum length of 1.9 metres and weight of 70 kg. The females tend to be slightly larger than the males and the newborns are 67 cm to 90 cm with a weight of around five kg.

It has dark grey-brown upperparts with the pale of the throat and underparts sometimes reaching up on to the flanks. The young tend to be slimmer, darker and more uniform. The Harbour Porpoise has a rounded head sloping to a small indistinct beak above a mouth containing 19-28 teeth on each side of each jaw and a mouthline which slants gently upwards giving a smiling expression. There is an inconspicuous fine dark line joining mouth to flipper (Hoyt, 1984). It has a short, broad-based triangular dorsal fin, usually low and blunt but very rarely slightly falcate, set just behind the mid-point of its back. There is a slight dorsal ridge leading from the dorsal fin to the tail stock. The tail flukes are all dark with a concave trailing edge, blunt tips and a small median notch. The flippers are small, dark and slightly rounded.

Harbour Porpoises are usually shy and retiring and rarely bow-ride, but they can sometimes be attracted by slow-moving and quiet boats. They are capable of swimming at about 14 mph when pressed, but usually travel much more slowly. When rising to breathe they give the impression of a slow, forward rolling motion as if the dorsal fin is fixed on the circumference of a large rotating wheel. They usually surface at 10-20 second intervals, before diving for two to eight minutes while feeding at depths down to 200 metres. They are typically in small loose groups of two to eight individuals, mother and calf pairs or singles, although numbers can accumulate at feeding frenzies. They feed by foraging near the seabed, catching schooling fish, cephalopods and crustaceans (Carwardine, 1995).

They are usually relatively slow swimmers with a characteristic "rolling" action as they surface to breathe with an invisible but audible "puff" type blow. They can occasionally swim more vigorously, even leaping out of the water and tail-slapping but this is rare and often associated with social interaction. In calm conditions they can rest or bask on the surface for some time. Harbour Porpoises become sexually mature between three and five years. Most calves are born between May and August after a gestation of 10-11 months. Calves are weaned between four and eight months, but the mother may become pregnant again whilst still lactating. Their maximum lifespan is up to 24 years though 12 years is more typical (Evans *et al*, in Harris and Yalden, 2008).

Harbour Porpoises inhabit the areas over the continental shelf at depths of less than 200 metres and seem to prefer the more turbulent and tidal waters around headlands, islands and even into estuaries and up rivers. Sightings suggest that there are resident populations around the more favoured locations, although numbers increase at times of food abundance which suggests a willingness to migrate or perhaps some transient individuals in the population.

Porpoises occur around the coasts of the whole of the North Atlantic, the Baltic and Black Seas, as well as the North Pacific. It was estimated that the population in northwest European waters was around 340,000 in 1994 (Shirihai and Jarrett, 2006). Analysis of various data sources such as the Sea Watch Foundation and the Sea Mammal Research Unit indicated that Harbour Porpoise numbers are relatively low adjacent to the North East coast roughly between Scarborough and Berwick-on-Tweed compared to other areas of the North Sea coast further north and south (Reid *et al*, 2003).

Many of the North East records of Harbour Porpoise come from strandings and data from these have been summarised in Figures 1 to 3. In the cases where cause of death has been ascertained, bye catch accounted for roughly half of the deaths, with starvation, pneumonia and parasitic infections being other notable causes.

Figure 1.
Harbour Porpoise, strandings by year

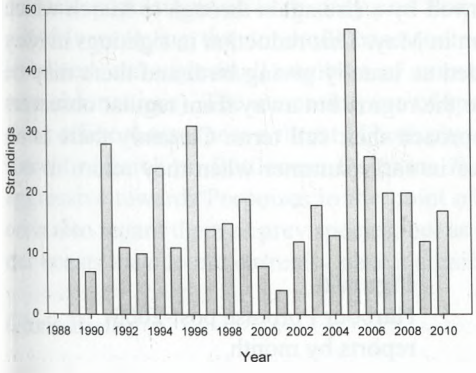


Figure 2.
Harbour Porpoise, strandings by region

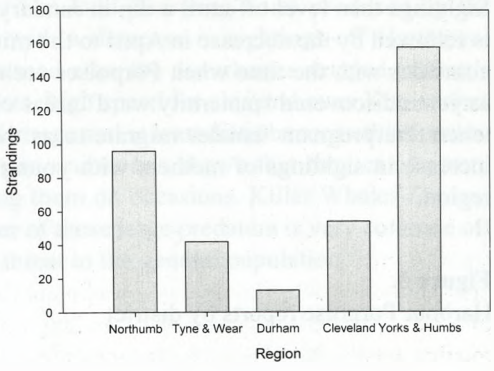


Figure 3.
Harbour Porpoise, strandings by month

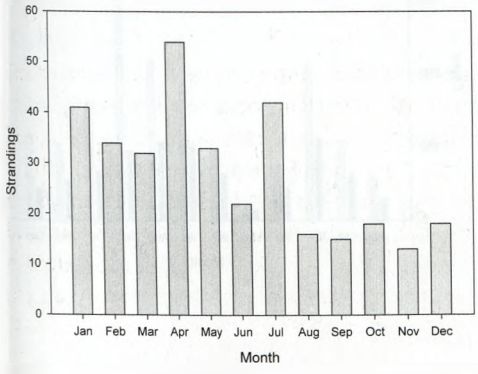
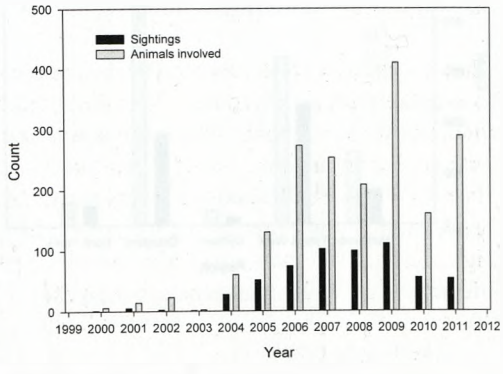


Figure 4.
Harbour Porpoise post-2000 records



The recent local distribution and records are summarised in Figures 4 to 6. The scarcity of records before 2000 makes it impossible to judge any trends accurately, although it seems clear that there has been a resident population off our coast throughout the period, albeit largely unrecorded. There was a particularly large count on 12 September 1993 which was from a chartered birdwatching boat some five miles east of the Farne Islands in perfect calm conditions when many small family groups totalling at least 100 animals were apparently feeding on shoaling fish, accompanied by many seabirds and two Minke Whales *Balaenoptera acutorostrata* (author's own observation).

Since 2005 there has been a relatively consistent effort in recording Harbour Porpoises. Figure 4 shows that total numbers in excess of 200 animals were recorded in 2006, 2007, 2008, 2009 and 2011. These data indicate a substantial population living off the North East coast and only continued and co-ordinated survey efforts will enable an accurate picture of trends to be established. This should form merely a baseline for further studies.

The recorded distribution illustrated in Figure 5 reflects to a large degree the location of observers who post their records, rather than the actual distribution of the Porpoise population. Note also that the Durham region has a shorter coastline with fewer headlands offering good viewing platforms than the others.

As can be seen from Figure 6, records of Porpoise off the North East coast show a general trend of low numbers during May followed by an increase to maximum numbers in September. Sightings then level off until a dip in January followed by a rise again through to March which is followed by the decrease in April to the minimum in May. This reduction in sightings in May coincides with the time when Porpoises are recorded as usually giving birth and there may be as yet undiscovered "maternity ward" areas close to the region but away from regular observers where the pregnant females migrate to as they approach their full term. Certainly there is an increase in sightings of mothers with young calves in early summer when they return to our region.

Figure 5.
Harbour Porpoise reports by district

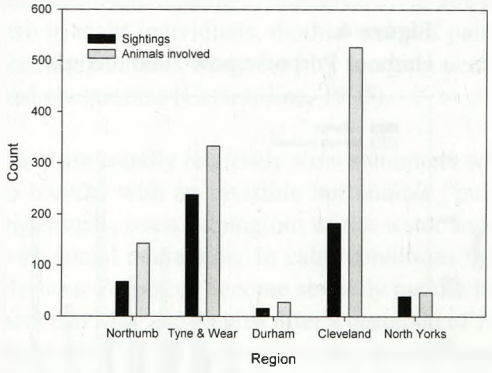
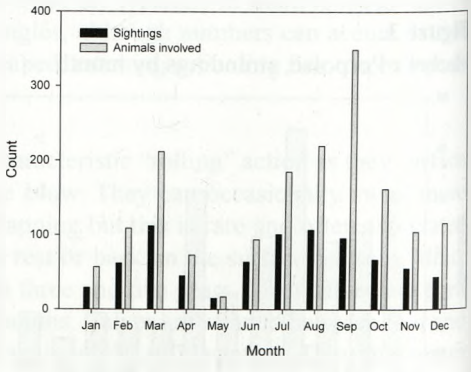


Figure 6.
Harbour Porpoise post-2000, reports by month



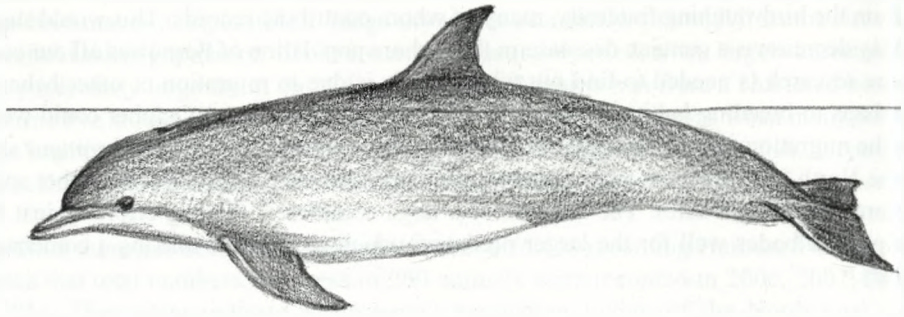
It is not possible to judge how much influence the variation in observer effort affects these results, but the decrease in the population in the early summer coincides with plenty of seawatching activity from the birdwatching fraternity, many of whom contribute records. This would suggest that the May decrease is a genuine decrease in the inshore population of Porpoises off our coasts. Much more research is needed to find out whether this is due to migration or other behaviour linked perhaps to breeding habits. Certainly the increase during July to October could well be linked to the migration of the Mackerel *Scomber scombrus* and Herring *Clupea harengus* shoals through the North Sea. In recent years these shoals have been very large attracting other species of Cetaceans including whales. The absence of a large commercial fishing effort against these shoals at present bodes well for the larger predators which seem to be making a comeback in recent years.

The population of Harbour Porpoise off our coast seems to be reasonably healthy and numbers are apparently fairly static. The apparent increase in potential prey species, like the summer run of Herring shoals down the North Sea, could be seen as a positive trend for the future of Porpoises and other cetaceans. Similarly, the increase in Salmon *Salmo salar* entering the Tees has attracted individuals as far upstream as the Barrage. The reduction in pollution in our rivers can only be good but there are still residuals in the ecosystem which pose threats to health.

Threats to Porpoises are still very real and include the use of monofilament gill nets which are set close inshore where they frequently feed. Similarly, recent surveying and engineering activities in Tees Bay in connection with Offshore Wind farms may have an unforeseen influence on local populations of both prey and Porpoises. The loud thumping noise produced by the pile-drivers laying the windmill bases coincided with a decrease in sightings off Hartlepool Headland, although small numbers of animals returned after the disturbance stopped (author's own observations). The increasing use of speedboats, high speed Jet-skis and even Kite-surfers close offshore must pose a threat of both physical damage and at least disturbance to this species. Recent research on Bottlenose Dolphins *Tursiops truncatus* has shown that they can be very aggressive towards Porpoises to the point of killing them on occasions. Killer Whales *Orcinus orca* also regard them as prey species, but as neither of these large predators is very common off our coasts they do not currently pose a significant threat to the general population.

Chris Bielby

BOTTLENOSE DOLPHIN *Tursiops Truncatus*



Bottlenose Dolphin by Chris Bielby

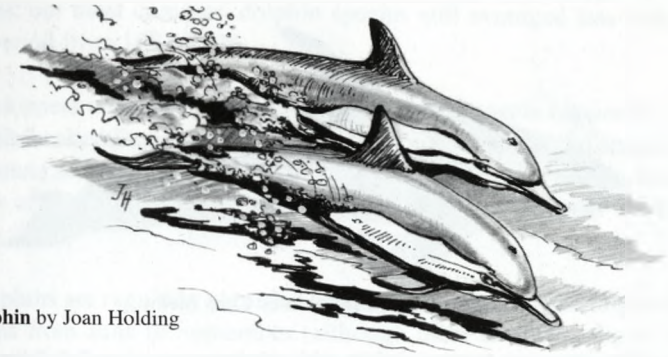
This is a large dolphin with a prominent falcate dorsal fin, grey upperparts and white underparts. Adults measure 1.9-3.9 metres in length (Carwardine, 1995). The JNCC Atlas (Reid *et al*, 2003) shows that Bottlenose Dolphin was a scarce species off northeast England over the period 1990 to 2002, with no records off the Northumberland coast. In the North Sea, the core area of distribution is the Moray Firth, where the population has been estimated at approximately 130 (Wilson *et al*, 1999). The summer abundance estimate in 2005 for northern and central North Sea areas from SCANS II surveys was 652 (International Council for the Exploration of the Sea (ICES), 2008). Mennell and Perkins (1864) do not list any records of this species while Davis and Muir (in Foster-Smith, 2000) include the earliest record for the region as an individual resident around the Farne Islands and Seahouses from March to October 1966.

Analysis of casual sightings from 2003 to 2009 shows that Bottlenose Dolphin was the second most frequently recorded cetacean species over the period with 133 sightings (Brereton *et al*, 2010). There are no regular sites for the species in our area, with the sightings widely distributed in coastal waters. However in some years, individuals have remained in the same area for several months at a time including between the Farne Islands and Seahouses from November 2004 to June 2005 and around the Farne Islands in April and May 2007. One particularly famous Bottlenose Dolphin was "Freddy" who took up residence in Amble in the late 1980s and early 1990s and it is not an unusual occurrence for lone individuals of this species to take up residence in rivers and estuaries, often associating with small vessels. A lone animal in the River Tyne from August to November 2005 frequently accompanied small vessels as they left the river and returned accompanying either the same vessel or another on several occasions. This individual was also thought to be the animal that was present in the River Coquet at Amble from 8 July to 19 August and the River Blyth on 20 August of the same year. An animal in the River Tyne on 25 August 2004 relocated to the River Wear on 1 September, remaining there until 28 September. It is tempting to speculate that this was the animal present between the Farne Islands and Seahouses from November 2004 onwards and subsequent sightings in Amble, Blyth and the River Tyne in 2005. Strandings are rare, with only five definitely recorded between 1992 and 2004.

Sightings have reached double figures on 11 occasions, with the maximum group size recorded being an unusually large pod of around 150 individuals that moved south along the Northumberland coast on 21 October 2012, although the best chance of seeing this species in our waters still occurs when a lone individual takes up temporary residence in one of our rivers.

Martin Kitching

COMMON DOLPHIN *Delphinus delphis*



Common Dolphin by Joan Holding

The Common Dolphin is a small dolphin with an elaborate hourglass pattern on the flanks, consisting of a dark cape forming a 'V' under the dorsal fin, a white underside, a pale grey tail stock and yellow flanks forward of the dorsal fin. Adults measure 1.7-2.4 metres in length (Carwardine, 1995).

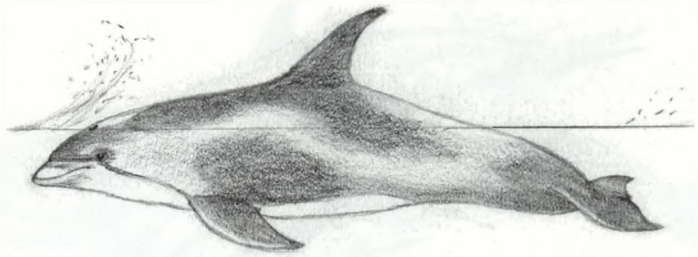
The JNCC Atlas (Reid *et al*, 2003) indicates that the Common Dolphin is a scarce species off northeast England, with very few records in the North Sea over the period 1990 to 2002. Too few were seen to estimate summer abundance in 2005 for Northern and central North Sea areas from the SCANS II survey (International Council for the Exploration of the Sea (ICES), 2008). Davis and Muir (in Foster-Smith, 2000) indicates that historically this is a rare species in the region, including only a number of anonymous reports received by Sunderland University in June 1989. Mennell and Perkins do not mention this species at all.

During the North East Cetacean Project (NECP) winter transect surveys in early 2010, there were two sightings of probable and definite single Common Dolphins both in the Farne Deeps, representing the only dolphins recorded on the surveys. The proximity of the two sightings suggests that possibly just one animal was involved and the occurrence of this warm water oceanic species in the cold waters of the central North Sea during the winter months, particularly given the severity of the winter of 2009/2010, was wholly unpredicted and quite remarkable. On the publication of the NECP report (Brereton *et al,* 2010), the media seized on the observations of this species off Northumberland as evidence of global warming and a rise in sea surface temperatures, but subsequent years have not supported that hypothesis.

There were four casual sightings over the period 2003 to 2009, with five animals off Tynemouth in early July 2009, from a transect survey on the Newcastle-Ijmuiden ferry and three sightings of three or four animals off Cullercoats in July and August 2004 by commercial fishermen, confirming that the species is rarely recorded from coastal watchpoints. However, the Common Dolphin is more of an offshore species than the Bottlenose Dolphin *Tursiops truncatus*, Harbour Porpoise *Phocoena phocoena* and White-beaked Dolphin *Lagenorhynchus albirostris* in the summer months, so sighting rates from coastal waters may be less representative of the species' wider status in the region, and the ongoing offshore survey work carried out by the NECP may reveal that the species is regular, if scarce, out of sight of land-based observers. Like Risso's Dolphin *Grampus griseus*, this species seems to be a recent addition to the marine megafauna of our region, and it seems likely that the number of sightings will increase.

Martin Kitching

WHITE-BEAKED DOLPHIN *Lagenorhynchus albirostris*



White-beaked Dolphin by Chris Bielby

The White-beaked Dolphin is a large dolphin with adults measuring 2.5-2.8m in length. It has a beautiful pattern of grey, white and black, including a distinctive pale saddle behind the prominent dorsal fin and frequently, although not always, a prominent white beak (Carwardine, 1995). The patterning and dorsal fin structure of the species is considered by the author to give rise to many of the claims of Orca *Orcinus orca* in our region, and may have led to a misunderstanding of the abundance and distribution of that species.

White-beaked Dolphin has a more limited range than most other cetacean species present in UK waters, being found only in cool temperate and subarctic waters of the north Atlantic (Reid *et al*, 2003). The population in the eastern Atlantic is thought to be larger than that in the west, with a range extending from northern Norway and Iceland to the British Isles and North Sea. Putting aside the well-studied population of White-beaked Dolphins in Lyme Bay, Dorset, the animals present off the North East coast are near the southern limit of the species' range and potentially more susceptible to habitat changes due to increased sea surface temperature. Abundance in the North Sea has been estimated through the SCANS II survey in 2005 which gave an estimated population of 10,562 for the central and northern North Sea (Small Cetaceans in the European Atlantic and North Sea (SCANS) II, 2008). Recent collation of sightings data indicates the species is declining in the southern half of its range linked to sea surface temperature rise and the spread of Common Dolphin *Delphinus delphis* into these waters. Water temperature has been shown to be the most important variable in habitat partitioning between these two species (MacLeod *et al,* 2008). Declines have been most apparent around Ireland, western Britain and in the southern North Sea (MacLeod *et al*, in prep.). Given these likely distribution changes, the central North Sea (which supports some of the coldest sea temperatures in the UK), may be a current and increasingly important stronghold. This is one of our least studied cetaceans. The main prey items are white fish including Whiting *Merlangius merlangus*, Cod *Gadus morhua* and Haddock *Melanogrammus aeglefinus*, with crustaceans also regularly consumed (Evans, 1992; Santos *et al*, 1994; Canning, 2007; Canning *et al*, 2008). Recent reductions in fishing effort of selected white fish species in the region may have benefited the species by increasing the availability of food sources. Observations from charter vessels by the author in 2003 and 2005 led to the development of the North East Cetacean Project (NECP) in 2009, in order to study the abundance and distribution of White-beaked Dolphins off Northumberland.

Mennel and Perkins (1864) did not list this species as being present in our waters although Davis and Muir (in Foster-Smith, 2000) described it as "the most common dolphin in the region, but occurring mainly offshore". The earliest dated record is of a skull seen in 1881, from a specimen captured off Berwick-upon-Tweed. Davis and Muir go on to list a further 49 records of 75 animals, mainly strandings, with very few sightings of live animals up to 1998 and a small

handful of records of indeterminate dates and counts. This perhaps typifies the difficulty in recording cetaceans; our most common dolphin species still averaged less than one record per two years for the period from 1881-1998.

A survey of local skippers undertaken during 2004/05 by Newcastle University (Stockill, 2006) indicated that White-beaked Dolphins were the most frequently sighted species, being present offshore all year round and seen on 50% of trips to sea. Some large groups were also reported including a group of 250 dolphins, 25 miles off Cullercoats, reported by fisherman Kevin Dickenson.

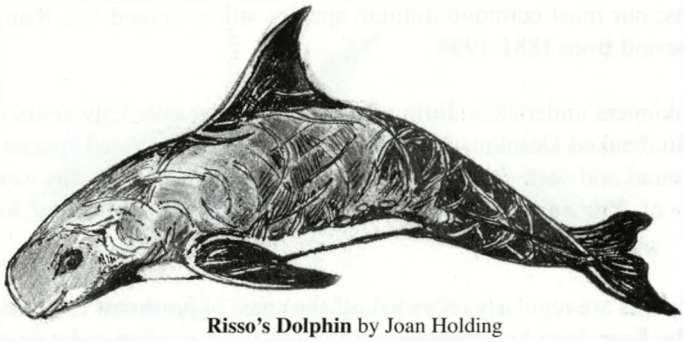
White-beaked Dolphins are regularly recorded off the coast of northeast England, chiefly during the summer months from June to September (although there is often a dip in sightings during August), with fewer sightings in the winter which is consistent with observations from Yorkshire and northeast Scotland (Brereton *et al*, 2010). Pods of 10-30 animals are typically observed close inshore from late June, in loose aggregations of small groups, often with calves and sub-adults (author's observation). The only month for which there are no records of the species in our waters is February, so it seems certain that it is present off the North East coast throughout the year, although the abundance and distribution pattern is not yet understood and is the subject of ongoing research. The majority of current North East sightings of White-beaked Dolphin are obtained from naturalists recording at land-based watch points. Local fishermen have indicated that the Farne Deeps has long been a key wintering area for White-beaked Dolphin. As the area supports high concentrations of White-beaked Dolphin prey items (Rogers and Stocks, 2001), it does seem likely that the area is a key location for this species. The only difficulty has been attempting to verify this; our offshore deeper water areas are no place for the faint-hearted during the winter and regularly prove difficult to visit during the calmer weather and sea conditions of the summer months.

Casual sightings data compiled for the period 2003-2009 by NECP found 43 sightings of approximately 279 animals for Northumberland and North Tyneside, along with several sightings for South Tyneside and County Durham. This compares with the 50 records of 79 animals from 1881-1998, and is a better indication of presence and abundance. It seems unlikely that the species has undergone a 20-fold increase in numbers, and much more likely that it has simply been under-recorded in the past.

Systematic survey work during the winter of 2009/10 failed to produce any sightings of White-beaked Dolphin and the media seized on this as evidence of global warming, with a rise in sea surface temperature leading to the loss of this cold-water species from the North East. The distribution of the species in UK waters is strongly linked to water temperature, with a strong preference for water temperatures cooler than 13°C (MacLeod *et al*, 2007, 2008). Inevitably just a few weeks after publication of the NECP report (Brereton *et al*, 2010), the author watched a pod of White-beaked Dolphins from the Northumberland coast and the summers of 2010 and 2011 proved remarkable for sightings. Offshore pelagic excursions organised by Northern Experience Wildlife Tours provided many local naturalists with their first experience of the species as dolphins were bow-riding and breaching persistently alongside the small charter vessel used for these trips. Ongoing research by NECP, including compilation of a photo-ID catalogue for the species in the North East's waters, aims to give us a better understanding of the abundance and distribution of this enigmatic species off our coastline.

Martin Kitching

RISSO'S DOLPHIN *Grampus griseus*



Risso's Dolphin by Joan Holding

Risso's Dolphin is a large animal, with adults measuring 2.6-3.8 metres in length with a prominent dorsal fin, a blunt head and frequently extensive scarring on the body, predominantly caused by other Risso's Dolphins (Carwardine, 1995). This is another species that could well be responsible for reports of Orca *Orcinus orca* in our region; a large animal with a prominent dorsal fin and often richly patterned flanks seems a very realistic identification mistake, especially as Risso's Dolphin is a species that is unknown to the majority of visitors to the coast.

This is primarily a warm-water pelagic species and the JNCC Atlas (Reid *et al*, 2003) unsurprisingly shows that Risso's Dolphins were rare off northeast England and in the wider central North Sea over the period 1990-2002. The subsequent pattern of occurrence in the North East's waters described below was interpreted by the media as yet more evidence of global warming causing increasing sea surface temperatures and leading to the loss of our "native" cold water species such as White-beaked Dolphin *Lagenorhynchus albirostris*, and seeing them replaced with species from warmer climes.

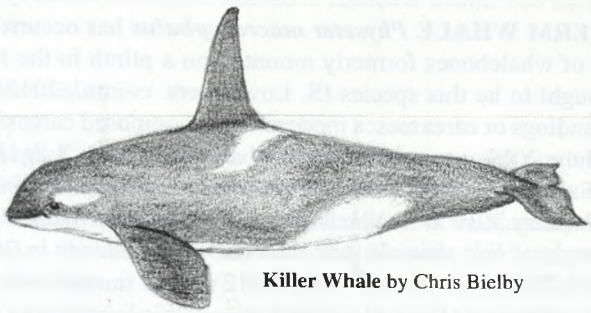
There were six sightings of 20 animals between 2003 and 2009 recorded in the North East Cetacean Project's (NECP) casual sightings dataset for Northumberland, including a group of four around the Farne Islands in September 2006. Risso's Dolphins were also recorded around the Farne Islands in late September 2007, when two adults and a calf were seen in a mixed pod with White-beaked Dolphins, and again in late September 2009 when three animals were seen. There was a further sighting around the Farne Islands in July 2011. Land-based sightings have included one off Cullercoats in June 2007, three off Blyth in October 2007 and six in Alnmouth Bay in May 2008. There have also been several sightings from Whitburn, in June, August and September 2007, June and July 2009 and August 2010. A male was recorded as a tideline corpse in Cullercoats Bay in June 2007.

Given that the first observed record for the English east coast was of four animals breaching near the Crumstone (Farne Islands) as recently as 1996 (Foster-Smith, 2000), the recent run of sightings clearly suggest that this species is increasing in the North East's waters. Furthermore, a survey of local skippers undertaken by Newcastle University (Stockill, 2006) indicated that Risso's Dolphins accounted for 12% of cetacean sightings by fishermen in 2004. It seems likely that this recent addition to our marine megafauna is a regular, if scarce, visitor to the waters of the North East during the months from May to October, although particularly from June to September. Whitburn and the Farne Islands seem to be good locations to search for this spectacular animal.

Martin Kitching

KILLER WHALE *Orcinus orca*

The largest member of the dolphin family, the Killer Whale, or Orca, is a striking species by any definition. The adults measure 5.5-9.8 metres in length (Carwardine, 1995) and with black and white patterning and an impressive vertical dorsal fin they should be unmistakeable.



Killer Whale by Chris Bielby

The JNCC Atlas (Reid *et al*, 2003) shows that Killer Whales were rare off northeast England and in the wider central North Sea over the period 1990 to 2000, with no records from Northumberland waters.

It is frequently reported in the media that Killer Whales regularly come to the Farne Islands to prey on Grey Seals *Halichoerus grypus* and their pups during the winter, but research carried out by the author for the North East Cetacean Project (NECP) - interviewing boat skippers, commercial fishermen and Farne Islands wardens (both past and present) - suggests that there is no record for this having occurred in the last 40 years. Davis and Muir (in Foster-Smith, 2000) report that Killer Whales were seen attacking seals off the Farne Islands on 30 August 1965 and described the species as "not uncommon off our coast". As only 17 records are listed in Foster-Smith (2000), it is difficult to consider the species as anything other than rare off our coastline, with the status of "not uncommon" perhaps being a function of unverifiable anecdotes rather than any firm evidence of the species' occurrence.

However, there were three reported sightings obtained from casual records collected over the period 2003 to 2009 by NECP. Each of the sightings was of a single animal, off Tynemouth in November 2004 and September 2005 and Druridge Bay in August 2008. In addition, on 12 December 2006, Chris Bielby saw two Killer Whales, which were about two miles off Hartlepool Headland. The whales were surfacing about 100 metres apart, initially heading south but then turned around simultaneously and returned north. During the period from 1989 to 2010 there were no stranding records of this species in our region.

Furthermore, a survey of local boat skippers undertaken during 2004/05 by Newcastle University (Stockill, 2006) indicated that Killer Whales were "regularly" (rather than rarely) seen in offshore waters off Northumberland, with a third of fishermen reported to have sighted the species recently. Perhaps more so than any other cetacean, reports of Killer Whale are tinged with the spectre of misidentification. During 2011 the author received two reports of this species, one of which, from photographs, was verifiable as a Minke Whale *Balaenoptera acutorostrata*, and the other of which, based on pod size, behaviour, date and location almost certainly referred to the small pod of White-beaked Dolphins *Lagenorhynchus albirostris* seen at the same location the following day, behaving exactly as the Killer Whales were described and at the same time of day. With Risso's Dolphin *Grampus griseus* starting to occur with greater frequency in our region, it may not be an overly pessimistic view that its large body size and prominent dorsal fin make it yet another potential ID pitfall for claims of Orca, and the status of this species in the North East's waters may remain clouded in confusion for years to come.

Martin Kitching

VAGRANT CETACEANS

SPERM WHALE ***Physeter macrocephalus*** has occurred on approximately eight occasions. A set of whalebones formerly mounted on a plinth in the former grounds of Cresswell Hall were thought to be this species (S. Lowe, pers. comm., 2012). In recent years there have been four strandings or carcasses: a moderately decomposed carcass at sea 18 miles northeast of Hartlepool in June 2010; a specimen, reported as 45 feet long, lodged on the rocks at Bird Flight Goit, south of Saltburn, in 2010, which may have been the same animal; and two well-publicised strandings in January 2010 at Beadnell and in May 2011 at Marske-by-the-Sea. There are also three recent records of live animals: one near the Farne Islands in 2004, one "logging" off Whitburn on 3 April 2008 and one on 31 May 2012 from a transect survey on PV *St Oswald*, when the author was scanning to the port side and missed this leviathan as it surfaced to starboard under a feeding flock of Gannets *Morus bassanus*.

HUMPBACK WHALE ***Megaptera novaeangliae*** has occurred on approximately six occasions, although there has been an increase in records in recent years. Following a report of two off Holy Island on 7 September 2009, a single animal was discovered breaching just beyond Longstone (Farne Islands) on 13 September by a dive boat and, presumably, the same animal came as quite a surprise to a fisherman hauling his pots east of Newton Point on 19 September as it breached near his boat. Other local records include one five miles east of Hartlepool on 7 September 2006, one past Whitburn on 1 January 2011 and another (or the same) feeding off Whitburn on 6 and 7 August 2011.

LONG-FINNED PILOT WHALE ***Globicephala melas*** was described by Mennell and Perkins (1864) as "occasionally met with on our coast in large herds" and they suggested that a pod of 63 animals killed at Shoreston on 29 July 1734, described by Wallis as "Grampus, Bottle Nose or Great Porpess" (Orca) was more likely to have been this species. Modern reports are scarce although there are three records of live strandings of single animals: Redcar in May 1991, the Long Nanny Burn in October 1997 and Berwick- upon-Tweed in May 2002, and reports of animals off Blyth in March 2007 and Cresswell in March 2009. Stockill (2006) reported that a third of commercial fishermen had described seeing this species in recent years, so it seems to be a real possibility for the diligent observer.

ATLANTIC WHITE-SIDED DOLPHIN ***Lagenorhynchus acutus*** occurred five times as dead strandings between 1990 and 1994: Amble in December 1990, two in Beadnell Bay in September 1993, Old Law (Lindisfarne NNR) in July 1994 and St Mary's Island in April 1994. There was also one report of three live animals off Sunderland in July 2007; so this cold water species must be a realistic possibility, certainly for anyone in our offshore waters.

BELUGA ***Delphinapterus leucas***. Three records of this striking species: one captured in salmon nets at South Shields, June 1903, one moving north off Hadston in March 1988 (Foster-Smith, 2000) and one in the late 1980s/early 1990s that was watched as it progressed down the Durham coast (N. Jackson, pers. comm., 2012)

SEI WHALE ***Balaenoptera borealis***. The skeleton of one stranded at Amble in February 1912 is in the Hancock Museum reference collection (Foster-Smith, 2000) and one was reported six miles off Cresswell in June 2009. On 26 September 2012 an 8.6 metre juvenile female stranded at Druridge Bay in Northumberland. At this length it was likely to be maternally dependent and

was suffering from malnutrition, probably as a result of becoming separated from its mother, and had to be euthanized. What was possibly the same animal had been reported within 100 metres of the shore at Cambois on 20 September.

Species only recorded as captured or stranded:

NORTHERN BOTTLE-NOSED WHALE ***Hyperoodon ampullatus***. Four records are listed by Davis and Muir (in Foster-Smith, 2000): one caught in nets at Hartley in 1744, fragments of a skeleton removed from the Tyne at Newcastle in May 1857, a stranded 28-foot male at Blyth in March 1914 and a 20-foot male stranded at Seal Sands in October 1958. There is also a record in Delany (1985) of a stranding at Marske-on-Sea on 13 July 1943.

FIN WHALE ***Balaenoptera physalus***. Three records are listed by Davis and Muir (in Foster-Smith, 2000): one brought into Sunderland, having being caught off Holy Island in 1810, one captured in 1831 and one stranded in Amble in May 1915.

BOWHEAD WHALE ***Balaena mysticetus***. Just two old records of this Arctic species: an animal captured at Tynemouth in August 1532 (Mennell and Perkins, 1864) and one stranded in Newbiggin Bay in October 1869 (Foster-Smith, 2000). It seems possible that these records may refer to **Northern Right Whale** *Eubalaena glacialis*.

FALSE KILLER WHALE ***Pseudorca crassidens*** has been recorded twice with specimens stranded at Berwick-upon-Tweed on 3 December 1935, and at Beal on 5 December 1935 (Foster-Smith, 2000).

SOWERBY'S BEAKED WHALE ***Mesoplodon bidens*** has been recorded three times in our region as strandings: West Hartlepool in July 1940, Whitburn in October 1978 (Foster-Smith, 2000) and Holy Island on 13 November 2006. This species, also known as the North Sea Beaked Whale, occasionally strands on the east coast of Britain (three animals for exampie, in East Yorkshire, Lothian and Fife in the week of 13 to 19 August 2012).

STRIPED DOLPHIN ***Stenella coeruleoalba*** has been recorded on four occasions with strandings at Blyth in October 1991, Seaburn in December 1999, Dunstanburgh Castle in April 2003 and Whitley Bay in April 2006. The Dunstanburgh Castle record was a live stranding of three animals and the Whitley Bay record was a small calf, all extremely unusual records of what is a warm-water species.

Martin Kitching

EXTINCT AND EVASIVE MAMMALS

If there is a message that comes across from the mammal species accounts in this book it is that populations change across time. Go back a few hundred years and our carnivore populations would have been a lot more robust; go back a few thousand years and our ungulates would have been more robust, with the presence of such species as aurochs and elk. The more recent extinctions, and thankfully in some cases subsequent re-colonisations, have at least some historical documentation which is outlined in the relevant sections in this book. The presence of mammals that have long been extinct in the region are known only from bones or inferred from texts and these are catalogued in this section.

On the other hand there is always the potential for new mammal species to colonise the region either as escapes or deliberate introductions. Since Mennell and Perkin's text in 1864, four species of mammal, Grey Squirrel *Sciurus carolinensis*, Mountain Hare *Lepus timidus*, American Mink *Neovison vison* and Muntjac *Muntiacus reevesi*, have become resident here and they have their own accounts, which detail their spread through the region. A good number of other species have been recorded at large in the region but without becoming established. Without doubt the most dramatic of these was in the late 1960s when Stanley Zoo was operating. On a farm near the zoo, a farmer walking round his buildings found himself face to face with a Brown Bear *Ursus arctos* that had escaped from the zoo (Bob Wilkin, pers. comm., 2012). Fortunately the bear was only out for a matter of hours but some animals have managed to survive quite successfully for several months. One snowy night in March 2001, three slightly inebriated entomologists (mothing in the snow?) spent a bizarre hour at Newlandside in the Derwent valley, trying to catch what was first reported to be a Pine Marten *Martes martes* but turned out to be a Brush-tailed Opossum *Trichosurus vulpecula,* whose ability to speedily climb the nearest tree put it at no risk of capture by the three very bemused hunters. Some months later, however, it unfortunately failed to elude a passing car (Terry Coult, pers. comm., 2012).

While many of the records of escaped mammals were backed up with some hard evidence in the form of diagnostic signs, photographs or even in some cases a body, there is one category of mammal reports that is so far comprised almost entirely of sightings. Since 2000, Northumbria Mammal Group has run a regular tongue-in-cheek column in its quarterly newsletter entitled "The Big Cat Diaries", chronicling reports of big or exotic cats in the region. While many remain sceptical, it is at least plausible that one or more such cats are, or have been, at large in the region, which is why they are given their own account in this section.

Ian Bond

EXCTINCT MAMMALS FROM THE PLEISTOCENE

Mammal remains pre-dating the retreat of the last glaciation are rare in northeast England. Most of the known specimens were found in glacial drift deposits, although Trechmann (1920) did discover some earlier material in fissures on the Durham coast, among which were a few bones of a fossil Elephant *Archidiskodon meridionalis* and vole *Mimomys*. Trechmann discussed their geological context at length. The few other specimens from the region are bones and teeth of Rhinoceros, Hippopotamus and Elephant and some Giant Deer horns.

Voles *Mimomys* species

Bones found in fissure filling on the Durham Coast by C.T. Trechmann were identified by Hinton, who added a short note to Trechmann's paper on the site (Hinton, 1920; Trechmann, 1920). An incisor and anterior cheek tooth of the left upper jaw and some minute fragments of the premaxillae and maxillae were said to agree perfectly with those of "the species of *Mimomys* which occurs in the Freshwater Bed of West Runton (Norfolk)".

Hippopotamus

The tooth of *Hippopotamus amphibius* found in a gravel pit four miles northwest of Stockton on Tees in September 1958 constitutes the most northerly record in the world for Hippopotamus (Sutcliffe, 1959).

Rhinoceros - 'The Brierton Rhinoceros'

A humerus of a Rhinoceros was found in November 1938 at a depth of 20 feet in a sand and gravel quarry at Brierton, about 2.5 miles south west of Hartlepool. The geological context was described by Trechmann (1939a), which ascertained that the bone was contained in glacial drift deposits. The bone was identified and conserved at the Natural History Museum and is now in Hartlepool Museum.

Elephants

The few records of *Proboscidean* remains are all from southern County Durham:

- A small portion of a Mammoth tusk five inches in circumference was found during the excavation of the docks at Hartlepool (Howse,1861; 1890). With such a small fragment we might question whether it was from a Mammoth or an Elephant.

- A fragment of a rib and an atlas vertebra were found by C.T. Trechmann in fissure filling on the coast of County Durham, near Blackhall Colliery. The bones were identified as *Archidiskodon meridionalis* by C.W. Andrews, who compared the material with other specimens (Andrews in Trechmann, 1920). The deposit dates from the Middle Quaternary, of a temperate stage near to the Cromerian (Johnson, 1995).

- A length of a tusk was found at Barmpton (northeast of Darlington) in 1978. The tusk was transferred to Tyne and Wear Museums following the closure of the Darlington Museum.

Irish Elk or Giant Deer

The genus *Megaceros* is best known for the Upper Pleistocene (Ipswichian-Devensian) species *M. giganteus*, the Giant Deer or so-called Irish Elk. Three occurrences have been reported from our area, the earliest being reported by Cade (1785) who described "a large cavity on the summit

of the camp at Mainsforth ... called the *Danes Hole*, where there was lately digged up a pair of mouse [*sic*] deer horns of an extraordinary size".

This antler was next mentioned by Surtees (1823), who gave the site name as Nab-hill (also known as Nable-hill or Marble-hill), a sandy mound of nine acres and with no evidence of being a Danish camp. "In digging a small pond at the Southern base of the hill, a pair of huge antlers belonging to the segh-deer were found bedded in clay, four feet below the surface. One of these is preserved; it measures from root to top three feet eight inches, and ten inches in circumference immediately above the root; the greatest breadth is fourteen inches; several of the branches are evidently broken off".

Hutchinson gave a figure of the antler [in large-paper editions of the book; the plate is lacking in octavo editions], and stated that it was found about the year 1740, which cannot agree with Cade's statement that it was 'lately' dug up; John Cade was born in 1734 and it is unlikely he would have been active that early. Howse (1861) accepted the 1740 date and pointed out that this made the find the first English record for the species – given the doubt over the date, this claim is now doubtful.

In the winter of 1855-56 a partial skeleton was discovered below a bed of peat, and resting on marly clay, in a brickyard at South Shields (Howse, 1861). The remains were sent to the Crystal Palace and identified by Waterhouse Hawkins.

A pair of antlers, lacking the skull, was reported to Howse (1861) as being washed out of the Forest Bed at Snook Point, at the mouth of the Tees. The antlers were deposited in Durham University Museum. Since the Forest Bed is more recent than the extinction of the Irish Elk, it is likely that the horns were washed out of a lower deposit, "Some of these deposits, as at Belford hall, Adderstone Mains, etc., have yielded the remains of *Bos primigenius*, the Red Deer *Cervus elaphus*, the Great Elk *Megaceros hibernicus*, and doubtless many more of these interesting relics remain to be unearthed" (Bateson, 1893). This is very vague, and possibly refers to the 'Irish Elk' from Coldingham that was actually a misidentification of an Elk *Alces alces*.

Leslie Jessop

EXTINCT MAMMALS FROM THE HOLOCENE

Beaver by Joan Holding

By way of introduction it is worth considering the evidence used to determine which mammals that existed after the last ice age have become extinct. There are few references to mammal remains of the Holocene in our area. The classic paper by Winch (1817) on the Geology of Northumberland and Durham mentions only "horns of some species of Bos and Cervus are found embedded" in alluvial marl on the west side of the river Till. Gunn and Clough (1895) also mention fossils, including several large stag antlers, from peat bogs east of Sunnylaws. The most important source of Holocene faunal and floral remains is the "forest bed" exposed periodically at several sites along the coast, most famously at Hartlepool (see Cameron, 1878; Trechmann, 1947; and Waughman, 2005). Other evidence largely comes from three sources: animal remains found in caves, remains found in archaeological digs and medieval literature.

Animals found in caves

Mammal bones have been found in several caves in County Durham. The oldest seem to be from Moking Hurth, the so-called Backhouse Cave in Teesdale, where a range of species famously included Lynx. For most of the caves the bones were removed without the stratigraphy (of periods of hundreds, possibly thousands, of years) being recorded. It would be an interesting, but major, project to re-examine the bones with the benefit of modern technology, using radiocarbon dating, DNA and isotope analysis. The major cave find sites are:

- Bishop Middleham. Raistrick (1933) reported on excavations of a cave at Bishop Middleham. The human remains were described in detail, the animal bones less so: Badger, Sheep, Goat, Cattle, "very small rodents" and "possibly Wolf" were mentioned. Raistrick said that the bones were to be deposited in the Hancock Museum in Newcastle upon Tyne, so it might be possible to confirm the identifications.
- Heathery Burn. According to Elliot (1862) a quantity of bones were exhumed "some undoubtedly human, and others belonging to the lower animals". Greenwell (1894) wrote a much lengthier treatment of the contents of the cave. He was primarily interested in the Bronze Age remains but also presented a faunal list based on identifications by Smith Woodward. The species as listed were Red Deer, Roe Deer, small Horse, Bos longifrons (chiefly small and young animals), Sheep, Pigs, large Dog, Fox, Otter, Badger, Hare and Water Vole.

- Moking Hurth. Moking Hurth, or the Backhouse Cave in Forest-in-Teesdale is best known for the Lynx bones. The contents were described by Davies (1880) and there is a modern reappraisal by Simms (1974). The faunal list given by Simms is Pygmy Shrew, Hedgehog, Mole, Wolf, Red Fox, Brown Bear, Marten, Stoat, Weasel, Polecat/ferret, Badger, Otter, Lynx, Wild Pig, Red Deer, Roe Deer, Cow (domestic), Goat or Sheep, Horse, Brown Hare, Blue Hare, Rabbit, Bank Vole, *Arvicola sp.*, and *Microtus sp.*
- Ryhope. See Kirkby and Brady (1866). As well as human remains, there were bones of Dog, Goat, Sheep, Ox and Pig, the bones being "scattered without any order through the cave earth".
- Whitburn. This is the "Great Auk" cave (see Howse, 1880). John Hancock identified remains of the following: Horse, Cow, Sheep, Dog, Pig/Wild Boar, Red Deer, Roe Deer, Badger, Fox, Pine Marten, Weasel, Hedgehog, Mole and Water Vole. The larger bones were said to be broken and gnawed, suggesting they were from prey that had been brought into the cave by a predator.

Archaeological remains

The archaeological literature includes a number of interesting mammal records. For instance, the Roman Fort at Arbeia has yielded Yellow-necked Mouse *Apodemus flavicollis* and Garden Dormouse *Eliomys quercinus* as well as several other small mammals (Younger, in Bidwell and Speak, 1994).

Important sites include the coastal "forest beds", of which the best known is at Hartlepool (see Waughman, 2005), which has yielded a number of bones. Also, finds at Corstopitum (see Meek, 1911) included Beaver, Hare, Water Vole, Mole, Badger and Fox as well as domesticated animals.

For a review of vertebrate remains from archaeological sites of all dates from the region, see Huntley and Stallibrass (1995).

Medieval literature

Much of the Medieval and later literature relating to animals that have become extinct in Britain was summarized by Harting (1880). The local evidence includes the Durham Account Rolls (Fowler, 1898-1900; Raine, 1844), which provide a wealth of evidence relating to Durham in the Mediaeval period. The rare occurrences of mammals in the Account Rolls are interesting:

- In 1380, two Beaver pelts were bought for two shillings and ninepence.
- There are a few mentions of Foxes.
- There are no mentions of Wolves, Badgers or Wild Cats.
- The mention of 'Wild Boar' need to be interpreted with care (see below).

Two intriguing mammal references in the Account Rolls are worth noting. In 1360-61, 31 shillings was spent on buying an ape and bringing it from York for the Prior (*In una simian empt. Apud Ebor. pro d'no Priore 31 s*). Also 1532-33 there was a payment of five shillings for the care of bears and apes for the Bishop (*custodi ursorum et cimearum domine Principis*).

EXTINCT SPECIES

EUROPEAN BEAVER *Castor fiber*

The evidence for Beaver in the North East is scant. There are two instances of the species at archaeological sites:

- The left ramus of a lower jaw, excavated at Corstopitum in 1907 (Meek, 1911). Since Corstopitum was a major Roman site, this may well have been an import – was it, for instance, part of a pelt that had been imported for clothing?
- An ulna and humerus from the kitchen Midden at Jarrow monastery, in the "Medieval I period", the period of the Durham cells at Jarrow (Cramp, 2006). Cramp pointed out that Beaver was classed as a "fish", so could be eaten when meat was disallowed, and the remains were probably of a food animal.

In addition a recent discovery of a Beaver-gnawed stick, protruding from alluvium on the bank of a North Tyne tributary, is awaiting interpretation (Angus Lunn, pers. com., 2012).

Coles, in O'Connor and Sykes (2010), said "In the earlier 12th Century an English Act set tolls for exports from Newcastle upon Tyne, including beaver skins". Tracing this reference backwards, Mennell and Perkins (1864) claimed that an export duty of fourpence each was levied on Beaver skins. In turn, their information was from Wilson (they say Watson, in error) (1858). The claim is based on a manuscript of the reign of Henry I (1135), published by Brand (1789, volume 2 p. 131) and Martin (1911). Headed *De tallio dando et accipiendo* (tally of giving and receiving), it lists specific tolls payable at Newcastle. Since there are entries for ox-carts, horses-and-carts and pack-horses, the list is more likely to be charges for things coming into-, out of- and through Newcastle (by road and river) than it is to be a list of export duties. The entry relating to Beaver skins reads *De tymbr' de gupill' vel martinis vel sablin' vel beverin' 4d.* (*tymbrium* = 40 furs, *gupillus* = fox). Since Martens and Beavers are never likely to have been so common as to be exported in batches of 40, and since Sable did not occur in our region, the duty was almost certainly payable on imports – possibly for luxury goods for the Norman population of the newly fortified city?

A further reference to the species is in the Durham Account Rolls where, in 1380, two beaver pelts were bought for two shillings and ninepence.

WOLF *Canis lupus*

Other than the well known "Allendale wolf" (see Carnivore introduction) evidence for the existence of wolves in the region is mainly archaeological. Skeletal material of *Canis lupus* is not easily distinguished from that of a large dog, and it would make an interesting project to track down and confirm the identity of the cited specimens.

The most certain Wolf remains are from Moking Hurth cave in Teesdale: listed by Davies (1880), cited by Reynolds (1909) and Yalden (1999), and further details given in the review of the site by Simms (1974). Simms repeated a passage by James Backhouse: "The almost complete skeleton of a Wolf, almost three-fourths the size of a full-grown male Arctic, was found in one of the fissures...". Simms also reported that a Wolf cranium found in 1969 yielded silt with pollen (including woodland and grassland with cereal cultivation and some standing water) that was analysed as "a typical Zone VIII assemblage", likely to be Iron Age or later in origin.

Doubtful archaeological records as dog/wolf are:

- "Possibly wolf" from the Bishop Middleham cave by Raistrick (1933).
- Excavations between 2000 and 2002 at Howick Haven Mesolithic settlement (Longhoughton) revealed remains of a Mesolithic hut, radiocarbon dated to about 7,800 BC. According to Waddington *et al.* (2003) analysis of the burnt bone from its hearths shows the presence of "wild pig, fox, birds and either domestic dog or wolf". This list lacks any details of which, or how many "dog or wolf" bones were found.
- Teeth of a 'dog or small wolf' from the Hartlepool forest bed (see Waughman *et al.*, 2005)
- A "possibly wolf" from 5th century deposits at Binchester, where a number of wild and domestic mammal species were reported (see Mason, 2012).

There are few claims for the later existence of wolves in the North East. Mennel and Perkins (1864) cited several allusions to wolves in Northumberland in the Mediaeval period, the most definite being from the reign of Henry III (1216-1272) where land is held with right of hunting wolves with dogs – but the place mentioned (Laxton) is in South Yorkshire. Similarly, it is said that Robert de Umfraville held the lordship of Riddesdale by service of defending that part of the county against enemies and wolves, but this is not evidence that wolves were actually in Riddesdale to be "defended against".

At first sight a Latin poem by Lawrence, Prior of Durham (1149-1154) (published in Raine, 1880), contains unambiguous evidence that states wolves ate 500 young horses during one winter. However, the poem is situated in the context of a violent civil war and should be read within that context. Is the reference to real wolves, or a metaphorical allusion to political/social events (cf. the "wolf packs" of the war in the Atlantic, 1939-1945)? If the Bishopric had been troubled by wolves to such a great extent, or if they had been hunted in the Bishop's parks, then we would expect to see references elsewhere, but these are notably absent.

LYNX *Felis lynx*

Radiocarbon dates of the few Lynx remains known from Britain show an astonishing range, the oldest ones dating from the thermal maximum of the Late glacial interstadial (12,650 ±120 BP) and other cave remains dating from the Holocene (9570-8930 BP). However, the youngest archaeological examples extend the time range of the species into the Roman period and beyond (the most recent date is 1550±24 BP).

The only reference for Lynx in the North East is the humerus and metatarsal of a Lynx that were found in Moking Hurth Cave (Teesdale), and which was only the second time the species had been found in England. The find was published by Davies (1880), the humerus was figured, and both bones described in detail. If the Lynx was from the same period as the Wolf analysed by Simms (1874), then it is Iron Age in origin.

WILD CAT *Felis sylvestris*

The last stronghold of Wild Cats in our area seems to have been northern Northumberland, where the species seems to have clung on until the middle of the 19th century. Wild Cats seem to be absent from the archaeological record, other than a skull and limb bones from a cave near Stanhope mentioned in a letter (1988) from James Rackham to Terry Coult. The bulk of the records are from a period when Wild Cats were actively being sought out and destroyed as vermin.

The bounty records of animals, listed in the Churchwarden's books of Corbridge, show that 141 Wild Cats were killed between 1677 and 1724. If this level of attrition was prevalent throughout the farmed areas of the North East, it is little surprise that the species declined. The next accounts of them date from a period when the population was failing. Hardy (1849) reviewed records for Berwickshire. He said that in the late 1700s they were numerous in the woods above Pease Bridge, and raided hen houses as far west as Dunglass. Below Blaikie, holes in a bank were called "Cat-Holes", which were home to Wild Cats. By 1849 the species had not been seen for at least 40 years, although it appeared that at least one still survived "secured amidst the fastnesses of our rocky coast": on 17 March 1849 Hardy saw one on the coast immediately to the east of St Helen's chapel, on very steep banks. He noted its large size and deep grey colour, and recalled his father seeing them 40 years ago in a similar spot.

An article by Sidney Gibson (1869) in *The Gentleman's Magazine* included information from Algernon, Duke of Northumberland (1792-1865), who told him he remembered a Wild Cat killed in Hulne Park around 1810 and stuffed by Thomas Newton, the keeper of Brizlee Tower. It had a short thick tail and measured six feet long.

More information about Wild Cats was published in the 1860s and 1870s, mainly in the *History of the Berwickshire Naturalists' Club*. Hardy (1874) followed up his earlier article with more stories of Wild Cats in North Northumberland and the Borders. He said that until the mid-1700s Kielder was "a great place for wild cats", and gave the story of James Telfer's grandfather being attacked by one (a story first printed in 1870 in *The Gentleman's Magazine* **3**: 254).

Mennel and Perkins (1864) noted the following records:

- Within three miles of Twizell (north Northumberland) around 1827 (noted by P.J. Selby in his paper on the Fauna of Twizell).
- The one killed near Brizlee woods, near Alnwick.
- At Castle Eden up to about 1845 (according to information provided by Canon Tristram).
- One shot by Lord Ravensworth in the woods near his seat at Eslington in 1853. However, Sidney Gibson (1869) commented that this one resembled the Wild Cat in colour, and almost in size, but it had a tapering tail. There is a very fine specimen of a Wild Cat among the Ravensworth collection in Tyne and Wear Museums. Unfortunately, it has no label stating its provenance.

Possibly the last Wild Cat record for the North East is a taxidermy mount by Rowland Ward of a Wild Cat holding a rabbit, labelled as being shot at Moss Wood, Barmoor (near Lowick), 1863. A photograph of the specimen was posted on the internet in 2012.

BROWN BEAR *Ursus arctos*

Brown Bear probably died out in Britain during the Roman period. The few records from our area – all from County Durham – are a mixture of wild and captive animals.

The wild bears are represented by one occurrence. Simms (1974) reported the presence of a juvenile mandible and portions of a cranial roof of *Ursus arctos* from Moking Hurth cave in Teesdale. If this is a similar age as the Wolf from the same cave, it is probably Iron Age or later in origin.

Bear bones have been found during excavations at Binchester on two occasions. A mandible unearthed in the backfill of one of Rev Hooppell's 19th century excavations was probably late Roman with a possibility of being medieval. Recently two bones, possibly bear, were found from two different contexts (67, and 353). The bones are both unfused proximal tibiae, one of which is broken into three pieces, the other is one piece.

Captive bears occur in the Durham Account Rolls (Fowler 1898-1900), where in 1532-33 five shillings was paid for the care of bears and apes for the Bishop (*custodi ursorum et cimearum domine Principis*). Also, four Brown Bear bones were found during excavation of the Inner Ward of the Castle at Barnard Castle (Austin, 2007): these are Medieval and, given the context, were most likely captive animals.

WILD BOAR *Sus scrofa*

It is not easy to identify *Sus scrofa* remains from archaeological sites as being "wild", "domestic", or "feral". For an in-depth discussion of the problem, see Rowley-Conwy *et al.* (2012). Any *Sus scrofa* remains predating the Neolithic are likely to be from wild pigs: thus it was reasonable to record bones from Howick Haven Mesolithic settlement (Waddington *et al.*, 2003) as being "wild pig". However, domestication of pigs did not mark the end of Wild Boar in Britain (see Albarella, in O'Connor and Sykes, 2010), so remains of that date and later need to be interpreted with care. Bones from other sites, including the cave remains (such as boar tusks from Heathery Burn cave) are still open to investigation.

Howse (1861) noted the following:

- Teeth of Wild Boar, associated with skeletons of Red Deer, were found in a lacustrine marl below a bed of peat at Middleton bog (near Wooler). These were possibly the same "remarkably fine tusks" found in Cresswell Moss and preserved at Middleton Hall (near Wooler; the seat of Mr G.H. Hughes) that were mentioned by Harting (1880).
- A cranium (also associated with Red Deer) was found at a depth of 13 feet in alluvial sand in North Bailey (Durham City).

Harting (1880) suggested that three entries in the Durham Account Rolls for 1530 and 1531 refer to Wild Boar because they use the Latin terms *aper* or *apro*. There are several mentions of swine in the Rolls, and these are mainly as *porci* (and *porcell*[*i*] = piglets), but also once (in 1376), as purchase of a *barhyd* (boar's head): the *apro* could have simply been male domestic swine rather than wild ones. A payment for erecting huts in the "garden of swine" in 1445-46 shows that the Monastery had its own piggery.

A 12th century poem by Lawrence of Durham (Raine, 1880) alludes to a wild boar hunt, but the context does not confirm that wild boar were being hunted in County Durham at that time. The place name Brancepeth is sometimes said to be derived from Wild Boar ("Brawn's Path"), but this is fanciful. The origin was probably from a personal name ("Brand's Path") (Watts, 2002).

CATTLE and AUROCHS *Bos*

The genus *Bos* is represented in Britain by *B. primigenius* (the Aurochs) and its descendants, the domestic cattle. The domestic forms were introduced into Britain in the Neolithic, and Aurochs occurred from the Middle Pleistocene until its extinction (in Britain) during the Bronze Age. Few skeletal remains of Aurochs from the North East have been dated. It is possible to confuse bones

of wild and domestic animals, and the remains of the species in our area deserve a specialist review.

Bos remains are quite widely distributed in our area. Howse (1861) listed the following examples:

- (as *B. primigenius*) A fine pair of horn cores found during excavation of Jarrow docks, embedded in silt at a depth of 17 feet.
- (as *B. primigenius*) Two horn cores dug up in sinking a well at the Salt Marshes.
- (as *B. longifrons*) A fragment of skull with the horn cores found during the excavation of the innermost dock at West Hartlepool.
- (as *B. longifrons*) A skull, possibly one listed in Brewer's *History of Stockton-on-Tees* found 12 feet below the surface when digging a new cut for the Tees.

More recent records are:

- A horn sheath found on Redburn Common, in a Mesolithic context (Johnson, 1985).
- Horns of Bos Moor House (Cross Fell) (Mesolithic).
- Bones are present in the Hartlepool forest bed (see Waughman, 2005).
- A skull from Haughton Strother Quarry (near Humshaugh) radiocarbon dated to 5670-5520 BC, found in December 2009.
- A very deeply stratified, but undated horn from Hedgehope Hill (Northumberland).

ELK or MOOSE *Alces alces*

There are few records of *Alces alces* from the North East, but one is particularly interesting and has been investigated scientifically:

- The "Neasham Elk" has been the subject of several studies. When a substantial part of a skeleton of an Elk was found in June 1939 in a brick pit at Neasham, the find was initially publicised by C.T. Trechmann. Kathleen Blackburn also began several years' work of identifying and analyzing the plant and animal remains in the peat in which the bones were found. Her study was published in 1952, and a paper on the diatoms from the deposit (Ross, 1952) followed hers in the same journal. Blackburn dated the Neasham Elk as being from a late-glacial or early post glacial age. Her work incorporated a radiocarbon date (see also Godwin, 1951) of 10,851 ±630 BP. The skeleton, formerly in the Darlington Museum, was transferred to Tyne and Wear Museums in 1998.
- An Elk antler was found in Chirdon Burn "near the bottom of the recent peat formation, resting partially on the coarse gritty marl formed by the weathering of the subjacent strata" (Howse, 1861). Howse gave two figures of the horn. The Chirdon Burn is a western tributary of the North Tyne.
- A second Elk listed by Howse was first published by Hardy (1860) - and corrected by Howse, 1861- as an Irish Elk. It was a fragment of an antler found near Coldingham at a depth of six feet in a deposit of gravel, earth and large boulders. An illustration by Hardy shows what appears to be an *Alces alces* antler.
- An Elk jaw bone, among peat, was discovered on the banks of the River Skerne in Darlington in 1995 and dated between 10,000 and 6700 BP (ref. in Huntley and Stallibrass, 1995).
- In the early 1980s Dr Paul Morrison found three bones, identified as ankle bones from an Elk, at Druridge Bay (opposite Cresswell Pond) in a peat layer that is occasionally exposed on the beach.

Leslie Jessop

ESCAPED MAMMALS

In addition to those animals that occur naturally in the North East and which have their own account in this book, there are a number of species that have turned up on occasion. These are all very likely to be as a result of escapes but it is possible that the one or two Sika Deer *Cervus nippon* that have turned up the region (see Red Deer account) are vagrants from the population that is established in the Scottish borders rather than escapes from deer farms. The only escaped species for which there is any reason to believe it may have bred in the North East is the American Marten *Martes americana casuarinas* (see Pine Marten account).

Escaped mammals have a long history in the North East. Included in the inventory of the mammals found in a Roman granary in South Shields (Younger, 1994) are remains from two Garden Dormice, *Eliomys quercinus*. There is no indication that this species has ever been native to Britain so it is more likely that these are escapees, potentially from animals kept for the table.

Table 1 (over page) lists all of the escaped mammals that have been recorded at large in the North East though doubtless there will have been a number of others that have gone unrecorded. For example Baker (1990) plotted the distribution of 22 records of Raccoon *Procyon lotor* found out of captivity in the UK between 1970 and 1989; one of the dots on his map is broadly in the Middlesbrough/Billingham area.

It is illegal under Section 14 of the Wildlife and Countryside Act (1981) (as amended) to release, or allow to escape into the wild, any animal not normally resident in Great Britain. This includes a variety of non-native animals that have established populations such as American Mink *Neovison vison* or Red-necked Wallaby *Macropus rufogriseus*. Escapes and particularly deliberate releases may therefore go unreported due to fear of prosecution.

Under the Dangerous Wild Animals Act (1976) (DWAA) certain mammal species must be licensed with the Local Authority, which carries out inspections of housing facilities in conjunction with a veterinary surgeon. In order to try and gauge the potential for escapes of those exotic species listed under the Act, the author contacted all Local Authorities in the North East to enquire as to what numbers of which species were registered with them under the DWAA. Responses were received from all Local Authorities except Middlesbrough, Redcar and Cleveland, and Stockton. As of January 2012, the only animals that were registered across the rest of the Local Authorities were 40 American Bison *Bison bison* with Durham County Council and one malmut/wolf cross *Canis familiaris x lupus* with Northumberland County Council. Of the species that have been recorded in Table 1, only Wild Boar *Sus scofra*, is on the Schedule of species for which a license is required under the DWAA though Raccoon was also on the Schedule prior to a modification order in 2007. The removal of species such as Raccoon and the related Coati *Nasua nasua* from the DWAA and therefore the removal of standards for husbandry and security for those species could well result in them being kept more widely and consequently escaping more often. It is likely then that reports of these species in the wild will occur more frequently in the future though whether they escape in sufficient numbers to breed and establish a population remains to be seen.

Table 1: List of mammals recorded as presumed escapees in the North East. Escapees are single animals unless otherwise indicated.

Date	Species	Location	Notes
Late 1960s	Smooth-coated Otter *Lutrogale perspicillata*	Stanley	Escaped from Stanley Zoo. Believed to have escaped into the River Team.
1983	Porcupine *Hystrix sp*	Shincliffe	Seen in bushes near Rose Tree pub; known to have been present for 2-3 years.
Mid 1980s	Golden Hamster *Mesocricetus auratus*	Darlington	Brought in by cat.
c1987	Chinchilla *Chinchilla lanigera*	Pow Hill Country Park	A group of three were captured. It was thought that they had not been long out of captivity as they were easily caught.
1980s	Chipmunk – spp unknown	Newcastle	Live specimen in school grounds – recaptured.
Late 1980s	Chipmunk – spp unknown	Thropton, near Rothbury	Killed by cat. Specimen now in Great North Museum: Hancock.
7.11.92	Red-necked Wallaby *Macropus rufigriseus*	Lanchester	Escaped from Acorn Bank garden centre. It was captured within 3 days having made it as far as Dryburn Hill in Durham City.
1993	Wild Boar *Sus scofra*	Brancepeth	*Northern Echo* report.
1995	Red-necked Wallaby *Macropus rufigriseus*	Lanchester	Escaped from a garden centre and was present on the Malton reserve for a couple of weeks. Fate unknown.
1996	Red-necked Wallaby *Macropus rufigriseus*	Wark area	Seen on the loose.
1997	Arctic Fox *Alopex lagopus*	Alnwick	Shot by gamekeeper while eating (scavenging?) a lamb.
1998	Raccoon *Procyon lotor*	Darlington	Found in a shipping container from the USA at Cummins Engines.
2001	Wild Boar *Sus scofra*	Chopwell Woods	On the loose for several days before being killed by a car.
2001	Brush-tailed Possum *Trichosurus vulpecula*	Riding Mill	One was seen in the wild over several months during which time it evaded attempts at capture. It was thought to have been an escapee from a private collection near Consett. It eventually turned up as a road casualty.
2001	Arctic Fox *Alopex lagopus*	Iveston	Seen outside the front door of house at night.
2002 (approx.)	Raccoon *Procyon lotor*	Castle Eden Walkway, Stockton	Notice put up offering reward for lost Raccoon.

Date	Species	Location	Notes
2005	Red-necked Wallaby *Macropus rufigriseus*	Elwick, Hartlepool	Escaped and not recaptured.
2007	Red Deer or Wild Boar	Elwick Hartlepool	Large print found in a stream bed in woodland. Cast taken, showing dew claws. DEFRA unable to say whether it was from Red Deer or Wild Boar.
2008	Wild Boar *Sus scofra*	Between Hexham and Corbridge	Road casualty – the dead animal was photographed.
2008	Wild Boar *Sus scofra*	Sedgefield	Road casualty near Hardwick Hall, Sedgefield.
2009	Red-necked Wallaby *Macropus rufigriseus*	Kielder	Escaped from the Bird of Prey centre.
2010	Raccoon *Procyon lotor*	Shadforth, Durham	Filmed by Durham Wildlife Trust in a private garden. It had been visiting the garden for the previous two years though it disappeared shortly after it was filmed.
2011	Chipmunk – spp unknown	Stobswood, Morpeth	Seen on the loose; unclear whether more than one animal involved.
2012	Raccoon *Procyon lotor*	Sunderland	Seen in a private garden for several days in July 2012. Durham Wildlife Trust has a report of a Raccoon in Sunderland for the previous two years which may be the same individual.

Ian Bond

EXOTIC CATS

The question of whether big or exotic cats are at large in Britain is one that has surfaced quite regularly in the media over the years and it is probably fair to say that hardly a week goes by without a sighting being reported in some local newspaper across the UK. In fact reports are now so frequent that a recent book addressed the issue of how we should respond to the situation where big cats have become part of our fauna (Minter, 2011). That exotic cat species can turn up in the wild in Britain is not disputed: there have been a small number of cases where this was well documented including the Eurasian Lynx *Lynx lynx*, that was darted in Cricklewood in 2001 and taken to London Zoo, or the Jungle Cat *Felis chaus* killed on a road in Shropshire in 1989. More locally a Leopard Cat *Prionailurus bengalensis* was found dead between the Reston and Grants Houses area of North Berwick in 1988 and a second in August 1990 at Hule Moss, Greenlaw and sent to the Royal Scottish Museum in Edinburgh (Bob Wilkin, pers. comm., 2012). The mainstream consensus seems to be that such instances are isolated though it is interesting that at least one county account of mammal fauna (Clark, 2001) considers big cats to be breeding in that county (Hertfordshire) and even gives advice on what to do should you encounter one.

The North East has one of the longer traditions in this subject. The so-called "Durham Puma" became well known as several reports featured quite prominently in the local newspapers in the 1980s. In fact the eponym has become so well entrenched that sightings of big cats are often assumed to be of Pumas *Puma concolor*, even though the animal described is usually of black colouration; black Pumas have never been definitively recorded anywhere in the world. Eddie Bell, who was a Wildlife Liaison Officer for Durham Constabulary and who was the primary researcher on this subject at that time, was aware of almost 300 reports from the period 1986-2000 (Minter, 2011).

In the 1990s reports seemed to shift to Northumberland or at least interest in them did. Many of these were published in a series of newsletters edited by John Tait. The ones for which there was a reasonable amount of information, which was by no means all of them, were tabulated in the November 1997 edition (Tait, 1997). From January 1995 to October 1997 some 37 reports had been collated for Northumberland. Of these, 26 referred to "Big Black Cats", often described as a black panther, with five reports of Puma and one each of Lynx, Ocelot *Leopardalus pardalis*, Bobcat *Lynx rufus*, Leopard *Panthera pardus* (of the normal spotted type), Wildcat *Felis sylvestris grampia* and one of an alleged corpse where the species was not stated. Reports were mainly from the Elsden, Kirkwhelpington, Harwood Forest area with another cluster of reports around the Hexham/Haydon Bridge area and some from Morpeth. There was no apparent distinction in the distribution patterns of reports of Pumas and black panthers with both types being reported in the same area.

The pre-2000 period also provided what is to date the only hard evidence for the presence of exotic cats in the North East. In 1992 professional photographer Philip Nixon took a photo of what he observed as a cat carrying an adult rabbit in its mouth, in the North Pennines near Ireshopeburn. The picture is believed by many to show a Jungle Cat though others maintain it merely shows a Fox *Vulpes vulpes*. Then in 1993 a dropping was found at Whorlton near Barnard Castle, which, it was claimed, was identified by Hans Kruuk of Aberdeen University as being from either Puma or Leopard. In the late 1990s, John Tait had a cast from Northumberland identified as Puma by someone who was experienced at tracking the species in the USA.

In 2010, Northumbria Mammal Group's "Big Cat Diaries" were compiled into a book, which also attempted a brief but more serious analysis of the reports (Bond, 2010). As of August 2010, some 134 reports had been collated. Of those, 102 were described in sufficient detail that they could be at least notionally attributed to a particular species. By far the majority of those, 88 in total, referred to a large, black, pantherine species, presumed to be a melanistic Leopard and subsequently referred to as panthers, with a further seven to Pumas, six to Lynx and a single one to Serval *Felis serval.*

In addition there were seven reports of black cats that are very much bigger than domestic cats but which clearly were not panthers. According to the Big Cats in Britain organisation, which catalogues reports across the country, this is the second most common category for "big cat" reports nationally (Mark Fraser, pers. comm., 2009). An example of such a cat, which was larger than a Fox in the same video clip, was seen on ITV news in 2012. The news clip included comment by Professor Steve Harris, former chair of the Mammal Society, who described the cat as "the largest predator currently at large in Britain" though he concluded that it was just an outsized domestic cat. A further five reports where the species was seen clearly and at close range and described in detail do not fit any known species. Some may postulate that these represent hybrids or even an unknown species but it may in fact just be a measure of the potential for unreliability in some of the reports. Nevertheless a number of those 134 reports were seen at close range by people who were experienced at observing animals and, in the author's opinion, it is reasonable to say that examples of Leopard, Puma and Lynx have been reliably recorded in the North East within the past 10-15 years.

Reports of panthers have occurred throughout much of the North East over the past decade though there are two particular areas where there are notable clusters of records. One of these is Tynedale, particularly around Stocksfield and Hexham. The other is in southeast Durham between Hartlepool and Sedgefield, particularly around the Wynyard area. The latter may be a case of recorder bias as this is where the author is based. Just as significantly there are certain areas where there are few if any reports, for example northeast Durham and south Tyneside. North Tyneside and several areas of Northumberland, including until recently Kielder, Europe's largest man-made forest.

The few reports of cats resembling Puma and Lynx have been spread across wide areas of the North East, with the only place where either of these species has been reported more than once being Wynyard with five of the 11 reports of Puma that the author has received to date.

Reports continue to come to light, if anything with increasing frequency, though this is largely due to them being forwarded from the national Big Cats in Britain website, which being web-based has probably smoothed out some of the effects of recorder bias. As of mid-2012 the author has received at least 200 reports. Even so these reports certainly do not represent the full picture. That there are potentially many more reports of exotic cats than those received by the author was demonstrated by a Freedom of Information request to Durham Constabulary in 2011 asking for details of reports of big cats over the previous five years. It transpired that Durham Constabulary had logged 28 sightings over that period and on matching those with reports received by the author it appeared that only three were the same report.

While the distribution of the reports would suggest that there has been more than one individual of certain exotic cat species at large in the North East, that is not to suggest that those species

might have established themselves. Only two of the reports that the author has received have claimed to be of mother and cubs. For Lynx, Hetherington (2005) has calculated that it would require a founder population of around 12-32 animals in order for the population to have a 95% chance of persisting 10 years after the release. Even if, for example, individual cats near Hexham and Hartlepool could meet up the statistical chances of a population resulting from that must be very small. The maximum that an individual cat might be expected to live in the wild is into the low teens, though these are the exceptions (Guggisberg, 1975). The reports have continued for several decades now, therefore the conclusion must be either: that virtually all of the reports are cases of mistaken identity; that there are continued releases; that the animals are breeding in the region, or that there is a breeding population outside of the region from which individual cats are emigrating. None of these strikes the author as very likely but one, or a combination of them, must be the case. It will be interesting to see if the next few decades shed any further light on this.

Ian Bond

AMPHIBIANS

There are five native amphibian species in the region; Common Frog *Rana temporaria*, Common Toad *Bufo bufo*, and the three newt species, Palmate *Lissotriton helveticus*, Smooth *Lissotriton vulgaris* and Great Crested *Triturus cristatus*. All are quite widespread, the most frequent being the Common Frog, and the least frequent the legally protected Great Crested Newt. All five species are declining in numbers.

Their habitat requirements are fairly similar, with some species slightly more restricted than others. All five species use mainly natural or semi-natural terrestrial habitats and breed in still, fairly neutral pH waters. Frog and toad tadpoles can survive on plant material such as algae, though they will also eat animals. Newt efts will only eat invertebrate animal material. Consequently, frogs and toads can more readily colonise new ponds at an earlier stage of succession than newts can.

In the species accounts, the descriptions of the newts, in particular, often include the words "usually", "mostly", "generally". There is quite a lot of variation in both appearance and behaviour, some of which is unexplained, and this should be borne in mind with these species. The terms used to describe juvenile newts vary between publications. Here, they are called aquatic efts and terrestrial efts. Elsewhere, terrestrial efts may be called "efts" and aquatic efts may be called "larvae". In this account, "larvae" is considered to be more appropriately used only for invertebrates.

Amphibians are regularly surveyed for, so there are many reliable records for these species. The protected status of Great Crested Newts ensures that developments requiring planning permission often have to have amphibian surveys of nearby ponds. The main survey method for newts is the use of "bottle traps" placed in the water and left overnight. These work like lobster pots, trapping the newts when they enter the bottles. Water Shrews *Neomys fodiens* are sometimes accidentally caught, with fatal results. Other amphibian survey methods are "torching" the pond after dark, netting, and looking for eggs and for terrestrial animals. A protected species survey licence is needed when surveying for Great Crested Newts.

The high level of public interest in amphibians has enabled the Wildlife Trusts to carry out public surveys of garden ponds in South Tyneside, Tees Valley and elsewhere. These have highlighted the importance of these ponds to amphibians and added to the picture of the distribution of the amphibian species, particularly for the introduced Alpine Newt *Ichthyosaura alpestris* .

The basic information on amphibians in our region came from H. G. Bolam (Bolam, 1915; 1917). Since 1998, regional maps of the distribution of the records of our amphibians have been periodically published (Durkin, 2010A). Natural England has a set of criteria for the designation of Sites of Special Scientific Interest (SSSI), on the basis of the numbers of species present and the breeding population size of each of the species. The criteria are discussed under each of the native species.

Non-native species are occasionally found. Alpine Newts have been well established at several ponds for many years, and can spread to other ponds, so they have their own account here. Pool Frogs *Pelophylax lessonae* and Natterjack Toads *Epidalea calamita* were reported in coastal North Northumberland in the 19th century, almost certainly as short lived introductions. Great

Crested Newts have been available from pet shops, sometimes from continental species and some of these may have been released into the wild. These may account for some of the variation found in some of our Great Crested Newt populations.

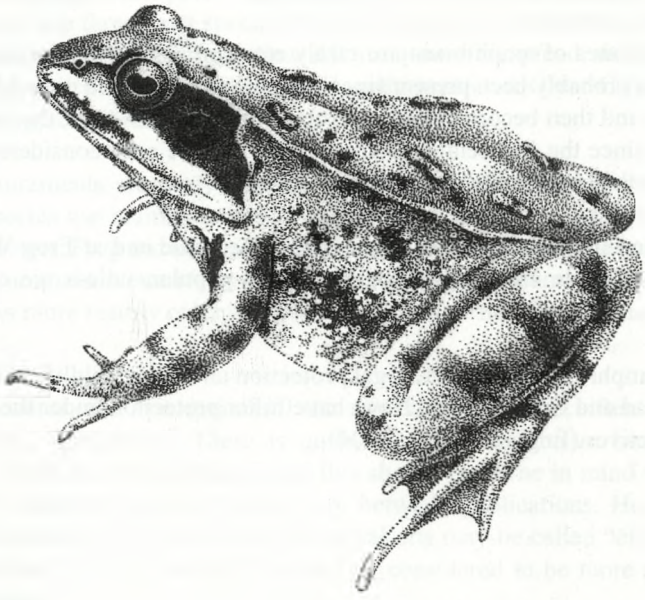
The small, fragile bones of amphibians are rarely retained in the fossil record. All five of our native species have probably been present since post-glacial times and probably no other species have been present and then become extinct. Except for Palmate Newts, the native species have all been recorded since the 19th century. Palmate Newts were only considered to be a separate species from Smooth Newts in Britain in the 19th century.

Frogs are celebrated in place names at Frog Hall in Teesdale and at Frog Wood Bog SSSI in Hamsterley Forest. Toads and newts have been less popular, unless we can count Newton Aycliffe!

All of our native amphibians have some legal protection under the Wildlife and Countryside Act, and Natterjack Toad and Great Crested Newt have fuller protection under the European Species and Habitats Directives (English Nature, 2004).

John Durkin

COMMON FROG *Rana temporaria*

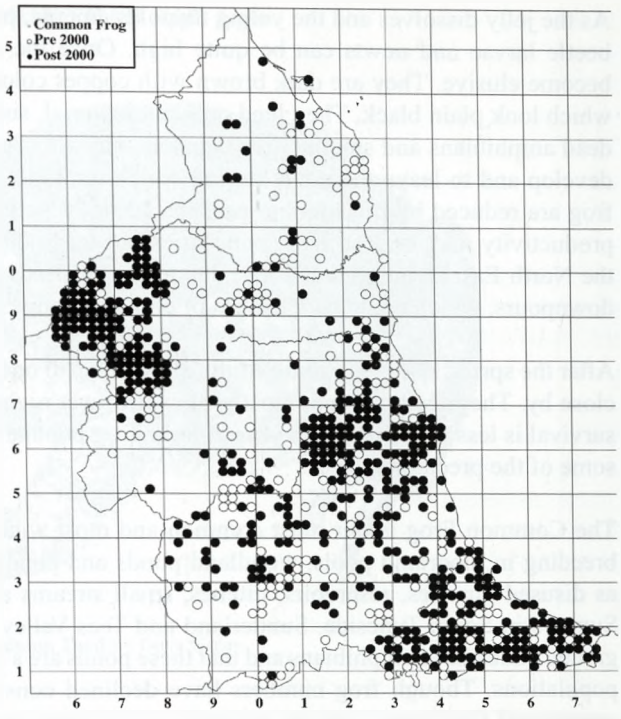


Common Frog by Dave Green

The most familiar of our amphibians, the Common Frog grows up to 65 mm long, the females being very slightly larger than the males. The colours are variable shades of brown and green above, with paler grey, white or lemon underneath. Frogs with yellow or red-brown above and lemon below are more likely to be females. No particular colour distribution patterns have been identified in the North East region. The back, head and legs have darker bars and spots, which help to camouflage the animal from its many predators. The skin is smooth, in contrast to the rough and warty skin of the Common Toad *Bufo bufo* (Arnold, 1978).

The hind legs are much larger than the front legs, and very muscular, enabling frogs to jump to escape predators and to swim strongly in the water. Common Toads have smaller hind legs than frogs, rarely jump, and swim less strongly. In the mating season male frogs develop "mating pads" on the "thumbs" of their front legs to assist in gripping the female frogs (Beebee and Griffiths, 2000).

Frogs are the earliest of our amphibians to breed, the whole population at each site spawning in one go, in contrast to newts, which spread the breeding season over several months. Early spawning may be linked to the tendency for frogs to spawn in ponds that are likely to dry out in the summer, making an early start a wise option. The timing of frog spawning has been getting earlier in recent years, due to climate change. Spawning usually follows the first two or three days when the night-time temperature is three or four degrees above freezing. This has been the second week in February in several recent years. In the North Pennines the date of spawning is later than in any other part of the British Isles, including the north of Scotland (Savage, 1961).



Some males will have hibernated under water in the breeding pond, others on land in crevices, rabbit holes etc. Females rarely hibernate under-water and usually arrive at the pond later than the males, in response to the chorus of croaking made by the males. They are often carrying a male in the mating position before they reach the water. The spawning animals tend to bunch together in one pond, even where there are several apparently suitable ponds close together. Each clump of spawn has one mother, and most of the eggs will be fertilised by the mating male, but at least some of the eggs may be fertilised by nearby males. Like most of our amphibians and reptiles, the males are sexually mature a year earlier than the females. Often the same pond is chosen each year. Typical spawning numbers in our region are 10 to 20 females and a larger number of males, which would be a "low" population by the Natural England Site of Special Scientific Interest (SSSI) criteria for amphibians. Fifty to 500 spawn clumps/females is a "Good" population. The largest of our spawning populations have about 500 females, which is the "Exceptional" rating in the SSSI criteria (Nature Conservancy Council, 1998). Most of the exceptional sites in our region occur in quarry ponds and disused mining reservoirs on the edges of moorland. There are few accurate counts for our large frog populations, though this would be an interesting area of research for someone.

Predation by carnivorous mammals and large birds can be quite high during the spawning period. Adult frogs, gathered together for spawning, are a good source of food for predators at the end of the winter, when finding food can be difficult. Many frogs are in poor condition after spawning and die shortly afterwards. The high mortality of both adults and tadpoles gives frogs an important place in the pond food chain.

The frogspawn is usually deposited in one place in the pond, each female's contribution merging together into a large clump. A sunny spot in water 10 to 20 cm deep, so that the spawn sits on the bottom, is usually chosen. The eggs are laid with the "jelly" part highly condensed. It expands rapidly by absorbing water, to produce the familiar frogspawn. The transparent jelly protects the dark-coloured egg and embryo from predators and also provides insulation and a greenhouse warming effect. The spawn is several degrees warmer than the surrounding water, and both frogs and newts can be found sheltering underneath it on frosty nights. Frogs often spawn in sites which seem, to us, to be totally unsuitable and certain to dry out too quickly. This is the frog breeding strategy as such sites will probably fail, but if they succeed then they will be highly productive because the tadpoles will have few aquatic competitors and predators.

As the jelly dissolves and the young tadpoles emerge, predation by fish, dragonfly larvae, water beetle larvae and newts can be quite high. Once the tadpoles are mobile, they disperse and become elusive. They are dark brown with copper coloured spots, in contrast to toad tadpoles, which look plain black. They feed on plant material, such as algae, and small invertebrates, but dead amphibians and smaller, live tadpoles may also be eaten. Tadpoles take 10 to 15 weeks to develop and to leave the pond, during which time the 1,000-2,000 tadpoles from each mother frog are reduced by predators to perhaps 10 or 20 survivors. In dry summers, all of the year's productivity may be lost if the pond dries out too soon. This has been a regular occurrence in the North East since around 2000, due to long periods of dry weather followed by occasional downpours, which could be a feature of climate change.

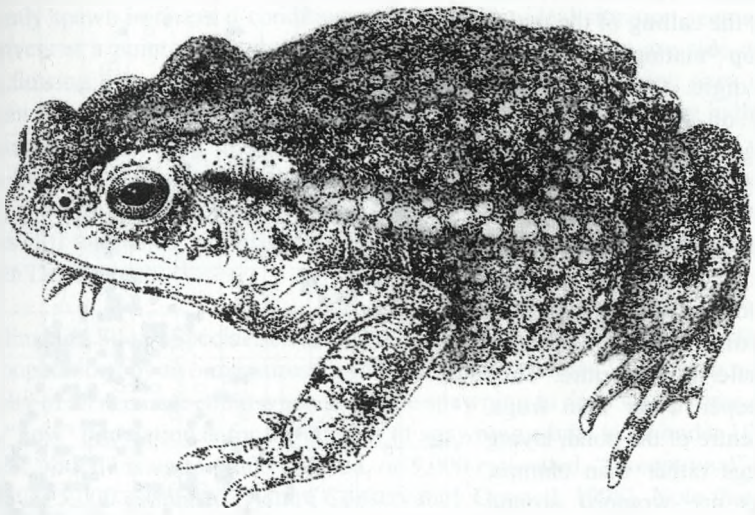
After the spring spawning some adults disperse up to one km from the pond, while others remain close by. They feed on land, mostly on warm, wet nights. They have many predators, so adult survival is less than 50% each year. A large frog population can be an important food source for some of the predator species.

The Common Frog is our most common and most widespread amphibian. They can be found breeding in moorland pools, woodland ponds and ponds in lowland agricultural areas, as well as disused quarries, reservoirs, ditches, small streams and garden ponds even in urban areas. Surveys in South Tyneside, Sunderland and Tees Valley have shown that a high proportion of garden ponds have amphibians and that these ponds are a significant part of the overall amphibian populations. Though frog numbers have declined considerably in the last century they have maintained their range and are probably still present in every kilometre square in the region, except for the Farne and Coquet Islands. The blank areas of the distribution map are unsurveyed areas, not areas where frogs are absent (Durkin, 2010A).

Frogs form the basic amphibian community. Often only frogs are present, and where any of the newt species are present, there are almost always frogs as well. Frogs are often the first colonists of new ponds, followed by toads if the pond is large enough, and then the newts. Frog tadpoles are often hatching just as newts return to ponds for breeding, and the tadpoles provide an easy source of food for newts, particularly while they are clumped together and not yet free swimming.

John Durkin

COMMON TOAD B*ufo bufo*

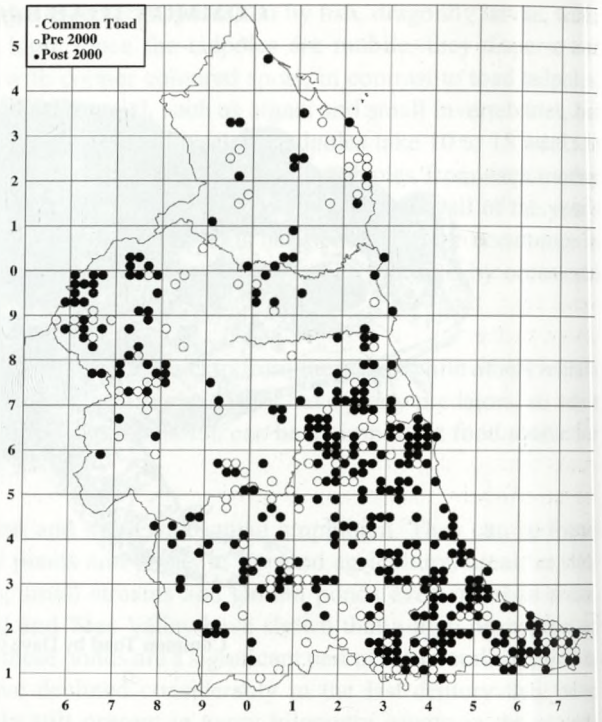


Common Toad by Dave Green

Adult Common Toads are brown, grey or olive above, often plainly coloured but sometimes with dark markings. The hind legs are not so large and powerful as the Common Frog *Rana temporaria*. Adult toads are variable in size, with females being larger, sometimes much larger, than males, 85 mm in length compared with 55 mm. They are not usually very variable in colour. In some populations young toads can be quite distinctive in colour, even though the adults have normal colouration. Brick-red is quite common in north Northumberland and in the Chester-le-Street/Washington areas. Blue-green adults are very occasionally seen, and have been photographed at Hetton Bogs and at Horden. Very pale or quite dark toadlets also occur, either as individuals or as the majority colour.

The "warty" skin is a distinctive feature. It contains glands which release a toxic and distasteful fluid if the toad is bitten by a predator. Pores can also release the toxin on to the skin if the toad is attacked without the skin being broken. Despite this, some foxes, badgers and hedgehogs learn to split the toad open, skinning it and eating the innards without being affected by the skin.

The Common Toad is much more terrestrial than the Common Frog, usually visiting ponds only for the few days of the intensive mass spawning. This preference probably accounts for the brief spawning period. The rest of the year is spent on land, up to two km from the breeding pond, often in fairly dry habitats. Studies in Holland and Germany have shown that the migration towards the breeding ponds starts in the autumn, until it is interrupted by cold weather. The animals then hibernate in crevices or small mammal burrows and resume their journey in the spring. It is not known if this happens in northeast England. Spring migrations of toads can be very visible, with single-minded animals travelling *en masse* by straight-line routes, sometimes with high casualties where they cross roads.



Toads spawn in the spring, several weeks after frogs, and are often quite noticeable because of their numbers and the calling of the males. Males develop "mating pads" on the inner three digits ("middle finger" to "thumb") of their front legs in the breeding season (Beebee and Griffiths, 2000). The males mature a year earlier than females, so they outnumber the females at the spawning pond, producing intense competition for mates. This can result in large balls of struggling males with a single female at the centre. They spawn in deeper water than frogs, often in the centre of the pond, laying strings of eggs rather than clumps. These strings are wrapped around water plants and like frogspawn they have transparent jelly that expands on contact with the water. The dark-coloured eggs are in two rows along the string, averaging from 1,200 to 1,500 per female (Beebee and Griffiths, 2000).

The tadpoles are almost jet black and often congregate together in large shoals, moving around the pond through the shallows keeping to where the water is warmed by the sun. They can group together because they already have toxins in their skin and are safe (or at least, the second one is safe!) from being bitten or swallowed whole by birds or fish. They can still be killed by some species of aquatic invertebrates, such as dragonfly and beetle larvae, which have piercing mouth parts and are able to suck out the tadpole's flesh through a hole in the skin. The tadpoles feed on algae and small invertebrates but also on frogs and toads that have died in the pond after spawning. In 2009, at Quarryhouse Moor ponds in Northumberland, a late frost killed several hundred adult toads and subsequently most of the tadpoles fed in large clusters around each of the decaying bodies of the adults.

The metamorphosed tadpoles emerge from the pond *en masse* and seek out sheltered niches with cover and a supply of invertebrate food. At this stage, mortality, which has been low in the pond, becomes much higher. Once a young toad has become established in a suitable terrestrial niche, they can remain quite faithful to that location for many years.

Toads are widespread in the region and only absent from the heather moors, the Northumberland islands and from some of the urban areas. Apart from these areas, gaps in the distribution map are very likely to be unrecorded areas, rather than areas where toads are absent (Durkin, 2010A).

Toad tadpoles are distasteful to most fish and waterfowl, so toads are able to breed successfully in the larger ponds, lakes and reservoirs, unlike frogs. Small ponds and shallow ponds, including

most garden ponds, are rarely used for spawning by toads and as a result they are rarely caught out by ponds drying out in summer.

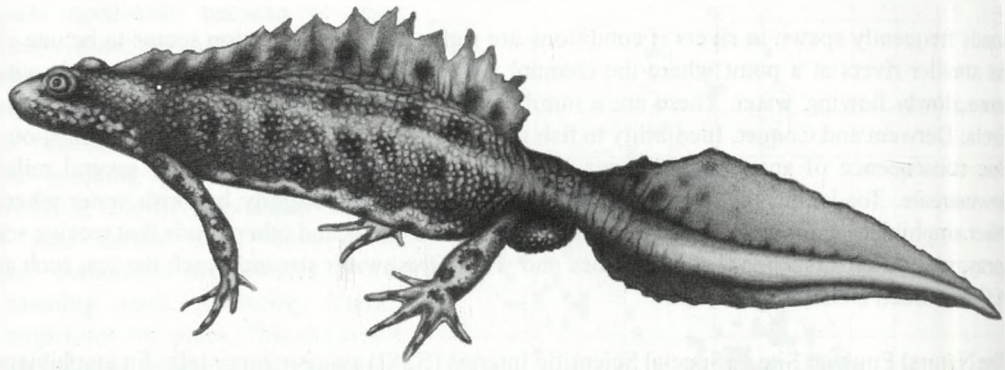
Toads frequently spawn in rivers if conditions are right. The ideal situation seems to be one of the smaller rivers at a point where the channel is "braided" and there are side channels with more slowly flowing water. There are a number of regular toad spawning sites in the Rivers Greta, Derwent and Coquet. Inedibility to fish is probably a significant feature in this behaviour. One consequence of spawning in rivers is that the tadpoles are dispersed for several miles downstream. Toads and their tadpoles are also able to tolerate slightly brackish water where other amphibians cannot. They can be found in sand dune pools and other ponds that receive sea spray, such as cliff top ponds, salt marshes and where freshwater streams reach the sea, such as at Castle Eden Dene mouth.

The Natural England Site of Special Scientific Interest (SSSI) assessment criteria for amphibians ranks toads populations by two measures, "estimated" and "counted" spawning adults, because of the difficulty of an accurate count when toads are spawning in deep water some distance from the shore. A "Low" population is for the number of spawning adults to be under 100 counted, or 500 estimated. "Good" is up to 1,000 counted, or 5,000 estimated. "Exceptional" is over 1,000 counted, or over 5,000 estimated (Nature Conservancy Council, 1998). Note that these figures are about 10 times the numbers for Common Frogs, as toads tend to be more concentrated in a smaller number of breeding sites than frogs. In our region there are a number of "exceptional" sites, including Quarryhouse Moor, Seaton Dunes, Newton Pool, Pockerley Farm Pond, Whitburn Observatory Pond, Caistron and Rothley Lake. Some reservoirs, such as Fontburn, Scaling Dam and Tunstall, may also have over 1,000, but there are no proper counts yet.

Toads can be the only amphibian species in some of their habitats, such as slightly saline ponds, large water bodies with predatory fish populations and in rivers. Where they do share the habitat with other amphibians it is usually in larger ponds without fish, where all five of our amphibian species may be present.

John Durkin

GREAT CRESTED NEWT *Triturus cristatus*



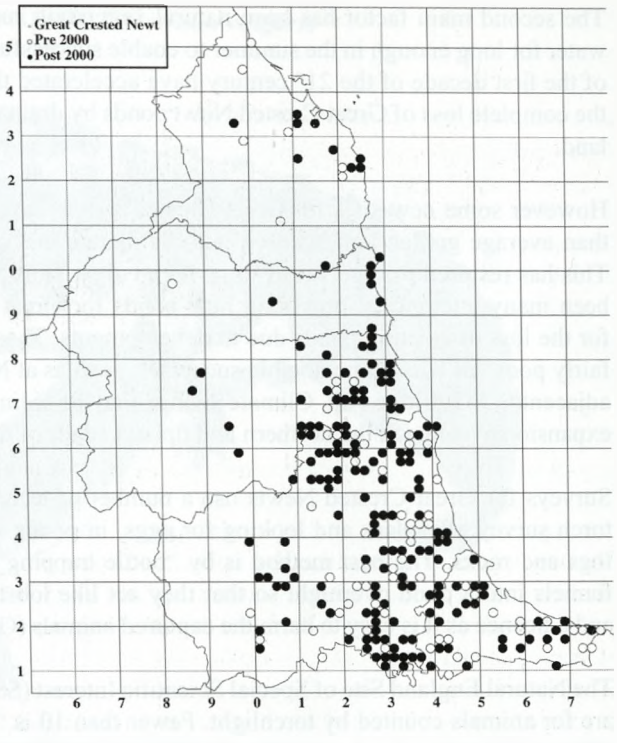
Great Crested Newt by Terry Coult

The largest of the three native newt species, often up to 12 cm and occasionally up to 17 cm long. Females are larger than males. Newts of 17 cm have been recorded at Hett in County Durham and at the former Choppington clay pits in Northumberland. In keeping with its alternative name of Warty Newt, the skin has a warty texture, distasteful to predators. The upper surface is black or very dark brown with darker spots while the newts are in the water, blacker and unspotted in terrestrial animals. The underside is usually "number plate yellow" with dark spots, sometimes merging into stripes or blotches. These are very variable between individuals and so photographs can be used to distinguish animals for "mark and recapture" population studies. Rarely, in the North East, the background colour can be a creamy yellow, lemon, orange or orange-red. There are usually many fine white spots along the flanks of mature animals.

In the aquatic phase males have a jagged crest along the body with a distinct notch before the less jagged tail crest begins. The tail crest is usually symmetrical above and below the tail. There is a pale central tail stripe that may have silvery and/or blue tones. Aquatic phase females lack the dorsal crest, tail crests and the pale central tail stripe but have a distinct yellow stripe along the lower edge of the tail (Jehle, 2011). Variations are rarely found in the region but include neotony, red underside, milk-chocolate brown dorsal side, exaggerated crests starting at the tip of the nose, and dwarf mature animals.

The British newt species breed continuously through the spring and summer, so that while there is a peak period in April and May, there are usually always some breeding adults present from March to September. This contrasts with the one-off, intensive spawning of frogs and toads. Great Crested Newt eggs are laid singly in a folded leaf and are about four to five mm across, compared with Smooth Newt *Lissotriton vulgaris* and Palmate Newt *Lissotriton helveticus* eggs, which are about three mm. The size and stiffness of leaf used is related to how readily the female newt can fold the leaf between her back legs, so larger, stiffer leaves with eggs enfolded are more likely to be from Great Crested Newts. The aquatic efts, or larvae, have a striped tail and have a tail filament like an adult male Palmate Newt: this is absent in Smooth and Palmate larvae (Green, 2001). Efts hatching late in the year have over-wintered in the aquatic phase in recent mild winters, apparently more often than is the case with the smaller species.

Terrestrial efts are similar to terrestrial adults but smaller and with fewer black spots on the underside. The word "eft" is related to the old word for newt, with the "n" of "an eft" moving to the second word, "a neft" and later "a newt". Curiously, this has happened the other way round with "an adder", originally "a nadder". The word "nadder" is related to the scientific name of the Grass Snake, "Natrix".



Great Crested Newts have a lowland distribution in all of the counties of northeast England, corresponding roughly to the cereal farming zone, with the main populations between the A1 and the coast. Numbers and densities decline northwards. Local distribution is quite patchy, with several strong concentrations associated with areas of high density and high quality of ponds. Less attractive ponds that would not be occupied if they were isolated may be occupied if there are good ponds nearby and/or the ponds form a cluster with linking terrestrial habitats between them. Lowest population densities are in urban areas, upland areas and areas of low pond density. The first major study of Great Crested Newt sites in our region was carried out by Dave Green in 1984 but since then Great Crested Newts have often been surveyed for as part of planning applications or for nature conservation. Probably more than 75% of Great Crested Newt sites in the region are now on record because of this.

West of the A1 their range is very patchy. They are generally absent from moorland and upland areas but there are two interesting exceptions to this. In north Northumberland there is an important population at Quarryhouse Moor, where an isolated population is found in a cluster of ponds in a disused limestone quarry at an altitude of 210 metres. In County Durham there is an upland population in long disused stone quarries on Knitsley Fell, at around 310 metres. This population seems to be spreading into a number of small ponds in Hamsterley Forest (Durkin, 2010A).

Trends over the last 20 years have been for a reduction in the number of ponds occupied by Great Crested Newts, with losses in our region of the order of 1% per year (calculated from the baseline of Dave Green's 1984 surveys). The main adverse factor has been the stocking of ponds with fish for angling. This has particularly affected the larger ponds. Fish have also been introduced to Great Crested Newt ponds casually or accidently, particularly after nearby ponds have been stocked deliberately. Much less frequently fish may arrive naturally, for example during flooding.

The second main factor has been natural vegetation succession, where a pond ceases to carry water for long enough in the summer to enable successful breeding to take place. The dry springs of the first decade of the 21st century have accelerated this loss. The third main factor has been the complete loss of Great Crested Newt ponds by drainage and/or infilling, often on agricultural land.

However some new sites for Great Crested Newts have also arisen with the creation of larger than average garden ponds, often with deliberate introduction of newts and exclusion of fish. This has restored the species to some urban areas from which it had been lost. There have also been many attempts at providing new ponds for Great Crested Newt, some as compensation for the loss of existing ponds due to developments. These have had very mixed results, usually fairly poor but with some notable successes, such as at New Hartley near Blyth and Daisy Hill, adjacent to Waldridge Fell. Climate change may be aiding Great Crested Newts, with a possible expansion of range at the northern and upland edges of their distribution.

Surveys for Great Crested Newts use a number of techniques; in ponds these include netting, torch survey after dark and looking for eggs, in ponds and for terrestrial newts looking under logs and rocks. The best method is by "bottle trapping": placing plastic bottles with inverted funnels into a pond overnight so that they act like lobster pots. This technique needs training and a licence as it is easy to harm the captured animals (Gent and Gibson, 1998; Langton, 2001).

The Natural England Site of Special Scientific Interest (SSSI) assessment criteria for this species are for animals counted by torchlight. Fewer than 10 is "Low", 10 to 100 is "Good", and over 100 is "Exceptional". For counts in daylight, or netting, these numbers are halved (Nature Conservancy Council, 1998). Daylight counts are rarely used as pond conditions can make these unreliable. The criteria have been in operation since the 1980s and so do not take account of the more modern technique of bottle trapping, which is now usually accepted as the most reliable method of population assessment. There are particularly large Great Crested Newt populations at New Hartley, Coxhoe Ponds, Pity Me Carr, Ramside Golf Course, Cowpen Bewley, Elementis (Stockton) and Carlin Howe.

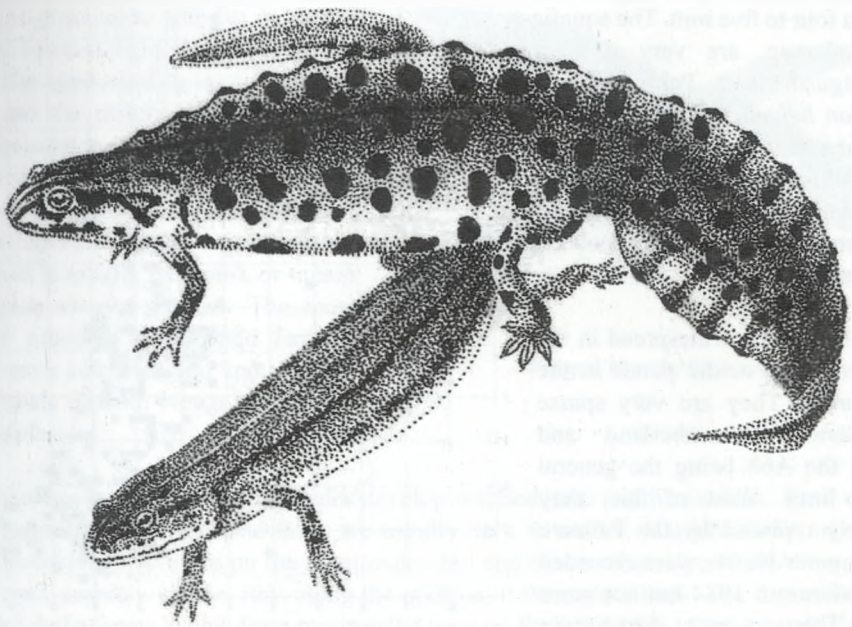
In 80% of ponds where Great Crested Newts are present Common Frogs *Rana temporaria* and Smooth Newts are also present. Smooth and Palmate Newts are present in most of the other 20% of Great Crested Newt ponds. Common Toads *Bufo bufo* may also be present in the larger ponds.

Very few ponds have Great Crested Newt as the only newt species, or have Great Crested Newts with Palmate Newts but not Smooth Newts.

In ponds with a mixture of newt species the proportions vary quite considerably. Great Crested Newt are only rarely the most common species, and often the least common, but they can occasionally account for 80% of all newts present.

John Durkin

SMOOTH NEWT *Lissotriton vulgaris*



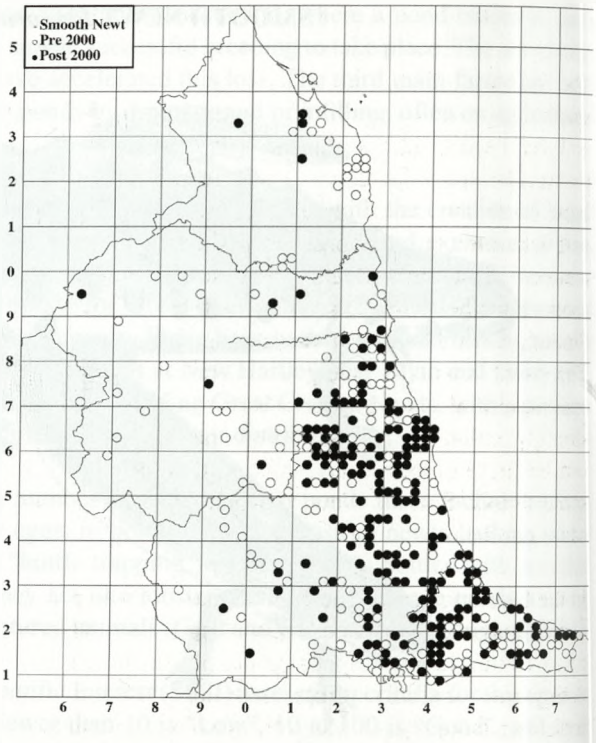
Smooth Newt by Dave Green

Males and females are a similar size, up to 10 cm in length. The dorsal surface is an olive brown or greenish brown, with pale lower flanks and belly. An orange stripe along the belly is usually wider and more colourful in the males but varies with the physical condition of the animal. Both the dorsal surface and the belly have black spots, more numerous and larger in the male, but varying considerably between individuals and populations.

In the breeding season the aquatic males have a crest, less jagged than a Great Crested Newt's *Triturus cristatus* and without a gap between the back and the tail. The lower edge of the tail develops orange and blue stripes, which vary in intensity. The hind feet are flanged, like a Coot's *Fulica atra*. Aquatic females are plainer, lack the crest, and have an orange lower edge to the tail, where Great Crested Newt females have a yellow stripe. Both sexes have a pale throat which is usually, but not always, strongly spotted. On land both sexes have a velvety skin and the males lose their crests. Breeding colours are also lost but the spots remain visible (Beebee and Griffiths, 2000).

Variations found in our region are mainly in the amount of spotting. Occasional individuals or populations have a sandy yellow-brown dorsal surface instead of the usual brown, or can be completely "blond" above and below. Other individuals or populations can be quite dark in colour. These variations have been noted more often in the North East than most books would suggest.

Eggs are laid singly in a folded leaf and are about three mm across, compared with Great Crested Newt eggs which are about four to five mm. The aquatic efts, or larvae, are very difficult to distinguish from Palmate Newt *Lissotriton helveticus* efts. Efts have over-wintered in the aquatic phase in recent mild winters. Terrestrial efts are similar to terrestrial adults but smaller and with fewer black spots on the underside.



Smooth Newts are widespread in the region except in acidic ponds in the upland areas. They are very sparse in western Northumberland and Durham, the A68 being the general westerly limit. West of this, they are largely replaced by the Palmate Newt. Smooth Newts were recorded on Lindisfarne in 1984 but not more recently. They are quite frequent in the Tees Valley area, including Redcar and Cleveland, up to the edges of the North York Moors. They are the most frequent newt found in garden ponds and in agricultural areas (Durkin, 2010A).

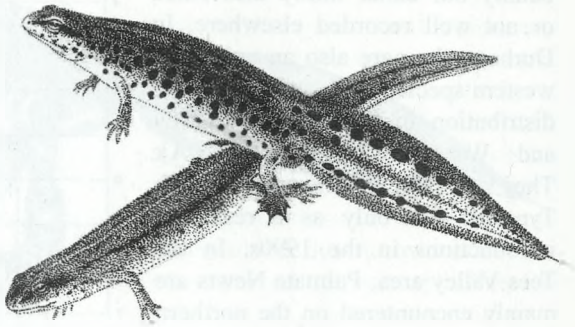
The Natural England Site of Special Scientific Interest (SSSI) criteria assessment is that less than 10 Smooth Newts netted or counted by torchlight is a "Low" population, 10 to 100 is a "Good" population, and more than 100 is an "Exceptional" population (Nature Conservancy Council, 1998). A great number of our populations would be "Good" on this basis, which could mean that this criterion is slightly too generous.

Smooth Newts have the least distinctive communities of the three newt species. Palmate Newts share about 40% of the ponds where Smooth Newts occur and Great Crested Newts share about 20%. All three species occur in about 10% of the Smooth Newt ponds. Smooth Newts occur as the only newt species in about 30% of their ponds. They are the only newt present in the majority of garden ponds and seem to have a stronger ability to colonise new garden, urban and lowland ponds than our other newt species. Common Frogs *Rana temporaria* are usually also present in Smooth Newt ponds. Common Toads *Bufo bufo* are usually present in the larger ponds used by Smooth Newts and less often in the smaller ponds.

John Durkin

PALMATE NEWT *Lissotriton helveticus*

The smallest of the three native newt species, it grows up to nine cm in length with the females slightly larger than the males. The upper surface is olive green-brown and the underside is lemon, or pale lemon-cream, or sometimes a pale orange. Most individuals have some spots on the belly which are smaller than Smooth Newt *Lissotriton vulgaris* spots. The throat is usually pale pink or cream and almost always spotless. The most strongly coloured and spotted females can be more colourful and spotted than some female Smooth Newts, which can cause confusion.



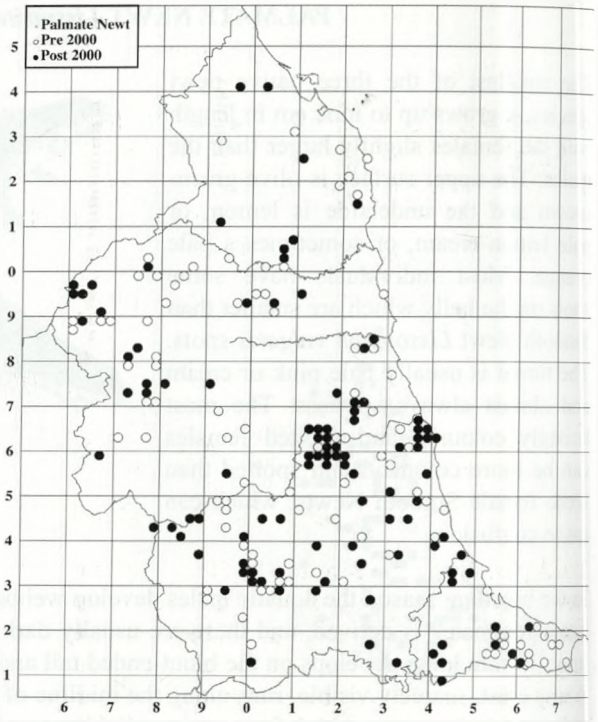
Palmate Newt by Dave Green

In the breeding season the aquatic males develop webbed hind feet like a duck, from which the name "palmate" is derived, and these are usually dark in colour. A tail filament, occasionally up to 10 mm long, develops on the blunt-ended tail and this is often nipped short by predators. A tiny crest, scarcely visible, runs along the midline of the male's back. The dorsal surface has indistinct darker spots, which form two parallel lines on the tail. Males in good condition have an orange flash between the rows of spots on the tail, underlined by a narrow white stripe. Aquatic females lack the tiny crest, tail filament and the dark, webbed hind feet. They have fewer and less distinct spots (Beebee and Griffiths, 2000).

Variations found in our region are mainly in size. Some populations of Palmate Newts have quite small animals, mainly five to seven cm long, and generally darker than usual. Occasional individuals or populations have a sandy yellow-brown dorsal surface instead of the usual brown. Neotonous males have been recorded from Hamsterley Forest. Aquatic males with one webbed hind foot and the other not webbed, or one dark foot and one light foot, are regularly found.

Eggs are laid singly in a folded leaf and are about 3 mm across. These are indistinguishable from Smooth Newt eggs and smaller than Great Crested Newt *Triturus cristatus* eggs which are about four to five mm across. The aquatic efts, or larvae, are very difficult to distinguish from Smooth Newt efts. Efts have over-wintered in the aquatic phase in recent mild winters. Terrestrial efts are similar to terrestrial adults but smaller and without, or with fewer, smaller dark spots on the underside.

Palmate newts are the most widespread of the newt species in our region, with a predominantly upland bias. They are able to breed in ponds that are slightly more acidic than Smooth Newts can tolerate, though not in the very acidic sphagnum pools. They survive well in woodland ponds, including ponds and ditches in conifer woods. Eastern coastal areas generally lack Palmate Newts, but not always. Their distribution has been expanded by introductions, particularly to garden ponds in the lowland areas, which is blurring their original range.



In Northumberland, Palmate Newts are well distributed in the west of the county but either thinly distributed or not well recorded elsewhere. In Durham, they are also an upland or western species, with strong areas of distribution in the Derwent Valley and Weardale (Durkin, 2010A). They are well distributed in South Tyneside but only as a result of introductions in the 1990s. In the Tees Valley area, Palmate Newts are mainly encountered on the northern fringes of the North York Moors, which probably represents their natural distribution (Rob Scaife, pers. comm., 2010). They are rarely encountered in the Tees Lowlands and their disjunctive distribution there probably indicates that those that are present are the result of introductions. For example Palmate Newts were entirely unrecorded in the borough of Darlington until 2011. Once introduced into garden ponds they seem to be able to establish themselves quite readily.

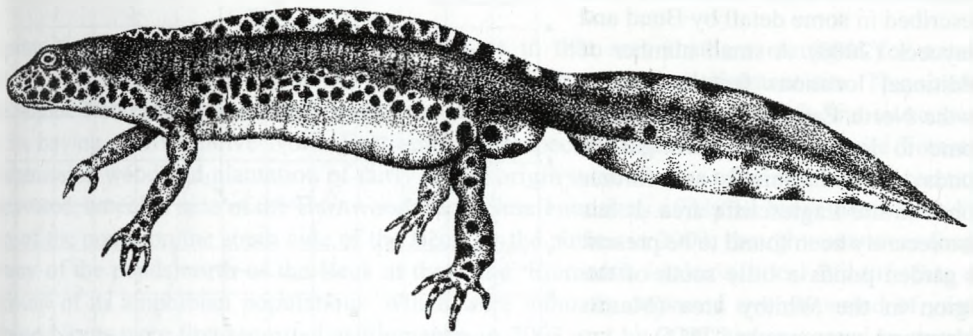
Upland areas are rarely surveyed for amphibians, so our maps show only a small proportion of the likely number of dots in the western and upland areas.

The Natural England Site of Special Scientific Interest (SSSI) criteria assessment is the same as for Smooth Newts: less than 10 Palmate Newts netted or counted by torchlight is a "Low" population, 10 to 100 is a "Good" population and more than 100 is an "Exceptional" population (Nature Conservancy Council, 1998). A great number of our populations would be "Good" on this basis which perhaps means that this criterion is slightly too generous. In the upland quarry ponds favoured by Palmate Newts they are readily seen by torchlight and counts of over 100 are easily achieved.

Palmate Newts have the most distinctive communities of the three native newt species. Most of the ponds that support Palmate Newts also have Common Frogs *Rana temporaria* but have neither of the other two newt species (60%). These are the large numbers of fairly acidic moorland and disused quarry ponds in the western, upland areas. Common Toads *Bufo bufo* are also usually present in the quarry ponds but only rarely in the moorland pools. The second most frequent Palmate community is at lower altitudes, where ponds generally have a more neutral pH, and both Smooth and Palmate Newts are present (30%). The proportions of the two species can vary considerably. Less than 10% of Palmate Newt ponds have all three newt species. Ponds supporting Palmate and Great Crested Newt but not Smooth Newt are very rare.

John Durkin

ALPINE NEWT *Ichthyosaura alpestris*



Alpine Newt by Terry Coult

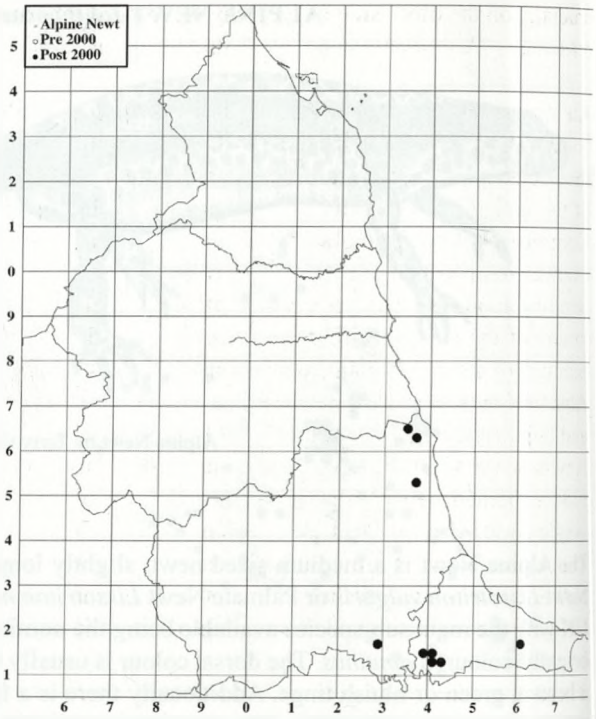
The Alpine Newt is a medium sized newt, slightly longer and noticeably bulkier than Smooth Newt *Lissotriton vulgaris* or Palmate Newt *Lissotriton helveticus*. It occurs in the pet trade in the UK with the main sub-species available being the nominate form *alpestris* and the slightly more brightly-coloured *apuanus*. The dorsal colour is usually dark, almost black, though this can have a brown, green or bluish tinge. Additionally there is a faint mottling on the back though this is not always readily noticeable. The dorsal side is slightly rough and the overall impression from above is of a small Great Crested Newt *Triturus cristatus*. Its ventral side is clearly delineated and a distinct, dense orange colour rather than the suffused orange appearance of the bellies of Smooth Newt or Palmate Newt. In the *alpestris* subspecies, there are no spots ventrally though *apuanus* may have spots on its ventral side (Steward, 1969).

While Alpine Newts are normally very dark dorsally, the Alpine Newts in the Eaglescliffe area are unusual in that the dorsal colour is usually brown, similar to that of typical Smooth/Palmate Newts though still with mottling present. A very small male found in a pond in Eaglescliffe by the author was initially of normal colouration but then changed to this light-brown colour within a few weeks.

The Alpine Newt is native to much of central, continental Europe and occurs up the coasts of northeast France through to Holland but it does not appear to have been native to the British Isles. As its name suggests it can be found in montane habitats up to 2,500 metres in altitude but it can also be abundant in lowlands, and it will use a variety of waterbodies including both shallow and deep ponds and slow flowing streams (Griffiths, 1995). Steward (1969) considers that it appears to be more adaptable than other newt species, wandering more widely from breeding habitats, being more inclined to enter water outside of the breeding season and being hardier than either Great Crested or Smooth Newts.

It is believed to have been introduced to Great Britain in the 20th century at an aquatic nursery in Newdigate in Surrey. Up until the 1970s this was regarded as the only colony in the UK (Lever, 1977). It has subsequently turned up in an increasing number of locations across England and has also been recorded in Scotland. The Non-Native Species Secretariat website described it as being established at 40 sites in Great Britain, as of March 2011 (www.defra.gov.uk). The known

distribution of the species in northern England, including Yorkshire, was described in some detail by Bond and Haycock (2008). A small number of additional locations for the species in the North East have subsequently come to light, notably two garden ponds in South Shields and further ponds in the Eaglescliffe area. It has also recently been found to be present in garden ponds a little south of the region in the Whitby area (Martin Hammond, pers. comm., 2011)



Historically its best known site in the North East has been Doxford Park in Sunderland (Banks, 1989). The author carried out a torch survey of part of the lake in Doxford Park in June 2007 and found the species still present. Five individuals were seen though it was impossible to get an estimate of the size of the population due to problems with access and visibility. Local children have reported catching "blue" newts from this pond (John Durkin, pers. comm., 2008) so it may be that the species is now more widely dispersed in the Sunderland area.

A garden pond in South Shields is known to have had Alpine Newts, along with the three native British newt species, for several years. These do not appear to have spread widely as a public survey of garden ponds by South Tyneside Council's Countryside Service in 2007 found no evidence of them in spite of having had a good response from across the borough, including from garden ponds on the same estate as the known site. However in 2011 Alpine Newts turned up in a garden pond some 2.5 km away in another part of South Shields. This came to light when the house owner was surprised to find them in the pond in his garden and, on making enquiries, found that they had originated from the pond next door where his neighbour had some that he had been given (Gary Scott, pers. comm., 2011).

A single Alpine Newt was recovered from a wheel-wash facility at a landfill site at Carlin Howe near Guisborough in 2004 and brought to the author to confirm its identity. The complex of ponds at Carlin Howe had been the subject of several amphibian surveys over several years prior to 2004 due to the need to fill in and provide replacement ponds as part of the landfill operations. None of the surveys prior to 2004 found any definite records of Alpine Newts and it remains to be seen whether this newt was an isolated individual or part of a population.

The main area for Alpine Newts in the North East, if not the UK, is around Eaglescliffe, a large suburb in the borough of Stockton-on-Tees. The species is known to have been present on one estate, east of the A135, since the 1990s and has been found in ponds in several gardens on that estate. More recently it has been found in two suburban ponds about 500 metres further west and

crucially on the other side of the busy A135 road that runs from Stockton to Yarm. It is therefore reasonably likely that the species will be present in other garden ponds throughout Eaglescliffe.

Alpine Newts are also established in three sites in that area that are managed for nature conservation. Eiliff's Mill is a small complex of ponds next to an allotment site. The size of the Alpine Newt population there is not known, but the site is a Local Wildlife Site on account of its having all five native North East amphibian species. Coatham Stob is a large Forestry Commission woodland plantation of fairly recent origin with a series of ponds, mainly recently excavated, on either side of the Burnwood Beck. Small numbers of Alpine Newts were found in two of the ponds on the south side of the Beck by the author in 2009, though none were found in any of the ponds north of the Beck at that time. Elementis is also a Local Wildlife Site on account of its amphibian populations, which were annually censused over a period of years. Alpine Newts were first recorded at Elementis in 2003 and by 2007 had increased in number and colonised all of the ponds. This led to concerns that the decline in the numbers of Palmate Newts on the site may have been related to the increase in Alpine Newts. A decision was taken to reduce the numbers of Alpine Newts and in October 2009 400 adult newts were removed from a single pond (Maxine Reid, pers. comm., 2009). This may have done little to diminish its numbers in that area as in 2011 an ecological survey of a site at Urlay Nook less than one km away from both Elementis and Coatham Stob found large numbers of Alpine Newts, estimated to be well in to four figures (Graeme Skinner, pers. com., 2012).

There are other examples of Alpine Newts achieving good numbers in ponds and Beebee (2007) expressed surprise that they have not spread widely in Britain already. In the North East, populations still appear to be very localised and there is no evidence that they are spreading far by themselves. Even in the Eaglescliffe area it is thought that much of the species distribution could be due to movement of pond plants as that is known to have occurred between various of the sites.

An extreme example of the Alpine Newt's ability to colonise was demonstrated in the author's own garden pond. In 2005 the author bred Alpine Newts in captivity, rearing 12 to the eft stage. The first two of the larvae to turn into terrestrial efts climbed through the mesh on the lid of their tank and escaped into the garden. In order to avoid a repeat of this the remainder of the larvae were then brought indoors. In 2010 whilst sweep netting the pond to count the Smooth Newts the author caught a single male Alpine Newt. Repeated searches found a total of a further five Alpine Newts in 2011 and two in 2012. This meant that the two efts had been a male and a female, both had survived to maturity and managed to breed. While the Alpine Newts caught so far have been removed to captivity it will be necessary to continue sweeping the pond for several years to remove any further cohorts that might occur due to any second generation breeding. As noted above, the species sometimes features in the herpetological trade and an advert in a North East newspaper in 2011 offered "For sale, captive bred adult alpine newts ... Will breed in aquarium or pond, South Shields". It is likely then that new populations will continue to become established across the North East.

Ian Bond

REPTILES

There are four native reptile species in the region: two snakes, Adder *Vipera berus* and Grass Snake *Natrix natrix*, and two lizards, Slow Worm *Anguis fragilis* and Common Lizard *Zootoca vivipara*. None are widespread and all are restricted to particular habitats, predominantly upland. Adders, Slow Worms and Common Lizards are often found in the same locations. The Common Lizard is the most frequent and well distributed; the Grass Snake, which is at its northern limit here, is much the rarest and the most local. All four species are declining in the region. Preferred habitats and regional distributions for Common Lizard, Adder and Slow Worm have many similarities and these are described in the Common Lizard account, whilst the differences are discussed in the Adder and Slow Worm accounts.

Sea turtles very occasionally occur when unusual sea conditions bring them from the Atlantic into the much less suitable North Sea. Most of the turtles reported along our coasts have been caught in fishing nets or washed up on the beach sick, injured or underweight. A Hawk's Bill Turtle *Eretmochelys imbricate* was caught in fishing nets off the mouth of the Coquet in 1852, exhibited at Berwick-upon-Tweed and later sent to London. A male Leathery Turtle *Dermochelys coriacea* was caught in the nets of the fishing boat *Avail* off Berwickshire, Scotland, in October 1980, and landed at Eyemouth. It was taken by lorry to Oban aquarium and later released (Den Hertog, 1984). Another Leathery Turtle was caught on 30 August 1999 a mile off Roker, Sunderland, but died shortly afterwards (British Marine Life Study Society, 2012). Changes in North Atlantic currents may bring more of these turtles into the North Sea in future.

Like amphibians, the small, fragile bones of reptiles are rarely retained in the fossil record. All four of our native species have probably been present since post-glacial times. Grass Snakes may have had several regional extinctions and re-colonisations as the climate has changed. There is the possibility that the European Pond Terrapin *Emys orbicularis* may once have been present in our region and then become extinct. Its sub-fossil remains from 6,000 years ago have been found in Norfolk (cgoecology.com, 2012).

Sand Lizards *Lacerta agilis* are native to Britain but not to our region. They may have been unofficially released at various points on Northumberland's sand dunes and on both sides of the river at Teesmouth at several times, but appear not to have survived for very long. The North East coast probably has summers that are too short for this species to breed successfully. Inland records of Sand Lizards, of which there are several, are almost certainly mistakes for Common Lizard. Common Lizards photographed by Derek Hornsby at Annstead Dunes in 2007 showed remarkably large, green specimens that could easily be confused with Sand Lizards.

Non-native species of snakes are often reported, sometimes misidentified as Grass Snakes. Corn Snake *Elaphe guttata guttata*, King Snake *Lampropeltis getula* and Garter Snake *Thamnophis spp.* seem to be able to survive in the wild, at least in the warmer months, though they are unlikely to over-winter. A Garter Snake has survived from May to September, at Ryton, but was not seen the following year. None have become established in the region. These escaped pet animals are often much more easily seen and approached than wild native reptiles.

Red-eared Terrapin *Trachemys scripta elegans* is our most frequent alien reptile species. Released as unwanted pets, a total of up to 100 of these North American terrapins have been recorded at a number of easily accessible, urban ponds across the region. They survive well, growing quite large, hibernating successfully and living for many years. A female was found

laying eggs at Shibdon Pond near Blaydon in 1992 (Bowie and Durkin, 1995). They are known to breed successfully at similar latitudes in Denmark and in the Netherlands, but not in Britain. They have declined in popularity as pets and it is now illegal to import this species, though other similar species can still be imported. Fewer are now being released but there are still a small number of long-term survivors in the wild. There may occasionally be other similar terrapin species released as well as Red-eared.

Since 1998 regional maps of the distribution of the records of our reptiles have been periodically published (Durkin, 2010B). All of the native reptiles have legal protection under the Wildlife and Countryside Act, and Sand Lizard and Smooth Snake have fuller protection under the European Species and Habitats Directives (English Nature, 2004).

John Durkin

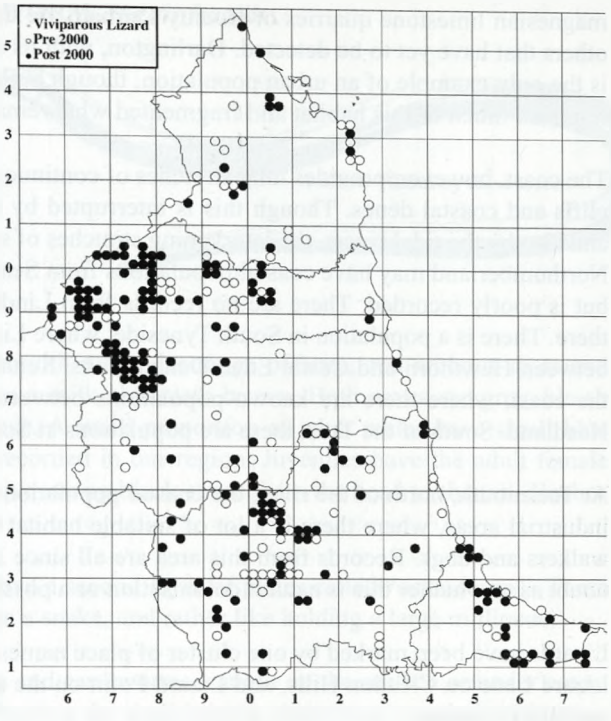
COMMON LIZARD *Zootoca vivipara*

Common Lizard by Dave Green

The Common or Viviparous (live-bearing) Lizard averages 12 cm in length, of which more than half is the tail. Lizards that have shed their tails as a response to predation are quite frequent and the tail may be absent or partially re-grown. It has very variable colours, mainly mid-brown with darker and lighter stripes. There are many colour variations, including strongly striped animals and quite dark-coloured individuals. Some males are yellowish or sufficiently green that they look like Sand Lizards. Young animals are plainer, dark grey or almost black. There are no consistent differences between the sexes on the upper side. The underside of the males is yellow or orange, with dark spots, brighter than the females, which are off-white, lemon or grey underneath with few or no spots (Beebee and Griffiths, 2000). There are echoes here of the sexual differences in the underside of Smooth Newts *Lissotriton vulgaris*. Inexperienced observers occasionally report picking up a lizard or several lizards by hand, but these are almost always just terrestrial newts.

They feed on a broad range of small invertebrates, alternating between basking in a favourite spot and hunting for prey. Log piles, dry stone walls and stone ruins are favourite basking spots. Dark-coloured substrates warm up more quickly in sunlight, so basking lizards are more likely to be seen on dark backgrounds in full sun. Hibernation may take place in the same locations, under log piles, in the footings of dry stone walls or in small mammal burrows.

Common Lizards emerge from hibernation as the weather warms up in April. Males moult after a few days of feeding and develop their brighter breeding colours. Mating takes place in late April/early May, with females often mating with more than one male. Development of the embryos takes about three months, depending upon summer temperatures and the condition of the female. Pregnant females maintain a higher temperature to promote the growth of their young by basking more than other adults. An average of seven or eight young are in each brood. Technically, they are ovo-viviparous, as the young are born in a transparent membrane, from which they break out in a day or so. On emergence, the four cm long young lizards can immediately feed and look after themselves. If they have been born early enough to feed and build up reserves before hibernation, they reach seven or eight cm by the autumn. At the end of their second summer they are 10-11 cm long. Like most of our amphibians and reptiles, the males are sexually mature earlier than the females. Males can breed two years after they have been born, females three (Beebee and Griffiths, 2000).



Common Lizards have many predators, particularly Kestrels *Falco tinnunculus* and Buzzards *Buteo buteo*, Stoats *Mustela erminea*, Weasels *Mustela nivalis* and Hedgehogs *Erinaceus europaeus*. Adders *Vipera berus*, which are often found in the same locations, are also regular predators. The newborn young are particularly vulnerable, and mortality in the first year can be over 90%. After the first year life is safer and Common Lizards live to an average of five or six years.

Common Lizards need insect-rich habitats with open spaces for basking, cover for protection from predators and suitable hibernation sites. Their main habitat in our region is the moorland edge, where there is varied topography including rocky stream banks, disused quarries and dry stone walls. The higher heather moors are also occupied, except for the larger bogs and mires, which lack hibernation sites. A mix of wet and dry moor provides both rich insect prey and hibernation sites. As with the other reptile species, the burning of heather moors for the management of grouse is very detrimental. Some of the fragmented moors on the edges of the main Pennine area that are not managed for grouse are better for reptiles than the main moor.

The moorlands in the area south of the Derwent Reservoir and north of Tunstall Reservoir, bounded by the A68 road, provide one of the best areas of reptile habitat in the region. This area, called the "Heart of Durham" by the Durham Wildlife Trust, has low moorlands, small woodlands, disused quarries, disused railway lines and small stream valleys that seem to provide just the right mix of well-connected reptile habitat. There are similarly suitable, more localised areas at Kielder and Redesdale Forests, Fontburn and at Kyloe Hills in Northumberland and at Scaling Dam and Eston Moor on the edge of the North York Moors National Park (Durkin, 2012B).

At lower altitudes, lizards can be found in areas that provide the same mix of basking, feeding and hibernation features. These can be disused quarries, disused railway lines, stream valleys and open woodland. The main problem for lizards in these mid-county areas is that such habitats are mostly fragmented and isolated, so re-colonisation events are much rarer than local extinctions. There has been a considerable decline in the lowland distribution of Common Lizards in the North East.

The handful of places with remaining populations in these areas are mainly centred on disused railway lines and disused quarries. The Ashington/Linton area of Northumberland and the

magnesian limestone quarries of County Durham are the main examples, though there may be others that have yet to be detected. Darlington, with its strong network of disused railway lines, is the only example of an urban population, though building developments in recent years have removed much of this habitat and fragmented what remains.

The coast, however, provides long stretches of continuous suitable habitat, with sand dunes, sea cliffs and coastal denes. Though this is interrupted by the Tyne, Wear and Tees conurbations, and also by the tidal rivers, the intervening stretches of suitable habitat remain intact and viable. Northumberland may have coastal populations from Seaton Sluice dunes to the Scottish Border, but is poorly recorded. There are no records from Lindisfarne, though there is suitable habitat there. There is a population in South Tyneside, where Lizards Farm still has lizards, and another between Hawthorn and Castle Eden Denemouths. Suitable habitat continues southwards along the coast, where there are known populations between Crimdon Denemouth and Hartlepool Headland. South of the Tees, there are populations at South Gare dunes and around Saltburn.

At Teesmouth, north of the river, the coastal population seems to extend into some of the large industrial areas, where there is a lot of suitable habitat behind security fences, undisturbed by walkers and dogs. Records from this area are all since 2005 and are increasing. There is some doubt as to whether this is natural colonisation or a possible deliberate introduction.

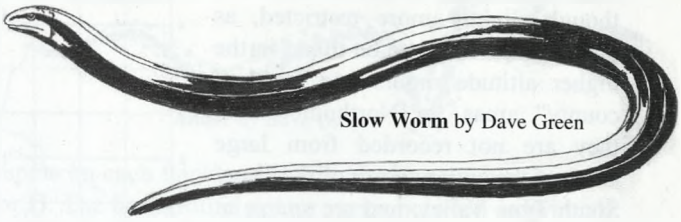
Lizards have been marked by one cluster of place names in the North East, at Lizards Farm and Lizard Lane on Cleadon Hills, and Lizard Point on the adjacent coast, where Common Lizards can still be found.

Just over half of our Common Lizard sightings that are on record are from casual encounters. Intentional surveyors use a combination of keen observation and quiet approach, trying to spot lizards basking on suitable rocks without disturbing them. Binoculars help the observer to see them from a distance. Sheets of corrugated iron or felt roofing material (called "tins") can be placed at strategic, sunny spots, to encourage animals to come out into the open to bask on these tins at points where they can be seen from a safe distance. The surveys are usually done at a time of day when the lizards are just warming up and before other people can cause disturbance (Gent and Gibson, 1998).

Common Lizards are often found in the same upland habitats and locations as Adders and Slow Worms *Anguis fragilis*, and in the same coastal habitats as Slow Worms. Adders can be an important predator of Common Lizards. In the mid county lowland areas Common Lizards are usually the only reptile species present.

John Durkin

SLOW WORM *Anguis fragilis*



Slow Worm by Dave Green

Slow Worms grow up to 40 cm long, the females being slightly larger than the males. The females are brown, reddish-brown or copper above, with contrasting dark brown or black flanks. Many have a thin dark central stripe down the middle of the back. The flanks have similar stripes or rows of spots. Males have a similar dorsal background colour, but with a broader range of hues, and without spots and stripes. Many animals in our region are a milk-chocolate brown. Both sexes are grey, bluish or black underneath, with paler markings. A small proportion of adult males have small blue spots near the head, but this is rarely recorded in our region. Juveniles have the adult female background colours, but have a distinctive strong black stripe from the head to the tail (Beebee and Griffiths, 2000).

Underneath their scales Slow Worms have a second layer of plates called "osteoderms". These make Slow Worms feel less flexible than a snake, and rather like holding a large millipede.

They feed mainly on small slugs, snails and earthworms, caught on the surface or under cover. Larger snails are eaten from the shell, leaving the shell behind, sometimes creating a "thrushes anvil" effect, but without the shells being shattered. The mostly intact shells can be taken as a good field sign for Slow Worms in suitable habitat.

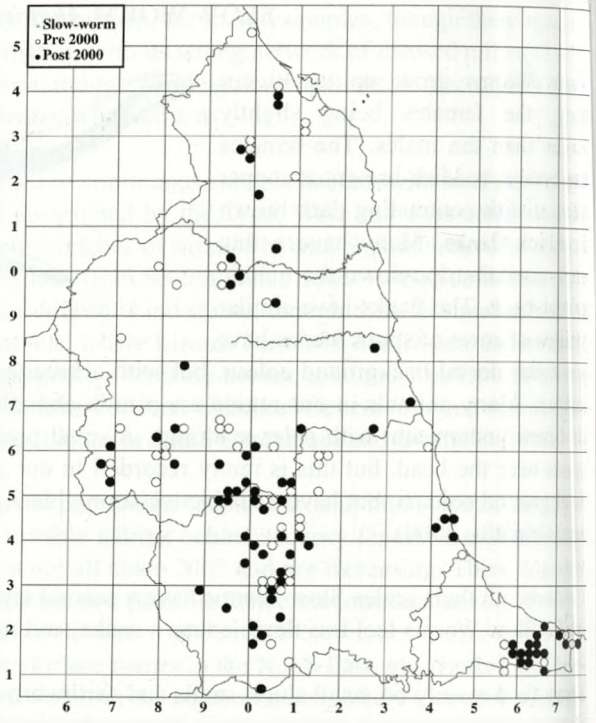
Slow Worms warm up in a different way to our other reptile species. The others bask in sunlight, warming both directly from the sun and also from heat radiating back from the substrate on which they are basking. Slow Worms prefer to avoid the sun and warm indirectly by being in contact with rocks, wood or metal that is being warmed by the sun. Often they are underneath a piece of wood or a survey "tin". They also spend more time underground than our other reptiles and can burrow in grass tussocks and soft soils. These habits may help to reduce predation. Consequently, in contrast to Common Lizard *Zootoca vivipara* and Adder *Vipera berus*, three quarters of our Slow Worm sightings are from deliberate surveys and only one quarter from casual encounters.

Hibernation is underground, in mammal burrows, natural crevices or stonework below the level to which frost penetrates. Emergence is in April, dependant upon the spring weather. The males emerge first. The rest of the year is spent in close proximity to the hibernation site. Mating takes place in the summer, with the average litter of eight young being born later in the autumn.

Like Common Lizards, the young are born in an egg sac and quickly free themselves. At birth they are seven to ten cm long, doubling this in their first year. They reach 23 cm in their second year. Breeding starts at age three for males, four years old for females. Slow Worms live longer than Adders and Common Lizards, perhaps to 10-15 years (Beebee and Griffiths, 2000).

Predators are the usual suspects: birds of prey, crows, carnivorous mammals and Hedgehogs *Erinaceus europaeus*. Newborn young are vulnerable to a broader range of birds and mammals.

Slow Worm range and habitats in our region are similar to Common Lizard, though slightly more restricted, as they are less likely to be found in the higher altitude moors and in "mid county" areas. In Northumberland, they are not recorded from large areas of the county north of the Tyne/ South Tyne Valley, and are sparse at Kielder and the Cheviots, especially when compared with Common Lizard and Adder. They are regularly recorded in the South Tyne and Allen dales, which account for most of the Northumberland records, and at Kyloe Hills.



In County Durham, the "Heart of Durham" area, as described under Common Lizard, is a very important centre for this species. The northern edges of the North York Moors also have important populations, extending beyond the moorland edge to woods and quarries at Guisborough and east of Guisborough.

Urban Slow Worms were unknown until recently, when a population was discovered near the Monkseaton/Whitley Bay area of Tyneside, using a variety of habitats including a disused railway line and adjacent scrub and gardens. The other occasional urban records are from known escapes.

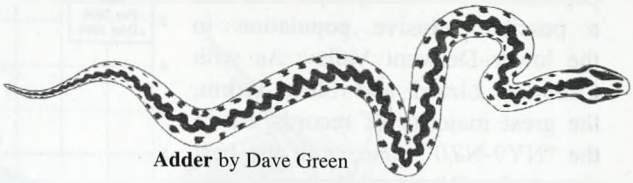
Unlike Common Lizard, there is no "mid county" lowland distribution, though there may have been historically. Like Common Lizard, there is a coastal distribution, certainly south of Sunderland, particularly between Hawthorn and Castle Eden Denes. This situation also occurs on the Cleveland coast, along the cliffs and in the wooded coastal gills in the Saltburn/Guisborough/ Loftus area. On the Northumberland coast, it is unclear whether there is a continuous or fragmented distribution, as there is too little data (Durkin, 2012B).

Many textbooks refer to the frequency of Slow Worms being found in gardens, churchyards, parks and allotments particularly around compost heaps, but this seems to happen very rarely in the North East.

Slow Worms are often found in the same upland habitats and locations as Adders and Common Lizards, and in the same coastal habitats as Common Lizards. Adders will occasionally predate Slow Worms, particularly juveniles.

John Durkin

ADDER *Vipera berus*



Adder by Dave Green

The smaller of our two snakes, and the only venomous one, female Adders average 55 cm and the smaller males 50 cm in length. Their colour is very distinctive, with a dark zigzag line along the back, two rows of dark spots on each flank and a dark head-marking of variable shape, which can look like a V, U, X or H. The background colour varies between individuals, populations and the sexes. Males generally have lighter, brighter colours: grey, off-white, cream, yellowish, or occasionally bluish or greenish grey. Females are mostly brown or reddish-brown. Juveniles are reddish brown. Rare adults of either sex can be plain black (Beebee and Griffiths, 2000). These variations in colour scheme enable researchers to identify individual Adders, so that movements, territories and longevity can be assessed.

Adders hibernate from November to March, though sunny days in February can bring some snakes out to bask. They use underground sites such as scree or rabbit burrows, in dry ground with good cover. Many hibernation sites are communal.

Males shed their skin in April, at the start of the mating season. Females shed in May, and then both sexes shed again before the autumn. Females bear young only every second year in our region.

In summer, Adders can move around into different habitats, feeding mostly on small mammals with occasional amphibians, reptiles and nestling birds. The prey is bitten, released, and, if still mobile, followed until it dies.

The onset of cooler weather in the autumn starts the return to the hibernacula. Females shed their skin, and give birth to an average of eight or nine live young close to the hibernaculum. The young Adders use their yolk and fat reserves to last them through their first winter. Mortality is very high in the first year, after which most adults survive for another five or six summers (Beebee and Griffiths, 2000).

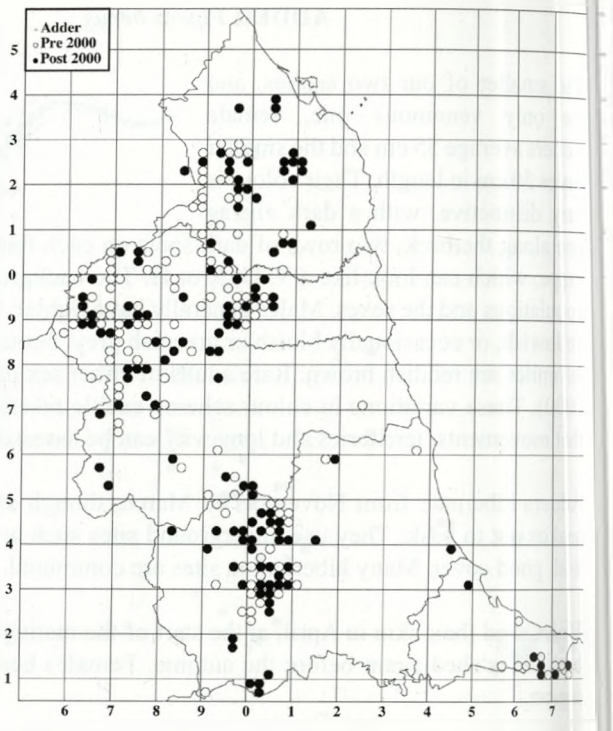
Although there are up to 100 cases of adder bites to humans in the UK each year, most have minor effects and there have been no fatalities for over 30 years. Often no venom is injected. Most cases result from basking snakes being accidentally handled or trodden on, with some resulting from snakes being picked up. Dogs are more often bitten but rarely with fatal results.

Adder distribution and habitat in our region is quite similar to that described for Common Lizard *Zootoca vivipara*, with Adders being more associated with heather moors, especially where the heather is not burnt. Like Common Lizard and Slow Worm *Anguis fragilis* they are scarce or absent on the higher moors. They are less adaptable to the small areas of habitat that might support Common Lizard.

In Northumberland, where they are much better recorded than the other reptiles, there are good populations at Kielder, Redesdale, Kyloe Hills, the College Valley/Cheviots, Redpath/Fontburn and Quarryhouse Moor.

In County Durham they are largely absent from the area east of the A68, except for a small

population on Hedleyhope Fell and a possible, elusive population in the lower Derwent Valley. As with Common Lizard and Slow Worm, the great majority of records are in the "NY9-NZ0" zone, with the best sites at the "Heart of Durham" area, as described under Common Lizard, in and around Hamsterley Forest, and in the Stang/River Greta area.



The northern edges of the North York Moors, especially around Scaling Dam, have a strong population, though they may be declining there (Durkin, 2012B).

In ideal habitat, population densities of one Adder per 10 metres of linear habitat surveyed have been found at Kyloe Crags, Hamsterley Forest and at Pow Hill. These ideal habitats are usually quite small in extent.

There is no mid-county lowland or coastal population; there are occasional records but these are probably escapes from captivity. Occasional records at Chopwell Wood and Gibside could be a small population, or may possibly be escapes. There is a curious record of Adders in Gosforth Park during the Second World War. Large stocks of gravel had been brought in from Biddlestone in north Northumberland, ready to use for infilling bomb craters. One or several Adders were seen basking on the stockpiles for several years afterwards. It seems likely that Adders, perhaps young animals, were accidently transported along with the gravel (Bob Wilkin, pers. comm., 2012).

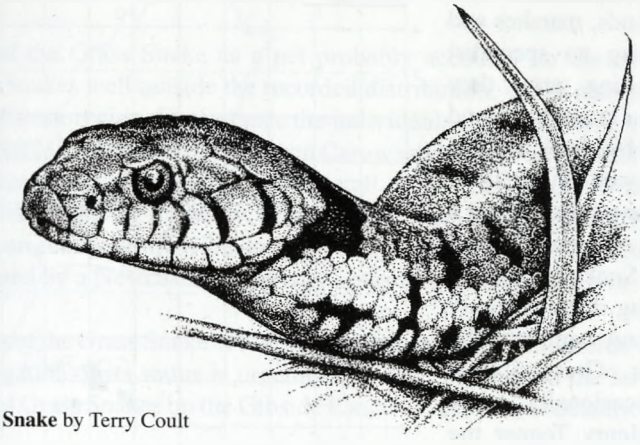
Two thirds of our Adder sightings are from casual encounters, often by botanists and foresters. Gordon Simpson is the champion recorder. Surveyors use a combination of keen observation and quiet approach, trying to spot Adders basking on suitable rocks without disturbing them. Binoculars help the observer to see them from a distance. Sheets of corrugated iron or felt roofing material can be placed at strategic, sunny spots, to encourage animals to come out into the open to bask at points where they can be seen from a safe distance. The surveys are usually done at a time of day when the Adders are just warming up and before other people can cause disturbance.

Adders have given us a number of place names, all within their current range, such as Adder Wood, Adder Crags, Adderstone and the White Adder Water.

Adders are often found in the same upland habitats and locations as Slow Worms and Common Lizards, but are absent from mid county lowland areas and from the coast. Adult Adders will predate juvenile Common Lizards and Slow Worms.

John Durkin

GRASS SNAKE Natrix natrix



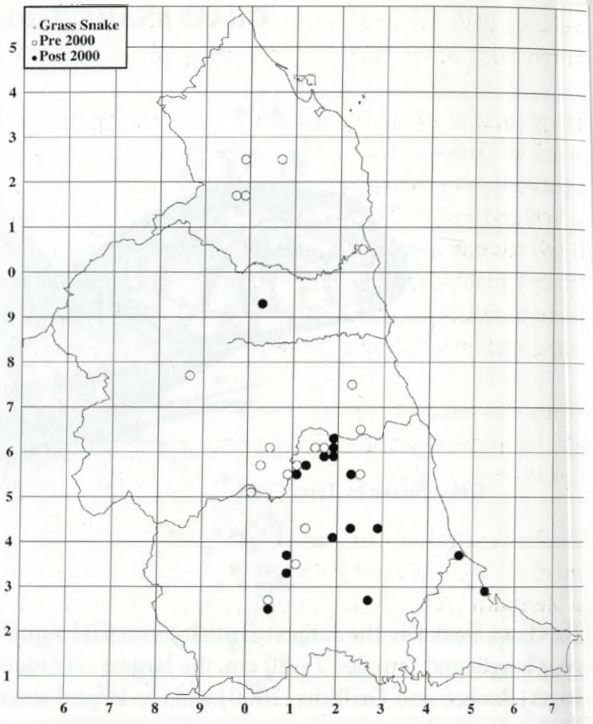
Grass Snake by Terry Coult

The Grass Snake is the largest British terrestrial reptile. Male Grass Snakes average about 65 cm in length and females 75-80 cm, the largest recorded British Grass Snake being 1.8 metres in length (Beebee and Griffiths, 2000) and the largest recorded Grass Snake in our region being 98 cm (Coult, 2012). Typical Grass Snake colouration is an olive green to brown background with a row of vertical black bars along each flank and two lines of dorsal black spots. The underside is black and white checked. The most conspicuous feature is the yellow/orange and black collar behind the head, which is the source of its older name, the Ringed Snake. Some County Durham Grass Snakes exhibit atypical colouration with the collar either absent or much reduced and a pair of pale dorso-lateral stripes, a colour form associated with Eastern European Grass Snakes (Coult, 2012).

During the winter Grass Snakes hibernate underground or under cover in frost-free locations, emerging in March or April to bask in the sun, raising the body temperature prior to mating. In June pregnant females lay eggs in piles of damp rotting vegetation, where heat generated by decay helps them to hatch. Good egg-laying sites may be used by several females. In Durham and Northumberland only two egg-laying sites have been recorded and both were manure heaps (Coult, 2012). Grass Snakes have been recorded breeding in Northumberland twice, around 1984 at Wallish Walls (Ken Hopper, pers. comm., 1984) and at Fontburn Reservoir in 1999 (John Durkin, pers. comm., 2000). In Durham breeding has been recorded several times on the Gibside Estate in the Derwent Valley (Coult, 2012). Occasionally autumn mating is reported including a September mating in County Durham (Coult, 1989 and 2012). Eggs hatch in August or September but it is unlikely that eggs laid as a result of an autumn mating could survive the winter in the wild. With the onset of cold weather the snakes will return to hibernation.

Grass Snakes require home ranges which include hibernation, feeding and egg-laying sites along with secure places to bask in the sun. On occasion they will climb into low shrubs to catch the last rays of sunlight and two of the earliest records of Grass Snakes in Northumberland describe climbing snakes in the Cheviots near Ingram and in Middleton Plantation near Wooler (Leighton, 1901).

As amphibian and fish eaters Grass Snakes are closely associated with wetland habitats, ponds, marshes and river valleys. Having no specialist adaptations for killing prey they prefer species such as frogs, toads and newts which cannot bite back and can be seized and swallowed alive with no risk to the snake. The swallowing of a large frog can take some minutes and I have seen a Grass Snake regurgitate a frog alive on being disturbed only to catch it again and complete the swallowing process. Grass Snakes themselves are occasionally taken by predators and Henry Tegner the Northumberland naturalist records one as prey in a Kestrel's *Falco tinnunculus* nest at Langleeford near Wooler (Tegner, 1972).



Grass Snakes are very rarely encountered casually. Intentional surveys have become increasingly unproductive as the Derwent Valley population has declined. Survey methods are similar to those described for Common Lizards *Zootoca vivipara*, but with areas close to amphibian ponds and suitable egg-laying sites being targeted.

Grass Snakes are generally distributed throughout lowland England and Wales in suitable habitats becoming rarer in the north of England, and are usually described as absent from Scotland with any Scottish records assumed to be introductions. They are not found in Ireland (Beebee and Griffiths, 2000). A recent review of Scottish records however indicates that some records from the south west of Scotland may be indigenous snakes (Cathrine, 2012). In the North East Grass Snake records occur as far north as Crookham within four miles of the Scottish border (Leighton. 1901) and are well dispersed in time and space across Durham and Northumberland. There are scattered records throughout County Durham, with a concentration along the valley of the River Derwent. There are no records from the valley of the River Tees and the Tees plain. There are 21st century records around Ingleby Greenhow on the northern edge of the Cleveland Hills. The earliest Northumberland records are those in Leighton (1901), which are extracted from the "J.A." articles in the *Newcastle Weekly Chronicle* of 1881, and in Durham, Fawcett (1900) recorded the Grass Snake in the Browney Valley in 1883.

The 19th century records were not universally accepted as true, particularly by the natural history establishment; Richard Howse then the curator of the Hancock Museum wrote "My opinion is that the Ring Snake does not occur here except accidentally" (Leighton, 1901) and George Bolam wrote "Of the Grass or Ringed Snake (Tropodinotus natrix) there are I believe no Northumbrian records, and very few (if any) well authenticated ones for Durham" (Bolam, 1917). Although it is now proven that Grass Snakes are or were resident in Northumberland and Durham, doubt over the validity of Grass Snake records persists to this day, with errors in identification caused by

confusion with Adder *Vipera berus* and Slow Worm *Anguis fragilis*. Such confusion clouds the interpretation of the current distribution map.

The popularity of the Grass Snake as a pet probably accounts for the occasional anomalous records of Grass Snakes well outside the recorded distribution, which also adds to the confusion about their status in our region. For instance the individuals caught in Wark in 1980, Esh Winning in 2009 and the 2007 Grass Snake from Seaton Carew which were all probably escapees. Langton (1989) records that in 1983 he found a market stall in Newcastle upon Tyne which was selling locally-caught Grass Snakes, probably from the Derwent Valley population. A captive Grass Snake probably originally from Gibside was re-released there in 1986. Another, of pet trade origin, was released by a Newcastle University researcher at Lockhaugh in 1988.

The current status of the Grass Snake can be summarised as no recent records for Northumberland, where an investigation of its status is urgently required. In Durham the last record was of two typically coloured Grass Snakes on the Gibside Estate in 2009 (John Grundy, pers. comm., 2012).

The Derwent Valley and the Gibside Grass Snakes require a special mention. The first Grass Snake record for the Derwent valley was in 1886 (Fawcett, 1900) with no further records until 1960 at Mereburn (Alan Brown, pers. comm., 1989). There is a subsequent scatter of records along the valley of the Derwent but a long term presence is only recorded on what is now the National Trust's estate at Gibside. Coult (2012) summarises the history of these snakes concluding that the population exhibits colour forms indicating a possible hybrid population between the native Grass Snake and introduced snakes from Eastern Europe. Snakes recorded at Gibside may show the typical colour form or may have a reduced collar and a pair of pale dorso-lateral stripes as in Grass Snakes found further east than the Po Valley in Italy. No Grass Snakes have been found at Gibside since the 2009 specimens and Durkin (2006) surmises that the population is under threat due to conflict between the requirements of the snakes and the increased numbers of visitors to the estate. Given the increased facility of DNA analysis, if biological material from Gibside can be obtained then genetic provenance of the Gibside snakes should be determined, and in any case survey work at Gibside and along the Derwent Valley in County Durham is urgently required.

It is difficult to draw any conclusion from the records and the history other than that the Grass Snake in Northumberland and Durham is in decline, possibly verging on extinction.

Terry Coult

NORTH EAST MAMMAL, AMPHIBIAN AND REPTILE GROUPS

Northumbria Mammal Group was set up in 1997 by staff members from the Natural History Society of Northumbria, Northumberland Wildlife Trust and Durham Wildlife Trust. Tees Valley Wildlife Trust joined us a few years later. The Group extends its interest in mammals from the Scottish Borders in the north, to the southern boundary of the Tees Valley and County Durham, and from the North Sea coast to the Cumbrian border in the west. Our main objectives are to raise awareness of mammal species and their habitats in North East England and to further their protection and conservation. For more information about our group, please see our website, or email:

www.northumbriamammalgroup.org.uk
Email: northumbriamammalgroup@hotmail.co.uk

There are many natural history groups across the North East which play an essential role in improving the understanding of our mammals, amphibians and reptiles and help with their conservation. We would encourage the reader to find out more about these groups, to support their work and to get involved, and we have provided details below to facilitate this.

Chillingham Wild Cattle Association
www.chillinghamwildcattle.com
Tel: 01668 215250

Durham Badger Group
www.durhamcountybadgers.co.uk
Email: info@durhamcountybadgers.co.uk

Durham Bat Group
www.durhambats.org.uk
Email: noelbats@onetel.com

Durham Wildlife Trust
www.durhamwt.co.uk
Email: mail@durhamwt.co.uk
Tel: 0191 5843112

Environmental Records Information Centre (ERIC) North East
Readers should send any North East sightings of mammals, amphibians and reptiles (and any other wildlife) to this organisation.
www.ericnortheast.org.uk
Email: eric.ne@twmuseums.org.uk
Great North Museum: Hancock
Newcastle-upon-Tyne, NE2 4PT
Tel: 0191 222 5158

Natural History Society of Northumbria
www.nhsn.ncl.ac.uk
Email: nhsn@ncl.ac.uk
Tel: 0191 232 6386

North East Cetacean Project
www.northeastcetaceans.org.uk
Email: martin.kitching@marine-life.org.uk
Tel: 01670 827465

North East Reptile and Amphibian Group
Website: groups.arguk.org/nerag
Email: nerag@yahoo.co.uk

Northern Red Squirrels
Website: www.northernredsquirrels.org.uk

Northumberland Badger Group
www.northumberlandbadgergroup.org.uk
Email: enquiries@northumberlandbadgergroup.org.uk
Tel: 07901951565

Northumberland Bat Group
www.northumberlandbats.org.uk

Northumberland Wildlife Trust
www.nwt.org.uk
Email: mail@northwt.org.uk
Tel: 0191 284 6884

North Yorkshire Bat Group
www.nybats.org.uk
Email: nybats@btinternet.com

ORCA
www.orcaweb.org.uk

Red Squirrels Northern England
www.rsne.org.uk
Tel: 0191 284 6884

Tees Valley Wildlife Trust
www.teeswildlife.org
Email: info@teeswildlife.org
Tel: 01287 636382

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Mammals, Amphibians and Reptiles of the North East is the first account since 1864 of all the species found in the northeast of England. Twenty-nine naturalists have described the current and historic status of the 63 species found in the region, plus further details of rare, vagrant, extinct and escaped species. Species accounts are accompanied by distribution maps and drawings by local artists.

"This timely and authoritative account of the past history, present status and future prospects of our most charismatic animals is essential reading for anyone with an interest in the wildlife of our region" - Dr. Phil Gates, Naturalist and *Guardian* Country Diarist.

Mammals, Amphibians and Reptiles of the North East has been produced by the Northumbria Mammal Group and published by the Natural History Society of Northumbria as volume 73 of its Transactions.

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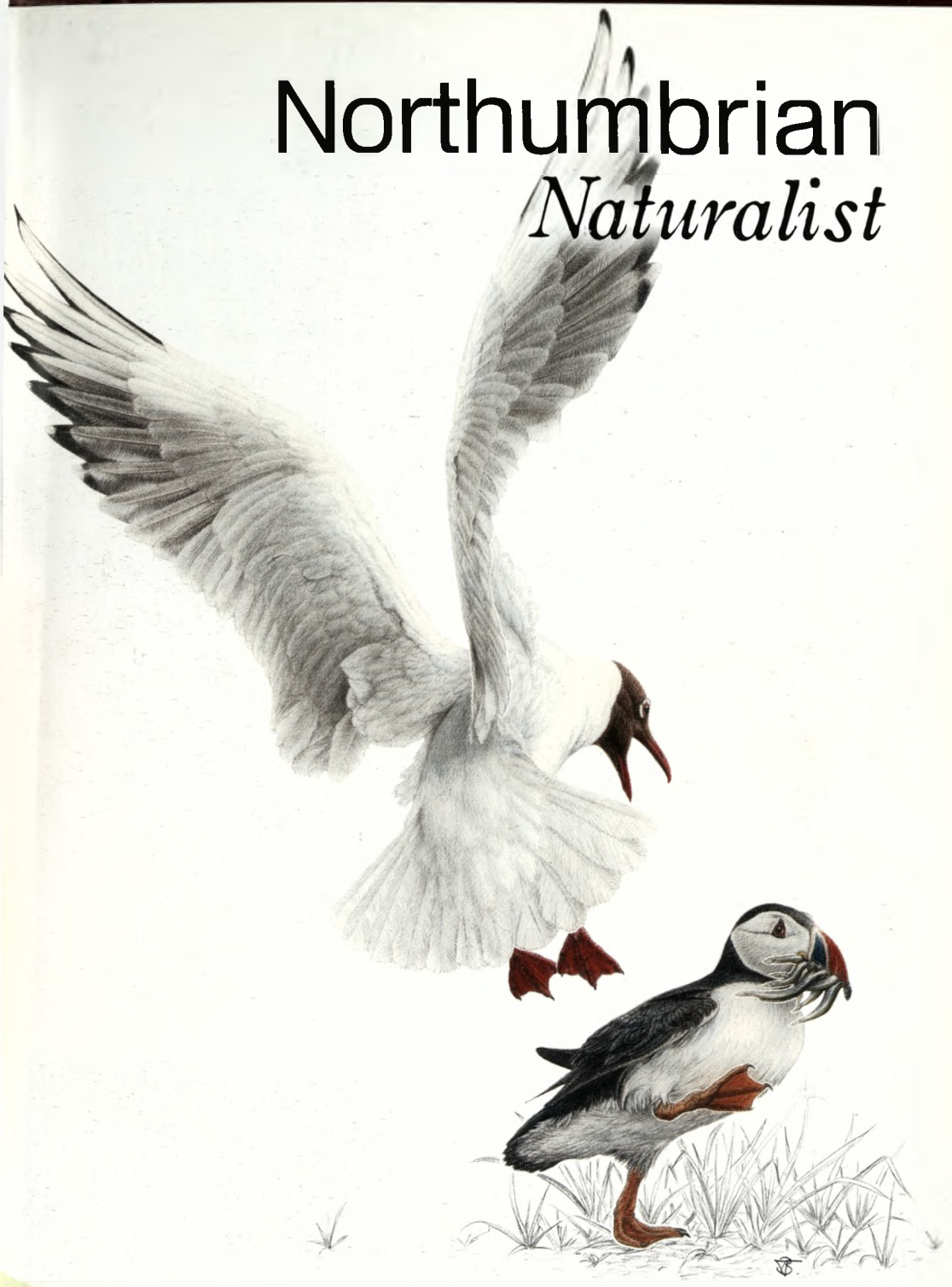
Northumbrian *Naturalist*



Farne Islands Wildlife

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Black-headed Gull harassing a Puffin for Sand eels © Bas Teunis 2013

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www.nhsn.ncl.ac.uk
nhsn@ncl.ac.uk
0191 232 6386

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Natural History Society of Northumbria

National Trust

PREFACE and ACKNOWLEDGMENTS

The National Trust team sailed on 23 March, and officially became "Rangers" following a change from the long-used "Wardens". The islands were manned for 260 days until vacated on 7 December.

Traditionally, the annual publication *Birds of the Farne Islands* has been used to record seabird breeding statistics and bird movements during the year on the islands. To reflect the widening scope of that annual publication which, over the last few years, has expanded to include summaries not only of birds and seals but also of cetaceans, moths and butterflies, we have decided that a new name *Farne Islands Wildlife* is more appropriate. In addition, since weather has a substantial influence on Farnes wildlife, particularly so in 2012, the first paper in *Farne Islands Wildlife 2012* is a month-by-month description of the weather in 2012 and explanation of how our local conditions were brought about by changing weather systems on a large scale.

Thanks go to the 2012 Ranger team of Andy Denton, Graeme Duncan, April Eassom, Jonathan Finch, Ciaran Hatsell, David Kinchin-Smith, Samantha Morgan, Bex Outram, Sian Richards, William Scott, Laura Shearer and David Steel who provided the bulk of records from the islands during the year. Thanks also go to several observers for submitting records during the season to help complete this report, including Jamie Coleman, John Dawson, Andy Douglas, Bill Holland, Jack Ibbotson, Jason Moss, Bobby Pearson, Craig Pringle, Chris Redfern, William Shiel, John Walton, and Anne Wilson amongst others.

I am also very grateful to Tim Dean (Northumberland County Bird Recorder) for help and advice and Ciaran Hatsell for completing the seabird review. This is the tenth Farne Islands report featuring a cover illustration by Bas Teunis to whom we are incredibly grateful. Final thanks go to the unseen hard work of James Littlewood, Chris Redfern, John Walton and Anne Wilson for advice, support and constructive criticism on the report.

David Steel
National Trust Head Ranger, Farne Islands

WEATHER ON THE FARNE ISLANDS IN 2012

Andrew Denton
National Trust Ranger, Farne Islands, Seahouses, Northumberland NE68 7SR

INTRODUCTION

The weather on the Farne Islands is integral to everything that lives, breeds and migrates to their rocky shores. It dictates the Rangers' day-to-day lives and the birds that migrate through the islands, and has a major role in seabird productivity and the prevalence of moths and butterflies. Weather was recorded daily throughout the Rangers' stay on the islands; temperatures and the rain gauge were checked every day at 09:00, and cloud cover, visibility, wind speed and direction were logged at three points (09:00, 14:00 and 19:00) during the day. Wind speed was interpreted using the Beaufort scale and direction was determined using a compass. Long term averages for comparison were for Seahouses as there are no historical datasets available for the islands, only casual observations.

WEATHER BY MONTH

March

The Rangers arrived on the islands on 23 March to glorious sunshine and it remained that way for the rest of the month, with above-average temperatures and no rain throughout. On 28 March, a temperature of 19 °C was recorded, unprecedented for the time of year. Light westerly to slack winds meant that on several days sea fog was an issue which reduced temperatures slightly.

April

April was characterised by a series of deep Atlantic lows running up the English Channel, bringing occasional strong east/northeasterly gales with below average temperatures and above average rainfall. An unusually vigorous low on 3 April brought storm force 10 northeasterly winds with sleet and snow; Lindisfarne castle nearby recorded gusts of 71 mph and a wind chill of -10 °C. After these extreme gales, the wind eased but a series of weather fronts kept things breezy with rain falling on 21 days during the month. The month ended as it had begun with more east/northeast gales but this time lasting for three days and causing the islands to close for a record 15 days. With blustery conditions prevalent throughout the month, fog and mist patches never had chance to develop.

May

The month started much as April had finished: stormy. The first half saw a procession of Atlantic lows passing through the English Channel bringing breezy to stormy conditions that invariably had an easterly flavour. After a brief incursion of westerly winds around mid-month (due to low pressure systems moving on a more northerly track over the Farnes) the winds switched back east and dropped away for the majority of the rest of the month. Rainfall was above average for the second month in a row with 63.2 mm falling compared to the average of 44 mm. However, abundant fine dry weather was enjoyed throughout the month as rain was only recorded on 12 days. The last two days of the month produced over 20 mm of rain in a 24 hour period, flooding Puffin burrows and causing general misery for all the breeding birds. Due to the cold easterly air flow from Scandinavia, below average temperatures were often recorded, resulting in a 12.6 °C

average compared to a long term average of 13 °C. Temperatures made a recovery towards the end of the month as a slack or light southeasterly wind brought warmer air and an increase in fog and mist patches, with poor visibility in the last four days of the month.

June

The month was characterised by rain: precipitation was recorded on 20 days and tended to be heavy when it occurred. A total of 128.4 mm fell, which is over 200% of the average June rainfall. Falling onto already saturated ground due to the two previous months of above average rainfall, some islands resembled peat bogs with standing water and flooded Puffin burrows commonplace. The easterly airflow was still very much dominant over the UK which meant the islands were on the frontline of the rain. During a normal season the islands are in the rain shadow of the Cheviot Hills as rain, arriving from the dominant west, peters out before it reaches the Farnes which thus remain relatively dry. Winds remained light throughout the month with only a few days where anything close to gale force was recorded. Towards the end of the month, a southeasterly airflow from the continent established itself bringing above average temperatures. This warm air was a big factor in the most notable weather event of the month, which has gone down in Northumberland legend as "Thunder Thursday". On 28 June, two lines of thunderstorms (one tracking through the Midlands and the other tracking northeast across the Pennines towards Northumberland) developed in the early afternoon, and as the heat of the day arrived around 15:00 these storms grew larger and became more violent. Such was the ferocity of this storm that large swathes of Northumberland were flooded, including Alnwick town centre, and landslides were reported in Berwick. On the Farnes, an otherwise unremarkable misty, muggy day was transformed at 16:00 when the storm rolled through bringing gusty winds, 25 mm of rain and fork lightning. As quickly as it arrived it disappeared leaving behind flooded islands and countless nests washed out. The average temperature in June was 17.6 °C, a whopping 1.6 degrees above the average of 16 °C, largely due to the warm air intrusion from the continent in the latter half of the month.

July

As July arrived, the easterly dominated airflow started to break down, replaced by the normal westerly flow by mid-month. With this, low pressure systems began to queue up in the Atlantic and roll across the UK bringing heavy rain and gales from the southwest. As a result, for the fourth consecutive month the Farnes had above average rainfall with 95.6 mm recorded compared to an average of 52 mm. The month was very cloudy due to these successive low pressure systems making midsummer a rather gloomy affair. When the sun did break through it felt quite warm but there was always a breeze which kept it feeling cool despite temperatures of over 20 °C on 13 days. As a result, the average temperature for July was 19.6 °C, 1.6 °C higher than average. The mild westerly flow continued throughout the latter half of the month producing generally overcast conditions. Low pressure systems tended to pass north of the Farnes, dragging in warm air from the continent making it feel muggy even in breezy conditions when the wind was noticeably warm.

August

August finally brought some settled conditions to the islands, just as the breeding birds were leaving. High pressure was sitting over or near the British Isles for much of the month resulting in warm settled conditions. There were times during the month when the high pressure broke down and allowed a wetter Atlantic airflow in from the west, but it was not long before high pressure built again, generally from the north. The wind was never very strong, peaking at force

four on a number of days during August. Due to all the fine dry weather there was a noticeable increase in moths and butterflies after a poor start to the season. Rainfall for the first time since March was below average with only 36.8 mm of rain compared to 67 mm on average. Average temperatures were also high at 20.3 °C compared to a long-term average for August of 19 °C.

September

The month began with the jet stream stuck stubbornly across the British Isles for the first three weeks of the month carrying any Atlantic depressions straight over the British Isles. This is a normal autumnal situation in the UK, bringing rain and strong southwesterly winds. After the first three weeks of constant westerly winds, the jet stream started to wander south allowing low pressure systems to take a more southerly track along the English Channel as in spring. This produced a "perfect" storm for stranding migrating birds. On the 23 September a very deep area of low pressure ran up the English Channel and made its way up the east coast of Britain straight towards the islands. For three days the islands were battered by severe gale force nine winds from the east bringing huge seas, rain and birds. As to be expected, with the Atlantic in charge of the weather, rainfall totals were above average with 60 mm of rain falling compared to a monthly average of 48 mm and temperatures were 1.4 °C above the average at 17.4 °C.

October

October was a strange month for weather with a variety of different conditions. For the first 10 days, the weather was unusually calm as high pressure sat to the north of the UK and brought fine and dry weather. During this period, a persistent area of high pressure formed over mainland Europe, creating a "block" for any Atlantic depressions moving through. Consequently, low pressure systems reaching the British Isles stalled, decayed to nothing and dumped all the rain they were carrying onto the UK, causing widespread flooding. It was no different on the Farnes as on 11 October 42.7 mm of rain was recorded as a low pressure stalled over the UK. This was over 15 mm more rain than had been recorded in any 24 hour period since the start of the year. The European block remained in place for the rest of the month and sometimes pushed its way west across the British Isles, giving settled weather and keeping the Atlantic train of weather systems at bay. The Farnes enjoyed something of an "Indian summer" as calm winds, sunny days and mild temperatures prevailed for almost a week in mid-month (unheard of in October). However, it was not to last as the high pressure retreated east allowing the dominant Atlantic air to feed back over the British Isles bringing plenty of wind and wet weather with it. As a result, yet again rainfall was much higher than average with 86.6 mm of rain falling compared to the 52 mm average. Temperatures were also below average due to the occasional cold incursion of air from the north, between weather systems.

November

With the European high set stubbornly in place, the November weather was much the same as in October. A mild but blustery southerly airflow developed over the North Sea as lows from the west squeezed up against the high in the east. This produced some mild weather in the first half of November, with temperatures peaking at 14 °C. Despite unsettled weather across the UK (particularly in the southwest), the Farnes fared quite well with very little rain. Towards the end of November, blocking highs started moving around with the Azores high stretching up towards Iceland and a low sitting to the southeast over northern Germany. This weather system brought a strong north/northeasterly airflow with lower temperatures and rain from fronts associated with the low over Germany.

December

The start of December was cold, with overnight frosts almost every night until the Rangers departed the islands on 7 December. Strong northerly/northwesterly winds were prevalent as low pressure sat just to the northwest of Scotland. The associated weather fronts brought frequent sleet, hail and even snow showers.

SUMMARY

The weather this season was dominated by the Atlantic and the position of the jet stream. This fast high level atmospheric wind defines the track of low pressure systems travelling across the Atlantic, as it picks them up and drags them along. If the jet stream is stationary over the UK (as was the case in 2011), westerly winds tend to dominate, bringing mild conditions and average rainfall. If the jet stream starts wandering north or south of the UK it sends the low pressures on different tracks bringing winds from a more easterly direction (Figure 1). Despite having a cold spring and a generally cold autumn, the warmer temperatures throughout the summer (Figure 2) meant that temperatures ended up around average for the year. Rain was a big feature of the year with precipitation above average for seven of the eight months that were fully recorded (Table 1) resulting in a total rainfall 164.5 mm above average. August was the only month that had a lower than average rainfall.

Table 1. Rainfall on the Farnes in 2012 compared to the monthly average for Seahouses.

	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Total
Rainfall (mm)	72.1	63.2	128.4	95.6	36.8	60	86.6	63.8	**606.5**
Seahouses average (mm)	54	44	62	52	67	48	52	63	**442**
Difference (mm)	+18.1	+19.2	+66.4	+43.6	-30.2	+12	+34.6	+0.8	**+164.5**

As a result the weather this year had a major impact on the wildlife of the Farne Islands. Moths and butterflies were hit hard by the cold wet spring but made a recovery in August when finally the sun came out for a few weeks. The breeding birds also suffered as the peak of breeding occurred during some of the wettest months.

Figure 1. Radar chart summarising wind directions and speed throughout the year. Axes are the number of recording sessions (3 per day) with the wind at the specified direction.

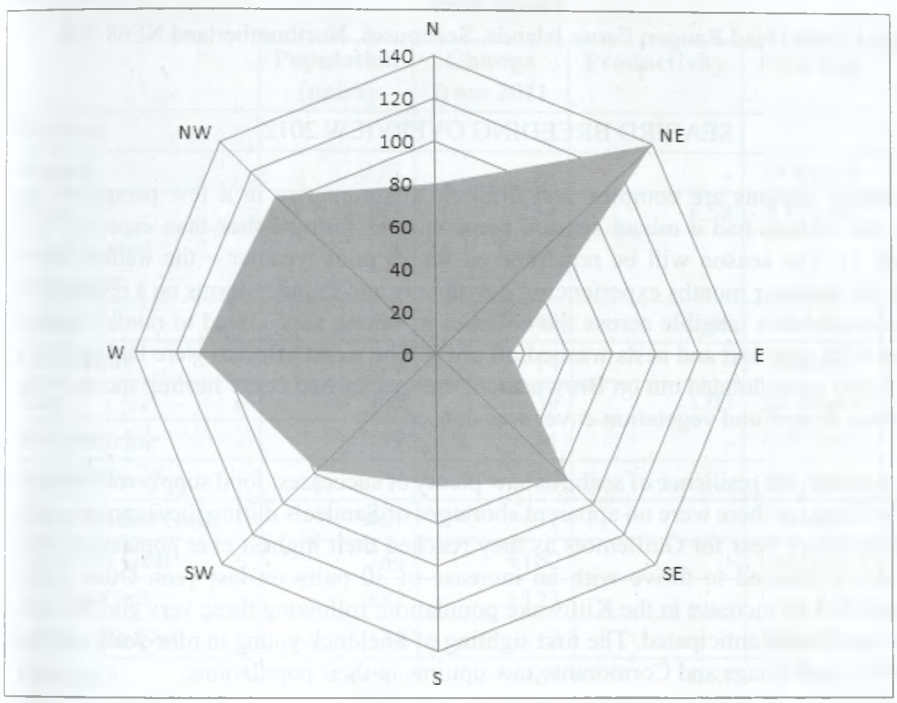
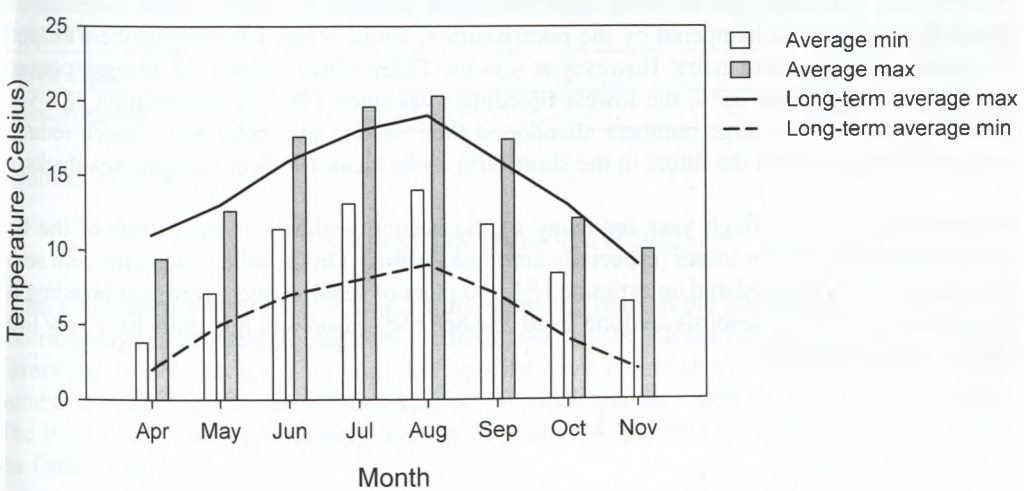


Figure 2. Average minimum (min) and maximum (max) temperature on the Farne Islands 2012 versus long-term averages for Seahouses.



BIRDS ON THE FARNE ISLANDS IN 2012

David Steel
National Trust Head Ranger, Farne Islands, Seahouses, Northumberland NE68 7SR

SEABIRD BREEDING OVERVIEW 2012

Seabird breeding seasons are complex and difficult to summarise in a few paragraphs and, predictably, the islands had a mixed season, some species faring better than expected, some worse (Table 1). The season will be remembered for its poor weather – the wettest year on record, with the summer months experiencing downpours and thunderstorms on a regular basis. The consequences were tangible across the colonies as young succumbed to rainfall and cold temperatures with eggs lost and nests washed off cliffs. The worst affected were Puffins with an estimated 12,000 pairs flooded out on Brownsman; the species had better nesting success where the soil cap was deeper and vegetation cover was denser.

Despite the weather, the resilience of seabirds saw plenty of successes: food supply was excellent, verging on brilliant, as there were no apparent shortages of Sandeels during the summer months. 2012 was a landmark year for Guillemots as they reached their highest ever population, whilst Razorbills also continued to thrive with an increase of 30 pairs on last year. Other notable successes included an increase in the Kittiwake population; following three very good breeding seasons this was keenly anticipated. The first sighting of Shelduck young in nine years was most welcome whilst both Shags and Cormorants saw upturns in their populations.

There was also positive news for the terns as Sandwich Terns made a welcome recovery from the low of 544 pairs last season with the population almost reaching the 1,000 mark this year (Table 1). Good numbers of Arctic Terns nested, with reasonable breeding success despite the weather. Unfortunately Roseate Terns showed no interest, with breeding attempts having been made in only one of the past five years.

As with any breeding season, along with the highs, there were lows. Fulmar numbers and breeding success were hampered by the poor weather, whilst Ringed Plover numbers dropped to a worryingly low four pairs. However it was the Eider which caused the greatest concern as numbers dropped by 35%, the lowest breeding total since 1967. A combination of a very poor breeding season (large numbers abandoned their nesting attempts) and a much reduced population suggests that the future in the short-term looks bleak for these majestic sea-ducks.

In summary, it was a tough year for many of the nesting seabirds as the effects of the bad weather resulted in major losses (especially amongst Puffins). On the other side of the coin some successes were celebrated and an estimated 81,000 pairs of seabirds were recorded breeding on the islands. Thankfully seabirds are long lived and one bad season will hopefully have very little impact in the long term.

Table 1. Breeding statistics for birds on the Farne Islands in 2012. Breeding populations and the change relative to 2011 are expressed as pairs, except for Guillemot where the number of individuals is given.

	Population (pairs)	Change from 2011	Productivity	First Egg	First Fledgling
Shelduck	2	+1	-	-	29 May
Mallard	17	+7	-	29 March	21 April
Eider	443	-234	1.58	13 April	9 May
Red-breasted Merganser	1	Level	-	-	-
Fulmar	233	-43	0.46	12 May	16 August
Cormorant	135	+14	-	7 April	Late June
Shag	965	+39	1.03	23 March	24 June
Oystercatcher	39	-1	-	14 May	15 July
Ringed Plover	4	-4	-	17 April	10 July
Black-headed Gull	461	+31	-	1 May	27 June
Lesser Bb Gull	744	+162	-	Late April	-
Herring Gull	882	+123	-	Late April	-
Greater Bb Gull	14	+2	-	Late April	22 July
Kittiwake	4,241	+265	0.87	1 May	5 July
Sandwich Tern	966	+422	-	5 May	7 July
Common Tern	88	-13	-	14 May	7 July
Arctic Tern	1,923	+93	0.65	13 May	1 July
Guillemot	49,076*	+1,099	-	10 April	2 June
Razorbill	420	+30	0.69	28 April	20 June
Puffin	36,835	Level	0.84	13 April	27 June
Swallow	4	Level	-	11 June	22 July
Rock Pipit	22	Level	-	12 April	20 May
Pied Wagtail	7	+2	-	17 April	8 June

*Number of individuals

MIGRATION OVERVIEW 2012

From a migration perspective, it was a truly stunning year on the islands, one of the best on record, with some impressive migrants including two "firsts" for the islands bringing the overall Farnes list to 297 species. This year, 185 species were recorded which ranked as the highest number in a year since the record-breaking 2005 season and the fourth highest-ever annual total. The Inner Group had a particularly fine season with 174 species recorded compared to 158 on the Outer Group.

The outstanding highlight of the year proved to be a **White's Thrush,** discovered on Inner Farne on 24 September, the first ever record and only the second for Northumberland after one in 1914. Whilst this "beast from the east" made the headlines, a **Baird's Sandpiper** on Brownsman during the same late September period was only the seventh for Northumberland and an island first.

Other major highlights included an adult **Temmnick's Stint** on Longstone on 30 May, only the second Farnes record, whilst a confiding **Radde's Warbler** was the islands' third. For many, an outstanding spring was capped by a stunning male **Rustic Bunting** which showed well for two days on Inner Farne in late May, the fifth Farnes record but the first for 17 years. An unprecedented influx of **Olive-backed Pipits** in October brought three to the islands including two together on Inner Farne, representing the fifth to seventh island records. The supporting cast included the islands' seventh **Hobby**, ninth **Nightjar** and tenth **Little Grebe**, **Greenish Warbler** and **Short-toed Lark**.

Overall it was a brilliant year, with spring "falls" (arguably the best spring in 20 years) combined with an impressive autumn, resulting in a memorable season. Other highlights included: Gadwall (4 records), Cory's Shearwater, Storm Petrel (3), Leach's Petrel, Great Crested Grebe, Marsh Harrier, Moorhen (2), Little Stint (2), Wood Sandpiper (3), Grey Phalarope (2), Long-tailed Skua (8), Sabine's Gull (3), Mediterranean Gull (several), Iceland Gull, Glaucous Gull, Turtle Dove (2), Cuckoo (2), Wryneck (5+), Great Spotted Woodpecker, Red-backed Shrike, Great Grey Shrike (2), Hooded Crow (4), Long-tailed Tit (7), Pallas's Warbler, Yellow-browed Warbler (3), Barred Warbler (4), Icterine Warbler (7), Waxwing (11), Bluethroat (5), Red-breasted Flycatcher (6), Richard's Pipit (2), Common Redpoll (2) and Little Bunting.

As usual a small handful of expected species failed to show including Balearic Shearwater (for the second consecutive year), Pochard (first time since 2002), Hen Harrier (first time since 2007), Quail (first time since 2007) and Stonechat (for the second consecutive year).

SYSTEMATIC LIST

The status of each species is classified using the following categories:

Abundant	More than 1,000 occurrences per annum
Common	101-1,000 occurrences per annum
Well represented	11-100 occurrences per annum
Uncommon	no more than 10 occurrences per annum but more than 20 in total
Scarce	11-20 occurrences in total
Rare	6-10 occurrences in total
Extremely rare	no more than 5 occurrences in total

The systematic list is in order of the British List (British Ornithologists' Union 2013). Where relevant in the text, counts of individuals or breeding pairs in 2011 are given in parentheses after count data for 2012.

Mute Swan *Cygnus olor*
An uncommon visitor.
The majority of Farnes reports usually involve local movement through Inner Sound; this year

was the quietest since 2000 with just a single adult on the sea in Inner Sound on 20 August, eventually drifting north with the tide.

Whooper Swan *C. cygnus*
An uncommon winter and passage visitor.
Northerly spring passage was recorded for the fourth consecutive year with birds utilising the east coast as a northerly flyway. A herd of 18 flew high over Inner Farne on 25 March with 12 north the following day through Inner Sound. One further spring record involved 33 north in two herds (of 22 and 11) on 29 March. As has been the norm in recent years, the autumn was quiet with just a single report of a family party of two adults and three juveniles, north through Inner Sound on 30 November.

Pink-footed Goose *Anser brachyrhynchus*
A well represented winter and passage visitor.
In complete contrast to the previous two springs, it was a quiet start with just one record: three flew north on 1 April over the inner group. As usual, birds started arriving back into the UK from mid-September, with two west over Brownsman on 14 September followed by 73 south, in two skeins, on 16 September. Migration gathered momentum over the following two weeks with 1-42 noted on five dates between 22 September - 4 October with a season's peak of 265 north (in one skein) through Inner Sound on 28 September. Thereafter only small numbers were recorded with a single over the islands on 21 October, 16 south on 15 November and 1-5 west on three dates between 20-24 November.

Greylag Goose *A. anser*
An uncommon passage and winter visitor.
Movements around the Farnes involve feral and wild birds and the majority of sightings this year were confined to March-April. After two north through the Kettle on 29 March, 1-4 were noted on four dates between 1-22 April around the inner group including two feeding on Inner Farne on 21-22 April. A season maximum of 14 flew north past Inner Farne on 6 April and 11 north over South Wamses on 5 June was the final record of the year.

Greater Canada Goose *Branta canadensis*
An uncommon passage visitor.
A pair in the Kettle on 15 March suggested a repeat of last year where a pair took up residency throughout the spring and summer (suggesting potential future breeding). However this was not to be and the season produced only a handful of subsequent records. An adult was on the sea off Brownsman on 25 March with four north over the inner group on 1 April. The season's peak occurred the following week as eight flew south through Inner Sound on 7 April. After a single north over Knoxes Reef on 9 April there were no sightings during the expected peak period in late May or early June when birds move north to moult. The final record involved a single north over Inner Farne on 4 October.

Barnacle Goose *B. leucopsis*
A well represented passage and winter visitor.
Late spring passage produced a handful of records and after six north on 15 March, 1-7 were recorded on four dates between 21-28 April with a peak of 45 east on 22 April. Late stragglers included 41 through Staple Sound on 3 May with a single, of unknown origin, north through Inner Sound on 8 May. Birds returning to winter in the UK from breeding grounds in Svalbard

started moving over the Farnes from 23 September when six moved north through Inner Sound followed by 24 west over the islands on 26 September. The major influxes this autumn occurred in the final few days of September as 251 moved west on 27 September with a total of 323 north on 30 September. Forty-eight flew west over Inner Farne on 4 October and there were 1-24 on five dates between 7-20 October with the final record of a single west over the islands on 21 October.

Brent Goose *B. bernicla hrota*
A well represented passage and winter visitor.
All records were confined to autumn and refer to birds heading north to wintering grounds on nearby Lindisfarne from breeding grounds further east. The first were noted on 10 September when a total of 78 were logged in four skeins moving north, with the majority through Inner Sound. After a single north over Brownsman on 13 September, an impressive 72 were logged flying north through Inner Sound on 21 September, followed by 109 north the following day. Smaller numbers of 1-14 were then recorded on a further five dates between 23 September - 27 October with a peak of 20 north on 10 October. The final record of the year concerned 10 north through Inner Sound on 27 November.

"Dark-bellied" **Brent Goose** *B. b. bernicla* is probably under-recorded on the islands with just a single record of one north through Inner Sound on 27 November, the second consecutive year the sub-species has been recorded.

Shelduck *Tadorna tadorna*
A well represented visitor and occasional breeder.
This secretive species yet again proved to be one of the trickiest species to monitor on the islands due to its underground nesting habits. This year, two pairs nested, doubling the population of recent years. As usual, birds were evident on the islands from late March with breeding behaviour observed throughout the spring. The veteran female (with white ear coverts) was again present and the pair was seen across the island groups favouring Brownsman and Staple Island. However, during this spring period, another pair arrived and was seen favouring Inner Farne. Neither nest was discovered but a pair with six very recently hatched ducklings were seen in Staple Sound, heading west on 29 May. This was the first sighting of any young on the islands since 2003. The last sighting of the breeding birds involved a female on Brownsman pond on 16 June. As usual, light passage was logged on six spring and seven autumn dates, generally involving 1-5 north through Inner Sound. The season peak involved nine north through Inner Sound on 28 October.

Wigeon *Anas penelope*
A common passage and winter visitor.
As usual, spring passage was light with seven on Brownsman pond on 24 March, six present on Knoxes Reef from 25-27 March and four south over the West Widopens on 9 April. The first autumn returnees arrived from 16 August with a single north through Inner Sound followed by another on Knoxes Reef on 25 August. Northerly passage brought 1-83 on 34 dates with three-figure counts on eight dates (Table 2) with a peak of 756 north on 23 September. As usual, a small number became resident for the winter on the islands with up to 15 on the outer group favouring Brownsman pond and North Wamses pools. On Knoxes Reef even larger numbers were present with 43 on 29 November increasing to 71 by the time the Rangers departed on 7 December.

Table 2. Northerly passage of Wigeon, Farne Islands 2012.

	10 Sep	22 Sep	23 Sep	10 Oct	12 Oct	26 Oct	28 Oct	27 Nov
Inner Sound	145	325	695	444	101	292	164	82
Staple Sound	62	0	61	79	81	3	83	27
Total	**207**	**325**	**756**	**523**	**182**	**295**	**247**	**109**

Gadwall *A. strepera*
An uncommon visitor.
The species remains a scarce visitor to the islands as birds have been recorded in only 16 of the previous 32 years since the first on 30 September 1979. However, since autumn 2010, small numbers have mingled with the large Mallard congregation around the inner group and this year produced sightings on four dates. A pair was present in the Kettle off Inner Farne on 15, 23 and 24 March, continuing the trend of recent springs. A pair south over Staple Island on 21 October was the first outer group record since 2003.

Teal *A. crecca*
A common passage and winter visitor.
The islands support a small wintering population favouring Knoxes Reef and the ponds on Brownsman and Inner Farne and these sites had small numbers still present when the Rangers returned in late March. Peak counts included 38 on Inner Farne on 3 April and 15 on Brownsman on 24 March. During April, there were 1-4 on 12 dates with the last record of two on Brownsman and then Inner Farne on 26 April. More unusual were two midsummer records with a male on Inner Farne pond on 2 June and a pair north through Inner Sound on 25 June. Autumn passage commenced from 13 July with a single north through Staple Sound. Thereafter, records of 1-80 were regular throughout the autumn and early winter with peak passage and the seasonal best of 305 north on 22 September (Table 3). Small numbers remained to winter at their favoured locations including up to 80 on Knoxes Reef.

Table 3. Northerly passage of Teal, Farne Islands 2012.

	1 Sep	10 Sep	22 Sep	23 Sep	24 Sep	28 Oct
Inner Sound	8	108	296	176	34	37
Staple Sound	79	72	9	23	10	96
Total	**87**	**180**	**305**	**199**	**44**	**133**

Mallard *A. platyrhynchos*
A common winter and passage visitor and well represented breeder.
It was a bumper year for this familiar fowl, with the nesting population increasing, and as usual, good numbers were reported throughout the year with an increase in late autumn. The first eggs were discovered on 29 March, one day earlier than last year, and 17 (10) pairs nested as follows: Inner Farne 7 (5), West Wideopens 3 (1), Staple 3 (1), Brownsman 2 (2), North Wamses 1 (0), South Wamses 0 (1), Big Harcar 1 (0). The first chicks hatched on 21 April and were heavily targeted as an easy meal by the resident gulls. The first chicks fledged on 7 July and in general they fared relatively well this year with at least three broods totalling eight ducklings fledging from Inner Farne. Birds on the outer group had a more difficult breeding season and no chicks

fledged from at least seven nesting attempts. During the autumn, numbers started to build on the inner group, favouring Knoxes Reef, with 23 on 25 October increasing to 34 on 21 November and 60 on 16 December. Not often seen on passage, a total of 55 flew north through Inner Sound on 26 October during significant wildfowl movement.

Pintail *A. acuta*
An uncommon passage and winter visitor.
This handsome member of the wildfowl family was recorded on four dates during the autumn: a pair flying low and calling over Inner Farne on the evening of 25 August, a female landing on Knoxes Reef with Mallards on 20 September, whilst seawatching on 26 October produced two singles north through Inner Sound (with Wigeon) and Staple Sound.

Garganey *A. querquedula*
A scarce passage visitor.
This summer visitor is predominately a spring passage migrant, with 17 of the previous 19 records occurring between 27 April and 27 May. A very late individual was flying north through Inner Sound on 26 October, the latest Farnes record and only the second ever October report after one on 2 October 1993.

Shoveler *A. clypeata*
A well represented passage and winter visitor.
It proved to be a very quiet year with only three records. A pair landed on Knoxes Reef on 25 March with a male in the same area on 30 March. Surprisingly, there were no more records until a male was seen flying north over the outer group on 16 November.

Tufted Duck *A. fuligula*
A well represented visitor.
Recorded on passage in small numbers, the year produced reports on 12 dates, with spring records including one south through Inner Sound on 23 April, a pair on Brownsman pond on 16 June and a male south through Inner Sound on 20 June. After a male north through Staple Sound on 20 July, 1-3 were recorded on five dates between 1 September and 24 October with four north on 6 August and 11 October. The final record was a female north through Inner Sound on 4 December.

Scaup *A. marila*
An uncommon passage and winter visitor.
The species is having a chequered run in recent years with no records from the islands in 2011, 2009 or 2006. However, after none last year, a return to form brought three records, all on northerly passage though Staple Sound: a female on 18 April, three (two male, one female) on 27 October and a pair on 28 November.

Eider *Somateria mollissima*
A breeding resident.
Small numbers were present throughout January-February and, with males in their breeding finery, courtship was very evident. The first prospecting birds arrived in late March and the first eggs were discovered on Brownsman on 13 April and Inner Farne on 18 April. A total of 443 (677) pairs nested as follows: Inner Farne 267 (415), West Wideopens 9 (22), East Wideopens 2 (5), Knoxes Reef 2 (6), Staple 23 (28), Brownsman 126 (178), North Wamses 1 (3), South Wamses 4 (6), Big Harcar 2 (5), Northern Hares 0 (2), Longstone 3 (3), Longstone End 4 (4). The

breeding population dropped by 35% from the previous season and constituted the lowest Farnes breeding total since 1967. The first chicks started hatching from 9 May but a combination of poor weather (many females abandoned nests before hatching), heavy predation and a dwindling population resulted in one of the worst ever breeding seasons. The Rangers monitored 288 nests (65% of the population) which produced 455 young (at hatching stage the females take the one-day ducklings to sea). This result gives an overall productivity of 1.58 (compared to 3.23 last year), one of the worst ever recorded on the islands. Bizarrely, a female was discovered incubating a Razorbill egg (along with five of her own) on Inner Farne although this failed to hatch. Good numbers remained around the islands throughout the autumn and winter with displaying drakes noted in late November.

Long-tailed Duck *Clangula hyemalis*
A well represented passage and winter visitor.
Apart from a small flock of wintering birds, most sightings were of birds flying north: the first of the year were four on 26 October (three through Inner Sound, one through Staple Sound), followed by one through Inner Sound on 28 October, a male through Inner Sound on 6 November, and a female in Brownsman haven from 10-15 November. Throughout late November, small numbers were logged on northerly passage through Inner Sound with a peak of six on 27 November. After northerly gales, the species returned to the traditional wintering area near the West Wideopens with a male on 26 November, four on 27 November and a peak of nine on 28 November. This flock remained throughout December with a peak of six in early December.

Common Scoter *Melanitta nigra*
A common passage and winter visitor.
Well represented throughout the year with records on an impressive 117 dates. On spring passage 1-17 were seen during March-May and a small group congregated behind the Wideopens/ Knoxes Reef during this period. This group of 15 were present on 23 March reducing to nine by 28 March and, after a further reduction to six by 8 April, the birds remained until last seen on 9 May. During the summer, passage numbers increased with 1-83 recorded during June-August and three-figure counts of 101 and 165 through Staple Sound on 19 and 20 July respectively. Autumn months produced 1-94 on passage with small numbers around the islands. Late October witnessed some impressive northerly movement with a peak of 755 north on 26 October (610 through Inner Sound, and 145 through Staple Sound), representing the second highest ever day count for the islands, followed by 436 on 29 October. On 27 November, 133 were logged flying north.

Velvet Scoter *M. fusca*
A well represented passage and winter visitor.
This impressive northern breeder was first seen on 20 July with three males flying north through Staple Sound heading to traditional moulting grounds off the Aberdeenshire coast. The first autumn records occurred in late September with a single north on 21 September and passage increasing over the following few days to six north on 22 September and 1-3 daily between 23-25 September. The season peak count was eight north (in one group) through Staple Sound on 15 October, whilst 25-27 October produced four, three and four north on consecutive days. The final record of the year involved four north through Inner Sound on 27 November.

Goldeneye *Bucephala clangula*
A common passage and winter visitor.
This handsome duck winters in small numbers around the inner group, mixing with other seaduck behind the West Wideopens. Wintering birds were still evident when the Rangers arrived in late March with 1-2 from 24 March - 1 April and the last spring record two on the sea behind the West Wideopens on 2 April. Autumn passage started early with two north through Inner Sound on 10 September, the second earliest autumn record in 17 years. The main bulk of passage did not start until late October and late November (Table 4). The only other records involved two female-types at the wintering area of the inner group by early December with a single north through Inner Sound on 4 December.

Table 4. Peak Goldeneye passage, Farne Islands 2012.

	25 Oct	26 Oct	27 Oct	28 Oct	29 Oct	9 Nov	27 Nov	28 Nov	29 Nov
Inner Sound	3	31	2	15	3	5	4	13	11
Staple Sound	0	1	1	5	0	0	0	0	0
Total	**3**	**32**	**3**	**20**	**3**	**5**	**4**	**13**	**11**

Red-breasted Merganser *Mergus serrator*
A well represented passage and winter visitor and rare breeder.
This sneaky sawbill once again proved difficult to monitor on the islands and potential nesting was not confirmed. Spring passage was logged on 10 dates with 1-4 between 2-26 April, the majority through Inner Sound. The spring peak produced five north through Inner Sound on 22 April. The breeding pair was first seen on St Cuthbert's Cove beach on Inner Farne on 28 April and then intermittently until 12 June with the last sighting involving the female on 29 June. Circumstantial evidence suggested that the pair did breed as the female was seen to wander into vegetation on at least three occasions, but the nest site was never discovered. After the summer, small numbers of 1-3 were noted on autumn passage on seven dates during September-November with four north on 28 November.

Goosander *M. merganser*
An uncommon passage visitor.
The islands produce a handful of records each year despite the species being regarded predominately as a bird of inland waterways. All records were autumn sightings through Inner Sound, the majority during a three day period in early September with eight south on 8, four north on 9 and two south on 11 September. The only other records involved two north on 28 October and three north on 29 November.

Red-throated Diver *Gavia stellata*
A common winter and passage visitor.
The Farnes produce 70-80 records annually with wintering numbers bolstered by spring and autumn passage. This year, the season produced reports on 78 dates with 27 in spring, four midsummer and 47 during the autumn. In general 1-7 were recorded with peak counts in Table 5. Away from the usual peak months, midsummer produced a handful of records including two south through Staple Sound on 20 June, a single north through Inner Sound on 24 June and 1-2 on 1 and 16 July. The first autumn birds started moving south into Farne waters from late August with noticeable southerly passage on 21 September. As usual, small numbers were wintering around the islands and were recorded regularly during November-December.

Table 5. Red-throated Diver, peak passage and direction, Farne Islands 2012.

8 Apr	9 Apr	11 Apr	21 Sept	22 Sept	23 Sept	27 Nov	28 Nov
9N	8N	6N	30S	14N	12N	9N	23N

Black-throated Diver *G. arctica*
A well represented winter and passage visitor.
This species is scarce in Farnes waters although the year produced a respectable six records, all in autumn. Early September saw passage through Inner Sound with one north on 8, two south on 10 and another south on 11 September. All other records were in late October with one on the sea in Staple Sound on 27 October and singles north through Inner Sound on 28-29 October.

Great Northern Diver *G. immer*
A well represented winter and passage visitor.
This hulk of a diver was well recorded especially during the autumn months. Late spring passage birds were flying north through Inner Sound with a single on 29 March, two north on 21 April and another north on 26 April. Autumn passage commenced in mid-September with two birds moving south through Inner Sound on 10 September followed by 1-2 on four dates between 17-27 September. Thereafter, 1-3 were noted on seven October and twelve November dates with peak passage in late November. A total of four flew north on 27 and a season peak of seven on 28 November included four north through Inner Sound and three on the sea. The Ranger team departed in early December but it was evident that 1-2 were wintering around the islands with records on three dates in the first week of the month.

Fulmar *Fulmarus glacialis*
A common breeder, abundant on passage.
The species was one of those most affected by poor weather during the summer which severely restricted the number of breeding pairs and overall breeding success. Good numbers were present in March and the first copulating pairs were seen on 16 April on Inner Farne. After a four day "honeymoon" period when pairs disappear from the islands prior to incubation, the first egg was discovered on 12 May on South Wamses. A total of 233 (276) nested as follows: Inner Farne 17 (27), West Wideopens 10 (16), East Wideopens 21 (17), Knoxes Reef 23 (23), Staple 36 (45), Brownsman 54 (74), North Wamses 28 (28), South Wamses 33 (33), Big Harcar 6 (8) and Longstone End 5 (5). Some pairs abandoned due to heavy rain in June, but the first chicks hatched on 1 July with the first fledgling on 16 August. Thereafter, fledglings took to the wing until the last departed in early September. A total of 167 nests were monitored with 76 chicks fledging giving an overall productivity of 0.46 (0.64 in 2011). Strangely, an adult was found brooding a small Oystercatcher chick on Brownsman north hill during late summer. As with the previous year, ringing activities revealed some chicks had eaten small lumps of plastic, which some birds regurgitated during bird-ringing. After the breeding season, birds became scarce on the islands until good numbers returned from 15 November, remaining until the year end.

Cory's Shearwater *Calonectris diomedea*
A scarce visitor.
This oceanic wanderer was recorded flying north off Brownsman at 15:25 on 21 September (giving superb views). Whilst the first record for the Farnes was as recently as September 1976, the species has only become regular in recent years, with nine records from 2000-2010. The sighting this year brings the overall total to 16.

Sooty Shearwater *Puffinus griseus*
A well represented to common passage visitor.
It was a quiet season for this southern oceanic wanderer with the first of the year seen flying north past the south end of the islands on 9 July. Other early summer arrivals in July included three north on 19 and seven north on 20 July, the majority through Staple Sound. With the lack of any northerly winds during August (a good time of year for large numbers) only 1-3 were recorded on six dates. However, in compensation for the lack of northerly passage, good numbers lingered around the islands in September taking advantage of large fish shoals moving close inshore. After 19 north on 6 September, some noteworthy numbers were recorded in a large feeding frenzy near Crumstone with 52 on 11 September peaking at 60 on 13 September. Birds continued to be seen in this area daily, with 34 on 21 September, but numbers declined soon after with only four present on 25 September. Small numbers 1-4 were recorded on four October dates with late passage including four north on 26 October and one north on 27 October.

Manx Shearwater *P. puffinus*
A common passage visitor.
This distinctive tubenose is one of the commonest stiff-winged visitors to the islands with reports on 54 dates during the year (10 dates less than the previous year). The first of the generally light spring passage involved four north on 11 April with an impressive 158 recorded north on 15 May, the majority off the south end of the islands. The following day, a further five were noted north with two north on 27 May. Overall it was a quiet year with three-figure counts of northerly passage on only four dates: 158 on 15 May, 122 on 10 June, 118 on 10 July and a maximum of 462 on 20 July. The species became more regular in July-September with counts of 1-67 before a gradual decline in early autumn. After singles north on 5, 9 and 20 October, late passage involved four north on 26 October, a single north on 27 and the last of the year was seen flying north through Inner Sound on 29 October.

Storm Petrel *Hydrobates pelagicus*
An uncommon passage visitor.
After the unprecedented numbers along the east coast last year, 2012 was below par for this dainty oceanic specialist. The only report involved three caught and ringed on Inner Farne on the evening of 20 July.

Leach's Petrel *Oceanodroma leucorhoa*
A scarce visitor.
This oceanic wanderer is generally recorded during severe weather although last year a single was trapped and ringed on Inner Farne. This year a single was seen flying north through Staple Sound in gale force easterly winds on 25 September, representing the seventeenth record (involving 21 birds).

Gannet *Morus bassanus*
Abundant passage and non breeding summer visitor.
This very abundant seabird is recorded almost daily throughout the season as large numbers move through on foraging trips from nearby breeding colonies in East Yorkshire and Lothian. As usual, northerly passage was strong in early spring with steady movements on several dates in late March and early April. This peaked at 1,718 north in one hour on 12 April with 951 north in 30 minutes the following day. However the most impressive gatherings occurred in early autumn as large feeding frenzies near Crumstone (to the south of the main islands) took advantage of

abundant fish shoals moving close inshore. These "frenzies" included an estimate of 5,000 birds on 11 September with 3,000 still present over the following few days. These huge flocks were an impressive sight but declined once the fish moved on. During the season, some individuals come ashore and an adult sat amongst Guillemots on the northwest cliffs of Brownsman on 15 May, while a recently fledged juvenile ventured onto Staple Island on 17 September. As usual, the species became scarce in early winter with only small numbers recorded in early December.

Cormorant *Phalacrocorax carbo*
A breeding resident.
There was a small improvement in the fortunes of this primitive-looking seabird, as the population showed a very slight increase for the first time since 2004. As usual, birds were on their breeding colonies in March with nest building activity from 24 March. The first eggs were discovered in the final few days of March and 135 (121) pairs nested as follows: East Wideopen 72 (59), North Wamses 18 (17) and Big Harcar 45 (45). Due to the timid nature of the species (pairs will flush at long range and are very sensitive to human disturbance) the Ranger team found it difficult to gain accurate data away from the basic population counts. However, observations suggested that it was a good breeding season (despite the weather) with good numbers of fledged young after the first fledgling on 11 June. Small numbers remained around the Farnes during the autumn and winter, with a typical count involving 28 south through Inner Sound on 3 September.

Shag *P. aristotelis*
A common breeding resident.
The species is one of the very few which remain around the island all year round, with large groups loafing on several islands throughout the winter. With a mild start to spring, the first eggs were discovered on 23 March, matching the previous earliest ever laying dates set in 1997 and 2011. After this rapid start, a good number of nests with eggs were recorded by the end of March and a total of 965 (926) pairs nested as follows: Inner Farne 263 (273), West Wideopens 92 (80), East Wideopens 88 (86), Megstone 19 (18), Skeny Scar 62 (52), Staple 162 (158), Brownsman 108 (103), North Wamses 42 (28), South Wamses 41 (51), Rodham and Green 5 (10), Big Harcar 64 (50) and Longstone End 19 (17). Encouragingly, the population increased for a fourth consecutive year with a 4% increase from the previous season. The first chick hatched on 25 April on Inner Farne and by mid-May many pairs were feeding young. The first fledgling was seen in the sea off Staple Island on 24 June and a protracted season saw a pair with a nest on Brownsman containing young in early October. As was the case for all the breeding seabirds, the weather caused issues across the colonies as large young (from the early nesters) were unable to shelter under their parents and succumbed to the elements (especially the rain). The Rangers monitored 344 nests (36% of the population) which produced 356 fledged young, giving an overall productivity of 1.03 (compared to 1.41 last year). Despite this slight decrease on last year, overall productivity was still well above the mean of 10 years ago. For the fourth consecutive year the colour ringing study continued, with over 130 new birds fitted with "darvic" rings, making them easily identifiable as individuals in the field. After the breeding season, large groups congregated around the islands throughout the autumn with 1,472 counted in one large flock in Staple Sound on 23 September.

Little Egret *Egretta garzetta*
Extremely rare visitor.
Following the explosion of the UK population, good numbers are now seen annually in Northumberland, especially around nearby Budle Bay and Lindisfarne. Despite this, the species

remains very rare on the islands with only three individuals recorded in 2011, 2003 and 1994. This year, an adult was seen flying past Inner Farne on the evening of 27 May.

Grey Heron *Ardea cinerea*
A well represented visitor. Bred 1894.
The islands continue to attract good numbers with a presence throughout the year, especially during the autumn with birds taking up residence on the favoured Knoxes Reef and Longstone complex. The spring produced just a handful of records with 1-2 on 12 dates between March and June. After the breeding season, birds became more frequent from early July with 1-2 on four July and nine August dates and a daily presence throughout September-November. As with recent seasons there were no large counts, with a maximum of three over Inner Farne on 21 August, over all the islands on 27 August and south through Inner Sound on 23 September.

Little Grebe *Tachybaptus ruficollis*
A rare visitor.
This freshwater specialist, still a rare sight around the Farnes, was recorded for only the tenth occasion. An adult was in the Kettle all day on 25 November and was seen successfully feeding despite the northerly gales at the time. This was the first record since 2 November 2008 and represents the tenth record (involving 12 birds overall) for the islands since the first in 1956.

Great Crested Grebe *Podiceps cristatus*
An uncommon visitor.
The species still remains a scarcity on the Farnes with records in only three of the previous five years. The only record of the year concerned an adult in summer plumage north through Inner Sound on 28 July.

Red-necked Grebe *P. grisegena*
A well represented winter and passage visitor.
The species is starting to become scarcer, reflecting the changes seen in Northumberland in recent times. The year produced records on only one day: a single flew south through Inner Sound on 26 October, with it, or another, north through Staple Sound later that day.

Slavonian Grebe *P. auritus*
An uncommon winter and passage visitor.
Despite good numbers wintering in Northumberland, it still remains a scarcity on the islands as the species has only been recorded in 19 of the previous 40 years (since 1970). An individual was on the sea, drifting north in Inner Sound, on 17 November.

Marsh Harrier *Circus aeruginosus*
An uncommon passage visitor.
The species is enjoying a population boom with birds now breeding in Northumberland and this has been reflected in the number of annual records. Up until 2008, the Farnes had only 15 records. However since then the species has been recorded annually with three in 2009 and two in 2010. This year a female flew low over Inner Farne on 27 March before heading north over Megstone towards Lindisfarne. This represented the earliest ever spring record, eclipsing the previous record of 21 April 2009.

Sparrowhawk *Accipiter nisus*
An uncommon visitor.
The British population is relatively sedentary, but is augmented by migrants from northern Europe. The early spring period produced three records as a large female was noted over the outer group and then Inner Farne on 25 March with further sightings of her over the inner group on 26-27 March. After a five month absence, a single was flushed off Brownsman on 24 September whilst a female was seen on Inner Farne on 30 September. Thereafter, the autumn produced singles on ten October and eight November dates. The number of individuals involved during this period could not be determined but at least one large female was responsible for daily sightings between 3-8 November. The last record of the year involved a male over the inner group on 22 November.

Kestrel *Falco tinnunculus*
A well represented passage visitor. May have bred in 1916.
This small hovering falcon is partially migratory within its range, as birds move from the near continent during the autumn. There were no spring records with the first of the year involving a female-type flying west over the inner group on 21 July, whilst it or a similar individual was present the following evening and again on 28 July. Autumn passage increased from mid-August with the appearance of an immature on Brownsman from 13-18 August. After one west over the inner group on 24 August singles were recorded on four September dates. Birds do not normally linger for long on the islands, so it was unusual for an adult male to take up residence from 14 October-3 December. During its stay the bird used both island groups and was seen successfully hunting on several occasions, with prey items including Redwing, Blackbird and Starling. The only other record during this period was an immature/female on Brownsman on 7-8 November.

Merlin *F. columbarius*
A well represented passage and winter visitor.
This impressive winged wizard breeds in the uplands of Northumberland and winters in the lowlands with the islands supporting resident birds in the spring and autumn. When the Rangers arrived in mid-March two birds were seen flying west together over Inner Farne on 25 March and at least one female was still active on the islands, seen on Longstone on 25 March and hunting the inner group on 5 April. The final sighting was of the bird hunting Staple Island on 11 and West Wideopen on 13 April before she departed for the summer. The first autumn record was an immature bird which lingered on Brownsman from 29 August-3 September. After a four week absence, birds became regular again from early October and were resident to the year end. At least two individuals were involved in daily sightings throughout this period and on some occasions two were seen hunting in tandem. The season peak count occurred on 30 October when three graced the outer group including two together on Brownsman and one on nearby Staple Island at the same time. As usual, a variety of prey was taken but the most spectacular was the sight of a bird smashing against the kitchen window of Brownsman cottage on 15 October, catching and killing a Robin.

Hobby *Falco subbuteo*
A rare visitor.
One of these majestic aerial hawkers was on Inner Farne during the late afternoon of 21 June. The bird, an adult, remained until dusk (upsetting the breeding Arctic Terns throughout) before roosting overnight on the window ledge of the dormitory window (see photograph in centre pages). The bird was present until 09:00 the following morning when it departed west towards

the mainland. The species still remains a rarity in the North East, but the islands boast six previous records: individuals in May 1859, May 1998, September 2000, September 2001, May 2002 and September 2008.

Peregrine *F. peregrinus*
A well represented passage and winter visitor. May have bred *circa* 1925.
This ultimate aerial predator reigned supreme throughout the spring and autumn as birds took up residence on the islands. Birds were present throughout January-March with at least two individuals regularly seen during this period. As the spring advanced, sightings became less frequent with late records including a female over Inner Farne on 1 May, a female over Big Harcar on 5 May and a male over the inner group on 21 May. Birds returned to the islands with a female over the inner group on 27 July. August saw singles on four dates before birds became regular from mid-September. As usual, 2-3 appeared to be wintering on the islands, including a very large female, with birds seen almost daily throughout October-November. Prey items this year included the usual feral Pigeons (which make up a large part of their diet) whilst Redwing and Turnstone were among those also taken. A half-eaten Puffin was found on 11 April and an egg was obvious within the corpse of the unlucky seabird.

Water Rail *Rallus aquaticus*
An uncommon passage visitor.
Although recorded annually, autumn produces the majority of reports as birds migrate into the UK. The year produced three records: a single was flushed from top meadow on Inner Farne on 24 October, and flew past the Ranger team as they were watching a Pallas's Warbler! The other two records were also on Inner Farne, with singles flushed from central meadow on 1 and 7 November.

Moorhen *Gallinula chloropus*
An uncommon passage visitor. Bred in 1901 and 1947-48.
Although a scarce visitor, they remain almost annual with records from 37 years since 1947. An adult was discovered on central meadow on Inner Farne on 23 April and remained for a further eight days. During its stay, the bird remained loyal to the vegetable garden on the island, often seeking shelter in the artificial tree. During this period, another was flushed from Staple Island on 26 April before eventually flying west. These were only the fifth and sixth spring records in the past 10 years.

Oystercatcher *Haematopus ostralegus*
A common winter and passage visitor, and well represented breeder.
It was a good year for this pied piper, as the population remained stable, equalling the highest ever total last year. The cacophony began in earnest when pairs started displaying and copulating on Inner Farne from 24 March. The first eggs were discovered on 14 May and 40 (40) pairs nested as follows: Inner Farne 7 (6), West Wideopens 4 (6), East Wideopens 2 (1), Knoxes Reef 3 (3), Staple 7 (6), Brownsman 7 (10), North Wamses 2 (1), South Wamses 1 (1), Big Harcar 1 (1), Northern Hares 1 (1), Longstone 3 (2) and Longstone End 2 (2). The first chick hatched on 9 June on Brownsman and this individual had the dubious honour of being the only chick to fledge from this island. It was a dreadful breeding season across the islands as poor weather and heavy predation resulted in very limited success with only 10 chicks fledged from 40 pairs. After the breeding season, post breeding flocks gathered with a peak of 272 on the inner group on 30 August (Table 6).

Table 6. Monthly peak counts of Oystercatchers, Farne Islands 2012.

	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov
Inner Group	71	67	32	64	63	272	87	120	92
Outer Group	20	89	53	6	22	83	52	68	30
Total	**91**	**156**	**85**	**70**	**85**	**355**	**139**	**188**	**122**

Golden Plover *Pluvialis apricaria*
A well represented passage visitor.
This upland moorland plover is well represented during the late summer as a sizeable post breeding flock assembles on Longstone. However, a flock of 35 north through Staple Sound on 26 April was the first spring record since 2010. Post breeding birds arrived on Longstone on 12 July with a single bird, increasing rapidly to 95 by 17 July. Numbers continued to increase in July and August (Table 7) to a peak of 960 on 22 September, decreasing during October with 51 north through Inner Sound on 1 November representing passage birds. More unusually, 1-2 remained on the islands throughout November and into early December with three on 30 November.

Table 7. Golden Plover numbers, Farne Islands autumn 2012.

17 Jul	27 Jul	2 Aug	6 Aug	19 Aug	29 Aug	2 Sep	22 Sep	23 Sep	1 Oct	15 Oct
95	210	306	457	632	500	620	960	500	201	240

Grey Plover *P. squatarola*
A well represented passage visitor.
It was a below-par season with just seven autumn records. The first, a summer plumage adult, was on Northern Hares on 7 August, and there was another on Knoxes Reef on 1 September. Further records were singles on the outer group on 25 September and 4 and 11 October. Northerly passage birds were two through Inner Sound on 26 October and two through Staple Sound the following day.

Lapwing *Vanellus vanellus*
A well represented passage visitor. Sporadic breeder in past; last attempt in 1962.
This declining farmland breeder is noteworthy on passage with small numbers seen annually during spring and autumn. The first record was an impressive 230 which arrived from the south on 2 September, the majority landing on the East Wideopens, and 60 heading west towards the mainland. The following morning, 174 were in this area before eventually heading west. Large numbers are unusual on the Farnes and this was the second highest ever count for the islands. Thereafter, records returned to normal with 1-2 on seven dates between 25 September-23 November, including one lingering on the seal colonies on Brownsman from 20-23 November. Higher counts during this period included seven west on 5 September and nine west on 22 October.

Ringed Plover *Charadrius hiaticula*
A common passage visitor, uncommon and declining as a breeding species.
After last year's catastrophic breeding season, it was a productive year although the drop in the population is a cause for concern. Displaying and courtship were observed from 28 March on Inner Farne beach and the first two eggs were discovered on Brownsman on 18 April. An

interesting record was 11 together on Longstone on 30 May, suggesting that they may have been northern-race birds. Only 4 (8) pairs nested as follows: Inner Farne 1 (3), Staple 0 (1), Brownsman 3 (3) and Longstone 0 (1). The breeding season was comparatively successful compared to recent years as the first chicks hatched on Brownsman on 8 June and both went on to fledge by 10 July. Similar success was recorded on Inner Farne where the first chicks hatched on 2 July and all three chicks fledged by 26 July. As usual a small post breeding flock gathered on the inner group with 25 there on 16 August peaking at 27 on 24 August. Numbers dwindled thereafter with 14 on 31 August and only three on 11 September. On the outer group 1-4 were evident during September-October with a peak of eight on 18 October. The species was scarce in November with only a single recorded on three dates on Brownsman.

Whimbrel *Numenius phaeopus*
A well represented passage visitor.
This migratory wader was recorded on seven spring and 38 autumn dates. The first of the year was flying north through Inner Sound on 11 April, the earliest record since 2004. All other spring reports occurred in May with 2-3 on the outer group, favouring Longstone between 11-20 May, with 1-3 on the inner group during the same period. A spring peak of five over the inner group occurred on 16 May. The final spring record was a single on Nameless Rock on 23 May. The first autumn returnees arrived from 13 July with one on Longstone followed by another on Brownsman on 15 July. During late July and August 1-4 were regularly recorded with peaks of 13 on Knoxes Reef on 31 July and 17 on the inner group on 20 August. Peak counts on the outer group included five on Brownsman on 26 July and six over the Wamses on 14 August. The last records of the year were two on Knoxes Reef on 11 September, and a single on Brownsman on 13 September was the latest for three years.

Curlew *N. arquata*
A common passage and winter visitor.
This upland breeder is recorded throughout the year with large numbers gathering on Knoxes Reef. It has become evident during recent years that numbers have reduced on the islands, as Knoxes Reef would regularly attract up to 400 compared with the peak of 236 this year. As usual, small numbers were evident in spring and early summer with peaks of 178 on 21 October and 236 on 8 November (Table 8). Only small numbers were recorded on the outer group during the year with a maximum of 23 on 31 October.

Table 8. Monthly peak Curlew count on Knoxes Reef, Farne Islands 2012.

Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
6	9	4	3	66	126	123	178	236

Black-tailed Godwit *Limosa limosa*
An uncommon passage visitor.
It was a disappointing season for this long-legged wader as the year produced just three records. A summer plumage individual was flushed off the pond on Inner Farne on 21 July and flew to West Wideopens. Another was seen flying east over Inner Farne on 2 August. The third and final record was one west, with a Golden Plover, over Brownsman and then Inner Farne on 29 August.

Bar-tailed Godwit *L. lapponica*
A well represented passage visitor.
This trim-legged traveller was well reported throughout the year. The Knoxes Reef area produced eight on 31 March with 1-4 on three dates between 2-12 April. After two on West Wideopens on 23 May, 1-29 were seen on 24 dates between 9 June-22 September, with the majority of sightings on the inner group. The only exception was a peak of 43 seen on Brownsman then Knoxes Reef on 2 June. The autumn months brought just a handful of records with singles on 8 and 21 October, and 15 noted on Knoxes Reef on 16 and 19 November.

Turnstone *Arenaria interpres*
A common passage and winter visitor, uncommon in summer.
Present all year round with large numbers reported in late summer (when the islands are within the 480 threshold for nationally important numbers; Table 9). The spring period produced regular reports of up to 155 throughout March-April, reducing in numbers during May as birds moved north. Non-breeders remained throughout the summer and birds could often be found feeding around flooded Puffin burrows, especially on Brownsman. Return passage gathered momentum with an impressive 758 counted on the islands on 24 July, with 465 on 3 August. However, this was eclipsed by 880 on 20 August: 514 on the outer group and 366 on the inner group (the third highest ever count for the Farnes). Good numbers remained over the following few weeks before numbers settled with up to 300 wintering on the islands.

Table 9. Peak monthly Turnstone counts, Farne Islands 2012.

	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Inner Group	70	45	42	28	368	366	231	150	42
Outer Group	33	110	60	68	390	514	35	140	58
Total	**103**	**155**	**102**	**96**	**758**	**880**	**266**	**290**	**100**

Knot *Calidris canutus*
A well represented passage visitor.
This high-arctic breeder is found commonly around the UK coast especially during winter. Northern-bound birds were recorded on spring passage with two over Knoxes Reef and then Brownsman on 31 March, and 14 on Knoxes Reef on 12 May. The only other May records were from Longstone, with a single dead at the base of the lighthouse on 21, and another on the east rocks on 31 May. Thereafter the species was recorded (mainly on the inner group) throughout June-August although in smaller numbers than recent years. Records involved regular counts of 1-15 with peaks of 25 on 23 July, 10 on 28 July and 20 on 29 August. Numbers gradually declined with a single on Inner Farne on 30 September representing the last record.

Ruff *Philomachus pugnax*
A well represented passage visitor.
It was a good year for this sexually dimorphic wader with six individuals recorded during late summer passage. The first, an immature, lingered on the outer group on 15-16 August and at one stage could be seen foraging amongst Kittiwake nests on the south cliff of Brownsman. Further Brownsman records included a ringed bird on the "flats" on 26 August, a moulting male on 8 September on the pond and an immature/female near the west cliffs on 11 September. On the inner group, a single landed on Knoxes Reef on 19 September with another south over Inner Farne on 21 September.

Temminck's Stint *C. temminckii*
An extremely rare visitor.
An adult of this pint-sized peep was discovered feeding on Longstone on 30 May during a noticeable influx of waders to the islands; only three Rangers enjoyed the delight as deteriorating weather conditions prevented others from travelling to see it. This was only the second Farnes record, almost 33 years exactly since the adult on Staple Island and Brownsman on 29 May 1979.

Sanderling *C. alba*
An uncommon passage visitor.
This long-distance migrant is recorded annually in small numbers (on average six records per year over the past decade) with the islands producing five reports in 2012. An adult summer plumage bird was noted on West Wideopens beach on 22 May with moulting adults on Inner Farne on 29 July, West Wideopens on 2 August and Inner Farne on 13 August. The only outer group record was four winter-plumage birds feeding together on the north rocks of Brownsman on 23 September.

Dunlin C. *alpina*
A common passage and winter visitor.
This passage wader is recorded in small numbers during spring passage, with most records of birds on autumn passage between July-September. On the inner group, 1-4 were recorded on 11 dates from 26 March-31 May with a peak of 16 on West Wideopens on 12 May. On the outer group a similar picture was evident with 1-9 between 11 May-8 June. The bulk of records occurred during the late summer as the species was present throughout, favouring Longstone, Brownsman and Knoxes Reef (Table 10). Numbers dwindled gradually with 1-4 present until late October and a peak passage of 46 north through Inner Sound on 28 October. As usual, the species was absent during the winter months.

Table 10. Peak Dunlin counts, Farne Islands summer 2012.

	17 Jul	20 Aug	30 Sep
Inner Group	16	8	7
Outer Group	63	15	11
Total	**79**	**23**	**18**

Purple Sandpiper *C. maritima*
A common passage and winter visitor.
The Farnes are an important site for the species and the islands hold nationally important numbers during the year (threshold for nationally important is 130). As expected, good numbers were recorded during spring and autumn passage with a season peak of 331 on 22 April (Table 11). The species was recorded throughout the year, including the summer months, with May producing daily records of 1-25 with a peak of 57 on 19 May. Birds were still present by the month end with six on Longstone on 31 May and two on 2 and 5 June. The first autumn returnees started arriving on the islands from 7 July with two on Brownsman increasing to 10 by 15 July. Thereafter the species was recorded regularly with an autumn peak of 277 on 11 November.

Table 11. Peak counts of Purple Sandpiper during the season, Farne Islands 2012.

	11 Apr	22 Apr	19 May	24 Jul	19 Aug	30 Sep	23 Oct	11 Nov
Inner Group	85	69	30	30	36	60	80	120
Outer Group	157	262	27	138	189	10	81	157
Total	**242**	**331**	**57**	**168**	**225**	**70**	**161**	**277**

Baird's Sandpiper *C. bairdii*
An extremely rare visitor – first record for Farne Islands.
This rare Nearctic wader appeared for the first time on the islands when a moulting adult was discovered feeding on Brownsman pond on 25-26 September (see centre pages). The bird showed well during its two day stay and associated with a small flock of Dunlin, occasionally wandering to nearby Staple Island on foraging trips. This was the seventh Northumberland record with the six previous including individuals at Druridge Bay 1967, Holy Island 1998, Hauxley 2003, Boulmer 2005, Cresswell 2008 and Cresswell again on 16 September 2012. However, adult birds are rare, as the majority of UK records refer to juveniles and this was only the ninth adult in the past 10 years.

Little Stint *C. minuta*
An uncommon passage visitor.
A great season for this demure peep as the islands had their first records for three years. A confiding adult in summer plumage was discovered on Longstone on 30 May, the first spring record since 1999. Autumn produced a single juvenile on Brownsman pond on 25 September and it or another was located on the pond on Inner Farne on 26 September (at times approachable to 4 feet). The species should be annual on the islands but these were the first records since 6 September 2008!

Grey Phalarope *Phalaropus fulicarius*
An uncommon autumn passage and winter visitor, extremely rare in spring.
This specialist surface feeder is now expected annually, although this has not always been the case with just 15 records of 17 birds between 1950-2000. This pattern has changed since 2001 as the species has been seen annually with some impressive numbers, including a minimum of 15 last year (including six together). This year saw a return to normal with two reports: a first-winter bird was seen near South Wamses on the morning of 5 October before relocating to the Kettle area, Inner Farne, later that day. The bird showed extremely well (down to 5 metres) and was present for a further two days, remaining until 7 October. Another first-winter bird was discovered feeding just off the west jetty of Staple Island on 4 November and allowed close views.

Common Sandpiper *Actitis hypoleucos*
A well represented passage visitor.
It was a good year for this dainty summer visitor. Three birds were present on 10 May (singles on Brownsman, Staple Island and Inner Farne) and 1-2 were reported on a further 11 dates between 11-29 May with one on Northern Hares on 30 May the last spring record. The first of the autumn arrived on Brownsman on 5-7 July and Inner Farne on 8 July; subsequently, 1-3 were reported on four dates in July and 20 dates in August with peaks of nine on 13 August, including five together on Brownsman pond, and four on 19 August. A late straggler was on Inner Farne then the East Wideopens on 25-26 September.

Green Sandpiper *Tringa ochropus*
An uncommon passage visitor.
A tremendous year for this stripe-tailed sandpiper: a spring bird was discovered on Brownsman, favouring the pond, and present for four days from 29 April-2 May, representing only the ninth spring record in the past 30 years (the last was in June 2010). Wader passage in July produced reports of individuals on three dates: Brownsman on 11 and 21 July and Inner Farne on 27 July. Passage continued into August with three on Inner Farne on 13 August and a single on Brownsman from 14-25 August. There were three west over Inner Farne on 27 August, a single on Brownsman on 6 September, and the last of the year was on the north rocks of Inner Farne on 24 September.

Greenshank *T. nebularia*
A well represented passage visitor.
It was a disappointing season for this familiar and distinctive passage wader and birds were recorded on just eight dates during the late summer. The first was flying low over Inner Farne on 31 July and was followed by a single on Staple Island on 6 August. The next day, three flew together over the outer group and continued west having investigated the pond on Brownsman. The season peak count occurred on 20 August with three flying west over Inner Farne whilst two were on Knoxes Reef and West Wideopens nearby. A single flew west on 24 August, two west on 25 August, with the last of the year a single over Inner Farne on 12 September.

Wood Sandpiper *T. glareola*
An uncommon passage visitor.
Since 2000, the islands have produced annual records (apart from 2004); that pattern continued with summer-plumage birds on Brownsman pond on 10 May (the second earliest ever record) and 26 May, with another over Inner Farne on 22 June. This impressive run of records is in contrast to previous decades as the 1990s produced records in five years, the 1980s six years and the 1970s in only two years.

Redshank *T. totanus*
A common passage and winter visitor. Bred in nine years 1901-1943.
This former breeder remains a common visitor to the islands although few are recorded during May and June (Table 12). Early spring brought daily records with a peak of 19 on 31 March; the species gradually became scarcer as birds moved off to mainland breeding grounds. During May and June there were reports on only seven dates, all involving singles with the exception of four on Longstone on 26 May. The first of the autumn arrived on 5 July, with good numbers recorded and a season peak of 71 over the inner group on 10 July. Small numbers remained to winter on the islands with up to six in early December.

Table 12. Peak monthly counts of Redshank, Farne Islands 2012.

	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Inner Group	19	6	1	0	71	10	15	8	11
Outer Group	8	5	4	1	22	24	23	10	7
Total	**27**	**11**	**5**	**1**	**93**	**34**	**38**	**18**	**18**

Jack Snipe *Lymnocryptes minimus*
A well represented passage visitor.
It was a reasonable year for this secretive passage and winter visitor to the islands with an easterly weather front bringing an influx to the islands in late September. On Inner Farne a single was present on 24-25 September with three discovered on 26 September, including two in the central meadow gully. During this period, even greater numbers were seen on Brownsman with four on 25 September and five on 26 September, with all the birds favouring the wet areas of the sluice leading from the pond. Further records included singles on North Wamses on 28 September, another caught and ringed on Inner Farne on 12 October, and singles on Brownsman on 1, 3 and 10 November. A late individual was present on Staple Island then Brownsman on 3-4 December feeding at the south end of the island.

Woodcock *Scolopax rusticola*
A well represented passage visitor.
This irruptive immigrant was first seen on Inner Farne on 7 February, followed by a fresh raptor kill of one on 23 March. As usual, the autumn produced the bulk of the records as an easterly weather front on 12 October produced six on the islands (five on Brownsman and one on Inner Farne) with singles on 16-17 October. A noticeable influx occurred between 22-30 October (Table 13) with a peak of 24 across the islands on 23 October including eight on Brownsman, seven on Longstone End, five on Staple Island and four on Inner Farne. November produced records of 1-3 on 12 dates with four on 19 November and an influx of 15 on Inner Farne on 25 November. Late migrants were seen on Staple Island on 1 December and Brownsman on 2-3 December.

Table 13. Woodcock influx, Farne Islands October 2012.

	22 Oct	23 Oct	24 Oct	25 Oct	28 Oct	29 Oct	30 Oct
Inner Group	2	4	3	0	7	1	2
Outer Group	2	20	2	1	4	2	2
Total	**4**	**24**	**5**	**1**	**11**	**3**	**4**

Snipe *Gallinago gallinago*
A well represented passage visitor.
Spring passage was light with four records, all involving singles, on Inner Farne on 24 March, Staple Island on 25 March, Inner Farne on 4 April and Brownsman on 11 April. Autumn passage was noted from 13 August with one feeding on Brownsman pond on 13 and 15 August. Thereafter the islands produced regular records throughout the autumn with 1-3 noted on passage and peaks of 13 west over Inner Farne on 10 September and five west over Brownsman on 23 October. Numbers declined as the winter progressed with only a scattering of records in November, the final report involving a single on Brownsman on 24 November.

Pomarine Skua *Stercorarius pomarinus*
A well represented passage visitor, common in some years.
It was a quiet year for this powerhouse of a Skua with reports on nine dates over a four month period. The first of the year, an adult with full "spoons", was seen flying north through Staple Sound on 20 July with a sub-adult north later that day. The lack of any serious northerly winds resulted in light passage with 1-2 north on six dates between 30 August-24 September. A third-winter was over the outer group on 6 November before visiting the inner group; this bird, with

full "spoons", was seen again the following day landing on South Wamses possibly looking for carrion on the Grey Seal colony.

Arctic Skua *S. parasiticus*
A common passage visitor.
This aerial sea pirate had another good year with sightings during both spring and autumn passage. Spring passage was light, with all records referring to individuals in June: a dark-phase adult flew north off Brownsman on 1 June, and another from 17-20 June. Autumn birds appeared from early July with 1-5 recorded on 54 dates from 1 July-25 September – these could often be seen harrying the local seabirds for food. Passage was logged on several dates (Table 14) with a peak of 26 north on 23 September. Late-passage birds were in early October with two north through Staple Sound on 8 October, and three north off the south end of Brownsman on 11 October.

Table 14. Peak Arctic Skua passage and direction off the Farne Islands 2012.

20 Jul	27 Aug	30 Aug	21 Sep	22 Sep	23 Sep	24 Sep	25 Sep
13N	15N	12S	10S	3N	26N	2N	11N

Long-tailed Skua *S. longicaudus*
An uncommon passage visitor.
It was another good year for this prized jewel of the avid sea-watcher after the influx last year and the season produced eight birds on four dates. The first, a dark-phase juvenile, flew north through Staple Sound on 27 August; this record was followed by an adult north through Inner Sound on 21 September, three north (all juveniles) off Brownsman on 23 September, and another three juveniles north on 25 September, all through Staple Sound.

Great Skua *S. skua*
A common passage visitor.
2012 was a good year for this bruiser of a skua with the autumn producing the first ever three-figure count. A very early spring record involved a single north through Staple Sound on 2 April, then singles north on 12 and 23 April. Subsequent spring records included singles north on 20 May (off Brownsman), over Brownsman on 1 June and again off the south end of the islands on 2 June. The first autumn passage birds arrived from 10 July with reports of 1-9 on 41 dates until late October. During this period peak passage included 14 north through Staple Sound on 20 July and a noticeable influx in late September (Table 15). The count of 107 north on 25 September was the highest ever from the islands, eclipsing the previous record of 99 on 13 August 1993. A juvenile lingered on the Grey Seal breeding colonies from 28 October-1 November but was found dead on Staple Island. The final records, all flying north, were one through Staple Sound on 6 November, and three on 27 November.

Table 15. Northerly Great Skua movement off the Farne Islands, September 2012.

19 Sep	20 Sep	21 Sep	22 Sep	23 Sep	24 Sep	25 Sep
1	2	27	6	12	13	107

Puffin *Fratercula arctica*

An abundant breeding summer and passage visitor.

It was a very difficult year with inclement weather (especially heavy rain), and the after-effects of moulting seals, affecting breeding success. After a mild spring, it was an early start and birds were already settled when the Rangers returned on 23 March, with bill-tapping and spring cleaning of burrows already underway. Birds remained unsettled until the first eggs were discovered on 13 April on Inner Farne and Brownsman the following day (the earliest egg-laying date since 1991). The first adults carrying Sandeels on Inner Farne were observed on 20 May and two chicks were found in burrows later that day. The population was not counted, with a full census due in 2013. The summer proved to be disastrous – the wettest year on record flooded out thousands of burrows, especially on Brownsman, where it was estimated that the island lost 8,000 (90%) of its nesting burrows. It was a better picture elsewhere as the deeper soil caps of Staple Island and Inner Farne allowed birds to escape the worst of the flooding. Monitoring by the team was virtually ruled out on Brownsman but 45 nests on Inner Farne produced 38 fledglings. The first "puffling" of the year was found dead on the rocks of Staple Island on 27 June but good numbers (in certain colonies) started fledging soon after and throughout July. The majority of young and adults were gone by late July, although birds were still feeding a youngster on Inner Farne on 16 August. The species became scarce immediately after the breeding season, with birds reappearing in Farne waters from late September. Typical autumn counts included four north on 25 October and six in Staple Sound on 29 October.

Black Guillemot *Cepphus grylle*

A well represented winter and passage visitor. Bred in 17th and possibly 18th centuries.

An individual was reported on seven dates between 12 February-4 March just north of Inner Farne near Megstone. An adult summer-plumaged bird was seen flying north through Inner Sound on 9 April and was presumed to be the same individual seen intermittently over the following two months. The bird was seen roosting with Eiders on Ladies Path on Inner Farne on 13, 14, 19 and 20 May and again on 13 June. The bird was starting to show signs of moult by the time it was last seen, again on Ladies Path on 26 and 29 June. It is unusual to have summering birds, the last midsummer records occurring in 2006. The first autumn returnees were seen on 27 October with three north (including two adults and an immature) through Staple Sound. It was a very quiet winter, with only two more confirmed reports: singles in Staple Sound on 21 November and 26 December.

Razorbill *Alca torda*

A common breeding resident and passage visitor.

It was another boom year for this dinner-jacketed auk; the inexorable rise in numbers since the 1970s is a real Farnes success story. Small numbers returned to the cliff ledges in late March although the first egg was not discovered until 27 April. A record 420 (390) pairs bred as follows: Inner Farne 193 (175), West Wideopens 85 (80), East Wideopens 21 (14), Skeney Scar 16 (12), Staple 48 (37), Brownsman 17 (12), North Wamses 7 (13), South Wamses 16 (22), Roddam and Green 0 (1), Big Harcar 16 (23) and Longstone End 1 (1). The first chicks hatched on 30 May and the first "jumpers" (chicks fledge at just 18 days of age) were seen leaving the lighthouse cliff on Inner Farne on 20 June. Gradually numbers declined as adults took small young out into the relative safety of the North Sea with the last fledglings on 3 August. Productivity suggested a reasonable year (despite the weather) with 16 chicks fledging from 23 monitored nests, and an overall productivity of 0.70. Small numbers were around the islands during the autumn and early winter, with 10 counted on 28 October being typical.

Little Auk *Alle alle*

A well represented winter and passage visitor.

The Farnes have cemented their position as one of the best localities in the UK for these small Nordic visitors, with another good showing during the autumn (Table 16). Northerly winds saw 20 north on 26 October, with good numbers over the next few days. The peak of 4,903 north on 29 October was the highest recorded nationally in 2012, with the majority of birds moving through Staple Sound. Small numbers were recorded daily during November with peaks of 40 north on 6 November and 35 north on 7 November. Unlike recent years, birds moved out of Farnes waters rapidly and the last record was of three in Staple Sound on 21 November.

Table 16. Peak Little Auk passage, Farne Islands October 2012.

	26 Oct	27 Oct	28 Oct	29 Oct	30 Oct
Inner Sound	1	2	7	218	1
Staple Sound	19	300	58	4,685	19
Day Total	**20**	**302**	**65**	**4,903**	**20**

Guillemot *Uria aalge*

An abundant breeding resident and passage visitor.

It was onwards and upwards yet again for this "northern penguin" on the Farnes as the population figures suggest a very healthy colony. As has been the case in recent years, the breeding season started early with the first eggs discovered on 10 April and a total of 49,076 (47,977) individuals nesting as follows: Inner Farne 6,784 (6,823), West Wideopen 2,232 (2,134), East Wideopen 3,096 (2,739), Megstone 420 (250), Skeny Scar 2,216 (2,672), Staple 23,665 (22,502), Brownsman 8,360 (8,547), North Wamses 1,317 (1,480), South Wamses 489 (440), Roddam and Green 97 (130) and Big Harcar 400 (260). The population showed a 2.3% increase on the previous year, representing a record population count for the islands. The first resident National Trust wardens, in 1971, counted 1,349 birds – it's been some increase! The first young hatched on 19 May and the first "jumpling" was off Staple Island on 2 June. Despite the atrocious weather the population experienced a very good year (unlike many east coast colonies) with huge numbers of young leaving the islands from mid-June to early July. It was estimated that over 20,000 fledged on the Farnes representing a very healthy return. The nesting season appears to be starting earlier year-on-year with the majority of the sea cliffs bare by early July: the last outer group fledgling departed on 11 July, and the last fledgling on the islands jumped from Inner Farne on 23 July. Small numbers returned to winter around the islands from September with counts of up to 30 noted in late October.

Little Tern *Sternula albifrons*

A well represented passage visitor.

The majority of records refer to the traditional evening roost in St Cuthbert's Cove, Inner Farne, with a rapid increase peaking mid-May before birds disperse to nearby breeding grounds. A count of 12 on 1 May suggested that the first birds may have arrived a few days before, with a rapid build up eventually peaking at 103 on 13 May (Table 17). This count was the third highest for the Farnes and the first time the three-figure barrier had been broken since 2007. Numbers soon declined with just six on the evening of 2 June. Birds were recorded at the roost site in late June, suggesting failed breeders, with four on 29 June and two on 2 July. The last record of the year concerned a single at St Cuthbert's Cove on 4 July.

Table 17. Little Tern evening roost counts in May, Farne Islands 2012.

May:	1	2	5	7	8	9	12	13	16	20	26
Count	12	18	26	58	61	83	64	103	49	39	3

Black Tern *Chlidonias niger*

An uncommon passage visitor.

This dainty marsh tern is recorded annually in small numbers and this year produced records on three dates. A moulting adult was seen flying north through Inner Sound on 6 August, with two juveniles north through Staple Sound on 27 August. The final record was a moulting adult off the south end of Inner Farne on 5 September.

Sandwich Tern *Sterna sandvicensis*

A breeding summer and passage visitor.

This transient tern continued its topsy-turvy trend on the islands with a welcome increase in the population. The first returning birds were discovered early with 10 on Knoxes Reef on 24 March. There was a rapid increase in the roost (Table 18) with 700 by mid-April. The first birds began to settle on the usual site on Inner Farne from 21 April, but moved in early May and started settling on central meadow. The first eggs were discovered on 5 May and the population showed a welcome increase with 966 (544) pairs nesting as follows: Inner Farne 966 (544) and Brownsman 0 (0). The first chicks hatched on 2 June and, as with all the breeding seabirds, found it difficult with the poor midsummer weather. The first chicks started fledging from 7 July and many more followed soon after. Unlike recent years, young did not crèche on the beach as birds remained loyal to the natal area around the ponds. After the breeding season, birds moved away from the islands and the last sighting was three through Staple Sound on 8 October.

Table 18. Sandwich Tern evening roost counts, Farne Islands 2012.

24 Mar	25 Mar	29 Mar	1 Apr	2 Apr	7 Apr	8 Apr	12 Apr	22 Apr
10	8	31	138	166	194	312	600	700

Common Tern *S. hirundo*

A breeding summer and passage visitor.

Another stable year for this relatively scarce Northumberland breeder, maintaining a toehold as a breeding species. The first of the year arrived on Ladies Path on Inner Farne on 12 April with aerial displays by two pairs from 23 April. Soon after, birds settled on the traditional breeding areas of central meadow on Inner Farne with the first eggs discovered on 14 May. For the second consecutive year there were no breeding attempts on the outer group. Thus the 88 (101) pairs nested as follows: Inner Farne 88 (101) and Brownsman 0 (0). The first chick hatched on 3 June with the first fledgling on 7 July. The breeding season appeared to be difficult with very few fledglings, mainly due directly to the poor weather. Birds started moving away from the islands in late July with the last record involving one north over Inner Farne on 22 September.

Roseate Tern *S. dougallii*

A well represented summer and passage visitor, uncommon breeding species.

This evocative summer visitor is now becoming a passage visitor as the species has only attempted to breed once in the past five years. This depressing trend continued and, despite the presence

of adults during the summer, there was no breeding attempt. The first of the year was noted on Ladies Path on Inner Farne with two present on 9 May and these, or another pair, copulating on 13 May. Birds were regularly recorded throughout the summer especially on Inner Farne with a maximum of three on 7 June. Despite courtship displays and sightings of birds dropping into the Sandwich Tern colony, no breeding attempt was suspected. Post breeding dispersal from the main breeding colony on Coquet Island brought good numbers to the islands with a peak of 11 on 27 July and seven on 28 July. However, numbers decreased rapidly with three present on 4 August. A late individual was noted with a small flock of Terns in Inner Sound on 10 September, the latest since 2002.

Arctic Tern *S. paradisaea*
An abundant breeding summer and passage visitor.
It proved to be a tough year for the "sea swallow" as weather conditions had a detrimental effect on breeding success. The first birds arrived on 18 April and aerial courtship display soon followed, with nest scraping from 7 May. The first eggs were discovered on 13 May (an average laying date) and 1,923 pairs nested as follows: Inner Farne 1,282 (1,170), Staple 11 (0) and Brownsman 630 (660). The first chicks hatched on 4 June but record breaking rainfall and below average temperatures saw chicks succumb to the cold, damp conditions. Bad news continued with an almost complete wash out of 87 nests on Brownsman due to a high tide and strong winds on 10 July, whilst predation remained an issue. Despite this, food supply was superb and for those chicks which did survive there was rapid development and healthy growth. The rangers monitored 1,010 nests (representing 53% of the population) which fledged 654 young (overall productivity rate 0.65). Once again, the highly disturbed courtyard on Inner Farne remained the most productive, the presence of visitors keeping away predatory gulls. Elsewhere, the colony within the lighthouse compound on Inner Farne continued to increase – from a few pairs in 2009 to 246. Overall it was a poor year with bad weather in June-July resulting in reduced breeding success, although a good number of chicks went on to fledge. The first fledglings were seen on 1 July with the last on 12 August from Inner Farne. Numbers rapidly decreased with late records including 10 north through Inner Sound on 27 September and four south through Staple Sound on 2 October.

Sabine's Gull *Xema sabini*
An uncommon passage visitor.
It was another good year for this Nearctic visitor. A juvenile flew north past Crumstone and through Staple Sound on 6 September. Two adults were together in Staple Sound on 10 September with both moving west through the Sound before diverting around the north end of Knoxes reef. The birds then moved into Inner Sound and, after a spell of feeding (observed dip feeding and sitting on the sea), headed south. After the first Farnes record in 1991, the islands now boast 25 records (involving 28 individuals) with 17 of these within the last 10 years.

Kittiwake *Rissa tridactyla*
An abundant breeder and passage visitor, well represented in winter.
Despite the weather (and consequent losses) it was still a productive year for this iconic seabird. The mild spring encouraged another early start (a trend of recent years) with nest building activity from 31 March. Birds continued courtship and nest building throughout April and copulation was seen on 25 April on Staple Island, with the first eggs discovered on 1 May. The population experienced another increase (for the second consecutive year) with 4,241 (3,976) pairs nesting as follows: Inner Farne 1,275 (1,192), West Wideopens 198 (183), East Wideopens 229 (221),

Skeney Scar 141 (155), Staple 1,197 (996), Brownsman 1,130 (1,104), North Wamses 20 (42), South Wamses 0 (24), Roddam and Green 10 (15) and Big Harcar 41 (44). The first eggs hatched from 28 May, but the season was blighted by poor weather: small "wrecks" of chicks were found washed up around the islands throughout June and early July. The poor breeding season was demonstrated in a sub-colony on Brownsman which lost all 32 nests on the evening of 28 June, the day which will go down in Northumbrian folklore as "Thunder Thursday". The first fledglings took to the wing on 2 July and despite the atrocious weather it still proved to be a reasonably successful year. The Rangers monitored 505 nests (representing 12% of the population) which produced 439 fledged young with an overall productivity of 0.87. Productivity was above the mean of the previous 12 years and goes to show how hardy and resourceful seabirds can be, despite the hardships they face in harsh weather and out to sea. Small numbers were recorded throughout the late summer and autumn, the exception being up to 1,000 roosting on Staple Island on 25 August, an unprecedented return at that time of year.

Black-headed Gull *Chroicocephaleus ridibundus*
A well represented breeding species from 1972 onwards, common visitor.
It was another good year for this boisterous bully as the population continues to increase. It was a quick start to the breeding season as 507 were counted on the inner group on 26 March, with birds displaying and calling above the traditional breeding areas on top meadow on Inner Farne. Birds were seen copulating on 28 March and started settling in the main colony the following day. The first eggs were discovered on 1 May and 461 (430) pairs nested as follows: Inner Farne 461 (424) and Brownsman 0 (6). Interestingly, the entire breeding population has shifted to Inner Farne and this was the first occasion since 1977 that breeding had not been attempted on the outer group of islands. The first chicks started hatching on 27 May with the first fledglings from 27 June. The colony continued to be heavily predated by large gulls although it still appeared to be a successful breeding season. After the breeding season only small numbers (up to 35) lingered around the islands, exceptions including 144 south through Staple Sound on 23 September and 120 on Knoxes Reef on 14 October.

Little Gull *Hydocoloeus minutus*
A well represented passage and winter visitor.
It was a very quiet year for this dainty passage visitor, as the islands produced only a handful of records. A first-summer was noted on Knoxes Reef on 27 March before flying east, only the second ever March record since the first on 23 March 2005. More in keeping was a second-summer bird on Inner Farne on 13 May. The only other records were in late October as passage produced five north on 16, eight north on 17 and five north on 29 October, all through Staple Sound.

Mediterranean Gull *Larus melanocephalus*
An uncommon passage and winter visitor.
As has been the norm during recent years, the spring period produced an influx onto the inner group as evening roosts of Black-headed Gulls and terns attracted one or two individuals. As the population increases nationally, and breeding has again been confirmed in Northumberland, it may be only a matter of time before a breeding attempt is made on the islands. In late March a first-summer individual was seen nightly between 25 March-1 April with a second bird present on 26 March. A second-summer bird (almost adult-like in appearance) was seen displaying with Black-headed Gulls on Inner Farne on three dates between 5-9 April, although nothing came of this. The final record involved a first-summer bird on Knoxes Reef on 18 April.

Great Black-backed Gull *L. marinus*

An uncommon breeder, common winter and passage visitor.

This goliath gull continued its rise to power on the Farnes, as the population increased once again. Small numbers were evident around the islands in early spring and 14 (12) pairs nested as follows: West Wideopens 1 (1), East Wideopens 3 (3), Knoxes Reef 1 (1), Staple 1 (1), Brownsman 2 (2), North Wamses 2 (1), South Wamses 2 (3), Big Harcar 1 (0) and Longstone End 1 (0). The population has reached an all-time high with nesting on nine islands, and the first eggs discovered in mid-April with chicks hatching on 12 May. The first chicks fledged in late July and numbers increased from early August as northern breeding birds filtered down into the islands with a peak of 505 on 31 October. During the autumn, these wily birds patrol the Grey Seal colonies in search of rich and nutritious pickings but can fall victim to protective cow seals when they get a little too close to the pup! There was also evidence of birds chasing and killing migratory thrushes on the outer group.

Common Gull *L. canus*

A common visitor. Bred 1910-14 and probably in 1916; attempted breeding in 1974.

The majority of Farne records occur in spring as birds move east to breeding grounds in Scandinavia, with a build up on Knoxes Reef during the early spring. The nightly roost increased daily from late March (Table 19) with a peak of 418 on 14 April, representing the third highest count. Thereafter numbers dwindled rapidly with small numbers recorded in early May, with the exception of 36 east over Brownsman on 5 May. The final spring sighting concerned two immatures near Staple Island on 7 May. A juvenile on the sea off the south end of Brownsman on 30 August was the first record in three months and it was not until late September that the species returned to winter around the islands. Small numbers were seen throughout the autumn with early winter peaks of 13 on 1 October and 25 on 15 November.

Table 19. Common Gull evening roost counts and passage numbers, Farne Islands 2012.

	23 Mar	25 Mar	29 Mar	31 Mar	1 Apr	12 Apr	13 Apr	14 Apr	15 Apr	16 Apr	17 Apr
Knoxes	5	13	50	67	58	30	203	418	114	94	28
Passage	0	1	5	0	0	9	51	0	126	31	3
Day Total	**5**	**14**	**55**	**67**	**58**	**39**	**254**	**418**	**240**	**125**	**31**

Lesser Black-backed Gull *L. fuscus*

A common breeding summer and passage visitor.

Good numbers of this menacing mariner arrived in early April (the Farnes population migrates south for the winter) and were in territorial disputes by mid-April. Nest building followed soon after and copulating was recorded in late April with the first eggs discovered in early May. A total of 744 (582) pairs nested as follows: Inner Farne 16 (18), West Wideopens 216 (138), East Wideopens 133 (83), Knoxes Reef 25 (6), Staple Island 34 (34), Brownsman 12 (5), North Wamses 97 (84), South Wamses 134 (141), Roddam and Green 2 (3), Big Harcar 70 (70) and Longstone End 5 (0). The breeding population showed a welcome increase with the first chicks hatching from early June. This species was once again a key predator around the islands, seen targeting the eggs and chicks of several species including a fledgling Arctic Tern which was caught mid-air on Brownsman on 11 July. Interestingly, a chick was seen to cough up Bank Vole on Brownsman indicating that foraging also takes place on the mainland. As usual, birds departed for southern Britain during September, with no records from early October onwards.

Herring Gull *L. argentatus*
A common breeding species, abundant winter and passage visitor.
It was another strong year for this grey backed assassin, with the population once again increasing on the Farnes. Birds were noted on territories in early March and copulation was seen on Knoxes Reef on 23 April. A total of 882 (759) pairs nested as follows: Inner Farne 8 (10), West Wideopens 139 (87), East Wideopens 152 (80), Knoxes Reef 120 (81), Skeney Scar 24 (25), Staple Island 55 (55), Brownsman 7 (4), North Wamses 168 (137), South Wamses 45 (98), Roddam and Green 18 (17), Big Harcar 98 (98), Longstone Main 3 (7), Longstone End 18 (32) and Northern Hares 27 (28). The first chicks hatched in early June and as usual the species was responsible for the majority of predation. The first fledglings were discovered on the south end of Brownsman on 11 July. After the breeding season, good numbers remain to winter around the islands with influxes of northern European birds during the late autumn. The autumn months also see huge nightly roosts, although due to access difficulties these go uncounted. However, estimates of 10,000 individuals have been made.

Iceland Gull *L. glaucoides*
An uncommon winter and passage visitor.
This elegant "white winger" moves through the islands on spring and autumn passage, with the months of March and April traditionally the best time to see them. An immature was seen towards dusk in the large gull roost on the West Wideopens on 27 April, the second latest spring record for the islands (the latest was seen on 12 May 1978). The species has now been recorded in 10 of the previous 12 seasons, with 2006 and 2008 the only blank years.

Glaucous Gull *L. hyperboreus*
An uncommon winter and passage visitor.
This stunning northern visitor was once a very familiar sight on the islands, but with the decline of the fishing industry in the region and the milder winters, numbers have declined. A second-summer was discovered feeding (and fighting!) amongst other large gulls in Inner Sound on 20 April before landing on the nearby rocky shoreline. Only two of the previous 10 years have produced more than a single record in a season, something unthinkable in decades gone by.

Feral Pigeon *Columba livia*
A common breeding resident.
The Farnes population remained as strong as ever, with good numbers commuting from the nearby mainland and small numbers breeding on several islands. As expected, peak numbers occurred during the autumn with 200 on Inner Farne and 75 on the outer group. A number of predators, including Peregrine and Greater Black-backed Gull, took full advantage.

Wood Pigeon *C. palumbus*
An uncommon passage visitor.
Small numbers cross the North Sea from the near continent and it was a typical year with nine spring and two autumn records. The first of the year involved one west over Staple Island on 25 March and was followed by six individuals between 16 April-4 May. The majority of records were birds on the outer group although occasional birds moved westwards over both island groups on 28 and 30 April. Late spring passage involved singles on Brownsman on 25 and Longstone on 30 May. Autumn passage was light with one west over Brownsman on 13 September and another lingering on Staple/Brownsman on 24-26 September.

Collared Dove *Streptopelia decaocto*
An uncommon passage visitor.
It proved to be a noteworthy year with eight records (involving 10 birds), in complete contrast to the dearth of records in recent years (just a single in 2011 and none in 2010). Most reports were in May, with five records including singles on Brownsman on 1 and Inner Farne on 7, 9 and 26 May. During this period, two were observed landing on the Pele Tower roof on Inner Farne on the evening of 23 May before departing west. Autumn produced three reports with two on Inner Farne on 24 July (having flown in from the west) and on Brownsman on 2 August, and the last of the year was one near the lighthouse on Inner Farne on 15 September.

Turtle Dove *S. turtur*
An uncommon passage visitor.
It was an interesting autumn for this nationally declining species. The national UK decline of 50% in recent years has been mirrored by numbers seen on the Farnes. Apart from four years, Turtle Doves were recorded in every season between 1970-2000; in stark contrast, there have only been three records since, with singles in May and September 2003 and in August 2010. This year, a single was flushed west off Inner Farne on the morning of 25 September and it or another was seen later in the day, on the same island. This latter bird then became resident on the inner group for a staggering 24 days and was last seen on 18 October. During its stay (when it became affectionately known as "Terry") the bird was caught and ringed on 6 October. It was underweight when caught but subsequent provision of grain helped the bird to feed up and presumably gain the strength for departure. This was the longest ever staying Turtle Dove on the Farne Islands.

Cuckoo *Cuculus canorus*
An uncommon passage visitor.
This enigmatic species has been recorded in 34 of the previous 50 years (involving 56 records) with this year producing two spring records, the first on the islands since August 2009. A female (rufous morph) was discovered in "fall" conditions on Staple Island on 10 May and soon relocated to Brownsman where it showed well in the vegetable garden. Another female (also rufous morph) on Longstone on 21 May was pursued by gulls and Rock Pipits during its short stay on the islands.

Long-eared Owl *Asio otus*
An uncommon passage visitor.
This nocturnal migrant is predominately recorded during the autumn as birds move across the North Sea from Scandinavia. A spell of easterly winds in late October produced all the records with the first discovered on the tip of Longstone End on 22 October. The following day produced three, with two on Brownsman: one flushed west from the vegetable garden area and another at the south end which landed on nearby Big Harcar. Later that day an individual was located in the courtyard on Inner Farne (potentially one of the Brownsman birds) and was still present on 24 October near the lighthouse cliff.

Short-eared Owl *A. flammeus*
An uncommon passage visitor.
Following the record year last season, the autumn months produced reports on seven dates, a more-typical showing for this migratory owl. The first of the year was discovered on the north rocks of Inner Farne on 25 September before departing west towards the mainland. A single west

over Brownsman on 12 October was later seen on Inner Farne where a second was present that day. Records then increased with two on Staple Island on 14 October, three across the islands on 22 (the season peak count) and two present on 23-24 October. The last sighting was on Inner Farne as one came in off the sea on 27 October.

Nightjar *Caprimulgus europaeus*
A rare passage visitor.
This crepuscular summer visitor remains highly sought after on the islands and a male was flushed from the north hill of Brownsman on the afternoon of 12 June. The bird was flushed again soon afterwards near cottage cliff but, frustratingly for the majority of the Ranger team, could not be relocated. The islands have produced eight records (six on the outer and two on the inner group) and all but one have occurred between 8 May-17 June. The significance of the record is shown by the number of previous records, as only three have occurred since 1954: on Brownsman on 22 May 1981, on Staple Island on 2 and 6 June 1983 and on Inner Farne on 3 June 1995 (which was caught in St Cuthbert's Chapel).

Swift *Apus apus*
A well represented summer and passage visitor.
It was a desperately disappointing summer for this aerial master, as birds were seen on only seven dates during May-July. However this was balanced by strong passage during late August. The first of the year was flying low north through Inner Sound on 16 May, followed by another in the same area on 22 May. Thereafter midsummer reports were few and far between with 1-3 noted on 19-20 June and 24 and 28 July. During this period an individual was found dead on Longstone on 2 July. August is not a month normally associated with the species on the Farnes as the majority of the UK breeding population has already departed. Late movers involved 1-3 between 13-18 August with 16 south on 17 August. However, the final week of August produced some noteworthy passage with 28, 90 and 190 on 22, 23 and 28 August respectively. This latter count represents the third highest recorded in a day on the Farnes. Final records were of 10 west on both 1 and 6 September.

Wryneck *Jynx torquilla*
An uncommon passage visitor.
It was an impressive, and confusing, year for this cryptic east coast drift migrant as birds were recorded daily for 16 days between 26 April-11 May. On 26 April, three individuals appeared with singles discovered on Inner Farne, Staple Island and Brownsman during the late afternoon. Over the next two weeks, individuals continued to be recorded daily on the outer group and one was caught and ringed on 1 May on Brownsman. However, the exact "turnover" of birds was difficult to assess as birds frequently switched from Brownsman to Staple Island throughout. It was thought that at least three birds were involved in sightings on the outer group between 26 April-9 May. The only other record involved another on Inner Farne on 10-11 May. Overall, at least five birds were recorded during the spring with two on Inner Farne and three on the outer group of islands. The islands now boast records of over 105 individuals with some impressive numbers in recent seasons (eight in 2004, seven in 2006 and five in 2008).

Great Spotted Woodpecker *Dendrocopus major*
An uncommon passage visitor.
One of these dead wood drillers was found deceased on the North Wamses on 14 October amongst breeding Grey Seals and appeared to have been dead for over a week when discovered.

The species has only been recorded in 14 years since the first was seen in September 1949, with a record influx of 10 in 2001. The majority of records are considered to involve birds of the northern race *D.m.major* and the record this year was the first since April 2004.

Red-backed Shrike *Lanius collurio*
An uncommon passage visitor.
This migratory "butcher bird" was discovered during a spring "purple patch". A beautiful adult male graced Inner Farne on 18 May and was seen to kill and skewer a Whitethroat in its larder on the main artificial tree in the vegetable garden. The bird remained for the day before moving on overnight. The islands have recorded birds in 40 previous years totalling almost 100 individuals and this was the first since 2010.

Great Grey Shrike *Lanius excubitor*
A scarce passage visitor.
This boreal butcher appeared in both spring and autumn, as an adult was discovered sheltering in the lighthouse compound during an easterly storm on Inner Farne on 3 April. On discovery, the bird took flight and headed west (backed by a good tail wind) towards the mainland. During the autumn a more obliging first-winter bird arrived on Brownsman for a three day stay from 15-17 October, which was caught and ringed on its first day. The bird, known for its predatory skills, managed to kill two Goldcrests, a Black Redstart, a Song Thrush and a Robin during its stay. The sight of the bird flying and perching with a Robin's head in its bill will live long in the memory. This brings the overall Farnes total to 25, nine of which have now appeared in the past eight years. The species remains predominately an autumn passage migrant with this year's April sighting representing only the ninth spring record.

Jackdaw *Corvus monedula*
A well represented visitor. Former breeder, last bred in 1966.
The species is still a scarce visitor with the majority of reports involving birds passing overhead during the early spring period. It was a poor year for records with only three confirmed sightings. Two flew south over Inner Farne on 25 March followed by another south on 27 March. The only other record involved two on Inner Farne which landed briefly on the island before departing west on 23 September.

Rook *C. frugilegus*
A well represented visitor.
A quiet year for this town and country corvid, as small numbers were logged on only six spring and five autumn dates. The early spring period produced 1-3 on five dates between 26 March-19 April, with the last spring sighting of one east over Inner Farne on 24 April. Wandering birds from the mainland during the autumn started arriving on 22 September when two were seen over Inner Farne with a modest peak of four west over the inner group on 30 September. The only other records were of 1-3 on three dates from 1-5 October.

Carrion Crow *C. corone*
A well represented visitor and rare breeding species.
This obsidian opportunist was recorded throughout the year as birds commuted daily from the mainland. As usual, spring produced the bulk of the large numbers with 21 over the inner group on 9 April followed by 10 west on 11 April. The season peak occurred on 21 April with 24 west over the inner group, and 15 were noted over Brownsman on 28 April. Thereafter a pair was

Baird's Sandpiper (David Steel)

Great Grey Shrike
(Graeme Duncan)

Greenish Warbler
(Graeme Duncan)

Long-tailed Tit
(Graeme Duncan)

Olive-backed Pipit
(Graeme Duncan)

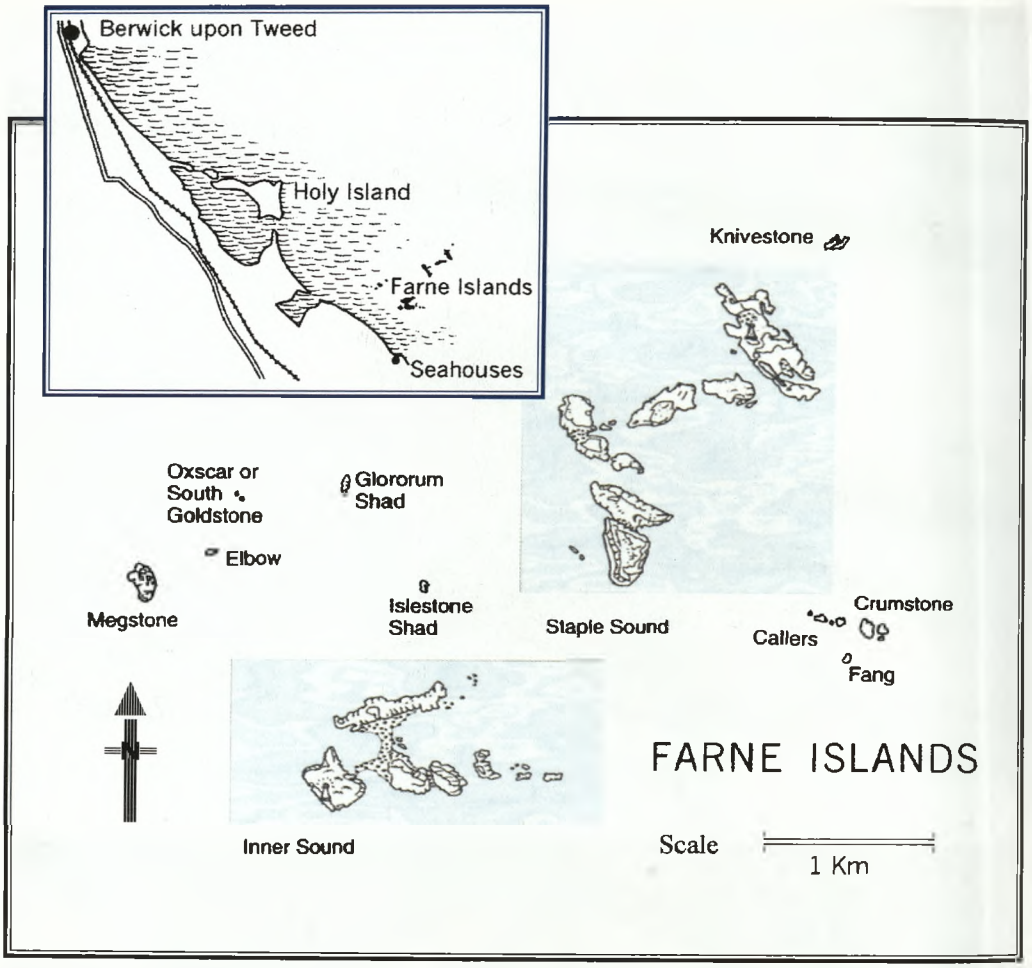
Waxwing
(Graeme Duncan)

White's Thrush rescued from the wire gas cage on Inner Farne
(Graeme Duncan and Andy Denton)

Hobby (William Scott)

Raddes Warbler (Bex Outram)

Rustic Bunting (Graeme Duncan)


Berwick upon Tweed
Holy Island
Farne Islands
Seahouses
Knivestone
Oxscar or South Goldstone
Glororum Shad
Elbow
Megstone
Islestone Shad
Staple Sound
Callers
Crumstone
Fang
Inner Sound
FARNE ISLANDS
Scale
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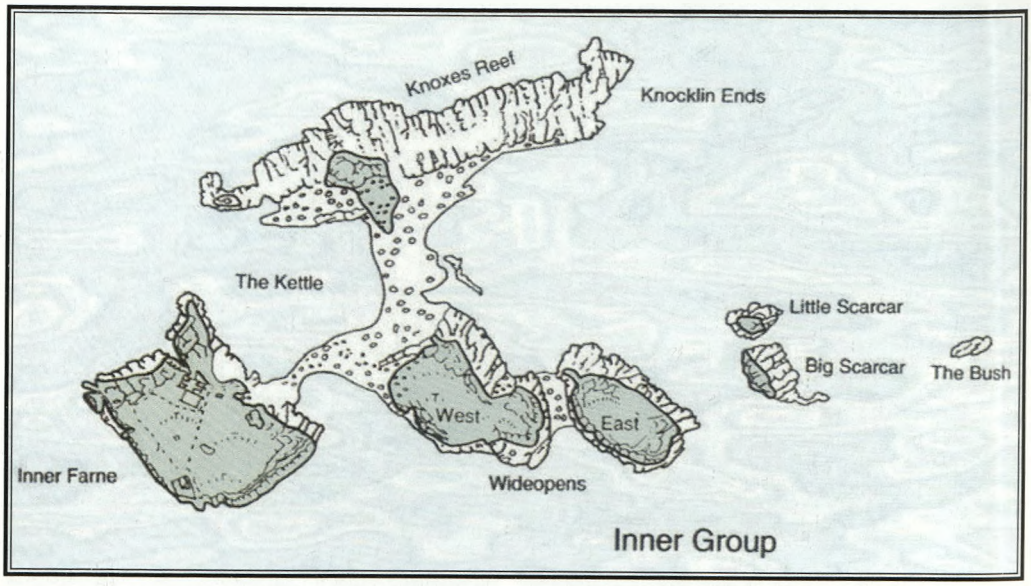
Knoxes Reef
Knocklin Ends
The Kettle
Little Scarcar
Big Scarcar
The Bush
West
East
Inner Farne
Wideopens
Inner Group


Northern Hares
Longstone
Brada
North Wamses
Little Harcar
Clove Car
Big Harcar
South Wamses
Roddam and Green
Brownsman
Gun Rock
Staple Island
Skeney Scar
Outer Group

Short-toed Lark (Graeme Duncan)

Ranger Ciaran Hatsell explaining bird ringing to visitors
(David Steel)

recorded regularly throughout the summer months, causing issues for the breeding seabirds, with predation of eggs and young especially on the outer group. Despite the regular foraging activities, no breeding attempts were made. Gradually numbers increased from early September with an autumn peak of 10 west over Brownsman on 30 September.

Hooded Crow *C. cornix*
An uncommon visitor.
This once common winter visitor is now a real scarcity on the islands with records from only 15 of the previous 30 years. However the islands remain one of the most regular areas for sightings in Northumberland with a strong bias towards spring passage in late March and early April. Four were recorded during this peak period with singles over the outer group on 25 March (lost in fog as it headed east towards Longstone), another northwest over Inner Farne on 30 March, and another north over the inner group on 7 April. The final sighting was one west over Brownsman on 18 April and seen flying over Inner Farne. Whether these were four individuals is not known but these four sightings represent the best showing since 1995.

Goldcrest *Regulus regulus*
A common passage visitor.
It was a good season for this diminutive sprite as the year produced reports on 10 spring and 44 autumn dates. The first of the year were two on Inner Farne on the early date of 15 March with another on Brownsman on 24 March. A noticeable influx occurred on 25 March with eight scattered across the islands. Thereafter, 1-5 were recorded frequently until last seen on 20 April. The first autumn migrant arrived on 22 August on Inner Farne and Goldcrests were then reported regularly during September-October. Records usually involved 1-10 but with higher counts on one date in September and for two periods in October (Table 20). The count of 150 on 23 October comprised 70 on Inner Farne, 40 on Brownsman, 15 on Staple Island, 20 on Longstone End and 5 on Longstone. The final record was one on Brownsman on 31 October.

Table 20. Goldcrest numbers, Farne Islands autumn 2012.

	25 Sep	12 Oct	13 Oct	14 Oct	15 Oct	22 Oct	23 Oct	24 Oct	25 Oct
Inner Group	40	26	25	30	24	25	70	20	20
Outer Group	8	30	25	23	8	45	80	34	10
Total	**48**	**56**	**50**	**53**	**32**	**70**	**150**	**54**	**30**

Short-toed Lark *Calandrella brachydactyla*
A rare passage visitor.
This rare southern Mediterranean overshoot was discovered during spring passage, the first on the islands for 11 years. The bird (see opposite) was initially seen very briefly in flight on the evening of 26 May on Brownsman, before eventually being seen well on the north beach of the island the following evening. The bird proved elusive and disappeared again before eventually being seen flying west, calling, through Staple Sound on 29 May. This is the tenth Farnes record (five spring and five autumn records) and fourteenth Northumberland record. Farnes records have occurred in 1981, 1987 (two), 1994 (three), 1998, 1999 and 2001. The four other county records were at Holy Island (1979), Newbiggin (2001), Briar Dene (2004) and Long Nanny (2008).

Skylark *Alauda arvensis*
A common passage visitor. May have bred in 1865 and *circa* 1900.
It was another disappointing season for this nationally declining farmland vocalist, as spring produced only seven records and only modest passage during the autumn months. The first of the year was seen on Inner Farne on 15 March and may have been the same bird present on 24 March. All other spring records occurred between 5-20 April with a maximum of two on 11 April. Autumn passage started on 6 August with the arrival of an immature on Brownsman which remained until at least 25 September (having lost its tail in late August). The first "new" arrivals occurred from 20 September with an influx of 14 on 25 September decreasing to 10 the following day. Thereafter 1-4 were noted throughout October with a modest season peak of 17 on 25 October. The last records involved singles on Brownsman on 6-8 November and south over Inner Farne on 1 December.

Sand Martin *Riparia riparia*
A well represented summer and passage visitor.
This summer hawker was seen on six dates, slightly below the average annual total for the Farnes. Northerly winds during early spring blocked passage and the first of the year was not seen until a single flew over Inner Farne on 30 April. Further spring sightings included two north through the Kettle on 9 May and three north through Inner Sound on 16 May. Autumn reports involved singles over Longstone on 25 August (the only outer group record of the year) and individuals over Inner Farne on 8 and 24 September. The latter individual was the latest record on the Farnes since 1985.

Swallow *Hirundo rustica*
A common summer and passage visitor. Scarce breeder.
It was another interesting year for this fork-tailed traveller, with the islands boasting four breeding pairs for the second consecutive year. It was a slow start to migration as the first of the year was seen flying north through the Kettle on 23 April with 18 north on 30 April. Northerly passage was generally light throughout the spring with modest peaks of 29 on 16 May and 18 on 22 May. Thereafter it was all about the breeding population as four pairs nested comprising Inner Farne 2 (0) and Longstone 2 (4). The first eggs were discovered on Longstone on 11 June although this attempt was abandoned due to the inclement weather during that period. A pair had settled on eggs in the acetate store at the lighthouse on Inner Farne by 19 June with the first chicks hatching by 3 July. The weather took its toll on nesting attempts as broods of young perished due to heavy rainfall in the summer. Despite this, overall the breeding season produced a total of 11 chicks fledging from the four pairs (involving six clutches), representing a reasonable success. After the breeding season, southerly passage was logged throughout August and September with 1-25 recorded daily and peaks of 63 south on 8 September and 50 south on 25 September. The final records of the year concerned 12 south on 27 September and four south over Inner Farne on 28 September.

House Martin *Delichon urbicum*
A well represented summer and passage visitor. Six pairs attempted to breed in 1950.
Spring produced seven records compared with nine autumn records. The first of the year was seen over Staple Island on 10 May with two north through Inner Sound on 16 May. Thereafter 1-3 were noted on three dates between 18 May-11 June with a peak of six north over Inner Farne on 24 May. Autumn passage involved 1-8 between 19 August and 25 September with double figure counts including 12 west on 1 September and 16 west on 17 September. However, this

was all eclipsed by 79 west on 13 September in six groups (the largest was 32) representing the second highest day count for the Farnes. The final record was two juveniles west on 25 September, the latest since 2006.

Long-tailed Tit *Aegithalos caudatus*
An uncommon visitor.
This "fluff ball" of a bird appeared in both the spring and autumn, representing the first records on the islands since 2008. Unexpectedly, an individual was found grounded amongst nesting Arctic Terns in the monastic courtyard on Inner Farne on 14 May, before moving westward soon after. This represents only the second ever spring record after one on Inner Farne on 17 April 1965. More in keeping, a vocal party of six arrived on Brownsman on 28 October and after a brief feeding stop flew north; five then returned but eventually moved off west. Soon after, four individuals arrived on Inner Farne and followed a similar pattern, moving west across the island before heading towards the mainland. All the autumn birds were presumed to involve the same group of individuals. The species remains rare on the islands with records from 10 years since first seen in 1965.

Greenish Warbler *Phylloscopus trochiloides*
A rare visitor.
A very confiding individual was discovered during an influx down the east coast in late August, and was present on Inner Farne from 26-28 August (see centre pages). The bird showed well throughout its stay and was heard in sub-song on its third day on the dock bank. This represents the tenth Farnes record since the first in August 1991 with no fewer than eight recorded between 2004-2008 alone. Interestingly, all bar one have occurred in August, with the inner group claiming six of the records.

Pallas's Warbler *P. proregulus*
A scarce visitor.
This seven-stripe sprite from Siberia was discovered at the top of the Inner Farne dock bank on the afternoon of 24 October, the first record since November 2010. The bird showed well in the nettle patches until dusk, occasionally down to 10 feet for the admiring Ranger team. This represents the eighteenth Farnes record, 15 of which have occurred in the last 20 years.

Yellow-browed Warbler *P. inornatus*
An uncommon passage visitor.
The impressive form of late (61 recorded in the past decade) continued for this Siberian sprite as the islands produced three during the autumn, all on the inner group. The first was discovered in the dock patch at the north end of Inner Farne on the afternoon of 22 September but was not present the following day. A second wave of birds arrived down the east coast in late October and an individual was discovered whilst watching the Radde's Warbler on central meadow on Inner Farne on 23 October. The following day, two were present on the same island with one remaining for a further two days, last seen on 26 October.

Radde's Warbler *P. schwarzi*
An extremely rare visitor.
This eastern Siberian vagrant (see centre pages) was seen on Inner Farne on 22-25 October and was initially found in the visitor centre as it stunned itself against the glass window whilst trying to escape the building. The bird was subsequently observed for five minutes composing itself on

St Cuthbert's Chapel nearby before moving to the central meadow area. It remained for a further three days and was last seen on 25 October. This represents only the third Farnes record after individuals on Brownsman on 27-29 September 1999 and Inner Farne on 30 September 2004.

Chiffchaff *P. collybita*
A common passage visitor.
Late March is now the expected arrival time for coastal migrants and the first of the year arrived on 25 March with four discovered: two on Longstone and singles on Brownsman and Inner Farne. Thereafter 1-2 were seen daily in late March and early April with the first noticeable influx occurring in mid-April (Table 21). After this influx, birds were recorded regularly with 1-6 noted until late May. An unusual record involved a bird with a facial defect which was resident on Inner Farne from 31 May-24 August, and this lengthy stay, unprecedented on the islands for such a migrant, may have been a result of poor health. The first autumn returnees arrived on 5 September with a single on Inner Farne and numbers increased during October (Table 21). Late autumn passage produced 1-2 on 1-8 November and 15-18 November. The last record involved one on the dock bank on Inner Farne on 20 November.

Table 21. Peak Chiffchaff counts during spring and autumn passage.

	19 Apr	20 Apr	21 Apr	22 Apr	22 Oct	23 Oct	24 Oct	25 Oct	26 Oct
Inner Group	7	16	8	5	2	15	15	11	7
Outer Group	7	3	8	2	5	16	10	8	4
Total	**14**	**19**	**16**	**7**	**7**	**31**	**25**	**19**	**11**

Willow Warbler *P. trochilus*
A common passage visitor.
As usual, reasonable numbers were recorded on spring and autumn passage with peak counts shown in Table 22. The first of the year arrived late as northerly backed winds stalled migration with the first reaching Inner Farne on 17 April, eight days later than the previous year. Thereafter, there was a continued presence into early June with the final spring records involving singles on Brownsman and Inner Farne on 9 June. A large pale bird, probably of northern origin, was seen on Brownsman on 21-24 June. More unusual was an adult on Brownsman on 5 July. Autumn passage commenced with the arrival of fresh juveniles on 1 August and birds were recorded throughout September and early October. As usual, pale birds were recorded during passage suggesting a more northern or eastern origin. The final record involved a single on Brownsman on 23-24 October.

Table 22. Peak Willow Warbler counts during the year.

	30 Apr	10 May	11 May	21 May	16 Aug	17 Aug	18 Aug	19 Aug	20 Aug
Inner Group	20	11	14	2	12	12	16	5	8
Outer Group	14	20	3	9	12	10	15	8	5
Total	**34**	**31**	**17**	**11**	**24**	**22**	**31**	**13**	**13**

Blackcap *Sylvia atricapilla*
A common passage visitor.
As with the majority of summer migrants, the northerly backed winds delayed the start of spring migration and the first arrivals were discovered on 17 April with a pair on Inner Farne and a female on Brownsman (10 days later than the first arrival last year). Thereafter, the spring produced some good numbers with 1-5 recorded on 29 dates until the end of May. During this period, a mini-influx brought a peak of 12 on 30 April (seven on the inner and five on the outer group) with six across the islands over the following two days. Late spring stragglers were a male on Brownsman on 15-17 June and a male on Inner Farne on 23 June. Autumn passage began with the arrival of a single on Brownsman on 24-25 September with seven on Inner Farne on the latter date. Small numbers 1-4 were then recorded throughout October with a peak of nine on 23 October. As usual, the final record was in November (for the tenth consecutive year) with a male on Brownsman on 12 November.

Garden Warbler *S. borin*
A common passage visitor.
It was a reasonable year for this robust *sylvia* warbler, as spring produced reports on six dates, a marked improvement on the previous two years. The first of the year arrived on 10 May with singles on Inner Farne and Staple Island, the latter bird moving to Brownsman the following day. Further spring records included individuals on Inner Farne on 13 May and Brownsman on 14 and two on Inner Farne on 18 May. There was an early arrival in the autumn on Brownsman on 31 July. Thereafter 1-4 were reported on nine August dates and seven September dates with a peak of nine on 25 September including eight on Inner Farne. The final record was a late individual on Brownsman on 12 October.

Barred Warbler *S. nisoria*
An uncommon passage visitor.
The Farnes are one of the best east coast localities in recent years for these large *sylvia* warblers as the past 10 years have produced 42 individuals. However, this boast fell flat on its face last year, as the islands failed to record the species for the first time since 1997. However this year the islands were back on track with four autumn records, all of first-winter birds. The first was discovered when it exploded out of vegetation on Brownsman on 6 August and notched up two noticeable achievements with its discovery: the first autumn 2012 record in the UK (something the islands also achieved in 2008), and the earliest ever autumn individual on the Farnes by two days. Brownsman then hosted two more individuals, the first on the evening of 25 August with two together the following day (both were trapped and ringed together), with one remaining until 27 August. The fourth and final record was an individual which showed well on Inner Farne for six days from 17-22 October, favouring the north end vegetation.

Lesser Whitethroat *S. curruca*
A common passage visitor.
This long distance migrant is predominately a spring migrant through the Farnes and the season produced records on 12 spring and eight autumn dates (there were no autumn records last year). The first of the year arrived on 30 April as individuals graced Brownsman and Inner Farne, with the latter staying until 3 May. May also produced singles on five dates with two present on 10 May including singles on Longstone and Inner Farne. The last spring passage bird was noted on 1 June on the dock bank of Inner Farne. Return passage commenced from mid-August with singles on Inner Farne on 15-16 and Brownsman on 15-17 August. On the outer group, an

individual was seen daily from 23-26 September whilst the latter date also produced a second bird and another on Inner Farne. The final record of the year involved one on Brownsman on 28 September.

Whitethroat *S. communis*
A common passage visitor.
This long distance summer migrant had a good year, especially on spring passage. The first of the year arrived on 30 April with five scattered across the islands: two on Inner Farne, two on Staple Island and a single on Brownsman. Between 1-7 were recorded on 16 dates in May with influxes of 13 on 10 May and eight on 30 May. Late spring stragglers were seen on 7-10 June with two on 21 June and another on 28 June on Brownsman. The first autumn returnees arrived on Inner Farne on 28-29 August with 1-2 on 15 dates in September. The final record of the year involved a single on Inner Farne from 1-5 October, the latest since 2005.

Grasshopper Warbler *Locustella naevia*
A well represented passage visitor.
A reasonable showing for this streaky *locustella* warbler with records on six spring and six autumn dates. The first of the year was on Inner Farne on 19-20 April which showed well on a bench near the lighthouse on both dates. Other records included two on 30 April including one observed creeping around seaweed-covered rocks on Longstone with a second on Inner Farne. Further spring sightings included singles on West Wideopens on 11 May and Brownsman on 19 May. The first autumn passage bird was found on Brownsman on 13 and 15 August, with another on Brownsman on 25-26 August. A very late individual was seen on Inner Farne on 13 October and was presumed to be the same bird caught and ringed there on 19 October. This is the latest since one on 24 October 2005.

Icterine Warbler *Hippolais icterina*
An uncommon passage visitor.
It proved to be a remarkable year for this classic east coast drift migrant as the islands hosted seven different individuals, with five spring and two autumn birds. An adult was discovered on Longstone End on the evening of 21 May and showed well as it fed amongst the rock crevices, and was still present the following day. A different individual arrived on Inner Farne on 23 May, discovered feeding on the picnic site, which remained all day. A showy bird was on Inner Farne on 30 May, a skulking individual on the dock bank on Inner Farne on 7 June, and the fifth and final spring record was one discovered on the artificial tree on Brownsman on 25 June. The autumn was not overshadowed as Inner Farne boasted two more records: a skulking individual in the dock at the north end of the island on 13 August with another on central meadow on 25 September. These sightings brought the number of Farne records to 76 since the first on 3 September 1963 and represented the seventh consecutive year the species has been recorded.

Sedge Warbler *Acrocephalus schoenobaenus*
A well represented passage visitor.
Despite being a good year for passage migrants, it proved interesting for this trans-Saharan migrant as the spring produced reports on 11 dates but no autumn records. The first of the year was discovered on Longstone End on 30 April, the earliest first arrival since 2000. As usual, May produced the bulk of records with singles on 11, 14, 17-18 and 21-22 May, and a late spring surge brought two to Brownsman on 29 May with three across the outer group the following day. The spring peak was on 31 May with two on Brownsman, two on Longstone End and a single on

Inner Farne. The final record of the year was a single on 16 June on Longstone End. For the first time since 1988 there were no autumn records.

Reed Warbler *A. scirpaceus*
A well represented passage visitor.
This reed bed specialist is recorded annually in small numbers, with the majority of Farne records occurring during the autumn (last spring record was 8 June 2010). The first arrivals of the year were on 20 August with a flighty bird discovered by the pond on Brownsman, and it or another was later seen on Inner Farne. Further records included one on Brownsman on 25-27 August, on Inner Farne on 24 September, on Brownsman on 25 September and again on Inner Farne on 26-29 September. The last of the year was a late individual on Brownsman on 12 October, the latest since 2007.

Waxwing *Bombycilla garrulous*
An uncommon winter and passage visitor.
Another good autumn for this bohemian berry burglar, as invasions appear to occur more frequently in recent years. The Farnes have experienced some good numbers during 2004, 2008 and 2010 and this was the seventeenth year the species has been recorded on the islands. The invasion began with two west over the outer then the inner group on 28 October, followed by another west over Brownsman on 30 October. As the national influx gathered pace, more birds were recorded and five were noted on 4 November, including one feeding on apples on Brownsman, with another found freshly killed. The final record was three west over Brownsman on 6 November.

Wren *Troglodytes troglodytes*
A common visitor and passage migrant. A rare breeder.
Small numbers over wintered on the islands with 3-4 on Inner Farne and 1-2 on Brownsman throughout January-March. During the early spring, numbers gradually decreased with the last Inner Farne sighting involving a single on 21 April. On the outer group the final spring record concerned a single on Brownsman on 4 and 6 May. The first autumn returnees were recorded from mid-August with 1-2 on Inner Farne from 15 August and the first outer group birds on 4 September. Thereafter there was a continued presence on the islands with small numbers remaining to winter including three on the outer group and up to five on the inner group. During the autumn period, small influxes were noted with a modest peak of 10 on 20-21 October.

Starling *Sturnus vulgaris*
A common visitor, extremely rare breeder.
One of the most numerous passerines recorded on the islands, especially from midsummer when local birds commute daily to the islands whilst immigrants arriving from northern European bolster numbers during the autumn. As usual, small numbers were present during the early spring with a peak of eight on 25 March. The species became scarce with 1-2 on seven April dates until last seen on 26 April. After a four week absence, the first family parties started arriving from the mainland in early June with eight on 11 June increasing to 16 by 14 June. Numbers rapidly increased as birds used the relative safety of the islands for foraging trips with 27 on 24 June and up to 70 daily throughout July. Numbers peaked in early August with counts of 134 on 5 and 190 on 7 August. As the autumn progressed, numbers were swelled by continental immigrants moving in small groups westwards towards the mainland, with regular counts of up to 80 in October. Small numbers remained on the islands with a daily presence until early December.

White's Thrush *Zoothera dauma*
An extremely rare visitor – first Farne Islands record.
Every decade or so, the Farne Islands hits the birding headlines with a sighting so outrageous that people pinch themselves for a reality check. This bird was one of those moments. After strong easterly winds overnight, a bird was flushed near the lighthouse on Inner Farne on 24 September. The realisation that the bird was a first-winter White's Thrush stunned those present. The bird was later rescued from the gas cage adjacent to the Pele Tower, presenting unexpected opportunities to take photographs of plumage details in the hand. Once released into suitable habitat, the bird remained loyal to an area north of the Pele Tower for the remainder of the day, but sadly was not seen again. Whilst the Inner Farne Rangers enjoyed this stunning bird, a thought must go to the "Brownsman three" (which included the author!) who missed out on this once-in-a-lifetime bird because heavy seas prevented any crossing to Inner Farne. Emotions on the islands varied that day from pure elation to utter despair. This first for the Farnes will certainly not be forgotten.

In a Northumberland context, this was the second record after an individual on Holy Island in 1914 which has the distinction of being the first accepted bird described from field notes for the BBRC as opposed to being shot as a specimen. Nationally only 29 have occurred in the past 30 years, including only four English records with individuals in Devon in 1984, Isles of Scilly 1999 and East Yorkshire 2004 and 2007.

Ring Ouzel *Turdus torquatus*
An uncommon passage visitor.
In complete contrast to the previous season (just one record), it was a sensational year for this upland Blackbird. A male dropped into the picnic site on Inner Farne on 19 April and roosted overnight in the chapel. The following day, two males were seen flying in off the sea onto Inner Farne in front of some heavy storm clouds and remained until the next morning when they were seen flying strongly west towards the mainland at 07:20. Four graced the islands on 26 April (two males on Inner Farne, male and female on Brownsman), but left overnight, apart from the male on Brownsman which lingered for the next day. Additional spring records included a male on Brownsman on 30 April, a female on Inner Farne on 1-2 May and three on 10 May including a pair on Brownsman. The final spring record was of a female over the outer group on 11 May. Autumn was as good although it began early with an individual flushed from a rock crevice at the south end of Brownsman on 15 July: the first ever July record on the islands. As usual, the main autumn arrival occurred during thrush passage in October with a possible six on 12 October comprising two on Brownsman, two west over the inner group and two on Inner Farne, although different sightings may have involved the same birds. Passage continued with a single on Inner Farne on 16 October and three on the outer group on 23-24 October involving at least five birds. A single male on Inner Farne on 23-25 October was the final record of the year.

Blackbird *T. merula*
An abundant passage visitor. Bred in the 1880s, four years 1893-1914, 1934, 1962 then annually 1964-74.
Small numbers overwinter on the islands with light passage recorded in spring and autumn witnessing the largest movements. In late March 1-3 were present on Inner Farne with a spring peak of 10 on 3 April. The next morning seven were still present but thereafter 1-3 were recorded intermittently until 5 May. Late spring migrants included singles on Inner Farne on 18, Brownsman on 21, Inner Farne on 22 and Longstone on 30 May. The first autumn arrivals occurred from 24 September with a male on Brownsman and then an almost daily presence

until the Rangers departed in early December. Numbers usually involved 1-45 with peak counts shown in Table 23. As usual, small numbers were settled on the islands by early December suggesting that 1-2 would once again over-winter.

Fieldfare *T. pilaris*
A common passage visitor.
This large northern thrush is seen on spring and autumn passage and, if winds are favourable, impressive numbers can be recorded. As usual, spring passage was light with 1-2 noted on 3 and 20 April although a late spring surge brought 1-2 daily on 25-29 April with four on Inner Farne on 30 April. These birds lingered with two on 1 May and one until 3 May. There was a quick return as a first-winter graced Brownsman on 13-14 August, the first August arrival date since 2004. Other early arrivals included singles on Brownsman on 9 and 25 September. As usual, westerly passage brought good numbers to the islands during October-November, with peak counts shown in Table 23. Apart from these days, counts generally involved 1-25 with passage declining by late November and just the odd straggler reported.

Table 23. Peak westerly passage of thrushes over the Farne Islands on selected dates.

	12 Oct	13 Oct	22 Oct	23 Oct	24 Oct
Blackbird	376	55	432	370	66
Fieldfare	10	1	555	750	120
Song Thrush	179	20	71	120	35
Redwing	1,251	48	3,504	1,985	180

Song Thrush *T. philomelos*
A common passage visitor.
Small numbers of northern breeders move through the islands during spring and autumn migration but are often overlooked in large concentrations of other thrushes. It was a reasonable spring with 1-8 recorded on 26 dates between 25 March-4 May with peaks of 10 on 3 April and 18 on 26 April. The last spring passage birds were logged on 11 May with two on both Brownsman and Inner Farne. The first autumn returnees arrived on 24 September with 15 on Inner Farne and four on Brownsman. However the following day brought huge numbers on westerly passage, well in advance of the other migratory thrushes whose main arrival did not occur until October. An impressive 400 were recorded on or over Inner Farne with 178 on Brownsman on 25 September. The following few days produced all-island counts of 243 on 26 and 105 on 27 September. Birds were then evident across the islands throughout the autumn with further influxes in October (Table 23). Numbers gradually declined with 1-3 during November and the final record of four on the dock bank of Inner Farne on 4 December.

Redwing *T. iliacus*
An abundant passage visitor.
Although small numbers of northern bound migrants move through the islands on spring passage, the autumn months are the time to witness heavy passage, especially if winds prevail from the east in October. Spring passage was represented by 1-2 on 14 dates between 4 April-5 May with late stragglers on Staple Island on 10 May and Inner Farne on 11 May. The first autumn immigrants were on 24 September with one on Brownsman followed by five on Inner Farne the next day. Thereafter, October produced most reports (Table 23) with three-figure counts on

three dates including an impressive 3,504 west on 22 October. Smaller numbers were recorded throughout November with 1-2 still present when the Rangers left in early December.

Mistle Thrush *T. viscivorus*
An uncommon passage visitor.
The species remains scarce on passage and the islands produce only a handful of records each season. An individual was flushed at dusk on Brownsman on 23 October and may have been the same individual seen on Inner Farne the next morning. Another was flushed off central meadow on Inner Farne early on 4 November and one flew west over Brownsman later that day.

Spotted Flycatcher *Muscicapa striata*
A well represented passage visitor.
This long-distance migrant had a good season with the first of the year discovered on Brownsman on 11 May, and further singles on 21, 23 and 28 May. After a spell of easterly winds, a noticeable influx occurred on 29-30 May with four on 29 May increasing to an impressive 15 on 30 May. This influx included seven on Inner Farne, four on Staple Island, three on Brownsman and one on Longstone, and represented the second highest ever day count for the islands. A small number lingered over the following few days, with four on 31 May and two on 1 June. The final spring records were singles on Brownsman on 8 and 10 June and on Staple Island on 20 June. Autumn passage was quiet in comparison, with the first returnees in mid-August being a single on Inner Farne on 13-15 August and another on Brownsman on 14 August. The only other autumn records involved singles on 24-25 August and 9 September on Inner Farne and the last of the year on Brownsman on 24 September.

Robin *Erithacus rubecula*
A common passage visitor. Bred in 1951.
It was a good year for this species with the two island groups experiencing similar patterns. Birds were present throughout the spring with influxes occurring during late April (Table 24); the peak of 81 on 19 April was a record spring count for the islands. As spring advanced, numbers declined with the last record on Inner Farne of two on 13-14 May. Birds lingered longer on the outer group as there was a daily presence throughout May with the final record of a single on Brownsman until 2 June. The first autumn arrivals were discovered on Brownsman and Inner Farne on 9 August with further reports of singles until the first major influx of the autumn on 25 September, and even greater influxes in late October (Table 25). The count of 120 on 23 October was the highest on the islands since 2001. Thereafter numbers dwindled on the outer group until the last report of a single on Brownsman on 7 November. Inner Farne hosted birds throughout the autumn as they settled to overwinter on the island, with 2-3 present when the Rangers departed in December.

Table 24. Robin influx, Farne Islands spring 2012.

	19 Apr	20 Apr	21 Apr	26 Apr	27 Apr	28 Apr	29 Apr	30 Apr	1 May	2 May	3 May
Inner Group	42	35	20	14	11	10	8	15	15	12	11
Outer Group	39	35	22	23	30	20	15	35	20	15	14
Total	**81**	**70**	**42**	**37**	**41**	**30**	**23**	**50**	**35**	**27**	**25**

Table 25. Robin influx, Farne Islands autumn 2012.

	25 Sep	26 Sep	12 Oct	13 Oct	22 Oct	23 Oct	24 Oct	25 Oct	26 Oct	27 Oct	28 Oct
Inner Group	40	35	7	3	4	45	20	20	10	6	6
Outer Group	15	28	15	15	20	75	39	20	15	15	12
Total	**55**	**63**	**22**	**18**	**24**	**120**	**59**	**40**	**25**	**21**	**18**

Bluethroat *Luscinia svecica*

An uncommon passage visitor, well represented in some years.

The Farnes just keep on producing: the islands remain part of an exclusive handful of UK localities which can still boast annual records, despite numbers on passage decreasing considerably. In 60 years of recording, the Farnes have had records in every year apart from nine seasons with recent "blanks" only occurring in 2005, 1999, 1983 and 1982. This season produced five during a "purple patch" in May, the best showing since 2008. A stunning male was discovered on Inner Farne on 10 May and was still present the following morning, occasionally showing down to 10 feet. Inner Farne hosted another splendid male, when one was seen near the pond on 18 May before relocating to the sheltered picnic site by the lighthouse. The bird showed exceptionally well for all the Ranger team to admire as the Farne spring was in full swing. The excitement did not finish there, as the outer group got in on the act a few days later when three females were discovered, one near the cottage on Brownsman and two together on Longstone End on 21 May. All three birds showed well and at least one was still present on Longstone the next day.

Red-breasted Flycatcher *Ficedula parva*

An uncommon passage visitor.

As with all the classic east coast drift migrants this year, it was an outstanding year with no fewer than six records, the best ever showing on the islands (the previous best was five in 1985). A first-summer was discovered on the dock bank on Inner Farne on 18 May and showed well throughout the day. An interesting (and educational as this plumage is not often seen in the UK) first-summer male was found during the late afternoon of 26 May on Brownsman whilst another, a female, was found on the rocky outcrop of the Northern Hares, the easternmost point of the islands, on 16 June. Remarkably, the islands had only ever produced four previous spring records (including one last year) and the spring reports this year included the Farnes first ever June record. The autumn doubled the year's total with three first-winter individuals found on Brownsman on 26 September, 12 October (caught and ringed) and 23 October. The records this year brought the Farnes total to 56 individuals.

Pied Flycatcher *F. hypoleuca*

An uncommon passage visitor.

This majestic black and white flycatcher has become a scarcity on spring passage so that five different individuals recorded during May were good finds. The first of the year, a female, was present on Inner Farne from 1-3 May, whilst another female was on the same island from 10-14 May. Two females were also on the outer group (Staple Island and Brownsman) on 10 May. The final spring record, a cracking male, was present on Inner Farne on 18 May. As expected, the autumn produced the bulk of records, especially August with reasonable numbers reported (Table 26). Thereafter, the only other records were 1-2 on 25-28 September. A very late individual was

discovered near the lighthouse on Inner Farne on 23 October, the latest ever recorded on the Farnes, beating the previous record set on 22 October 2002 by one day.

Table 26. Pied Flycatcher, Farne Islands, August 2012.

August:	13	14	15	16	17	25
Inner Group	4	3	3	3	1	1
Outer Group	5	1	1	2	3	6
Total	**9**	**4**	**4**	**5**	**4**	7

Black Redstart *Phoenicurus ochruros*
A well represented passage visitor.
It was another good year as the Farnes maintained its record as the prime North East location for these stunning summer visitors. A first-winter male (in the *cairii* morph plumage, a young male with the appearance of a female) took up residence on Inner Farne from 25 March-3 April. During its stay, the bird was caught and ringed and was observed singing on several occasions as it set up temporary territory in the vegetable garden. Further spring passage brought two males around the Brownsman cottage on 19 April with a different bird present on 21 April. The latter date also brought another adult male to Inner Farne. A very early autumn migrant arrived on Inner Farne, as an adult male was discovered on the south rocks on 7 July with a moulting male on Brownsman on 6 August. All other records were confined to a productive October period (Table 27) with a peak of seven on 12 October, the highest day count since the record count of nine in 2010. During this "purple patch", one fell prey to a Great Grey Shrike on Brownsman on 15 October.

Table 27. Black Redstarts, Farne Islands, October 2012.

October:	12	13	14	15	22	23	24	25	28
Inner Group	4	2	1	0	0	1	2	1	3
Outer Group	3	1	1	1	1	1	0	0	1
Total	7	**3**	**2**	**1**	**1**	**2**	**2**	**1**	**4**

Redstart *P. phoenicurus*
A common passage visitor.
In complete contrast to last year which only produced six records, 2012 was a very good year with one of the best showings in spring for some time. The first of the year arrived on 26 April, with a pair gracing Inner Farne and a stunning male on Staple Island. The latter bird lingered on the outer group for a further four days. Inner Farne produced 1-2 on seven dates between 27 April-5 May with a noticeable influx on 10-12 May involving good numbers of immaculate full summer plumage males (Table 28). This was the best spring "fall" since 1993. Late-spring passage birds included a female on Inner Farne on 21 May and Longstone on 31 May. The first autumn returnees arrived on 24 September with four on Inner Farne and a single on Brownsman. Over the following few days, an easterly weather front produced some good numbers (Table 28) with 35 in a day representing the highest day count since 1999. Thereafter, 11 were counted on 12 October (six on Inner Farne, five on Brownsman) with one lingering on Inner Farne from 13-16 October, the last of the year and the latest since 2009.

Table 28. Redstart peak spring and autumn counts.

	10 May	11 May	12 May	24 Sep	25 Sep	26 Sep	27 Sep	28 Sep
Inner Group	1	6	7	4	30	14	7	8
Outer Group	10	6	5	1	5	6	1	1
Total	**11**	**12**	**12**	**5**	**35**	**20**	**8**	**9**

Whinchat *Saxicola rubetra*

A common passage visitor.

Once again spring passage was light. The first of the year were five colourful males which arrived on 30 April, comprising two on Staple Island, two on Brownsman and a single on Inner Farne. Thereafter, singles were seen on 1, 10 and 18 May on Inner Farne and 2 May on Brownsman. The final spring record was a female on Longstone on 31 May. More unusually, an immature was discovered on Staple Island in central gully on 16 July. After the first autumn arrivals, with two on Brownsman and two on Inner Farne on 13 August, there was a noticeable arrival over the next few days (Table 29) and 1-2 were then noted on five dates between 21 August- 4 September. The final record of the year was a single on Brownsman on 25 September, a typical final leaving date.

Table 29. Whinchat, August influx Farne Islands 2012.

August:	13	14	15	16	17	18	19
Inner Group	2	5	2	3	1	1	1
Outer Group	2	1	1	2	2	1	1
Total	**4**	**6**	**3**	**5**	**3**	**2**	**2**

Wheatear *Oenanthe oenanthe*

A common passage visitor. Bred in six years 1931-59.

This sentinel of the uplands was very evident on passage through the islands with reports from 41 spring and 45 autumn dates and, as usual, Greenland-race birds were recorded in small numbers. The first of the year, a female on Inner Farne, arrived on 25 March (a typical arrival date) with a male four days later on 29 March. Thereafter, good numbers of 1-12 were recorded almost daily from 6 April-21 May with peak counts shown in Table 30. A late Greenland-type female was on Staple Island on 29 May-1 June representing the last spring-passage sighting. The first autumn returnees arrived on 8 August with three on Brownsman. However it was not until 15 August that birds started to become regular with a daily presence on the islands from 22 August-2 October; peak counts are shown in Table 30. Late autumn stragglers (and the last of the year) included two on Inner Farne on 4-5 October.

Table 30. Wheatear, peak counts Farne islands 2012.

	30 Apr	10 May	18 May	6 Sep	8 Sep	16 Sep	25 Sep	26 Sep
Inner Group	35	8	23	11	8	5	10	8
Outer Group	19	15	4	8	9	11	10	8
Total	**54**	**23**	**27**	**19**	**17**	**16**	**20**	**16**

Dunnock *Prunella modularis*
A common passage visitor. May have bred in the 1890s.
Very small numbers overwinter on the islands with two present during January and February, although when the Rangers arrived in late March these birds had already departed due to the mild start to spring. The only spring passage birds (probably involving the migratory nominate race *P. m. modularis* from Fennoscandia) were recorded on the outer group with 1-2 noted daily from 19 April-8 May with a maximum of three on 21 April. The first of the autumn arrived on 17-19 September on Brownsman with two on Inner Farne from 25 September. There was a continued presence on the inner group throughout the autumn with a modest peak of four in mid-October whilst 1-3 were recorded on the outer group until last seen on 11 November. At least two were present on Inner Farne when the Rangers left in early December, suggesting overwintering birds once again.

Yellow Wagtail *Motacilla flava flavissima*
An uncommon passage visitor.
This nationally declining summer migrant was recorded on seven occasions during the year, an improvement on the previous season (just three records). Spring produced three birds: a male on Brownsman on 30 April, a single in Brownsman Gut on 10 May and a female on Staple Island on 30 May. Autumn passage commenced with a first-year on Brownsman on 9-10 September whilst the first records on the inner group were singles on Inner Farne on 25 and 27 September. The final record was one heard calling over Inner Farne on 4 October.

Grey Wagtail *M. cinerea*
An uncommon passage visitor. May have bred in the 1890s.
The population in Scotland and northern England consists of partial migrants, and some birds move to southern Britain for the winter. It was another quiet year with reports on only five dates. Spring produced just one record, a single moving west over Brownsman, then Inner Farne on 25 March. Autumn records were singles west over Brownsman on 23 September and north over Inner Farne on 27 September and 2 October. The last of the year was near St Cuthbert's Gut on Inner Farne on 5 October.

Pied Wagtail *M. alba yarrelli*
A well represented summer and passage visitor and uncommon breeding species.
It was a good year for this pied passerine, with reasonable numbers recorded on passage and the breeding population reaching a 12 year high. Breeding pairs had established territories by the end of March across the islands with small numbers on northerly passage. A total of 7 (5) pairs nested: Inner Farne 3 (2), Brownsman 2 (1), Staple 1 (1) and Longstone Main 1 (1). The first eggs were discovered on 4 May on Inner Farne with the first chicks on Brownsman on 14 May. The weather had a detrimental effect on breeding success as broods of young were found dead, soaked and exposed by the inclement summer weather. The first successful fledging occurred with the discovery of two young on Inner Farne on 8 June but the facts speak for themselves: from the seven breeding pairs, 27 eggs were laid with 26 chicks hatching but only nine survived to fledging. After the breeding season, the now traditional evening roost on the dock bank/ cemetery bank on Inner Farne brought good numbers with 25 in early September whilst a second (new) roost was discovered on Brownsman with a maximum of 15 on 26 September. As usual the species became scarce during the autumn months with the final records of one on Brownsman on 12 and on Inner Farne on 16 October.

It was another excellent year for the continental sub-species **White Wagtail** *M. alba alba* and the spring produced reports on 11 dates. After the first, a male on Brownsman on 11 April, a further 10 were recorded until last seen on Brownsman east rocks on 30 May.

Richard's Pipit *Anthus richardi*
A scarce visitor.
The impressive Farnes run continued as the number one locality along the North East coast for these large Siberian pipits. A vocal individual was present on Brownsman during the late afternoon of 6 October, whilst another circled Inner Farne calling on 3 November, before flying off towards the mainland. In context, this was the eighth consecutive year the species has been recorded, involving 15 individuals. All records have fallen between 2 October-3 November, with 7-14 October the prime time to discover one of these monster pipits.

Olive-backed Pipit *A. hodgsoni*
A rare visitor.
An extraordinary year for this rare skulking Asiatic pipit as the east coast experienced an unprecedented influx which brought no fewer than three to the islands. A confiding individual was found near the cottage on Brownsman on 12 October which remained for the day and was observed preying on various insects including moths and butterflies. Incredibly, two vocal individuals were present together on the dock bank on Inner Farne on 23 October, eventually settling in the lighthouse compound area for the remainder of the day. Unfortunately a very flighty pipit on Brownsman the same day could not be confirmed as this species. The three confirmed records bring the Farnes total to seven (all since 2001) with the four previous records comprising individuals on Inner Farne on 1 October 2011, and on Brownsman on 12-15 October 2010, 14-15 October 2001 and 28-29 September 2001.

Tree Pipit *A. trivialis*
A common passage visitor.
Overall it was an excellent year, especially during the spring passage when only a handful is expected in normal years. The first arrived on 30 April with three across the islands including two on Staple Island and another on Inner Farne. Thereafter, 1-2 were recorded on 18 dates between 2-24 May with an impressive peak of 12 on 10 May including eight on the inner and four on the outer group, the highest ever day count on spring passage. Some had moved on overnight but seven were still present the next day. The final spring record was a single by the lighthouse compound on Inner Farne on 25 May. The first autumn returnee arrived on Inner Farne on 14-17 August with another on Brownsman on 17 August. Thereafter 1-2 were recorded on eight dates between 25 August-11 October with a peak of seven on 25 September consisting of four on Brownsman and three on Inner Farne.

Meadow Pipit *A. pratensis*
A common passage visitor. Bred *circa* 1901 and in 11 years 1946-1973.
As usual, the species was one of the most numerous passage migrants on the islands during the spring and autumn. Northerly spring passage was logged almost daily from 23 March-11 May with small numbers lingering on the islands. Peak passage included 75 north on 25 March, 33 north on 29 March and 23 north on 2 April. Spring passage gradually dwindled with the onset of summer and the final passage bird was on Brownsman on 15 May. After a three month absence, the first autumn birds started arriving from 26 August with a single on Inner Farne followed by a good westerly passage in early September, with 65, 82 and 104 on 5, 7 and 8 September

respectively. The species was very evident with daily records throughout September-October although numbers never peaked above 40. Numbers dwindled as the autumn progressed and the species was scarce by mid-November with the final record of one on Inner Farne on 3 November.

Rock Pipit *A. petrosus*

A common resident well represented as a breeding species.

This plain but plucky passerine nests in good numbers on the islands but can be very difficult to monitor due to the inaccessibility of their nest sites. This year was tough all round for breeding passerines with insect food becoming scarce on occasions during the summer due to the inclement weather. The first eggs were discovered on the early date of 12 April on Inner Farne in a nest under a tussock of grass between the two ponds on central meadow. The first chicks hatched from the same nest on 27 April, with four of the five eggs hatching on that date. The first fledglings were seen on Staple Island on 8 June, although the nest was not located. In total, 24 (24) pairs nested as follows: Inner Farne 7 (5), West Wideopens 2 (2), East Wideopns 1 (1), Staple Island 3 (3), Brownsman 7 (9), North Wamses 1 (1), South Wamses 1 (1), Longstone Main 1 (1) and Longstone End 1 (1). Despite the weather, good numbers of young were seen around the islands throughout July and August, with the last chick fledging on Brownsman on 2 August. During the autumn, the local population was supplemented by northern birds with counts including 11 on 29 October and 21 on 16 November.

Chaffinch *Fringilla coelebs*

A common passage visitor.

Small numbers move from the near continent during the spring and autumn, with the majority of island reports considered to involve these birds. Spring passage was light with one west over Inner Farne on 26 March followed by a female on the same island on 3-6 April. The only other spring records occurred in mid-May with a male on Brownsman from 10-16 and a female on Inner Farne on 10-11 May. Autumn passage commenced with four on Inner Farne on 24 September and the following few days produced some good numbers with 28 and 15 on 25 and 26 September respectively. Thereafter numbers dwindled with reports of 1-8 on five September and 15 October dates and further peaks of 11 on 22 October. The final record of the year was a single on Brownsman on 2 November.

Brambling *F. montifringilla*

A common passage visitor.

It was a good season for this northern finch, as the spring produced reports on six dates (the best showing in three years) and as usual, good numbers were recorded on autumn passage. Spring reports included one west over Brownsman on 25 March, which may have been the same bird seen later on Inner Farne. Further records included a male by the pond on Inner Farne on 2 April, a pair on Inner Farne on 19 April and individual males on Brownsman on 21 and 24 April. The final spring record was a pair on Brownsman on 30 April. The first autumn passage birds were on 21 September with two west over Inner Farne. Easterly winds over the next few days brought the first real influx of the autumn with another in mid-October (Table 31). The islands produced records throughout October with late passage involving singles on Brownsman on 6 and 15 November.

Table 31. Peak Brambling passage, Farne Islands, September-October 2012.

	25 Sep	11 Oct	12 Oct	13 Oct	22 Oct	23 Oct
Inner Group	40	5	90	10	14	21
Outer Group	36	17	72	12	17	12
Total	**76**	**22**	**162**	**22**	**31**	**33**

Greenfinch *Chloris chloris*
A well represented passage visitor.
This large seedeater has being going through a disappointing spell recently, with less than five records annually over the previous four years. There was a slight improvement this year with a male on Inner Farne on 25-26 March, two west on 28 March and three north on 29 March. The only other spring sightings involved singles on Inner Farne near the pond on 2 April and over the dock bank on 18 April. There was just a single autumn record; a female with Linnets in the cemetery on Inner Farne on 21 October. It is now three years since the last outer group record, when three were on Brownsman on 12 October 2009.

Goldfinch *Carduelis carduelis*
A well represented passage visitor.
It was a quiet season for this colourful seedeater, as the year produced reports on just seven spring and five autumn dates, all on the inner group of islands. Two on Inner Farne on 26 March were the first of the year with 1-2 on a further six dates until last seen on 17 April with a male singing from the vegetable garden. Autumn records were all between 22 September-6 October with a family party of six feeding on the dock bank on 1 October.

Siskin *C. spinus*
A common passage visitor.
It was a reasonable season for this migratory finch with records on 10 spring and 13 autumn dates. Late March produced the bulk of records as four west on 23 were followed by nine west the following day. Westerly passage continued with a noteworthy 13 on 25 March (the highest count of the year), four on 26 March and a single on 28 March. Other spring records included a single on Staple Island on 30 April, three north over Inner Farne on 14 May and singles on the outer group on 26 May and 23 June. Autumn passage was generally much quieter with 1-3 on six dates between 5-26 September and 1-2 daily between 22-29 October. The only higher count was four present across the islands on 26 September.

Linnet *C. cannabina*
A common passage and winter visitor. Bred in the 1890s.
Numerous throughout the year as the islands attract both passage and resident individuals. Spring produced reports on 22 dates during late March and early May with a peak of 10 on 28 March and 21 April. Late-passage birds were recorded during late May with singles on Inner Farne on 16 May and Staple Island on 22, 25 and 30 May. The first autumn individual was on Inner Farne on 20 August and Linnets were then recorded daily on the inner group from 1 October throughout the autumn and early winter period. However numbers were not as impressive as in recent years with the resident flock only attracting double figures on a handful of occasions, with modest peaks of 21 on 28 October and 30 on 29 November.

Twite *C. flavirostris*
A well represented passage visitor.
This upland breeder winters along the Northumberland coast with small numbers recorded on passage through the Farnes, predominantly during the autumn months. The arrival of four onto Inner Farne on 27 October heralded the start of autumn passage with 1-3 recorded on eight dates between 28 October-8 November, all on Inner Farne. The only outer group record of the season concerned a single on Brownsman on 28 October. From 20 November a pair was resident on Inner Farne and still present when the Rangers left on 7 December.

Lesser Redpoll *C. cabaret*
An uncommon passage visitor.
It was an excellent year with reports of 1-2 on 13 dates between 26 March-24 April, and more unusually one lingered on Inner Farne on 22-24 June. Autumn passage commenced with the arrival of four onto Inner Farne on 7 September and thereafter 1-4 were recorded on 22 dates between 8 September-22 October. During this period, a season-best count of seven flew west over the inner group on 8 October. Fly-over records of birds calling were included into these totals, although separating this species from *C. flammea* on call only is virtually impossible.

Common Redpoll *C. flammea*
An uncommon passage visitor.
The species is recorded annually although spring records remain scarce. The year produced two records with a single on Inner Farne on 19-20 April, only the sixth spring record in 20 years. The only autumn individual involved a very large, dark individual (suggesting northwest origins) which was trapped and ringed on Brownsman on 14 October.

Snow Bunting *Plectrophenax nivalis*
A well represented passage visitor.
This charismatic winter and passage visitor had a reasonable year with a single spring record of a male seen dropping onto Knoxes Reef on 27 April. Autumn passage commenced with the arrival of a young male on Brownsman on 23 September and 2-3 present on 25-26 September. On the inner group, a winter plumage individual favoured St Cuthbert's Cove from 26-29 September. Thereafter birds were recorded throughout the autumn and early winter with reports of 1-3 on 17 dates reaching a peak of five west over Brownsman on 23 November. The final records were of four over Inner Farne on 25 November and one on Brownsman on 2 December.

Lapland Bunting *Calcarius lapponicus*
An uncommon passage visitor.
As usual, this high arctic breeder moved through the islands in late September, with an individual seen on Brownsman on 22 September and singles west over Inner Farne on 23 and 24 September. A young male was recorded visiting a feeding station on Brownsman on 25-27 September and was heard in sub-song during its stay. Further records included singles over Inner Farne on 27 September and 5 October with the last of the year over top meadow on Inner Farne on 9 November.

Yellowhammer *Emberiza citrinella*
An uncommon passage visitor.
The species remains scarce on the islands with the majority of records in late autumn. A female/immature was on Brownsman on 23 October and was joined by a second bird the next day. Both remained for the day with at least one still present on 25 October. This was the best showing since 2007 as the islands have only produced two records in the previous four years!

Rustic Bunting *E. rustica*
An extremely rare visitor.
One of the highlights of the year involved a splendid summer-plumaged male which was present on Inner Farne for two days between 31 May-1 June (see centre pages). The bird was discovered on the southeast rocks of the island on the morning of 31 May in heavy rain. It remained loyal to the area, allowing over 78 birders from the mainland to enjoy this stunner. This was the first on the islands in 17 years and the fifth overall after individuals in October 1992, May 1993, May 1994 and October 1995. In a Northumberland context, this was the twentieth individual to be recorded although the first since one was on Holy Island on 3 June 1999.

Little Bunting *E. pusilla*
An uncommon passage visitor.
This rare, demure eastern bunting was discovered in a mist net on Brownsman on 22 October and was ringed and released soon afterwards. The bird was present for a further two days and was last seen on 24 October. The species remains rare in Northumberland with the islands continuing their excellent run of records, boasting 40 records since the first in 1977. In recent years there has been an outer group bias of records with the previous five having all occurred on Brownsman (the last inner group record was in 2003), the last record being on 29 September 2010.

Reed Bunting *Emberiza schoeniclus*
A well represented passage visitor.
A much improved showing (compared with the previous year) with reports on 10 spring and 12 autumn dates although no real build up of numbers occurred. The first of the year, a male, was in the Inner Farne vegetable garden on 26 March followed by 1-3 on eight dates between 16 April-2 May with a spring peak of four on 28 April (three males together on the outer group and a single on Inner Farne). The final spring report was of a female on Brownsman/Inner Farne on 10 May. Autumn passage was light with four arriving on 24 September and a daily presence on Inner Farne until 1 October involving three individuals. Three were on Brownsman on 11-12 October with 1-2 on a further three dates until the last of the year was on Inner Farne on 25 October.

FARNES RINGING AND RESEARCH REPORT FOR 2012

Ciaran Hatsell[1] and Chris Redfern[2]
[1]National Trust Ranger, Farne Islands, Seahouses, Northumberland NE68 7SR
[2]School of Biology, Newcastle University, Newcastle upon Tyne NE2 4HH

INTRODUCTION

The Farne Islands represent a unique resource for understanding seabird biology; this is vital if we are to conserve seabird populations effectively in the face of the increasing impact of modern society on our oceans. Recoveries (birds found dead and recaptures or re-sightings) of ringed birds build up to form patterns of seasonal movements, and can be used to identify causes of significant mortality and assess the impact of mortality on breeding populations. Detailed studies involving rings that can be read easily in the field can elucidate population processes and colony dynamics at regional, national and international scales. Coupling migration, movement and mortality studies with colony-specific studies of seabird breeding behaviour, breeding success and foraging, is a powerful approach for developing a clear understanding of the factors that make the Farne Islands and their bird populations such a unique and economically important part of our marine landscape.

RESEARCH PROJECTS

This is the third year that GPS loggers have been deployed on Kittiwakes nesting on Brownsman. Although not as successful as previous years, with only three loggers recovered from eight birds, the results obtained are a useful addition to the dataset. Overall, the data from 19 birds from Brownsman and five birds nesting on the Tyne Bridge now give us a picture of where birds from opposite ends of the Northumbrian coast (using this definition loosely) forage, and it is clear that the Farne Deeps represent an important food resource for birds from both colonies. Also in 2012, Richard Bevan from Newcastle University continued GPS and datalogger studies of Puffins and Shags which are providing valuable information on how different seabird species use the marine resources around the islands.

The ringing of breeding adult Arctic Terns continued in 2012, providing biometric data from 233 captures. As part of this study, the location of Arctic Terns caught on the nest has been recorded over the last few years and it is clear that, even in heavily disturbed areas, the birds return to their nest sites from previous years. Biometric data from Arctic Tern chicks were also obtained for a separate long-term study and a preliminary analysis has shown that body-condition indices were good, despite the poor weather throughout the season. The various research projects carried out on the Arctic Terns are now building up to give a good picture of how visitor disturbance affects their breeding biology. Michael Babcock, a Masters student from Newcastle University, carried out his research project on Arctic Terns on Inner Farne. As with previous work on the islands, he was not able to detect a significant negative impact of visitor disturbance on the feeding frequency or growth characteristics of Arctic Tern chicks. The data we have so far suggest that, for Arctic Terns at least, the birds adapt well to the presence of visitors.

In previous years, we have collected biometric data on the adults and chicks of Puffins and Kittiwakes to complement the studies on Arctic Terns. In 2012, the run of data for Puffins

was maintained, but for Kittiwakes GPS studies took priority again in 2012; we aim to return to biometric studies on Kittiwakes in the forthcoming season as these data are important for finding out how seabirds with different foraging requirements (Puffins: water-column feeders; Arctic Terns: short-range surface foragers; Kittiwakes: long-range surface foragers) respond to variations in environmental conditions.

RINGING TOTALS AND ACTIVITY IN 2012

The number of seabirds ringed or recaptured in 2012 rose substantially to a total of 2,046 compared to 1,162 in 2011, due mainly to the presence of several experienced ringers amongst the Ranger team which enabled seabirds to be ringed as part of nest-monitoring work. Nevertheless, despite having ringers in residence, ringing was limited by the heavy rainfall and atrocious weather throughout the breeding season which also reduced the breeding success of many species. Capture totals for adult seabirds (newly ringed or recaptured from previous years) were broadly similar to 2011, but with a marked decrease in Eiders balanced by an increase in captures and recaptures of breeding Arctic Terns (Table 1). Both species are being ringed as part of long term Re-trapping Adults for Survival (RAS) studies running on the Farnes, but few Eiders were ringed in 2012 because of poor weather conditions and concern that the declining numbers of breeding Eiders may be accompanied by poorer body condition in those that were breeding, which could make them more likely to abandon their nests if disturbed. For Arctic Terns there were substantial increases in the number of adults captured compared to the previous year, while the number of Arctic Tern chicks ringed increased to an excellent total of 940. The Sandwich Tern colony size increased this year, allowing a greater number of chicks to be ringed (Table 1).

After ringing no Kittiwake chicks in 2011 due to a lack of ringers and a focus on other projects, a concerted effort on this species in 2012 resulted in a total of 248 ringed Kittiwake chicks. The Shag colour-ringing study continued into its fourth year with 99 chicks and 30 adults (19 new adults and 11 re-traps ringed in previous years) fitted with uniquely coded red rings, making them easily identifiable as individuals in the field with the help of binoculars or a telescope. The number of Fulmar chicks ringed decreased after the bumper total last year but still reached a respectable 94. This decrease resulted from many of the pairs failing at either egg or chick stage, presumably due to the poor weather.

Table 1. Adult seabirds ringed and retrapped (including "controlled"), and chicks ringed in 2012 compared to 2011. Species or age classes not targeted or unlikely to be found are indicated as "-".

	Adults				Chicks	
	Ringed		Re-trapped		Ringed	
	2011	2012	2011	2012	2011	2012
Storm Petrel	10	3	3	0	0	0
Leach's Petrel	1	0	0	0	0	0
Fulmar	1	6	0	0	156	94
Shag	26	20	19	11	90	99
Eider	10	0	50	6	0	-
Puffin	112	115	7	2	29	40
Razorbill	6	4	0	0	9	8
Guillemot	0	1	0	0	0	0
Kittiwake	3	6	19	22	0	248
Black-headed Gull	0	0	0	0	32	4
Sandwich Tern	0	0	0	0	29	136
Common Tern	0	1	0	2	0	1
Arctic Tern	84	110	73	123	391	940
Oystercatcher	0	0	0	0	2	2
Ringed Plover	0	0	0	0	0	5
Total	**253**	**266**	**171**	**166**	**738**	**1,577**

There was an increase in the number of passerines ringed on the islands this year due to a renewed focus on catching migrant birds during autumn. The limited vegetation cover on the islands makes the use of mist nets difficult and it is usually the case that a "fall" of migrants coincides with strong winds and rain. The total of 291 passerine captures, representing 36 species (Table 2), may not be a large sample but is not bad considering the size of the islands, the limited cover and the terrible weather! Robins were the most commonly caught passerine with 58 newly ringed and three recaptured. Other species caught in good numbers included Swallow, Goldcrest, Song Thrush and Blackbird; more unusual were single Jack Snipe, Turtle Dove, Great Grey Shrike, Red-breasted Flycatcher, Wryneck and two Barred Warblers.

There are many reasons why migrant birds stop on the Farne Islands. Some are forced down by detrimental weather, others use the islands as navigation points in and out of the country and many birds use them as a fuelling station before continuing their migrations. An excellent example of the latter was a Willow Warbler caught on 8 September 2012 with a weight of 10.1 g. and re-caught seven days later in the same location but now weighing 12.5 g. This shows how the islands can be used by birds to gain weight before migrating. Another capture of interest was a Blackbird, hand-caught in one of the buildings, which was already carrying a Norwegian metal ring; although we know that many thousands of migrant thrushes come in from Scandinavia, it was excellent to see the evidence first hand.

Many ringing demonstrations were done throughout the year to give visitors to the Farnes a

chance to see some of the scientific work taking place on the islands. This was very popular and people were especially interested seeing birds in the hand. These demonstrations gave us a chance to promote the benefits of ringing and widen people's knowledge of the mysteries of migration.

Table 2. Other species ringed in 2012.

	New	Re-trap	Control	Total
Jack Snipe	1			**1**
Turtle Dove	1			**1**
Wryneck	1			**1**
Great Grey Shrike	1			**1**
Goldcrest	48			**48**
Swallow	45	8		**53**
House Martin	1			**1**
Chiffchaff	6			**6**
Willow Warbler	10	1		**11**
Blackcap	11			**11**
Garden Warbler	3			**3**
Barred Warbler	2			**2**
Lesser Whitethroat	1			**1**
Whitethroat	1			**1**
Grasshopper Warbler	1			**1**
Wren	6	1		**7**
Ring Ouzel	1			**1**
Blackbird	16		1	**17**
Fieldfare	2			**2**
Song Thrush	35			**35**
Redwing	3			**3**
Robin	58	3		**61**
Red-breasted Flycatcher	1			**1**
Pied Flycatcher	2			**2**
Black Redstart	3			**3**
Redstart	3			**3**
Greenland Wheatear	1			**1**
Dunnock	1			**1**
Pied Wagtail	2			**2**
Tree Pipit	1			**1**
Rock Pipit	7			**7**
Brambling	1			**1**
Siskin	1			**1**
Lesser Redpoll	1			**1**
Mealy Redpoll	1			**1**
Little Bunting	1			**1**
Total	**280**	**13**	**1**	**294**

RECOVERIES

Shag sightings accounted for a large proportion of recoveries this year, largely down to the colour-ringing project marking birds with uniquely lettered red rings. This project, organised by the Centre for Ecology and Hydrology (CEH), Edinburgh, has been in place on the Farnes since 2009. The resulting increase in the number of re-sightings and recoveries of Farnes-ringed birds confirms the northerly bias of Shag movements, with Farnes birds seen along the east coast up to Aberdeen, and has shown that some birds can be remarkably site-faithful in winter, returning to the exact roosting spots (Jane Reid, personal communication). Nevertheless, some of our birds do go south and two southerly movements were reported during the 2011 winter, one to Suffolk and one to Norfolk. The Suffolk bird, ringed as a chick on Inner Farne the same year, was found walking along a road in Lowestoft; it was taken into care on 14 December 2011 but died the next day. The Shag in Norfolk was found dead at Winterton on 9 December 2011 having been ringed as a chick on Staple Island nearly six months previously. In autumn 2012, we received reports of another southerly movement to Norfolk of a chick ringed on the East Wideopens on 8 August 2012 and seen at Cromer on 28 October 2012.

There were 23 sightings on the Farnes of colour-ringed Shags from the Isle of May, demonstrating the connection between the two colonies. The majority of these birds, ringed as chicks on the Isle of May between 1997 and 2011, were seen on the Farnes in August. One of these, a chick ringed on the Isle of May at the end of June 2011 was on Inner Farne in early August the same year, indicating that juvenile birds can disperse away from their natal colony quite quickly. The post breeding dispersal of adult birds from the Isle of May is likely to account for the majority of birds seen here in August, although some may well be breeding on the Farnes.

Four dead Shags were also reported from Scotland, two for which only the rings were discovered, one at Eyemouth (a chick from Staple in 2010) and one at East Lothian (a chick from Staple in 2002); the other two birds were found dead in Aberdeen and Lossiemouth (chicks respectively from Staple in 2011 and Brownsman in 2010). A very belated report of a bird ringed as a chick on Staple Island on 25 July 1986 and seen at Oostende, Belgium was of particular interest, and shows that birds can also disperse across the North Sea: this bird was first seen at Oostende on 14 March 1988, then at a site 2 km away on 26 March 1988 and finally back at the original finding location on 1 January 1989.

The Sandwich Tern is another species which generates a good number of recoveries. The ring-reading efforts by Kjeld Pedersen at the Hirsholm colony in northern Denmark located eight birds during the 2011 breeding season which had been ringed as chicks on the Farne Islands between 1996 and 2007. This shows a clear pattern of juvenile dispersal to more northerly breeding grounds. However, the Hirsholm colony is relatively unique in the intensity of ring-reading efforts, so our view of dispersal based on these alone will be rather biased. For next year, we plan to follow the initiative of Ewan Weston, a ringer based in Scotland who has been colour-ringing Sandwich Terns caught using mist nets at autumn roost sites, and ring samples of chicks with more easily identifiable colour rings. Hopefully, this approach will lead to a broader understanding of natal dispersal around the North Sea.

As an example of the life history detail of individual birds that can be generated from this approach, we received a report two years ago of a bird ringed as a chick on Brownsman in 1996 and caught on the Ythan Estuary on 17 August 2010 when a colour mark was added; this bird

was identified from its colour mark further south at Arbroath, Tayside, on 15 September 2012. As a result of metal ringing, now considerably reinforced by these colour-ringing studies, we know that many of our Sandwich Terns move north after breeding to a pre-migration staging point on the Ythan Estuary in Aberdeen. Unlike previous years, there were no new recoveries of Sandwich Terns from the West African coast; this is an encouraging sign and it may be that conservation efforts to prevent human persecution may be having positive effects.

As a result of its Antarctic wintering range, we get few recoveries of Arctic Terns away from the breeding colony and this year was no exception. One notable recovery in the breeding colony was of a bird ringed as a chick on Inner Farne on 23 June 1984 and found dead there on 4 June 2012, making this bird almost 28 years old. The continuing RAS study on this species generates some short range movements of note and this year four Arctic Terns, all ringed as chicks 30 km to the south on Coquet Island, were re-trapped breeding on the Farnes, thus demonstrating natal dispersal between local breeding sites along the Northumberland coast.

We received two belated reports of Kittiwakes this year, both of birds ringed as chicks on the Farne Islands and shot in the Davis Strait of the Arctic Ocean, west Greenland. The first was ringed on Brownsman on 1 July 1985 and shot at Ikaarissat on 17 September 2006, just over 21 years old and over 2,900 km away from the original ringing site. The second bird was ringed on Inner Farne on 3 July 1997 and shot in Nuuk on 18 September 1998. These recoveries are further evidence of the threats from human persecution that Farnes birds are exposed to away from the islands, and follow an established pattern of movement of some Kittiwakes across the north Atlantic during autumn and winter.

Recovery reports of other species this year were for Eider (four found dead locally), Herring Gull and Great Black-backed Gull. An adult Herring Gull bearing an orange coded colour ring was sighted on Brownsman Island on 9 June 2012 having been ringed as a bird in at least its fourth calendar year by the North Thames Gull Group at Rainham Rubbish Tip in London on 29 January 2011. It will be interesting to see whether we see this bird again and can build up a pattern of its life history. Finally, a Great Black-backed Gull ringed as a nestling on the Isle of May, Fife on 27 July 2002 was caught on Inner Farne on 1 August 2009, 89 km from the original site of ringing.

ACKNOWLEDGEMENTS

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CETACEANS AROUND THE FARNE ISLANDS IN 2012

Graeme Duncan
National Trust Ranger, Farne Islands, Seahouses, Northumberland NE68 7SR

INTRODUCTION

With 87 records of four species (Minke, Harbour Porpoise, Bottlenose and White-beaked Dolphin), it was an excellent year for cetacean sightings around the Farne Islands (Table 1). It also proved to be a good year for cetacean viewing with several sightings of large pods. The presence of these animals and the regular sightings of large dolphin pods further offshore, suggest the possibility of above-average stocks of fish (especially Herring) throughout the summer months. Although not a cetacean, records of Basking Shark are included in this report.

Table 1. Comparison of 2012 sightings to previous years.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
Humpback Whale *Megaptera novaeangliae*							1				1
Minke Whale *Balenoptera acutorostrata*	7	8	14	1	7	6	5	2	3	11	**64**
Dolphin spp.								2	1		**3**
Risso's Dolphin *Grampus griseus*				1	1		1		1		**4**
Bottlenose Dolphin *Tursiops truncatus*	1	8	10	3	5	3	7	1		13	**51**
White-beaked Dolphin *Lagenorhynchus albirostris*	7	1	1	2	2	2			1	2	**18**
Harbour Porpoise *Phocoena phocoena*	47	50	59	42	49	26	24	37	93	61	**488**
Basking Shark *Cetorhinus maximus*					5					2	7
Total Cetaceans	**62**	**67**	**84**	**49**	**64**	**37**	**38**	**42**	**99**	**87**	**629**

As in previous years, two recording methods were used: systematic morning surveys throughout the year were supplemented by the casual recording of cetaceans in local waters. Surveys were generally focused on Inner Sound from the vantage point of Lighthouse Cliff, the high viewing angle and large horizontal scope providing the best opportunity to spot cetaceans from the island. In total, 101.3 hours of surveys were undertaken until the end of October, producing 26 cetacean sightings of four species, with an average of 3.9 hours of effort per sighting, on par with 2011 in terms of effort but far ahead in recorded diversity (surveys in 2011 produced records only of Harbour Porpoise). Alongside Rangers' surveys and casual sightings, records from boat operators are included in the totals, as they provide an invaluable additional source of information on the abundance and variety of cetaceans around the Farnes. Cetacean sightings are summarized by month in Table 2.

Table 2. Cetacean sightings around the Farne Islands by month 2012.

	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Total
Minke Whale				1		1	2	4	3		11
Bottlenose Dolphin			1		3	2			2	5	13
White-beaked Dolphin									2		2
Harbour Porpoise	1	6	10	2	2	11	15	11	3		61
Basking Shark								2			2
Grand Total	**1**	**6**	**11**	**3**	**5**	**14**	**17**	**17**	**10**	**5**	**89**

Finally, the large number of sightings reported by a few local tour operators and fishermen suggest that there is a far greater presence of cetaceans around the Farne Islands, especially further offshore in the deep water channels, than is currently recorded. This monitoring resource (especially fishing vessels) should be expanded upon in the future to gain a more accurate record of whale and dolphin presence around the greater Farnes waters throughout the year.

SYSTEMATIC LIST

Minke Whale *Balenoptera acutorostrata*

It was a good year for sightings of this reclusive rorqual. Six sightings of individuals by the Ranger team were supplemented by a further five sightings by local tour operators and fishing boats. An early sighting of an individual in Inner Sound from *Serenity II* on 28 May was the first record of the year, and an unusual – but not unheard of – location for this cetacean; the species usually favours waters further out in the island group. The next sighting was not until 29 July, when two days of wind-ridden and fruitless seawatching on the National Whale and Dolphin Watch finally produced a lone individual moving south beyond Crumstone, providing some alleviation to the Rangers' disappointment.

August provided two further sightings, one on 23 August off the south end of Brownsman, and one on 31 August spotted from *Serenity II* south of Crumstone. September produced four records, a *Serenity II* sighting east of Longstone on 12 September, *Glad Tidings III* then encountering one off Longstone on 19, a second sighting off Crumstone on 21, and finally, an individual travelling

north between Longstone and Knivestone by *Serenity II* on 23 September. These sightings may have been of the same individual, but this is impossible to confirm without photographic records.

The last records were of individual sightings, again in Inner Sound, on 8, 9 and 10 October. These sightings are assumed to all be of the same individual lingering around the local waters, the animal last seen heading northwards north of Megstone in Staple Sound. Outside of the immediate Farnes local waters, Minke Whales proved to be frequently encountered during tourist pelagic trips, operated mainly southeastwards from North Sunderland Harbour. The waters roughly 15 miles offshore from Beadnell and Craster proved especially fruitful from anecdotal evidence.

Bottlenose Dolphin *Tursiops truncatus*

After the lapse in Bottlenose records last year, it was a welcome return to form for this playful pod-dweller. The first record was of a pod of 20 sighted by *Serenity II* in Inner Sound on 28 April swimming south. On 5 June, a pod was sighted swimming north through Inner Sound by *Glad Tidings VII*, with a second sighting of four on 7 June; possibly the same pod lingering. Records of singles in Inner Sound on 19 June, 5 July (*Serenity II*) and 10 July continued the summer trend of sparse encounters with small groups.

On 6 October, a mixed pod of 12-15 dolphins, mainly White-beaked with a few Bottlenose, were sighted heading south through Inner Sound past the North Sunderland harbour entrance. On 21 October a larger pod of similar mix was seen heading south through Inner Sound. Reports of the pod size range from 40-100 individuals, though there is the possibility of two pods combining. Individuals were observed full-body breaching as the pod moved at migration-pace towards the southern waters.

On 4 November, a pod of Bottlenose Dolphin roughly forty-strong was spotted heading south. A pod of 25-30 animals containing at least two juveniles was then encountered in Inner Sound on 9 November, bowriding a passing visitor boat. The same pod (distinguished by dorsal fin markings) was then seen on 10, 11 and 14 November, marking the last sightings of the season, and it is now thought that this pod is from the Moray Firth in Scotland (pers. comm., Ailsa Hall). It is unknown, however, whether the 4 November sighting was of the same pod.

White-beaked Dolphin *Lagenorhynchus albirostris*

There were only two sightings of this light-sided leaper around the Farne waters in 2012. Both were of the aforementioned mixed-species pods in Inner Sound on 6 and 21 October comprising mainly of White-beaked Dolphins, with a few interspersed Bottlenose. Although sightings were scarce through the inshore waters, large pods of over 50 animals were regularly seen in the "Farne Deeps" throughout July and August on pelagic tours by operator Alan Leatham and several others. It is possible that White-beaked Dolphins, which are far more oceanic in habits than their neritic cousins, the Bottlenose, have little need to enter the more inshore waters of the Farne Islands for food; this may account for the low frequency of sightings near the islands over the 12 year period, especially relative to Bottlenose.

Harbour Porpoise *Phocoena phocoena*

It was another good year for Harbour Porpoise, with a total of 61 sightings, 23 of which came from the systematic surveys and 22 from visitor boats. This represents the second highest count in 12 years, only surpassed by the bumper year in 2011. The earliest three records, on 25 February, 15 and 19 March, all before the Rangers arrived on the islands, are from *Serenity II*, and all through Inner Sound. 27 March produced the first sighting by Rangers of five adults and two much smaller juveniles (likely to be young from last year) travelling northwards through Inner Sound. A further three March and ten April sightings, all in Inner Sound, made a very good spring for Harbour Porpoise on the Farnes.

Early summer was comparatively quiet, with only four records throughout May and June, all through Inner Sound. July proved more productive with a total of 11 sightings, including four sightings in Staple Sound southeast of the Scarcars, a feeding area suggested in last year's report (Coleman, 2011). One of these sightings was, in fact, of a group of three to four individuals (including a juvenile) feeding, reinforcing the likelihood of this area as a key feeding site around the island. August proved to be the most productive month, with 15 sightings, followed by 11 in September. Two sightings were of small groups off Brownsman South End, an under-reported location for this species. After records on 8 and 19 October of small groups in Inner Sound, the final sighting of the year was on 21 October.

Juveniles and calves were recorded on 16 separate occasions throughout the year, with the greatest density of sightings in July and August (10). This provides further circumstantial evidence towards the use of local waters by porpoise as a breeding ground, a theory long postulated by Farnes Rangers and locals, but as yet unverified. This could be a future area for studies around the islands, and important for the conservation status of our local waters.

Basking Shark *Cetorhinus maximus*

Although not a cetacean, the general size and feeding strategy of this immense fish warrants its inclusion in this report. The individual was first spotted on 17 September, by *Serenity II* south of Longstone lighthouse, providing views of its two fins protruding from the water – a key diagnostic feature of a Basking Shark. The Ranger team, however, failed to observe the individual. Disappointment at having missed such a sight turned to elation when the same individual was spotted by the team in the Kettle, just off from Inner Farne in the afternoon of 19 September. This animal was seen for roughly a minute before disappearing again from view, probably leaving the shallow location for deeper waters. The length of the animal was estimated at only 10 feet, much smaller than the average size of an adult (roughly 20 feet), and therefore it was considered most likely a juvenile. Basking Sharks, generally a west-coast species, are not often seen on the Northumberland coast; the last Farnes record was in 2007 when two were recorded together.

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GREY SEALS ON THE FARNE ISLANDS IN 2012

David Steel
National Trust Head Ranger, Farne Islands, Seahouses, Northumberland NE68 7SR

DATA FOR 2012 SEASON

Pupping statistics

It was another successful year with an increased pup production and the mild autumn weather helping towards low mortality. The first pup was born on South Wamses on 21 September, and births continued throughout the autumn and early winter, with the final pups born in early January.

In total 1,603 pups were born on 10 islands (Table 1). This is the fifth consecutive year the population has increased and represented the highest pup production since 1974. The Staple Island colony remained the main nursery, having overtaken that on South Wamses in 2011 (Table 2). Forty-four pups born on the Inner group was the highest number since 1983.

Table 1. Farne Island Seal pups: counts by date and island, Autumn-Winter 2012.

	B'man	Staple	South Wamses	North Wamses	North Hares	Big Harcar	Longst.	Knoxes	Wide-opens	Inner Farne
7 Oct			3	5						
10 Oct			2	5						
14 Oct		1	8	9						
18 Oct	3	2	23	37		2				
21 Oct	1	9	28	22						
24 Oct	19	11	55	39	1					
30 Oct	65	104	121	83	4					
4 Nov	60	115	31	9	8	1	1			
10-11 Nov	71	85	54	35	9					
15-16 Nov	27	54	22	11	4	1		2	1	
21 Nov	23	38	16	10	8	1		4	3	
24 Nov	8	14	9	7	10		1	1	2	
30 Nov	42	10	3	4	3	3	1	4	7	
6 Dec	24	11	4	3	5					
17 Dec	25	8	1					4	12	
Mid-Jan	5	1				1		3		1
Total	**373**	**463**	**380**	**279**	**52**	**9**	**3**	**18**	**25**	**1**

Table 2. Pups born in the main Farne colonies in the last three years.

	2012	2011	2010
Staple Island	463	475	343
South Wamses	380	374	418
Brownsman	373	334	358
North Wamses	279	253	293

The mortality rate was low this year, a mild autumn with few strong winds/big seas providing a respite. The low-lying islands and ridges were not washed over, the usual cause of losses during stormy periods. The movement of mothers onto different islands may also be having an impact (see below). The overall mortality of 27% was low by Farne standards, usually between 45-55%, and was comparable to the 30.7% mortality in 2011 (Table 3).

Table 3. Grey Seal mortality statistics in the last three years.

	2012	2011	2010
Successful:	1,266	1,077	806
Unsprayed dead:	54	62	56
Sprayed Dead:	71	61	54
"Missing"	312	355	583
Mortality rate:	27.20%	30.7%	48.2%

Seal Twins

On 23 October two freshly born pups were discovered on a secluded beach near the jetties on the south end of Brownsman. Observations over the next few days showed that only one cow was in attendance and both pups were suckling. Both pups were sexed as being male and it would appear a twin birth had taken place – a world first. Grey Seals have never been known to have produced twins, although it has been recorded in other seal species. A DNA test was taken on both pups and confirmation is still pending at time of writing. Both pups were successfully weaned and were independent by mid-November.

Seal in Netherlands

For the second time in three years, a young Farne Islands pup was discovered washed ashore in the Netherlands during the late autumn. The young female (with red dye on flippers) was discovered on Texel, Netherlands in early November. Records showed that the animal had been sprayed on the South Wamses on 10 October, and had, therefore, made the 350-mile journey south (having probably been washed off the island she was born) when less than four weeks old. During the winter of 2010, three Farne youngsters made it to the same coastline on the Netherlands. Like those three, the young female from 2012 was taken into care and is making good progress. This should no longer surprise us – the first Farnes pup recorded travelling to Holland was back in 1958 – and they have probably been commuting for as long as there have been seals on the islands.

Colony movements

Since 2000, both Staple Island and Brownsman have proved attractive to pupping mothers. These populations have followed similar patterns: Staple Island from no births in 2000 to 463 in 2012, and Brownsman increasing from 10 births in 2000 to 373 pups in 2012. This is the largest number of births on both islands since 1976. Animals have moved away from more vulnerable areas (especially on the North Wamses) to the more sheltered and generally safer areas of these two islands. In just 12 years, Staple and Brownsman have gone from supporting 1% of the Farnes pup production to the current rate of 52%.

East Coast boom

The Farne Islands are not the only site which is experiencing a pup boom, as other English east coast sites are reporting record numbers: Donna Nook (Lincolnshire) 1,525 pups, Blakeney Point (Norfolk) 1,222 pups, and Horsey (Norfolk) 612 pups. This dramatic rise in pup numbers in England is in contrast to Scottish colonies which show stable or decreasing numbers in the northwest.

Seal dilemma

Throughout the late 1990s, annual seal births on Brownsman were in single figures. Then in 2000 it hit 10 and the "population explosion" began, resulting in 373 pups in 2012. These pupping cows and attendant bulls are having an impact on the relatively fragile soil cap. However, this pales into insignificance when compared to the effect of moulting animals later in the winter. In the last two years (why not earlier is a mystery) seals have realised that this is the "perfect" island. In January-February, with no Ranger presence, up to 1,500 animals hauled out across the top of Brownsman. As these animals moulted, they used the ground to scratch, rub, and roll, resulting in a compact mat of mud and fur. By March the moult was over and they moved off, leaving a battered and bruised island.

The result of this compaction was that vegetation was lost, Puffin burrows had collapsed, and bare ground was left to erode. It was particularly unfortunate that the first year of moulting haul-outs in 2012 coincided with possibly the wettest summer the islands have experienced. By June, parts of Brownsman more resembled the soggy Sutherland Flow Country than a maritime island. The Ranger team estimated that 7,000 to 8,000 Puffin burrows were flooded out. Seals hauled out again in 2013 and, whilst some staff spent six days living on the Island in mid-January, this gave only a temporary respite.

This is a problem that is not going to go away. The previous seal *versus* soil cap *versus* Puffin controversy was resolved by culls in the 1970s. This cannot be the way forward in the 21st century, and we need to be thinking urgently about what can be done. The soil cap is thin, the seals are numerous and weighty, and time is short – ideas are needed!

BUTTERFLIES ON THE FARNE ISLANDS IN 2012

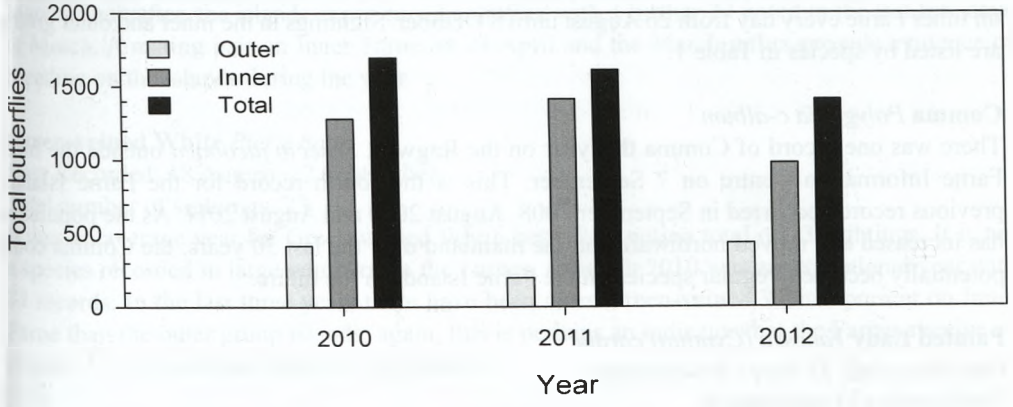
Bex Outram
National Trust Ranger, Farne Islands, Seahouses, Northumberland NE68 7SR

INTRODUCTION

During the season, 1,411 individual butterfly sightings of 11 species were recorded. The first on 25 March involved two Small Tortoiseshells *Aglais urticae* on Inner Farne; the first sighting on the outer group was not until nearly two months later, a Small White *Pieris rapae* on 22 May. The last record on Inner Farne was a Red Admiral *Vanessa atalanta* found on 29 November hibernating in the Pele Tower cellar; the last butterfly record on Brownsman was also of a Red Admiral on a sunny but autumnal 15 November.

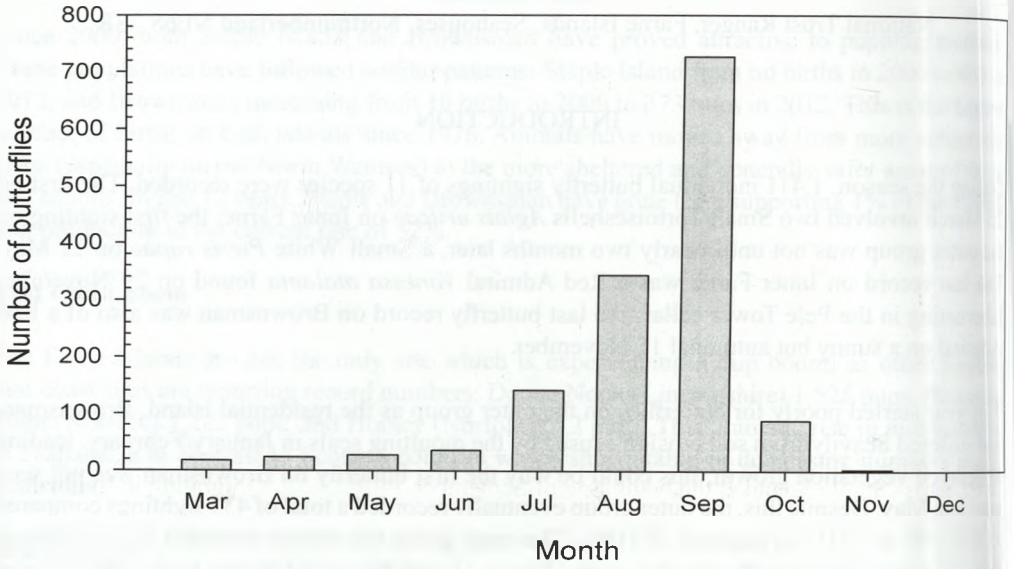
This year started poorly for butterflies on the outer group as the residential island, Brownsman, had suffered heavily from soil erosion caused by the moulting seals in January/February, leading to delayed vegetation growth; this could be why the first butterfly on Brownsman was not seen until late May. Despite this, the outer group eventually recorded a total of 433 sightings compared to only 198 in 2011, an increase of 119%. The inner group has always recorded more sightings than the outer islands in the last few years (Figure 1), and this could be due to the proximity of Inner Farne to the mainland.

Figure 1. Total number of butterfly records for the last three years.



The majority of butterfly sightings this season were recorded in September with nearly half of all sightings during this month (Figure 2). This was most likely due to the weather: for each month during the April-June period, the islands experienced higher than average rainfall and lower than average temperatures. However, higher than average temperatures occurred from July through to September and it was during these months that the butterfly numbers started to increase to their September peak.

Figure 2. Monthly breakdown of butterfly sightings.



SYSTEMATIC LIST

During the 2012 season butterflies were recorded in two ways: casual sightings and transects. Casual sightings consisted of Rangers recording any butterflies seen on a daily basis around the islands throughout the year. As butterfly numbers started to increase, transects were conducted on Inner Farne every day from 26 August until 8 October. Sightings in the inner and outer groups are listed by species in Table 1.

Comma *Polygonia c-album*

There was one record of Comma this year on the Ragwort *Senecio jacobaea* outside the Inner Farne Information Centre on 7 September. This is the fourth record for the Farne Islands: previous records occurred in September 2008, August 2010 and August 2011. As the population has increased and moved northwards on the mainland over the last 30 years, the Comma could potentially become a regular species on the Farne Islands in the future.

Painted Lady *Vanessa (Cynthia) cardui*

Date Recorded: 23 May – 8 September

Total number of sightings: 8

The first was discovered on Brownsman in May with further records during late summer across the islands. It proved to be a very disappointing season for this species with a total of just eight sightings compared to 149 sightings the previous year. The Painted Lady is a migrant species that has no hibernation stage and the caterpillars cannot survive below 5 ºC; therefore, the adults travel south to the breeding grounds around desert edges in North Africa and Arabia and then return north in spring. The timing of this northerly migration is dependent on the location of breeding grounds and the prevailing winds; the first sighting in May would probably have been an adult that had completed its migration and the subsequent sightings were potentially newly emerged butterflies from the UK.

Peacock *Inachis io*
Date Recorded: 27 March – 21 October
Total number of sightings: 102
There was only one record of Peacock in March, an adult coming out of hibernation from St Cuthbert's Chapel. However, the majority of sightings were during the late summer with reports on four dates in August, three in September and four in October. The species had a very good year on the Farnes with a total of 102 sightings recorded in 2012, representing a 240% increase on sightings in 2011. Peacocks are a suspected breeder on the Farne Islands; they lay eggs on Common Nettle *Urtica dioica* which is abundant on certain islands although no evidence of breeding was found during the year.

Red Admiral *Vanessa atalanta*
Date Recorded: 27 March – 15 November
Total number of sightings: 513
The majority of the butterflies seen (36% of all records) belonged to this species during the year. The early sightings of Red Admirals are of those that have wintered in Southern Europe and have migrated to the UK to breed. Most sightings were in September on both the inner and outer groups and this was potentially weather related. One individual was seen on Brownsman heading west across Staple Sound at the beginning of September, most likely a migrating individual.

Small Tortoiseshell *Aglais urticae*
Date Recorded: 25 March – 21 October
Total number of sightings: 391
It was a good year as the species was the second most abundant butterfly, accounting for 28% of the total sightings. The total number of sightings exceeded the last two years, with 312 in 2010 and 138 in 2011. Over-wintering hibernators resulted in the first butterflies recorded on the Farnes in March with two in St Cuthbert's Chapel and another on the dock bank on 25 March. Thereafter, the islands experienced an influx with a further 27 noted in the last few days of March. A mating pair on Inner Farne on 24 April and the March influx provide evidence of breeding on the islands during the year.

Green-veined White *Pieris napi*
Date Recorded: 18 August – 2 September
Total number of sightings: 23
It was an average year for Green-veined White butterflies with a total of 23 sightings. It is not a species recorded in large numbers on the Farnes, although 2010 was an exceptional year with 73 records. In the last three years there have been more Green-veined Whites present on Inner Farne than the outer group islands; again, this is perhaps an indicator that the Farnes receive an overspill from mainland butterfly populations.

Large White *Pieris brassicae*
Date Recorded: 19 August – 15 September
Total number of records: 78
Large Whites have two to three broods per year and the first sighting on the Farnes was not until mid-August on Inner Farne. This is most likely from a second brood which are usually the most numerous recorded. After a good year in 2010 with 185 records, the following year was poor with only 15 records. 2012 saw an increase in sightings with 78 Large Whites recorded, the majority seen on Inner Farne.

Small White *Pieris rapae*
Date Recorded: 25 March – 21 October
Total number of sightings: 276
There was an increase in records compared to the previous year and it proved to be the only species which was recorded more abundantly on the outer group than the inner group islands. Like other species, numbers fluctuate between years depending on winter temperatures and the fairly mild winter of 2011/12 may have resulted in the observed increase. The majority of records during the year were seen in September, and these potentially related to second broods. On 10 August an individual was seen flying through Inner Sound, two-thirds of the way across, heading towards Seahouses.

Meadow Brown *Maniola jurtina*
Date Recorded: 4 September – 10 September
Total number of sightings: 4
The year produced four sightings, all from Inner Farne and potentially the same individual. This was a decrease from the previous year (which had seven in one day) but 2011 was exceptional as the species is not always recorded annually.

Speckled Wood *Pararge aegeria*
Date Recorded: 24 – 25 May
Total number of sightings: 2
An individual was seen on Inner Farne on 24-25 May and represents only the fifth record in recent times with three in 2011 and a single in 2008.

Wall Brown *Lasiommata megera*
Date Recorded: 26 August – 16 September
Total number of sightings: 13
It was another good year for this species with sightings on 13 days with at least three different individuals involved. Most interestingly, an individual on 5 September was observed egg-laying in a clump of Red Fescue *Festuca rubra* on the dry stone wall of the cemetery. It has been thought in the past few years that this species may breed on the islands and this is supporting evidence.

Table 1. Butterfly sightings by species in the Inner and Outer Groups in 2012.

	Inner Group	Outer Group	Total	% of total
Comma	1	0	1	<1
Painted Lady	5	3	8	<1
Peacock	90	12	102	7
Red Admiral	331	182	513	36
Small Tortoiseshell	328	63	391	28
Green-veined White	18	5	23	2
Large White	58	20	78	6
Small White	129	147	276	20
Meadow Brown	4	0	4	<1
Speckled Wood	2	0	2	<1
Wall Brown	12	1	13	1
Total	**978**	**433**	**1,411**	**100**

MOTHS ON THE FARNE ISLANDS IN 2012

William Scott
National Trust Ranger, Farne Islands, Seahouses, Northumberland NE68 7SR

INTRODUCTION

Micro- and Macrolepidoptera, or moths as they are commonly known, are an essential component of any ecosystem. Their impact on our world may be as subtle as their presence. Being largely nocturnal they often escape notice entirely! Unlike birds on the Farne Islands, Lepidoptera have only been studied somewhat patchily since 1991, so our understanding of their role in ecology and habitats of the islands is still in its infancy. With over 2,500 species found in every conceivable niche across the UK they are a fundamental part of our ecosystems and by acting in their millions they have a direct impact on plants and the insects, birds and other animals that feed on them.

The Farne Islands are no different with the plants either promoted by moths via pollination or suppressed via larval feeding. Vegetation growth, in turn, influences our breeding birds, as well as the availability of food for our passerine breeders and migrants. It may seem surprising that small insects can produce such disproportionate effects, but in midsummer there are tens of thousands of these nocturnal gems flying, pollinating and grazing at any time. Inevitably, the numbers of individuals recorded represent only the tip of the iceberg!

2012 Season

After a westerly-dominated 2011, this year was a polar opposite; below-average temperatures coupled with twice as much rain and persistent strong easterly winds, meant that the recording of moths was severely hampered. This led to a dramatic reduction in moth numbers recorded, perhaps a symptom of weather-reduced populations on the Farnes, although, paradoxically, 2012 was an excellent year for species diversity across the islands.

Despite the weather, 124 species were recorded – the highest total ever, with 14 new to the islands. Predominantly hot, muggy, still and dry conditions during peak season in July, August and September produced 78% (3,075) of sightings, accounting for such a respectable total. The intensity and variety of recording techniques may also have maximised the diversity of species found. Many species of moth are not attracted to light and therefore casual recording during the day and at dusk are very important (Table 1). Sustained casual recording can enhance our knowledge of the diversity of moth species present on the islands and their ecology; for example, a dependence on limited nectar sources such as Thistle (*Cirsium* and *Carduus spp.*), Sea Campion *Silene maritima* and later Ragwort *Jacobaea vulgaris*.

Table 1. Numbers of moths, moth species and recording intensity (days) for the four different recording methods used.

	Number of Moths	Number of Species	Days of Recording
Casual Daytime	334	36	93
Casual Dusking	773	34	14
125w MV Trap	836	75	18
15w Actinic Trap	1748	78	32
Total:	**3925**	**124**	**151**
2011 Total:	**5205**	**117**	**113**

In addition to casual recording, two moth traps were employed on 50 nights on both Inner Farne and Brownsman. Generator issues meant the 125w MV trap was only used until late July with a 15w Actinic used thereafter, limiting recording to one island and days when enough power was available. The preference of moths to fly in pockets of still air meant that traps were deployed in sheltered areas. The purpose of this varied and constant recording is to improve our understanding of the role our resident species play on the islands, the relationship of the island moth fauna to that of the wider Northumbrian landscape and, more pressingly, to confirm which species are currently resident. As a result of the rapid population turnover of moths, we might expect island populations to change quickly in response to variables such as weather and climate; regular monitoring is important to understand the magnitude of environmental effects on moth biodiversity. In the following summary of highlights and systematic list of breeding species, numbers before the moth names are the Log Book numbers widely used in moth field guides, such as Bradley and Fletcher (1979).

MOTH HIGHLIGHTS IN 2012

1454/1454a *Dioryctria sp.* – The one that got away! An individual that was initially identified as *D. simplicella,* was later thought to be the rare *D. schuetzeella*, but this could not be confirmed from photographs; otherwise it would have represented a first for the Farnes and Northumberland.

1981 Poplar Hawkmoth *Laothoe populi* – A great year for this king of moths with a female (bearing eggs), then a male caught on 16 July and 21 July respectively. These represent only the fifth and sixth records for the Farnes and the first since 2010.

2348 Lyme Grass *Chortodes elymi* – This coastal specialist found on 16 July was the second Farnes record.

2201 Shore Wainscot *Mythimna litoralis* – A dune specialist; found for the first time with singles on 23 and 29 July and presumably originating from the large dune systems on the nearby mainland.

SYSTEMATIC LIST OF BREEDING SPECIES IN 2012

As moth recording on the Farnes reaches its 21st year we are now in a position, using historical data and flora reports as well as the 2012 records, to establish firmly which species are resident

on the islands. There are telling indicators of the "Island Effect" where small areas like the Farnes have fewer species, but these often compensate by being far more numerous. Other features include a bias towards generalist species besides the odd saltmarsh specialists (promoted by presence of *Atriplex spp.*). The dominance of annual plants in our flora, coupled with a short growing season, mean that many species possess highly restricted flight periods in response to such fleeting nectar and larval-food availability. Many mainland wanderers caught in low numbers have the potential to colonise the Farnes when conditions are right. For example they experience a population boom on the mainland where their populations overflow into adjacent areas like the Farnes, allowing our records to indicate the state of nearby mainland communities.

0014 **Ghost Moth** *Hepialus humuli humuli* – Males were found lekking at dusk and at light on eight dates between 26 June and 2 August with a peak count of five in the evening of 2 July. Having been found in all but four years since 1991, this species is steadily increasing with 20 seen in 2012, an encouraging total. Interestingly, an Arctic Tern was seen to predate a displaying male on the evening of 27 June showing a perhaps unexpected interaction between these species!

0017 **Common Swift** *H. lupulinus* – This potential pest's larva were found during boardwalk maintenance in April while adults were recorded in low numbers regularly from 30 May to 8 July, peaking at 21 on 27 June with rare lekking behaviour observed at dusk on 3 and 5 July.

0245 *Tinea pallescentella* – This lover of feathers and hair was, rather amusingly, found commonly in Brownsman Cottage throughout the year, peaking with eight on 15 September.

0385 **Nettle-tap** *Anthophila fabriciana* – Living up to its name, it was abundantly disturbed from the meadow rich in Common Nettle *Urtica dioica*, with 44 records between 1 July and 20 October peaking at 30+ on 20 October. A species that is surely under-recorded during the breeding season.

0647 **Brown House Moth** *Hofmannophila pseudospratella* – A regular fixture inside buildings and moth traps from 6 August to 3 September, especially the Pele Tower, peaking with six on 1 July in the dormitory.

0695 *Agonopterix alstromeriana* – Another great year for this recently discovered Hemlock *Conium maculatum* feeder, and Northumberland rarity. The Farnes boasts 33 records of adults in 2012, from 24 March to 20 November – the longest flight season of any Farnes moth. Mainly found casually as singles and peaking with four on Inner Farne on a sunny afternoon on 24 March, presumably having just emerged after hibernation.

0724 *Metzneria lappella* – As with 2011, two records of singles on 5 and 27 July indicated the continued residency of this locally-scarce Burdock seed specialist. While the impact of this species on the ever-increasing Burdock on the islands remains unknown, with only 30 Northumbrian records its presence on the Farne Islands is significant.

0946 *Aethes rubigana* – A widespread seed-feeding species which is relatively uncommon further north. Being increasingly found on the Farnes since 2010, this year followed the trend with 60 individuals seen on 15 dates between 16 July and 6 August. Dusk recording produced a peak count of 30 around the food-plant Burdock on 16 July, presumably benefitting from the increased presence of this plant on the islands.

1016 *Cnephasia longana* – This generalist species has been recorded in the previous three years. These records, married with singles on 31 August and 3 September, indicate that it is likely to be resident.

1076 *Celypha lacunana* – This unfussy moth is abundant on Inner Farne and is observed casually and attracted to light. Numbers were down on 2011 totals, with ones and twos found on 18 dates between 17 June and 7 August, peaking with six on 17 July.

1201 *Eucosma cana* – Both the moth and its food-plant *carduus* Thistles are common residents. It was attracted to light on 11 occasions from 27 June to 6 August, involving 27 individuals. Seven extracted from the 15w Actinic on 21 July was the highest count since it was first detected in 2010.

1293 *Chrysoteuchia culmella* – Ten individuals from the moth traps on eight dates (25 June to 26 July) indicate the relatively low frequency of encounters with this species on the Farnes, being uncommon compared to its abundance on the mainland. Like most "grass moths" this species is best disturbed by day and may be under-recorded due to restricted access to areas while breeding birds are present.

1304 *Agriphila straminella* – The commonest micro moth last year held its form with an astounding 280 individuals found from 9 July to 28 August; the thorough searching of suitable habitat after seabirds had departed paid dividends as 150 were recorded on 6 August.

1305 *Agriphila tristella* – A disappointing year for our largest resident grass moth with singles attracted to light on only three dates, 25 and 29 July and 6 August, representing an 89% decline from 2011, presumably a result of poor weather in the spring.

1341 *Eudonia lineola* – This Farnes speciality was once again found in reasonable numbers 10 years after being discovered. A locally-found species and Northumberland rarity, 24 Adults were found in both moth-trap types on 10 dates between 27 June and 7 September showing a protracted flight season. The year-round availability of lichen may allow several generations to occur each summer on the islands.

1376 Small Magpie *Eurrhypara hortulata* – Recorded for the third year, but was far less numerous than 2011. Only five singles and a duo were found, three on Brownsman on 3 and 6 July while Inner Farne produced three singles: 4 and 16 July and 2 August: much later dates than those in 2011, possibly an effect of the cold spring.

1388 *Udea lutealis* – A rare resident on the Farnes with two records in each year in 2010 and 2011. Three records of singletons on 6, 7 and 28 August stayed firm to that status of this "wasteland" species.

1392 *Udea olivalis* – Despite many dusk-recording sessions, this species was considerably less abundant than in 2011. However, it remained common with 21 individuals found both casually and at light on 12 dates with four found at dusk on 5 July being the peak.

1405 Mother of Pearl *Pleuroptya ruralis* – The only records were of one on 28 August and two on 2 September.

1727 **Silver-ground Carpet** *Xanthorhoe montanata montanata* – Despite numbers being 83% down on the boom year of 2011, it remained relatively common between 27 May and 4 July with 19 found, generally in ones and twos on nine dates.

1728 **Garden Carpet** *X. fluctuata* – Recorded almost annually since 1991, it was no surprise that 10 were recorded at dusk and at light between 28 August and 7 September, peaking with six on 28 August, representing a far later flight season than more southerly populations.

1738 **Common Carpet** *Epirrhoe alternata alternata* – An adventive resident being recorded in only six years since 1991. In 2012, records of singletons on 1 and 7 September remained true to this species' adventive nature.

1742 **Yellowshell** *Camptogramma bilineata bilineata* – The only "Geometrid" recorded on multiple islands, with Inner Farne producing six while Brownsman recorded two, all singles, between 21 July and 8 September.

1749 **Dark Spinach** *Pelurga comitata* – The second most numerous Farnes resident with 629 found, accounting for 17% of moths seen this year! Paradoxically, there have been at least four years without records since 1991. Casual and moth trap records spanned 25 days from 27 June to 7 September, peaking with 270 at dusk on 4 August where males were watched displaying, and females egg-laying on *Orache* sp. The Farnes population far exceeds any other locality in the North East showing how islands can enhance the abundance of moth species dramatically.

1842 **Plain Pug** *Eupithecia simpliciata* – A superabundant *Orache* sp. feeder that has only recently colonised, being recorded in only one year before 2010. Since then, it has increased by an amazing 1,589% to 321 in 2012, becoming the fourth most numerous Farnes resident. The peak count of 160 at dusk on 4 August demonstrated how numerous this Pug has become. After emerging on 4 July, it was found at light and casually (often at dusk) on 24 dates up to 31 August. The most northerly outpost for this species, as well as one of only two colonies in Northumberland, makes the Farnes population extremely important regionally and nationally.

2050 **Common Footman** *Eilema lurideola* – Although scarce, this lichen specialist has been found consistently in all but seven years since 1991; this year, the species was recorded on three occasions between 29 July and 2 August.

2057 **Garden Tiger** *Arctia caja* – A rapidly-declining species that epitomises the current state of moth communities in the UK. Progressively milder winters have been blamed by many for the dramatic reduction in the population. Unfortunately the Farnes reflect this trend, with a decline of 89% noted from 2002 to 2011. The population seems to have stabilised in 2012, albeit at a low level with seven individuals recorded on six dates between 16 July and 8 August, peaking at a paltry two on 21 July.

2069 **Cinnabar** *Tyria jacobaeae* – An irruptive species that has only been found in six years since 1991. After hundreds of larvae were found in 2011, this year was low key. Visits to the Ragwort on West Wideopen in April revealed around 50 larvae while single adults were seen by day on 20 May and 11 and 22 June.

2082 Garden Dart *Euxoa nigricans* – Recorded almost annually, it was comforting to prove breeding with the discovery of four larvae during boardwalk maintenance on 4 April. However, only 16 adults were recorded between 23 July and 8 September compared with 200 last year, while the peak count of three on 2 September was down from 30 in 2011.

2107 Large Yellow Underwing *Noctua pronuba* – An annually-recorded resident with numbers routinely bolstered by immigrants from the mainland and Europe. With 120 moths found on 30 dates between 9 July and 7 October, 2012 was the best-ever showing for this widespread common species. The peak of 19 attracted to the 15w Actinic light on 1 September hints at the seasonally late-flying nature of this species.

2109 Lesser Yellow Underwing *N. comes* – A nationally common species recorded yearly on the Farnes bar two since the 1990s. 2012 was an exceptional year with 115 adults recorded from 16 June to 8 September. Another late flying species, numbers peaked on 1 September with 16 attracted to light.

2111 Lesser Broad-bordered Yellow Underwing *N. janthe* – An above-average year for this almost annual Dock feeder: five adults were attracted to light between 23 July and 6 August.

2134 Square-spot Rustic *Xestia xanthographa* – A nationally common species that conforms roughly to this status on the Farnes, having been recorded in small numbers in all but seven years since 1991. In 2012, the highest total ever of 53 was found between the typically late dates of 28 August and 22 September. The 15w Actinic laid claim to the peak count of 12 on 7 September.

2154 Cabbage Moth *Mamestra brassicae* – This garden pest seems to have stabilised after steadily increasing up to 2011 when 55 were recorded. In 2012, a respectable 31 adults were found between 25 May and 6 August along with a single larva found on 29 April proving breeding at long last!

2160 Bright-line Brown-eye *Lacanobia oleracea* – This annual had a below-average year in 2012 with 78 recorded on 17 dates between 27 June and 6 August, peaking at 12 on 16 July. Long known to be resident, larvae were frequently found on *Orache* sp. in August and September.

2171 Marbled Coronet *Hadena confuse* – Despite the abundance of Sea Campion *Silene maritima*, an important food-plant for this species, it is surprisingly scarce on the Farnes. It has been recorded nearly annually in low numbers since 1991 and the nine adults recorded at light from 4 July to 2 August was an average total.

2173 The Lychnis *H. bicruris* – Another paradoxical species that is scarce despite the abundance of its food-plant Sea Campion. Perhaps only a recent colonist, being absent from 1992 to 2006, but recorded almost annually since. With five singles attracted to light between 21 July and 30 July this species remains uncommon on the islands.

2190 Hebrew Character *Orthosia gothica* – The first "macro" to be found this year. Typically an early species, six adults were found in ones and twos between 10 April and 30 May.

2198 Smoky Wainscot *Mythimna impura* – Having been recorded in low numbers in all but four years since 1991, this species has become resident with substantially increased numbers from five in 2010 to 80 in 2011. Like many species, this root feeder suffered from the cold and wet

spring in 2012 with 39 individuals recorded at light from 21 July to 6 August, mainly in single figures, with 11 on 29 July the highest count.

2270 Lunar Underwing *Omphaloscelis lunosa* – Typically a late flyer, this species was found abundantly at light from 22 September to 7 October. A lack of autumn trapping or recent colonization may explain its patchy occurrence since 1991. It is certainly resident now with an astounding 71 found in five 15w Actinic traps, with a single in late September and 14-22 in early October, peaking on 6 October.

2299 Mouse Moth *Amphipyra tragopoginis* – A regular but sparingly found generalist that has occurred in all but four years since 1991. Light traps and dusk casual recording sessions indicated that this species had a great year with an above average 25 specimens on eight dates between 28 August and 8 September; a double figure count of ten in the trap in 7 September was the highest ever.

2306 Angle Shades *Phlogophora meticulosa* – A distinctive annual species that lays claim to the second longest flight period of any Farnes resident. Dry stone wall surveys unearthed several pupae on 4 April with adults emerging from 16 April. A further 19 singles were found, mainly causally, until 23 November.

2321 Dark Arches *Apamea monoglypha* – This species, the commonest Farnes resident, remained abundant despite a 47% decline from 2011. A total of 683 adults were found between Inner Farne and Brownsman from 5 July to 5 October, accounting for 17% of moths seen in 2012. Six larvae were found during boardwalk work on two occasions, three on 28 March and three on 29 April. Adults were recorded on 35 dates and peak counts were 66 on Inner Farne on 6 August and 47 on Brownsman on 9 August.

2340 Middle-barred Minor *Oligia fasciuncula* – A small but bonny moth found abundantly by day and night across the islands from 18 June to 4 August. Mainly found in low numbers casually, the moth traps provided a different perspective with a peak of 121 in the 15w Actinic on 4 July.

2342 Rosy Minor *Mesoligia literosa* – Recorded almost annually, this resident had an above average year despite being down by 58% on 2011, producing a total of 23 between 27 July and 8 September. Five in the 15w Actinic on 2 August was the peak in numbers of this Lyme Grass and Marram feeder.

2343/2343a Common/Lesser Common Rustic *Mesapamea agg* – Larvae of Lesser Common Rustic were again discovered with 22 recorded during boardwalk work in April. Adults of either or both of these species emerged on 21 July with 215 found on Inner Farne and Brownsman up to 8 September. Although often found at dusk, the peak count of 19 was extracted from the 15w Actinic on 6 August.

2353 Flounced Rustic *Luperina testacea* – A dismal year for this usually abundant species: after terrible spring conditions there were only three records involving five individuals, on 24 August, 31 August and 16 September, down from 128 adults last year, providing evidence of moth species' potential to react almost instantly to environmental variables such as changes in weather.

2361 Rosy Rustic *Hydraecia micacea* – This root-tuber generalist is annual on the Farnes. An excellent year with 364 individuals found, mainly at light from 28 August to 7 October, making it the third commonest species in 2012. Huge counts from lights traps peaked with 97 on 7 September, some of which no doubt provided fuel for sub-Saharan migrant birds resting on the Farnes.

2387 Mottled Rustic *Caradrina morpheus* – Nationally a common species that has become increasingly frequent on the Farnes, being present in the last three years, but found in only six years previously. With counts of one to seven on 21 dates between 4 July and 7 August, this year continued the upward trend, with a total of 43 recorded.

2434 Burnished Brass *Diachrysia chrysitis* – A Common Nettle lover, this moth had been frequent but never common in all but six years since 1991. In 2012 15 were found in ones and twos at light from 21 July to 1 August; overall, an average showing for this metallic noctuid.

2450 The Spectacle *Abrostola tripartite* – The worst year since 2003 for this charming species, with only five adults between 21 July and 2 August. This total is well below the 25 and 37 recorded in 2011 and 2010 respectively. This follows a pattern shown by several other resident species in 2012 and may be due to the extremely wet spring.

2477 The Snout *Hypena proboscidalis* – Another nettle lover that is surprisingly rare on the Farnes, found in small numbers in seven years since 1991, and annual since 2006. Moth traps held a total of five individuals during the period 21 to 27 July.

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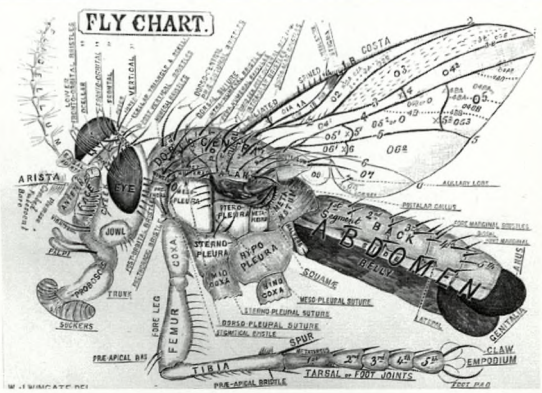

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www.nhsn.ncl.ac.uk
nhsn@ncl.ac.uk
0191 232 6386

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A SURVEY OF THE PLANT COMMUNITIES OF SUBSIDENCE PONDS AT BLAKEMOOR FARM, DRURIDGE BAY, NORTHUMBERLAND

Michael Jeffries

Department of Geography and Environmental Management, Ellison Building, Northumbria University, Newcastle upon Tyne NE1 8ST
michael.jeffries@northumbria.ac.uk

SUMMARY

Subsidence ponds are a characteristic and numerous feature in southeast Northumberland, forming over coal mine works. Their wildlife remains poorly recorded. This paper presents data on the plant communities from 20 subsidence ponds in fields at Blakemoor Farm at the southern end of Druridge Bay. Plants were surveyed in the summer of 2012 to characterise the communities, using the National Vegetation Classification (NVC). Ponds ranged from the permanent and well vegetated to ephemeral tyre ruts. Thirteen NVC communities were identified, primarily "Open Vegetation" and "Swamp" communities dominated by emergent species or plants of disturbed, occasionally flooded land. The subsidence ponds therefore create habitat for some temporary and shallow-water plant communities which are not represented in permanent, deeper ponds. No non-native species were found in the subsidence ponds, their inaccessibility on farm land perhaps a barrier to infestation. In addition the origin of the ponds represents a form of cultural biodiversity in the landscape linking back to the coal mining economy of the region.

INTRODUCTION

The large numbers of subsidence ponds in southeast Northumberland are a characteristic and distinctive feature of the landscape, attracting specific mention in overviews of the region's flora and fauna (Swan 1993; Lunn 2004) and in specific regional inventories and descriptions (for example Fiege 2000). Sutcliffe (1972) pointed out that the abundance of shallow, plant-rich lakes throughout the county suggested "an exceedingly rich freshwater fauna". Sutcliffe's study focused on larger lakes, but the number of subsidence ponds lends support to his suggestion, given the recent advances in our understanding of ponds as biodiversity hotspots in the landscape (Williams *et al.* 2004). The subsidence ponds have contributed to a net gain in ponds in the southeast coastal plain since the mid-Victorian era based on comparisons of historic Ordnance Survey maps (Jeffries 2012). Subsidence ponds may also represent a nationally and internationally unusual pond type, a type of cultural biodiversity, the landscape reflecting its economic heritage. Subsidence ponds also occur over old coal mines in Poland (Krodkiewska 2007) and China (Zhenqi *et al.* 1997) and over salt works in Cheshire (Bell *et al.* 2000), but have not been documented elsewhere.

Despite their distinctive regional character and sheer abundance there remains a paucity of detailed surveys of our subsidence ponds. Vegetation from 118 subsidence ponds was recorded in the late

1980s.[1] A few subsidence ponds were included in a general survey of ponds throughout lowland Northumberland, which revealed the overall variety of pond types in the county (Jeffries 1998). A more detailed comparison of plants in subsidence ponds with those in old field ponds, ponds created for nature conservation or golf courses (Jeffries 2012), showed the value of subsidence ponds, not least those inaccessible on private land which seemed to have escaped colonisation by non-native invasives, in particular New Zealand Pygmy Weed *Crassula helmsii* which is widespread especially in ponds on nature reserves. Surveys of fauna are even more limited (Adams and Robbins 1990; Williams 1993), but suggest that these ponds support invertebrates typical of ponds in lowland England.

This paper presents data from a botanical survey of 20 ponds all from one site, Blakemoor Farm, at the southern end of Druridge Bay. The plant communities within each pond were characterised using the National Vegetation Classification (NVC), as well as overall plant lists for each pond. The whole bay is rich in ponds and wetlands of many sizes, types and origins (Jeffries 2012). Ponds along the bay feature in several general surveys (Jeffries 1998; Zealand and Jeffries 2008; Jeffries 2012) and a set of 30 small experimental ponds at Hauxley Nature Reserve, further north on Druridge Bay, has been studied in detail, tracking changes to plants and invertebrates since 1994 (e.g. Jeffries 2002, 2008, 2010). The data presented here represent the first detailed survey focusing on the subsidence ponds within a working farm.

This survey was prompted partly by the conspicuous number of small ponds often in the middle of agricultural fields at Blakemoor, and by the fact that this southern landscape of the bay has not been disturbed by the opencast coal extraction which dominates further north in the bay and presents a distinctly rippled landscape. Waddington (2010) mapped the ponds in the Blakemoor area and compared their distribution to coal seam maps from the nearby Ellington Pit; whilst a few ponds may not be solely the result of subsidence the great majority coincide with the extensive underground works.

METHODS

The 20 ponds chosen all appear to be subsidence ponds, including the wheel rut sites, all of which had formed in shallow hollows which occasionally hold water.

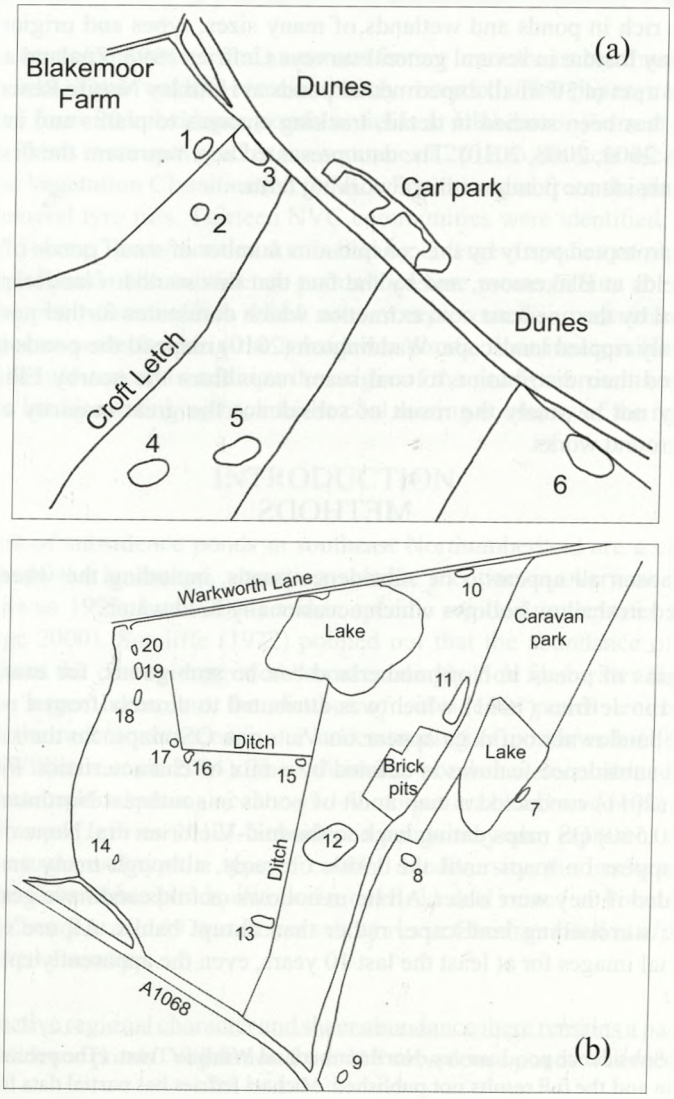
The precise origins of ponds in Northumberland can be ambiguous, for example a pond near Belford included in Jeffries (1991) which was attributed to aircrew from a nearby World War Two base by the landowner but does appear on Victorian OS maps. So the status of the ponds in this survey as subsidence features is defined by a mix of characteristics. Firstly, their recent origins: Jeffries (2011) conducted a map audit of ponds in southeast Northumberland based on 1:10,000 (or 1:10,560) OS maps dating back to the mid-Victorian era. None of the ponds in the current survey appear on maps until the 1950s onwards, although many are large enough to have been recorded if they were older. All lie in hollows or folds and have gently sloping edges grading into the surrounding landscape, rather than abrupt banks. All are recurrent features, appearing in aerial images for at least the last 10 years, even the apparently ephemeral tyre track

[1] Scott, N [1990]. Subsidence pond survey, Northumberland Wildlife Trust. (The precise date of this survey is uncertain and the full results not published. Michael Jeffries has partial data from the survey from 1990.)

pond sites. None has been created or managed intentionally and all lie over the extensive seams from Ellington Colliery (mapped by Waddington 2010).

The 20 were chosen to represent a range of types, permanent or temporary, large or small, in arable or pasture. Some potential ponds could not be included because of the danger of damaging crops, whilst other adjacent ponds were excluded because they were known to have different origins, for example Ellington Caravan Park brick pits. The position of the 20 ponds is shown in Figure 1. The ponds were surveyed from late June to the end of July 2012, their wetted areas ranging from 40 m^2 to 2200 m^2.

Figure 1. Position of surveyed ponds at (a) Blakemoor Farm, Cresswell Dune road and (b) Warkworth Lane. Each pond is numbered to match the numbering in the text.



The primary purpose of the survey was to characterise the plant communities using the National Vegetation Classification. The NVC relies on sampling distinct, homogeneous stands of vegetation. The current survey used a $1m^2$ quadrat with cross wires at 10cm intervals, recording the plants under each of the cross-wire intersections to give a measure of percentage cover, five such quadrats from each distinct stand of vegetation. For aquatic, swamp and lower herbaceous vegetation the NVC specifies a $2m^2$ quadrat; the smaller size used here was chosen to capture the finer-grained mosaics and zones evident in the ponds.

Plants were identified using Stace (1997, including microscopic examination), with the exception of the Starwort *Callitriche* species which were checked against Lansdown (2008: however no ripe fruits were found to allow effective identification). Filamentous algae were not identified further, nor a small amount of moss in one pond. No Charophytes (a division of green algae) were found, although these occur widely in dune ponds further north along the bay.

RESULTS

Vegetation types found in the 20 Blakemoor ponds comprised aquatic and swamp communities (Rodwell 1995; NVC types A and S), grasslands (Rodwell,1992; NVC types MG) and open habitat vegetation (Rodwell 2000; NVC types OV). Recent suggestions of additional NVC types and variations summarised in JNCC (2011) were also checked. More information on all the NVC types described in this report and the associated methods can be found in these references. The NVC types described in this report are based on keys and descriptions in Rodwell 1992, 1995 and 2000. In total 210 quadrats were recorded.

The mean number of taxa across all 20 ponds was 12.4 ($\pm$ 4.1 SD), although the great majority were emergent species (as defined by Pond Action 1998) plus terrestrial plants favouring damp habitats (mean of emergents plus terrestrial taxa = 11.8). The only three aquatic taxa were Starworts, Lesser Duckweed *Lemna minor* and Ivy-leaved Duckweed *L. trisulca*.

Thirteen NVC vegetation types were recorded from the 20 ponds. Table 1 lists all the NVC types and example ponds in which they occurred. Some ponds did not support distinct NVC types, notably the tyre rut ponds 18-20, which had a sparse version of OV18 *Polygonum aviculare-Chamomilla suaveolens* community (note that the NVC uses an older name *Chamomilla suaveolens* for Pineapple Mayweed *Matricaria discoidea)*. This same community showed considerable variation in some of the other, larger, arable field ponds, the plant species' mix and density varying with tyre track depth and shape, creating a distinct and attractive surround to these ponds. The four main pond types, defined by surrounding land and permanence, are characterised in Table 2, and the overall plant records for each pond are summarised in Table 3.

Table 1. The NVC Community types identified from the 20 ponds.

NVC code	Description	Example ponds
A10	*Polygonum amphibian* community. Thick sward of Amphibious Bistort, *P. amphibium,* in deeper water than surrounding grass dominated vegetation.	2, 6
MG13	*Agrostis stolonifera-Alopecurus geniculatus* grassland. Creeping Bent and Marsh Foxtail characterise this grass sward of moist, occasionally inundated areas. A distinct ring around several ponds. The finer scale sampling used for this report did pick out areas which were wholly *A. stolonifera* or A. *geniculatus* which have been separated out for this list, that is OV28 and OV29.	1, 2, 4, 5, 6
OV18	*Polygonum aviculare-Chamomilla suaveolens* community. Knotweed and Pineapple Mayweed. A community of moderately disturbed and trampled areas of agricultural landscapes such as field gateways and paths. This plant community graded into the more wetland types of many ponds around Warkworth Lane, perhaps due to unusually high water levels this year, but was often mixed with types such as OV31 and OV33.	8, 9, 12
OV28	*Agrostis stolonifera-Ranunculus repens* community. Areas dominated by *Agrostis stolonifera*. Conspicuous additional species included Meadow Buttercup *Ranunculus repens,* or Amphibious Bistort *Polygonum amphibium*.	3, 4
OV29	*Alopecurus geniculatus-Rorippa palustris* community. The grass *A. geniculatus* in a less thick sward, patches of open water and Yellow Bitter Cress *Rorippa palustris,* constant in samples.	5
OV31	*Rorippa palustris-Filaginella uliginosa* community. Yellow Bitter Cress and Cudweed are characteristic. Distinct patches of vegetation with the grey foliage of the *F. uliginosa*, reddish *Polygonum* species and small clumps of bright green Toad Rush *Juncus buffonius*, but most of the substrate bare.	8, 9
OV32?	*Myosotis scorpioides-Ranunculus scleratatus community.* Several ponds contain thick stands of Celery-Leaved Buttercup *Ranunculus scleratatus*, a plant which copes with nutrient enrichment, livestock and saline incursion. However the stands do not fit the OV32 type well, lacking other indicator species, for example. *Glyceria maxima* and *Myosotis scopioides*: all *Myosotis* checked keyed out as *M. laxa.*	11, 16
OV33	*Polygonum lapathifolium-Poa annua* community. Annual Meadow Grass *Poa annua* is a conspicuous plant on the bare substrate of the Warkworth Lane ponds. In these ponds the *Poa* tends to be dominant, a thick sward with some Knotweeds, *Polygnonum* spp., and Toad Rush *Juncus buffonius,* mixed in.	7, 16
S4	*Phragmites australis* swamp and reed beds. Pond 3 grades into adjacent reed beds which have developed over subsidence of the ditch running between two fields. Reed bed communities vary considerably but this survey did not attempt to describe reed beds in more detail.	3

S12	*Typha latifolia* swamp. Bulrush swamp. Small clumps of this tall dominant have appeared in last five years in ponds 2 and 3.	2, 3
S14	*Sparganium erectum* swamp. Erect Bur-Reed swamp. Dominated by the tall bur-reed but with other plants as a distinct understory, including duckweeds (*Lemna* spp.) and starworts (*Callitriche* sp.) in pond 3. Pond 3 contains an extensive area parallel to the adjacent road which is dominated by the tall stems of Greater Spearwort *Ranunculus lingua,* with *Sparganium erectum*, grasses and duckweeds occurring as an understory and also patches with *Typha latifolia* physically dominant, although again with *S. erectum* as a co-dominant understory.	3, 6
S19	*Eleocharis palustris* swamp. Spike Rush *E. palustris,* is found across many of the ponds in small amounts often in amongst more dominant grasses but forms extensive areas in several sites.	1, 3
S22	*Glyceria fluitans* swamp. Flote grass is widespread as scattered individuals in many ponds in amongst other dominants but can form a thick zone of its own.	3

Table 2. The four main pond types.

Type	Characteristics	Pond numbers
Permanent ponds in pasture fields along Cresswell dune road	Larger ponds, not recorded as drying out over several years of casual visits. 1, 3 and 6 are extensively vegetated throughout but pond 4 largely bare. Pond 4 is fed by a conspicuous spring with elevated conductivity (~1000 $\mu S\ cm^{-1}$).	1, 3, 4, 6
Temporary ponds in pasture fields along Cresswell dune road	Known to dry out occasionally. Both extensively vegetated. Pond 5 is adjacent to pond 4 but lacks the inflow from a spring which may explain why it dries whilst 4 does not.	2, 5.
Temporary ponds in arable fields at Warkworth Lane	Wide range of sizes but all drying out most summers. Most ponds are along edges of fields. Either largely bare except for around edges (12, 13), a mix of bare mud and patches of Bistorts, Toad Rush (7, 8, 9) or thick cover of grasses and amphibious species (16, 17).	7-17
Tyre rut ponds at Warkworth Lane	Water filled tyre ruts, although known to be recurrent at same places within the crops over the years. Sparse but distinct vegetation of Mayweeds, grasses and Bistorts.	18, 19, 20

Table 3. Overall plant data for each of the 20 ponds. Abundance was summarised using the DOMIN scale.

	Pond number																			
Plant taxa	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Agrostis stolonifera											5				4	5	3	6	4	7
Alopecurus geniculatus		1	1	7	7	10	4	3	3	7	4		2	2	4	7	4		7	5
Filamentous algae							2											3		
Callitriche spp.								1	1			1						5		
Cardamine pratensis																		3		2
Compositae seedling															1					
Deschampsia coespitosa					1		1													
Eleocharis palustris								1			1		1		2	6	3	7	5	8
Epilobium ciliatum							1	1		1	1			1	2					
E. hirsutum	1				1		1	2	2	1				1				2		
E. palustris																		2		
Equisitum arvense											1							2		
Glyceria fluitans				6	6					4					2	4	3		1	2
Gnaphalium uliginosum (= *Filaginella uliginosa* in NVC)												3	4							
Holcus lanatus										2	1			1						2
Juncus articulatus				1	2		4			1			1		2			3	4	2
J. buffonius			1		4	3		2	2	3		4	4		4					
J. conglomeratus																				1
J. effusus						1														1
J. inflexus																		1		
Lemna minor											1				4	2	2	5	2	2
L. trisulca																		3		
Matricaria discoidea (=*Chamomilla suaveolens* in NVC)	5	4	4	4	4	2	3	3	3		1	3	3	8	2					
Myosotis laxa										2								3		
Lolium perenne								1	2		1				4		1			
Chenopodium ficifolium			2	2	1															

	Pond number																			
Plant taxa	**20**	**19**	**18**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**
Chenopodium unidentified		1												1						
Persicaria aviculare	2	2	2	2	2	1	1	1	3	2	2	3	2	2						
Plantago major				2											1					
Poa annua	2	4	2	7	7	6	2	3	3	2	4	4	5	10	4					
Poa trivialis					1	3	2										3	2		2
Polygonum amphibium									2						6			4	7	1
P. lapathalium													2	2						
P. persicaria		2	2	4	1			1				4	3	1						
Ranunculus lingua																		5		
R. repens			1	3	1	4	1			3			2		3	2	2	2		
R. scleratatus				2	4					4					2					1
Rorippa palustris				4	1			1	3	1			4		2	3	2			
Rumex crispus					1		1			1			1	1	3	3	3	1	1	
R. obtusifolia										1				1			1			
Rumex unid.	1																			
Senecio vulgaris				1																
Sparganium erectum								1	1		1				3			6		1
Stellaria media				1																
Tripleurospermum inodorum	2		1	2	1	2	3	1	1	2	2	2	2	2						
Typha latifolia															1			3	3	

Ponds 1-6 in the fields to the immediate south of Blakemoor Farm were extensively vegetated, ponds 1-5 in permanent pasture fields and pond 6 along the roadside edge of an arable field. Ponds 2 and 4 have dried up occasionally in recent years but the others are permanently wet. All six ponds support mosaics of wetland NVC communities, in particular dominated by the grasses Creeping Bent *Agrostis stolonifera*, Marsh Foxtail *Alopecurus geniculatus* and Flote Grass *Glyceria fluitans*. They also provide habitat for NVC swamp communities dominated by Spike Rush *Eleocharis palustris*, Erect Bur-reed *Sparganium erectum* and Common Reed *Phragmites australis*. Ponds 1-3, 5 and 6 are largely covered by plants. Pond 4 retains an open substrate. It is fed by a conspicuous spring to the west side which has a markedly high electrical conductivity (routinely ~1000 µS cm^{-1} compared to normal freshwater ponds of the coastal plain of ~100-500 µS cm^{-1}), which may indicate saline intrusion (Waddington 2010).

The ponds around Warkworth Lane are associated with arable fields. They are shallower, prone to drying most years and have either a bare, muddy, submerged substrate or are covered with plants such as Annual Meadow Grass *Poa annua,* Pineapple Mayweed, and several species of Bistort *Polygonum* spp. Figure 2 shows examples of the pond types from throughout the farm.

Figure 2. Examples of main pond types characterised in Table 2.

(a) Permanent ponds in pasture fields along Cresswell dune road, pond 1.

(b) Temporary ponds in pasture fields along Cresswell dune road, pond 2.

(c) Temporary ponds in arable fields at Warkworth Lane; thick sward of amphibious grasses, pond 17.

(d) Temporary ponds in arable fields at Warkworth Lane; largely bare substrate, pond 13.

(e) Temporary ponds in arable fields at Warkworth Lane; patchy Bistorts, Toad Rush, Mayweeds, s pond 8.

(f) Tyre rut pond at Warkworth Lane, pond 18.

No rare plants were found nor any non-native invasives. Several of the latter occur frequently along the bay, in particular New Zealand Pygmy Weed along with more occasional Pondweed *Elodea* species and, at Ellington pond, Fairy Fern *Azolla filiculoides*. Jeffries (2012) notes that the non-native species are found at ponds on nature conservation sites but not in the subsidence ponds on private land and that the actions of conservationists seem to be acting as a Trojan horse for these invasive taxa.

DISCUSSION

The 20 subsidence ponds surveyed at Blakemoor Farm supported a variety of NVC types, mostly swamp emergent communities or grass and herbs of damp and inundation habitats. There are no NVC data available from local ponds to allow direct comparison with the subsidence ponds' plant communities; nonetheless the ponds provide habitat for a range of plant community types not found in other wetlands along the bay or more widely in Northumberland. In particular the ephemeral OV communities are absent from other pond types such as those dug for conservation, which tend to be deeper and permanent, or larger, older subsidence ponds which are often dominated by thick stands of tall dominants such as Reed Canary Grass *Phalaris arundinacea* and Bulrush *Typha latifolia* (Scott 1990; Jeffries 1991, 1998). The mean number of taxa per pond (12.4) is similar to results from a survey of 12 subsidence ponds across southeast Northumberland (mean 11.3. Jeffries 2012); the higher number at Blakemoor is probably due to the wider variety of ponds chosen for the survey, ranging from larger, extensively vegetated ponds to ephemeral tyre ruts.

The ephemeral subsidence ponds are also likely to be valuable for specialist animals. No systematic recording was done of animals for this survey but in the bare substrate arable field ponds microcrustacea were abundant, for example *Daphnia* and *Ostracoda*. More unexpectedly, mature Three-spined Sticklebacks *Gasterosteus aculeatus* (L.) also turned up in one tyre rut pond.

The ponds in the middle of arable fields clearly represent an opportunity cost to the farm, but are recurrent features, probably resistant to draining or infilling. Water sources for the ponds are not reliably known, but several of the ponds in the dune road fields have visible upwellings through their substrate; one has an adjacent spring inflow, and the water from these sources and in several other ponds has elevated conductivity suggesting either mine or saline influenced water tables underground. Waddington (2010) also found unusually high sodium levels in many of the ponds around Blakemoor. Despite the loss of productive agricultural land to the ponds, the farm management have taken a proud interest in these features.

In summary, the subsidence ponds support a varied range of plant communities, many of which have not been recorded from deeper, permanent ponds in the region. Subsidence ponds add to the overall landscape diversity of the county, representing a distinct regional, perhaps national, pondscape, and an ecological echo of the economic and cultural heritage of southeast Northumberland.

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VEGETATION CHANGE FROM 1979 TO 2008 AT CHILLINGHAM PARK IN RELATION TO CONSERVATION OF THE CHILLINGHAM WILD CATTLE

Robert G H Bunce[1] and Stephen J G Hall[2]

[1] Alterra, Wageningen, Netherlands; present address, Estonian University of Life Sciences, Kreutzwaldi 64, 51014 Tartu, Estonia
[2] Department of Biological Sciences, University of Lincoln, Riseholme Park, Lincoln LN2 2LG
Corresponding author: sthall@lincoln.ac.uk

SUMMARY

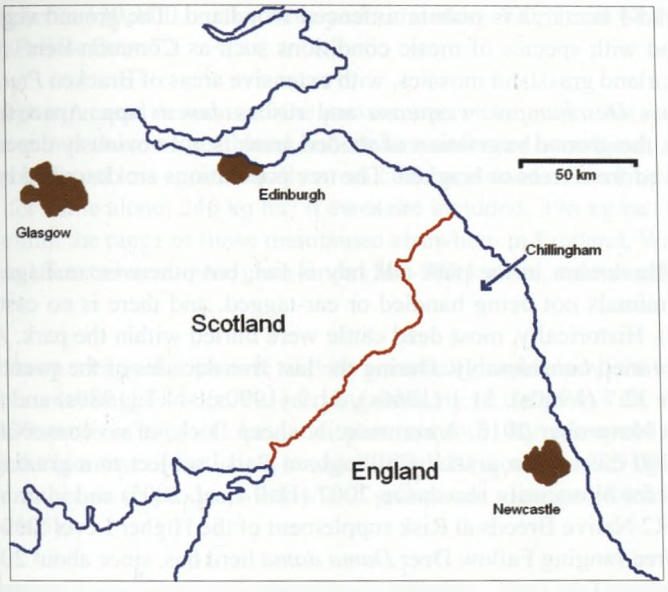
Parks where the botanical interest of the sward has been retained are relatively unusual in the British Isles. Chillingham Park, northeast England, has been managed primarily to conserve its native cattle breed and the sward has been of only secondary importance in conservation terms. A liming programme was in operation from 1980 to 2004 in order to secure the nutrition of the cattle herd. The relatively species-rich vegetation was surveyed in 1979; in 2008 plant species richness of sampled quadrats was found to have declined by 23%. Species characteristic of higher soil pH and fertility, increased light and decreased wetness had been favoured, with a decline in stress-tolerating species. Possible causes of these changes include liming and inputs of fixed atmospheric nitrogen. Few if any plant species have been completely lost, and grassland diversity is now the subject of conservation management.

INTRODUCTION

Wood pasture and parkland are, collectively, a priority habitat in the UK covering 10,000-20,000 ha (JNCC 2004; http://ukbars.defra.gov.uk). Each represents a distinct form of land use. The former was very widespread in many marginal and upland areas (Stiven and Holl 2004), providing wood and pasturage, while parkland was primarily aesthetic and recreational in function. In the British and Irish lowlands, many wood pastures still exist because they were incorporated into landscape parks particularly during the eighteenth and nineteenth centuries (Rackham 2000; Williamson 1995). Much wood pasture is now in decline, and parks where both tree and grassland components are in good condition are rare ("the wood and pasture components seldom both survive" Rackham 2006) while the botanical diversity of grassland in most of the 26 National Trust lowland parks surveyed was "very low" (Cox and Sanderson 2001).

Chillingham Park (Figure 1; 55° 31' N, 2° 54' W) was remodelled from a medieval deer park in a process that began in the 1700s (Hall 2010). Quick access to detailed maps and imagery can be obtained using the UK postcode NE66 5NP. Elevation is between 98 and 235 metres above sea level; annual precipitation is 939 mm and accumulated temperatures below 0 °C are 235 (number of days below zero x minimum temperature for each such day, Smith 1984). A Higher Level Stewardship agreement is in place (Natural England 2011). The park, the cattle and the surrounding woodlands are owned by the Chillingham Wild Cattle Association (www.chillinghamwildcattle.com)

Figure 1. Location of Chillingham Park.



This historic landscape has been managed primarily for the cattle herd (Figure 2). Chillingham cattle are a distinct breed, which have inhabited Chillingham Park since at least 1646 (Hall *et al.* 2005; Visscher *et al.* 2001). Apart from a reserve herd in northeast Scotland, the breed is found nowhere else.

Figure 2. Members of the Chillingham herd on damp grassland near streamside ash and alder trees.

The cattle graze the 142.61 hectare core of the park, of which the uppermost 10.70 hectares is heathland and 18.84 hectares is mature unfenced woodland. The ground vegetation is mainly infertile grassland with species of mesic conditions such as Common Bent *Agrostis capillaris* and includes moorland grassland mosaics, with extensive areas of Bracken *Pteridium aquilinum*, Tufted Hair Grass *Deschampsia cespitosa* and rushes *Juncus* spp. Apart from tree-covered streamside areas, the ground vegetation of shaded areas is not obviously dependent on whether the shade is derived from trees or bracken. The tree populations are described by Hall and Bunce (2011).

In winter the cattle remain in the park and hay is fed, but otherwise management of the herd is minimal, the animals not being handled or ear-tagged, and there is no castration or culling (Hall *et al.* 2005). Historically, most dead cattle were buried within the park. Average numbers in the herd have varied considerably. During the last five decades of the twentieth century they were respectively 32.7 (1950s), 51.1 (1960s), 51.9 (1970s), 44.7 (1980s) and 51.0 (1990s) and numbered 103 in November 2013. A commercial sheep flock, of no conservation significance and numbering 300 ewes, also grazed Chillingham Park, subject to a grazing tenancy which was extinguished for biosecurity reasons in 2007 (Hall *et al.* 2005) and in order for the park to qualify for the HR2 Native Breeds at Risk supplement of the Higher Level Stewardship scheme. An unmanaged, free-ranging Fallow Deer *Dama dama* herd has, since about 2005, considerably reduced its utilisation of the park, apparently in response to a more active management policy. In order to preserve the traditional landscape there is no compartmentation of the pasture by fences.

In early 1980, deaths of lactating cows apparently through magnesium deficiency led to the establishment of a liming programme, and up to 2004 the five principal patches of grassland were fertilised with magnesian limestone, 40 tonnes per year at a rate of 6 t ha^{-1}. On average each patch received five applications over this period. No other fertiliser was applied though before 1980 small plots had received basic slag. There is no record of manure having been applied.

Since 1980, no lactating cows have died for demonstrable nutritional reasons. Neither was there a clear increase in cattle biomass until the sheep had been removed, but the nutrition of lactating cows had evidently been safeguarded, which was the desired outcome. Soil analysis in 2002 indicated two areas requiring lime at a rate equivalent to 7.92 t ha^{-1} and a deficiency of phosphorus over most of the park, but remedial action has not been taken. Bracken crushing has been practised as opportunity affords, to increase herbage production. The management has not been intensive, compared with what has happened in the wider English countryside and, indeed, in most lowland parks.

The ground vegetation was originally surveyed in 1979 (Hall and Bunce 1984) to provide insights into the behaviour of the cattle (Hall 1988). Since then in many European grasslands a general shift has been observed from relatively species-rich infertile classes to less diverse classes (Carey *et al.* 2008; Dupré *et al.* 2010). This raised the question of whether the pasture plant biodiversity has been resilient at Chillingham, so in July 2008 the 1979 survey was repeated.

METHODS

Herbivore biomass

Biomasses and metabolic body weights ($kg^{0.75}$ ha^{-1}) of herbivores were calculated from herd records. Sheep and deer numbers were obtained from unpublished records and from personal

observation. Body weights (kg) were taken as follows: calf 40, yearling 80, two-year-old bull 140, two-year-old heifer 130, bull or cow three years and older 300; South Country Cheviot ewe 48, mule ewe 73, Fallow Deer 72.

Stocking rates were expressed in terms of the pasture area of the park, that is 113.09 ha, being the enclosed area minus those of heathland and mature unfenced woodland, and comprising a mosaic of mesotrophic and less agriculturally productive grasslands. Stocking rate at its peak in 2002 (86 kg ha^{-1} for cattle alone; 246 kg ha^{-1} if ewes are included; 396 kg ha^{-1} if lambs and deer are added) was within the range of those maintained elsewhere in England, Wales and Northern Ireland on National Trust mesotrophic grasslands (360-800 kg ha^{-1}, calculated from Figure 1 of Hearn 1995).

The removal of sheep means that pasture will be seasonally superabundant for the foreseeable future. Local experience suggests that the carrying capacity of the park with winter hay feeding is likely to be 120 cattle in total (C Leyland, pers. comm.). By extrapolating from the herd structure in 2008 the biomass of cattle in a herd totalling 120 would be 223 kg ha^{-1}, similar to the rate observed on rather more productive lowland grasslands managed for nature conservation (Kirkham *et al.* 2005).

Nitrogen balance

A mass balance nutrient nitrogen budget was deduced (see Appendix). Losses through leaching could not be calculated; estimated annual deposition of anthropogenic fixed nitrogen (Fowler *et al.* 2004) is 16.1 kg ha^{-1} (www.apis.ac.uk). Input from other sources has been trivial, as is generally the case in comparable upland pastures (Ineson 1987).

Botanical survey

In 1979 the survey was based on a 25 metre grid drawn on to a 1:2500 map, 101 grid squares being sampled. A square quadrat frame (200 m^2 in area) was used. The plant species were recorded according to whether they were first encountered in the innermost, nested, rectangular 4, 25, 50, 100 or 200 m^2 of the quadrat.

For the 2008 survey, 50 of the grid squares surveyed in 1979 were selected at random and their centres re-located. The 2008 survey was based on a square quadrat frame of 100 m^2 and all species were recorded.

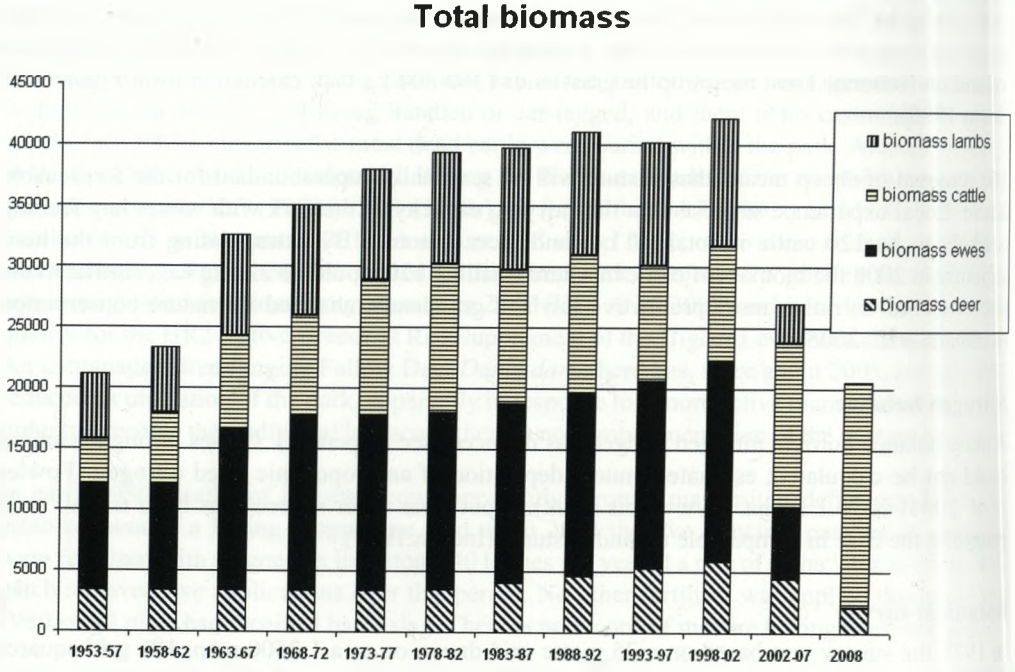
Species richnesses were compared by matching the 2008 lists (from 100 m^2 quadrats) with the 1979 results from the innermost 100 m^2 of the quadrat. As a preliminary exploration of whether species that were widespread in 1979 might have been reduced to smaller and more localised stands, the number of species recorded in the innermost 25 m^2 of the 1979 quadrat was compared by matched-pairs t-test with that recorded in the corresponding 100 m^2 quadrat used in 2008.

Species lists for the 50 quadrats surveyed in 2008 and the counterpart lists from 1979 were analysed. MAVIS software (Carey *et al.* 2008) was used to compute Ellenberg values for fertility, light, acidity and moisture, and the competitor/stress tolerator/ruderal (CSR: Grime *et al.* 2007) scores for each quadrat, which were compared between 1979 and 2008 by matched-pairs t-tests. To facilitate comparison between surveys, quadrats were assigned by MAVIS to Aggregate Classes, of which eight are defined in the UK (Bunce *et al.* 1999a) namely crops/ weeds, tall grassland/herb, fertile grassland, infertile grassland, lowland wooded, upland woodland, moorland grass/mosaic, heath/bog.

RESULTS

Biomasses for each group of animals are presented in Figure 3.

Figure 3. Temporal change in total biomass (kg) for each herbivore species individually. Lamb biomass is the seasonal peak, those of the other groups are year-round.



Balance of fixed nitrogen per hectare was always positive. The highest calculated annual value was 5.06 kg ha^{-1} in 2008, the lowest 0.13 kg ha^{-1} in 1953-57. The overall mean was 1.86 kg ha^{-1}. Deposition of atmospheric anthropogenic fixed nitrogen would add 16.1 kg ha^{-1} to these values.

In 1979, 109 species were recorded in total in the fifty 100 m^2 quadrats; in 2008, of these species, only 81 were recorded, a reduction of 25.6%. The species that have shown the most marked reduction in occurrence are shown in Table 1. A list of 27 further species recorded in 2008 and not in 1979 is given in Table 2.

Table 1. Occurrences of species in the fifty 100 m^2 quadrats surveyed in both 1979 and 2008. N 79 and N 08: number of quadrats where species was present in 1979 and 2008 respectively. o: species absent, x: species recorded elsewhere in Park. Species with more than 10 records in 1979 and a decline of more than 50% in occurrence are underlined and in bold.

	N 79	08		N 79	08		N 79	08
Achillea ptarmica	1	1	*Dryopteris dilatata*	1	1	***Plagiothecium undulatum***	17	o
Achillea millefolium	5	x	*Dryopteris filix-mas*	x	x			
Agrostis canina	14	o	*Epilobium palustre*	1	4	*Plantago lanceolata*	23	28
Agrostis capillaris	47	45	*Equisetum arvense*	4	2	*Plantago major*	3	2
Agrostis stolonifera	5	5	*Euphrasia nemorosa*	3	4	***Poa annua***	31	1
Ajuga reptans	1	2	***Festuca ovina***	43	x	***Poa pratensis***	33	8
Alopecurus pratensis	1	x	*Festuca pratensis*	1	x	*Poa trivialis*	36	30
Anthoxanthum odoratum	49	45	*Festuca rubra*	41	47	*Polygala serpyllifolia*	4	o
Arrhenatherum elatius	1	o	*Filipendula ulmaria*	3	x	*Polygonum aviculare*	x	o
Atrichum undulatum	4	o	*Galium aparine*	2	o	*Polytrichum commune*	1	o
Bellis perennis	2	2	***Galium saxatile***	35	1	*Potentilla erecta*	46	40
Blechnum spicant	1	o	*Galium verum*	x	o	*Potentilla reptans*	x	o
Brachypodium sylvaticum	1	o	*Geranium robertianum*	1	1	*Potentilla sterilis*	7	5
Brachythecium rutabulum	12	4	*Glyceria fluitans*	x	x	*Prunella vulgaris*	15	20
Briza media	2	1	*Hieracium pilosella*	x	o	*Pteridium aquilinum*	31	34
Calliergon cuspidatum	15	9	*Holcus lanatus*	50	46	*Ranunculus acris*	28	26
Calluna vulgaris	x	x	*Holcus mollis*	11	15	*Ranunculus flammula*	2	4
Campanula rotundifolia	1	o	*Hyacinthoides non-scripta*	1	2	*Ranunculus repens*	25	28
Cardamine pratensis	21	5	*Hypnum cupressiforme*	1	o	***Rhytidiadelphus squarrosus***	35	10
Carex binervis	x	2	*Juncus acutiflorus*	x	o			
Carex caryophyllea	1	o	*Juncus articulatus*	23	20	*Rumex acetosa*	42	41
Carex echinata	1	o	*Juncus bufonius*	x	o	*Rumex conglomeratus*	1	1
Carex flacca	3	16	*Juncus conglomeratus*	1	15	*Scrophularia aquatica*	x	o
Carex nigra	4	4	*Juncus effusus*	31	29	*Senecio jacobaea*	x	2
Carex ovalis	5	10	*Juncus squarrosus*	3	o	*Sphagnum* [sp]	1	x
Carex pallescens	x	1	*Lathyrus montanus*	x	o	*Stellaria alsine*	x	o
Carex panicea	16	o	*Lathyrus pratensis*	7	8	*Stellaria graminea*	23	25
Carex pulicaris	x	1	*Lathyrus tuberosus*	2	1	*Stellaria holostea*	3	3
Carex remota	2	2	*Leontodon autumnalis*	1	4	*Stellaria media*	2	3
Cerastium fontanum	35	35	*Lolium perenne*	16	26	*Taraxacum* agg.	15	15

	N	79	08		N	79	08		N	79	08
Circaea lutetiana		2	1	*Lophoidea bidentata*		x	o	*Thelypteris oreopteris*		x	o
Cirsium arvense		29	29	*Lotus corniculatus*		19	15	*Trifolium pratense*		3	1
Cirsium palustre		18	25	***Luzula multiflora***		36	11	*Trifolium repens*		35	42
Cirsium vulgare		9	17	*Luzula pilosa*		5	o	*Trisetum flavescens*		4	13
Conopodium majus		27	4	*Lysimachia nemorum*		2	1	*Urtica dioica*		10	9
Crepis paludosa		x	o	*Mercurialis perennis*		1	x	*Vaccinium myrtillus*		6	x
Cynosurus cristatus		31	38	*Mnium hornum*		6	1	*Valeriana dioica*		1	o
Cytisus scoparius		1	1	***Nardus stricta***		14	3	*Veronica beccabunga*		1	o
Dactylis glomerata		14	22	*Ophioglossum vulgatum*		8	1	*Veronica chamaedrys*		32	24
Danthonia decumbens		19	1	***Oxalis acetosella***		22	9	*Veronica montana*		2	o
Deschampsia cespitosa		47	42	*Pedicularis sylvaticus*		x	o	***Veronica officinalis***		13	o
Deschampsia flexuosa		3	x	*Phalaris arundinacea*		1	o	*Veronica serpyllifolia*		4	2
Dicranum scoparium		3	x	***Phleum pratense***		19	2	***Vicia sepium***		7	5
Digitalis purpurea		3	x					*Viola riviniana*		36	21

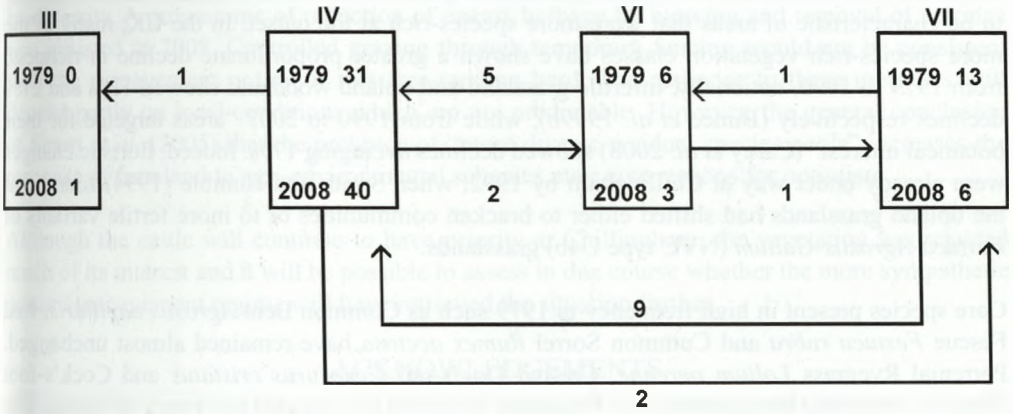
Table 2. Species found in 2008 and not recorded in 1979, with number of quadrats in which species was found.

Alopecurus geniculatus	x	*Hypochaeris radicata*	1
Anemone nemorosa	x	*Linum catharticum*	7
Angelica sylvestris	1	*Lotus pedunculatus*	2
Bromus hordeaceus	3	*Lotus uliginosus*	2
Cardamine flexuosa	x	*Mentha aquatica*	1
Carex pendula	5	*Molinia caerulea*	1
Chrysosplenium oppositifolium	1	*Pleurozium schreberi*	x
Dactylorhiza maculata	x	*Polytrichum formosum*	1
Epilobium montanum	4	*Rumex acetosella*	x
Eurhynchium praelongum	x	*Sagina procumbens*	1
Galium palustre	4	*Stachys palustris*	x
Glyceria fluitans	x	*Stachys sylvatica*	2
Hylocomium splendens	1	*Thuidium tamariscinum*	3
Hypericum pulchrum	1	*Triglochin palustre*	1

(x: noted opportunistically elsewhere in Park)

Changes in Aggregate Classes (AC) are summarised in Figure 4. Classes associated with high environmental fertility are towards the left of the diagram. A general trend of increasing fertility and a decline in shade is evident. In 1979, AC IV Infertile Grasslands formed 62% of the sample. In 2008 AC IV had increased to 80% of the sample, at the expense of AC VI Lowland Woodland and AC VII Upland Grassland. One plot had shifted into AC III Fertile Grassland.

Figure 4. Shifts between Aggregate Classes from 1979 to 2008 (III: Fertile Grasslands; IV: Infertile Grasslands; VI: Lowland Wooded; VII: Upland Grasslands). Numbers within boxes signify numbers of quadrats assigned to each Aggregate Class at each survey. Numbers associated with arrows indicate number of quadrats that shifted from one Aggregate Class to another from 1979 to 2008.



Taking all AC together, for 1979 the mean species richness per 100 m^2 quadrat was 29.84 (SD 6.77) and for 2008, 22.96 (SD 5.48), implying a reduction from 1979 to 2008 of 23% ($t = 6.43$, $P < 0.001$). This is also evident if only the quadrats that were in AC IV in both 1979 and 2008 are considered. These showed a significant decline (also of 23%; $t = 5.41$, $P < 0.001$, $n = 25$) in species richness (1979 mean 30.8, SD 6.56; 2008 mean 23.6, SD 5.06). Mean species richness in the fifty 25 m^2 quadrats in 1979 was 24.1 (SD 6.41), similar to the mean of 22.96 species in the corresponding 100 m^2 quadrats in 2008.

Ellenberg scores and CSR scores are compared in Table 3. Increase in Ellenberg scores for pH, fertility and light and decrease for wetness score imply plants being favoured that prefer less acid, more fertile, less shaded and drier conditions. These parallel changes in CSR scores, which show a marked decline in stress-tolerator score.

Table 3. Changes from 1979 to 2008 in Ellenberg and CSR scores (averaged across all 50 quadrats surveyed in both years).

	1979		2008			
Ellenberg scores	**mean**	**SD**	**mean**	**SD**	**t**	**P**
pH	4.64	0.46	5.06	0.58	-5.61	< 0.001
light	6.73	0.40	6.83	0.30	-2.28	< 0.01
fertility	3.94	0.45	4.30	0.52	-3.52	< 0.001
wetness	5.81	0.36	5.49	0.38	5.05	< 0.001
CSR scores						
Competitor	2.98	0.40	3.18	0.32	-3.46	<0.001
Stress tolerator	2.79	0.39	2.59	0.30	3.13	<0.01
Ruderal	2.22	0.29	2.54	0.32	-8.31	<0.001

DISCUSSION

Nationally, over the period covered by our study, species richness in the open countryside in the UK has declined by 8% (from 17.1 species per 200 m^2 plot in 1979, to 15.7 in 2007: Carey *et al.* 2008). This has already been reported in Northumberland (Lunn 2010). The decline we observed, of 23% (from 29.8 species per 100 m^2 plot in 1979 to 22.3 species in 2008) seems to be characteristic of areas that were more species-rich at the outset. In the UK, many of the more species-rich vegetation classes have shown a greater proportionate decline in richness; from 1979 to 1990, nationally, infertile grassland and upland woodland showed 12% and 21% declines respectively (Bunce *et al.* 1999b), while from 1990 to 2007 "areas targeted for their botanical interest" (Carey *et al.* 2008) showed declines averaging 17%. Indeed, floristic changes were already under way at Chillingham by 1992, when Smith and Humble (1994) found that the upland grasslands had shifted either to bracken communities or to more fertile variants of *Festuca-Agrostis-Galium* (NVC type U4b) grasslands.

Core species present in high frequency in 1979 such as Common Bent *Agrostis capillaris*, Red Fescue *Festuca rubra* and Common Sorrel *Rumex acetosa* have remained almost unchanged. Perrenial Ryegrass *Lolium perenne*, Crested Dog's-tail *Cynosurus cristatus* and Cock's-foot *Dactylis glomerata* have increased in frequency, as would be expected as a result of liming. The only widespread pasture grass to have declined in frequency is Common Meadow-grass *Poa pratensis*. Species that have shown major declines include Common Heath Grass *Danthonia decumbens*, Heath Bedstraw *Galium saxatile* and Matgrass *Nardus stricta,* all characteristic of acidic soils and poor competitors (Grime *et al.* 2007), generally unable to withstand the denser shade caused by increased grass growth. Twenty-seven of the 109 species recorded in 1979 on the sampled quadrats are no longer detectable, while (coincidentally) 27 others were detected for the first time in 2008. These changes are probably sampling and detection effects rather than results of local extinction and colonisation. That the less frequent species continue to exist but in smaller and weaker stands is implied by the observation that on average a given 25 m^2 quadrat in 1979 contained the same number of species as the corresponding 100 m^2 quadrat in 2008.

The greater prevalence of species of less shady, more fertile, less acid and drier conditions and the decrease at Chillingham in stress-tolerator score and concomitant increase in competitor and ruderal scores parallel what has been seen in acid/neutral grasslands generally in the UK (Carey *et al.* 2008). However, light score decreased in these habitats nationally, implying an increased importance of shade as a national ecological factor possibly because of reduced grazing intensity. Perhaps Chillingham runs counter to this national trend because of dominating effects of removal of bracken or as a result of grazing pressure.

Chillingham Park was evidently heavily stocked while the sheep flock was present and deer were numerous, and the changes in plant species richness are presumably due to the interaction of grazing pressure and nutrient enrichment. Other studies have implied that eutrophication of upland grazing is the result of positive feedback, whereby atmospheric deposition of fixed nitrogen "increases the proportion of grasses, making the vegetation more palatable for grazing animals [which] in turn increase the levels of nitrogen in the vegetation through input from dung and urine" (Firbank *et al.* 2000). Sheep exhibit greater selectivity on pastures of this kind (Hodgson *et al.* 1991), so such a feedback process will be less evident now the sheep have been removed; but there is a lack of information on the vegetational consequences of the replacement of a sheep flock by a numerically growing cattle herd.

Changes in patterns of survival of the cattle during the 16 years of liming are being investigated (S J G Hall in preparation). There was not a clear increase in cattle biomass over the period, but the nutrition of lactating cows had been secured, which was the desired outcome. In summary, the pasture biodiversity has been damaged but probably not irretrievably.

Management policy, which previously focused on the cattle, now includes conservation of plant biodiversity. A programme of reduction of excess herbage by mowing and removal of cuttings was initiated in 2008. Controlled grazing through temporary fencing would not be consistent with the management policy of this free-ranging herd. The response to these measures will depend partly on local conditions which are not predictable. However, the general conclusion of Smart *et al.* (2005) that the presence of "more diverse residual species pools" increases the response of farmland to agri-environmental schemes may give reasons for optimism.

Although the cattle will continue to have priority at Chillingham, the vegetation has retained much of its interest and it will be possible to assess in due course whether the more sympathetic pasture management regime will have retrieved the situation further.

ACKNOWLEDGEMENTS

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APPENDIX

Supplementary Information: nitrogen balance

Herd records document the quantity of hay fed to the cattle each year together with the results of occasional chemical analyses, which included crude protein (mean 8.77%). Protein generally is 16% fixed nitrogen so 1 tonne of hay provided 14.03 kg of fixed nitrogen. During this study dead cattle were almost all buried within the Park so there is no cattle output term for nitrogen. Mean annual input of fixed N in cattle hay from 1953 to 2002 was 289.8 kg.

For sheep, literature data were used (ADAS 2000; MLC 1988). The flock numbered 180 South Country Cheviot ewes up to 1963. From 1964 it numbered 300 ewes. Management was intensified from 1981, and a progressive (and unfortunately undocumented) change to mule ewes and other genotypes including Texel and Beltex crossbreds followed. The flock in the park was reduced to 200 in 2003 and usage of the area was progressively less intense up to final removal of sheep in 2007.

Annual inputs per ewe were taken as follows: for South Country Cheviot ewes 23 kg concentrates (20% protein) and 22 kg hay (10% protein) up to 1981, and 34 kg concentrates and 33 kg hay thereafter; for mule ewes, 55 kg concentrates and 50 kg hay. Annual outputs from ewes were as lambs and as wool. Lambs sold per ewe were taken as 1 for South Country Cheviot up to 1981 (live weight per lamb 30 kg), 1.1 thereafter (33 kg) and for mules 1.31 (39.3 kg). Lambs are 20% protein, i.e. 3.2% fixed nitrogen. Fleece weights were taken as 2.5 kg for South Country Cheviot and 3 kg for mules: fleece is 20% grease and wool is 15% water (and 85% keratinised protein). The N budget of South Country Cheviot ewes was approximately in balance (net annual output 0.144 kg/ewe to 1981 and 0.272 kg/ewe thereafter) while for mule ewes input was 0.974 kg/ewe greater than output, reflecting a lower than usual lamb/ewe rate for this normally prolific genotype.

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A MAJOR GLACIAL MELTWATER CHANNEL AND FOSSIL WATERFALL IN THE NORTH PENNINES, NORTHERN ENGLAND (WITH A NOTE ON THE FLORA OF THE WATERFALL)

Angus G Lunn

32 Trajan Walk, Heddon-on-the-Wall, Newcastle upon Tyne NE15 0BJ

SUMMARY

A major ice-directed, subglacial meltwater channel crossing the main North Pennine watershed is described. It last operated at and near the Late Devensian Last Glacial Maximum, and led water to a large waterfall, now fossil, over an outcrop of the Carboniferous Great Limestone.

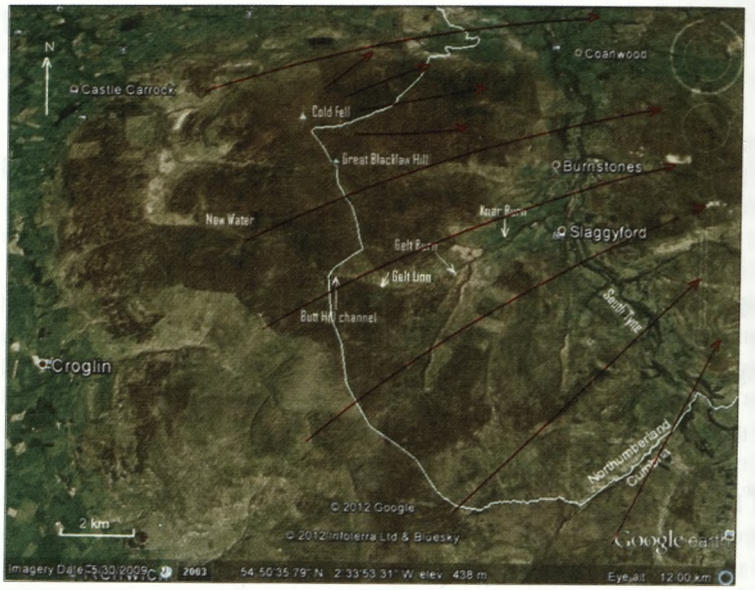
DISCUSSION

At the local Last Glacial Maximum (LGM) of the Late Devensian glaciation (about 31,000-11,700 Before Present (BP)) in the North Pennines, both Cold Fell in the north and Cross Fell in the south nourished their own ice caps, powerful enough to deflect ice dispersing from an ice dome centred over the Lake District to the west. However, the rather lower section of the North Pennine escarpment between these ice caps was overridden by the ice-sheet, with flow being broadly towards the east-northeast (Livingstone *et al.* 2012; Lunn 1995; Mitchell 2007; Trotter 1929; Vincent 1969: Figures 1 and 2). East of this section of the divide, including in the Gelt Burn[1] and Knar Burn valleys which are the subject of this paper, are numerous erratics derived from the west. They consist of Borrowdale Volcanic Group and New Red Sandstone material, some Scottish granite (there was possibly some influence of southwestern Scottish ice), and some quartz-dolerite erratics (the quartz-dolerite Whin Sill crops out in the New Water valley, immediately to the west of the divide in this area).

Figure 1. Northern England. NP = North Pennines; LD = Lake District; TG = Tyne Gap; VE = Vale of Eden; St = Stainmore; CF = Cross Fell. After Google Earth.

[1] There is a separate River Gelt in Cumbria, into which New Water flows. The Gelt Burn is an indirect tributary of the South Tyne, in Northumberland.

Figure 2. Part of North Pennines: approximate ice-sheet flow lines at the Last Glacial Maximum indicated in red. Northumberland-Cumbria county boundary in white. After Google Earth.



Crossing the main North Pennine watershed (the Northumberland-Cumbria county boundary), between the Eden and South Tyne drainage and at the head of the Gelt Burn valley, is a major glacial meltwater channel known as the Butt Hill channel (National Grid NY 621506-632503). Its floor is at approximately 450 metres above sea level (m.a.s.l.) at the highest point (and raised by an unknown amount owing to post-glacial peat accumulation). The channel is cut mainly in sandstone and its steep sides rise around 40 metres above the peat surface, with shoulders about 300 metres apart. Its level floor is approximately 100 metres wide. The channel's length is difficult to specify because it grades into the upper New Water and upper Gelt Burn valleys to west and east respectively: perhaps in the order of 1,000 metres where it cuts through the watershed. Neighbouring higher ground is at around 500-600 m.a.s.l. (Figure 3).

Figure 3. Oblique view of Butt Hill channel (centre frame), viewed from south-southeast. After Google Earth.

The channel was first recorded by Trotter (1929) and interpreted by him as a "direct overflow" into the South Tyne catchment from a lakelet impounded by the retreating Vale of Eden ice sheet in New Water. It was named the Butt Hill channel by Trotter and Hollingworth (1932) in their subsequent account, and is depicted as a "glacial drainage channel" on the Geological Survey one-inch Brampton drift sheet (Geological Survey of England and Wales 1931). Trotter's interpretation was according to the then accepted paradigm (Kendall 1902) that such channels are normally ice-dammed lake overflow channels. However, the Butt Hill channel is now recognised as a major ice-directed subglacial meltwater channel, carrying debris-charged meltwater from the Lake District and Vale of Eden into the South Tyne valley (Vincent 1969; Lunn 1995). It has a "humped" longitudinal profile, indicating subglacial flow under a hydraulic pressure gradient. Because the orientation of such ice-directed meltwater channels approximately accords with that of the ice surface gradient (which largely determines the sub-glacial hydraulic gradient), the channel must have been operating when ice from the Lake District and Vale of Eden was still able to override this part of the North Pennines. In fact, the channel could well have been eroded incrementally during successive Quaternary glacial stages. An implication is that at the LGM the basal ice in this area was at pressure melting point, and wet-based, in order that meltwater could be present.

Livingstone *et al.* (2012) have recently identified different flow phases during the existence of a dynamic last British-Irish Ice Sheet, and the channel likely operated mainly during their Stage I and subsequent early down-wasting – that is, during the maximum expansion of the ice sheet at the local LGM, around 25-22,000 BP, and shortly afterwards. Thereafter, since thinning ice in the Vale of Eden was no longer able to surmount the Stainmore col at about 420 m.a.s.l. from the head of the Vale and thus follow an easterly flow pathway there, it is unlikely that east-flowing ice (and therefore ice-directed subglacial meltwater) was by then able to override the higher divide (above 450 m.a.s.l.) in the Butt Hill area. Rather, during deglaciation, ice flow in the Vale of Eden was redirected towards the northwest, more or less parallel to the North Pennine escarpment.

The Butt Hill channel is one of the major meltwater channels in northern England. Its floor (the surface of the peat infill) is located at the lowest point (by some 150 metres) on the main North Pennine watershed between the Tyne Gap and Stainmore, a distance of some 50 km, as also – prior to its incision – were its shoulders, albeit some 40 metres higher. It can therefore be expected, since subglacial water tends to cross divides at topographic lows, to have drained very substantial amounts of meltwater from a large up-glacier catchment to the west and southwest: hence the channel's impressive dimensions. The col into which the channel is incised may itself have been selectively deepened and broadened by ice sheet erosion (Vincent 1969). After the abandonment of the channel owing to ice-sheet surface down-wasting, continued meltwater flux was responsible for the impressive suite of subglacial and lateral channels trending broadly north-westwards obliquely down the Pennine escarpment into the Vale of Eden (Arthurton and Wadge 1981; Livingstone *et al.* 2012).

At the eastern end of the channel, at around 290 m.a.s.l. and where it opens out into the northeast-flowing Gelt Burn, is a large, east-facing, fossil waterfall over an outcrop of limestone (NY 639502), known as Gelt Linn (Figure 4). The limestone is the Carboniferous (basal Namurian) Great Limestone, the thickest of the local limestones, located at the top of the Upper Alston Group of the Alston Block (Stone *et al.* 2010). From its dimensions the waterfall is clearly misfit with respect to the minor Gelt Burn headwater, which now flows over it in a narrow slot

gorge (Figure 5). The dimensions of this fossil waterfall are approximately 50 metres wide and 8 metres high, while the slot gorge, which is incised almost completely through the fossil fall, is only1-2 metres wide. There is a plunge-pool at the base of the fall and the underlying sandstone is undercut. There are potholes in the slot gorge, whose detailed course is controlled by joints in the limestone. The waterfall was clearly formed when the subglacial Butt Hill channel was operating and discharging large volumes of meltwater eastwards. The upper reaches of the Gelt Burn valley also have the dimensions of an oversize misfit with respect to the modern burn, and presumably also date from the time of subglacial meltwater discharge.

Figure 4. Gelt Linn.

Figure 5. Slot gorge, Gelt Linn.

The floor of the Butt Hill channel above the fossil waterfall, as noted, is occupied by peat ("The Bog") and is partly blanket and partly soligenous mire. The blanket mire is locally dominated by Common Cottongrass *Eriophorum angustifolium*, with a very high water-table. The steep channel sides are mainly covered by upland *Calluna* heath, which is partly on sandstone block scree, presumably dating from frost climates in Late-glacial times. There is very extensive *Calluna-Eriophorum vaginatum* blanket bog on gentler slopes to north and south, managed as grouse moor and hill sheep farm.

The flora of the fossil waterfall, with elements of tall-herb and calcareous rock-face communities, is typical of ungrazed, upland limestone outcrops, particularly ones such as this where the humidity is enhanced by spray from the modern waterfall and by the presence of the slot gorge. The vascular plants include:

A Lady's Mantle	*Alchemilla glabra*
Maidenhair Spleenwort	*Asplenium trichomanes*
Green Spleenwort	*Asplenium viride*
Carnation-grass	*Carex flacca*
Brittle Bladder-fern	*Cystopteris fragilis*
Crowberry	*Empetrum nigrum*
New Zealand Willowherb	*Epilobium brunnescens*
An Eyebright	*Euphrasia* sp.
Wild Strawberry	*Fragaria vesca*
Herb Robert	*Geranium robertianum*
Wood Cranesbill	*Geranium sylvaticum*
Meadow Oat	*Helictotrichon pratense*
Hogweed	*Heracleum sphondylium*
Hard Shield-fern	*Polystichum aculeatum*
Stone Bramble	*Rubus saxatilis*
Wild Thyme	*Thymus polytrichus*

and where they can gain a foothold on ledges:

Ivy	*Hedera helix*
Goat Willow	*Salix caprea*
Rowan	*Sorbus aucuparia*

The Brittle Bladder-fern and spleenworts are very abundant. On a visit in 2000 Mountain Everlasting *Antennaria dioica* was present. It was never common in Northumberland and Cumbria, is in general national decline for reasons which are not yet clear, and was not refound at Gelt Linn in 2012. The current electronic *Flora of North East England* (www.botanicalkeys.co.uk/northumbria/) clearly indicates its greatly reducing distribution in the region.

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A RARE DISCOVERY OF A PERMIAN STINGRAY *JANASSA BITUMINOSA*

Ken Bradshaw

County Hall, Durham, DH1 5UQ
ken.bradshaw@durham.gov.uk

SUMMARY

In August 2013 whilst on a "family-fun" day to Lafarge-Tarmac's Thrislington Quarry and National Nature Reserve, a rare Permian stingray-like fish fossil was found in the 250 million-year-old Marl Slate, part of the Magnesian Limestone sequence. Whilst the Marl Slate is internationally famous for its fossil fish, particularly of the mackerel type *Palaeoniscus,* the flat fish *Janassa bituminosa* is infrequently found. The fossil was discovered in the Marl Slate pile to which Lafarge-Tarmac kindly allowed us access.

INTRODUCTION

The Magnesian Limestone stretches from Hartlepool on the coast in the southeast to South Shields in the northeast, tapering down to the southwest at Newton Aycliffe, and consists of a series of limestones and evaporites resulting from the English Zechstein Cycles. Below this a mud stone, more commonly termed the Marl Slate, is found, being approximately six metres maximum in depth, though it can be absent on the dune ridges of the Yellow Permian sands.

The Marl Slate was created during the first transgression of the Zechstein Sea when the previous desert phase was brought to an end. It is a laminated, commonly bituminous, silty argillaceous dolomite that smells of oil when fractured and consists of alternating grey and black laminae (Lawrence 2009). The coloured layers are thought to have been deposited in bi-annual fluctuations of biological activity with an algal bloom in the summer months and an oxygen-depleted sea in the winter months. The overall effect was to form a thin blanket of dark-coloured organic matter in summer, and when phytoplankton production was not possible a pale layer was deposited, probably in winter (Pettigrew 1980).

The Lafarge-Tarmac quarry is one of the largest quarries in the Magnesian Limestone area and is regionally important for the extraction of a variety of products including sand, aggregate dolomite and industrial limestone, some of which are high purity and utilised in the adjacent furnaces. Many of these products are used in the chemical industrial works of Billingham and Teesside.

Between the Yellow Permian Sands and limestone of the quarry is a thin band of Marl Slate of a maximum thickness of six metres, which has very little economic value. However, it is internationally famous for the widespread occurrence of fossils, the most abundant being free-swimming animals dominated by the *Palaeoniscus.* Other fish and plant debris have also been discovered.

METHODS

Lafarge-Tarmac remove some Marl Slate from the Thrislington Quarry, adjacent to Thrislington National Nature Reserve (Latitude 54.686, longitude -1.522; grid reference NZ309324), to a safe holding place outside the main quarry area, where under supervision it allows small groups to search for fossils (Figure 1). As part of the Limestone Landscapes Partnership, a landscape-scale initiative led by Durham County Council and funded by the Heritage Lottery Fund, there have been a number of visits to the quarry over the last two years.

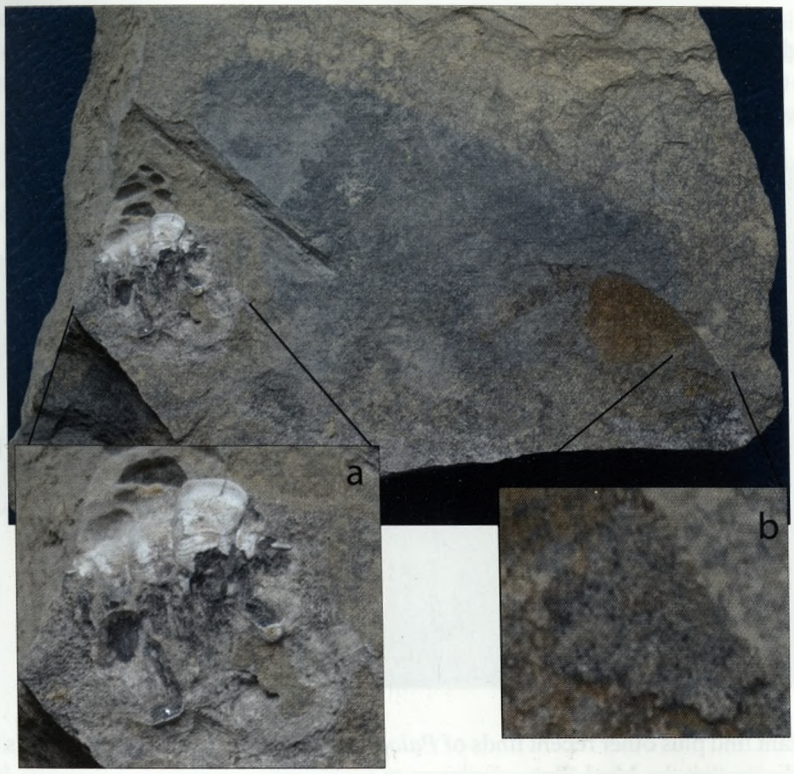
In partnership with Natural England outreach service at Castle Eden Dene, a group of people, including children, walked around the Castle Eden Dene National Nature Reserve on 7 August 2013 and then used geological hammers to search for fossils in the Marl Slate from the quarry.

Figure 1. Marl Slate fossil hunt.

RESULTS and DISCUSSION

Various parts of fish and plants were found in the Marl Slate but the main discovery was of a rare *Janassa bituminosa*. On finding the fossil, it appeared to be a jumble of what seemed like shellfish until the left lobe of the body of the fish was noted (Figure 2). Previous experience of geological talks and a visit to the Permian room in Sunderland Museum enabled the finder to realise that this was a shellfish-eating *Janassa bituminosa*. What appeared to be shellfish were, in fact, the teeth of this stingray-like fish. The left lobe showed the remarkable "dark" areas where it is possible to make out the dermal denticles or scales of the shark-like skin (Pettigrew, pers. comm.; Figure 2b).

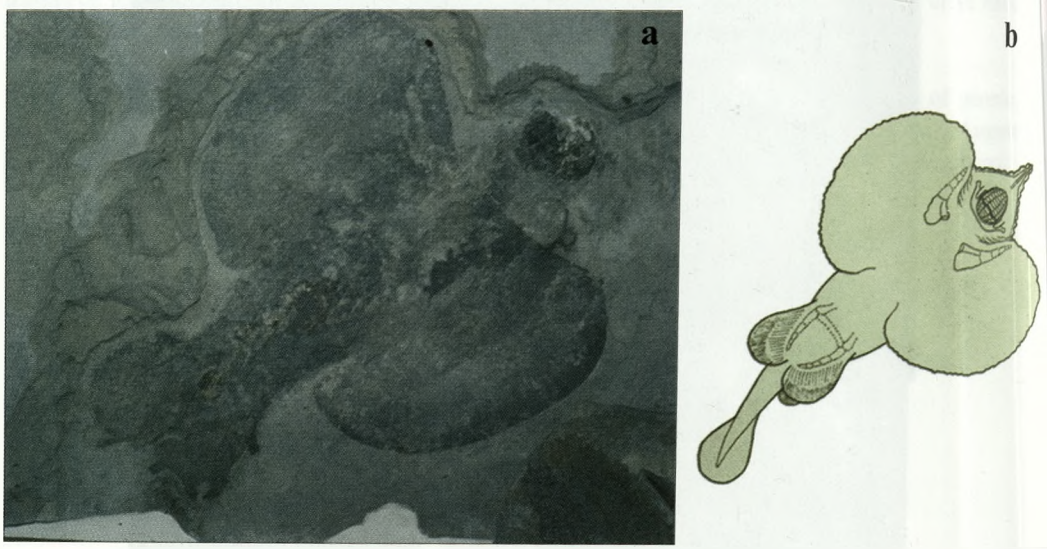
Figure 2. *Janassa bituminosa* from Thrislington Quarry, 7 August 2013, showing dentition (inset **a**) within the outline of the body and scales (inset **b**) from the skin surface.



Marl Slate has been a rich source of fossils for over 150 years with geologists such as Sedgwick coming to the area to search in the fledgling quarries such as Middridge near Shildon. The most common fish were the palaeoniscids which were a mackerel/herring type shoal fish up to 20 cm in length. Larger preying fish that hunted palaeoniscids were *Acrolepsis* and *Pygotperus* which would have been over 50 cm long, extremely fast and streamlined and armed with a set of sharp teeth and powerful jaws. They would have been exceptionally good at predating smaller fish such as the *Palaeoniscus*.

However, the stingray-like *Janassa bituminosa* has rarely been found due to its lack of swimming prowess and the likelihood that it would have frequented the shallower waters where it would have been found feeding on the slow-moving shellfish using its large array of teeth, which continually grew. *Janassa bituminosa* would have inhabited the shallower areas of the Zechstein Sea and because of this they are comparatively rare in the deeper waters. They only rarely drifted out to the deeper water and sank down to where the Marl Slate was forming. There are specimens of *Janassa* in both Sunderland (Figure 3) and the Great North Museum: Hancock. The first fossils were found in the German *Kupferschiefer* in 1762. Some of these had intact stomach contents showing shellfish and Bryozoan (moss animals) remnants that had been taken from the reef. Estimates of the rarity would suggest that they are probably in the low tens.

Figure 3. *Janassa bituminosa* specimen (**a**) found by Ken Sedman (Geologist, Cleveland County Museum Service) in Marl Slate from Quarrington Quarry (near Bowburn), accessioned into the Cleveland County Museum (CLEVE : F2585C79) and displayed in the Sunderland Gallery, Sunderland Museum, when it opened in 1982 (© Tim Pettigrew). This specimen is currently on display in the Lost Worlds Gallery at Sunderland Museum. The sketch interpretation (**b**) is by the late David Green.



This important find plus other recent finds of *Palaeoniscus spp.* and various parts of fish and plant material indicate that the Marl Slate continues to yield large quantities of Permian fossils. The find of a small incomplete skeleton of the flying lizard at Eppleton in 1978 *(Coelurosauravus)* plus two other finds of small reptiles from the Middridge Quarry *(Protorosaurus)* would indicate the possibility of more lizards being found in the future along with further finds of important Zechstein Sea fish.

The Heritage Lottery Funded project Limestone Landscapes ends in 2014, but the interest in the Marl Slate shown by local residents and amateur geologists demonstrates the importance of excursions to quarries and Marl Slate piles continuing beyond the life of this project. This significant fossil would not have been found without the very kind support of the staff of Lafarge-Tarmac at the Thrislington plant.

Over the past couple of years and with help from Sunderland Museum the project has amassed fossils and rocks which have been delighting and entertaining people at events and activities in the area. The *Janassa* fossil will, for the time being, be kept as part of the collection of Limestone Landscapes Partnership and used as an educational tool. In the longer term it will be returned to Thrislington as part of their collection or given to Sunderland Museum.

ACKNOWLEDGEMENTS

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THOMAS ROBSON 1812-1884: THE FORGOTTEN BIRD MAN

Michael Turner

4 Landswood Terrace, Winlaton Mill NE21 6RX

SUMMARY

When two naturalists with the same name have lived and recorded birds in the same area, confusion must arise. This paper attempts to separate the ornithological contributions of the unknown Thomas Robson from those of his namesake, author of *Birds of the Derwent Valley* (1896).

INTRODUCTION

The Two Thomas Robsons

Thomas Robson (1871-1944) of Winlaton is well known in the North East for his *Birds of the Derwent Valley*. The 137 species recorded were later described by George W Temperley (1951) as being "very well and reliably described". In 1993, when *Birds of Gateshead* was published (Bowey *et al.* 1993), Robson was described as "Undoubtedly the most important ornithologist of the area" his book being "one of the principal reference documents on which this present work draws". It also mentions Thomas Robson as being "responsible for adding Great Reed Warbler to the British List".

However, it is in Robson's account of the Great Reed Warbler *Acrocephalus arundinaceus* that we learn of a second ornithologist (also called Thomas Robson), where the author writes "A specimen of this bird was shot at Swalwell by the late Mr. Thomas Robson" (Figure 1), and he also provided a short biographical account of his namesake, the Ryton-born Robson.

The author also acknowledged Robson for information given on seven species: Wryneck *Jynx torquilla*, Great Grey Shrike *Lanius excubitor*, Siskin *Carduelis spinus*, Woodlark *Lullula arborea*, 'Grey-headed' Wagtail *Motacilla flava* ssp, Great Reed Warbler and Quail *Coturnix coturnix*. Of particular interest are the entries for 'Grey-headed' Wagtail and Robson's most famous find, the Great Reed Warbler (see Appendix).

Thomas Robson of Ryton

Thomas Robson, son of John and Isabella Robson, was born at Ryton, County Durham on 24 March 1812. His father was registered on the baptism certificate as an Anchor Smith and probably would have been employed by the Crowley family.

In turn, Thomas Robson joined Crowley Millington & Co. as a clerk; we can place this prior to 1836 thanks to J W Fawcett's *Notes of the birds of the Derwent Valley* (1891). Fawcett had compiled the records of Thomas Grundy, "a gamekeeper for gentleman in the Valley of the River Derwent". Grundy's entry for Redwing *Turdus iliacus* reads "A regular visitor. Two or three eggs of this bird were obtained on the Bradley Hall Estate about 1836, by Mr. Thomas Robson, at that time clerk for Crowley, Millington, and Co., Swalwell. They were lying on the grass, and had probably been dropped by the birds while feeding".

Figure 1. The Great Reed Warbler captured at Swalwell in May 1847 and now in the collections of the Natural History Society of Northumbria (David Noble-Rollin, courtesy NHSN).

Thomas Robson married Rebecca Clark at St John's Church, Newcastle in September 1848 and they made their home at Winlaton Mill in the Derwent Valley. They had two daughters, Ann (born in 1849) and Mary (born in 1851). Rebecca Robson died in 1851, and 10 years later the Census recorded Thomas Robson (widower and head of household), Ann and Mary (both scholars) and live-in housekeeper Mary Jeavens all living in Winlaton Mill.

Robson continued with his contribution to local avifauna. Two articles were published in *The Zoologist* in 1861. In "Late Stay of Swallows" (Robson 1861a) he refuted earlier comments by a Captain Hadfield who had supposed swallows would not suffer much, were they to stay throughout the winter. Robson wrote "I remember quite well on November 28, 1846 seeing several on the wing here, one of which I shot, and on close examination it was in a most emaciated condition, and I think could not have lived here much longer".

In his second article "Nest of The Longtailed Titmouse" (Robson 1861b) he debated the point of there being two holes built into the structure of the nest of this bird. He wrote "I have known dozens of their nests, but never found one with two holes". However later in the article he refers to his friend Thomas Thompson of Winlaton who "took a nest in Gibside Wood near this place which had two distinct holes. This is the only one I have ever seen". In both articles he gave his address as "Thomas Robson; Swallwell Iron Works, near Gateshead-on-Tyne".

The following year, 1862, would prove decisive for Thomas Robson. Due to ill health, and following medical advice to seek a place with a warmer climate he emigrated to Turkey. It is not known what happened to his daughters Ann and Mary (by then aged 11 and 13) although in the census for 1871 Mary was recorded as boarding in Winlaton with Mary Jeavens, Robson's former housekeeper. Before his departure Robson sold off his collection of birds, that he had stuffed himself. The larger birds were purchased by Col. J A Cowen of Blaydon Burn while the rest of the collection was sold to Thomas Thompson, then of Whickham, who in his will of 1904 wrote:

> I bequeath to the Hancock Museum of Natural History at Newcastle upon Tyne my preserved specimen of the Great Sedge or Reed Warbler (the only one taken in the Kingdom) ... and the cases (eighty or thereabouts in number) of small birds purchased by me from the late Thomas Robson of Winlaton Mill and now mostly on the east end of my room together with the said Thomas Robson's manuscript catalogue thereof. And I desire that the small birds in the above bequest to the said museum including the Great Sedge or Reed Warbler shall be kept together in one place and not dispersed or divided up.

The Thompson collection was used as an educational resource for local schools during the 1930s.

From Turkey to the British Museum, and an irate curator

Robson settled in the town of Ortakoi near Constantinople (Istanbul) where he once again began to study and collect the birds of the region. His contribution to Turkish ornithology would become quite significant. This together with his work on British avifauna would see his material used by some of the prominent ornithologists of the day. Henry Eels Dresser, William Yarrell (1784-1856), John Hancock, John Gould, Richard Bowdler Sharpe and Henry Seebohm (1832-1895) amongst others would all include contributions by Thomas Robson in their publications.

Many of the specimens he found were sent to the British Museum, and are now in the Natural History Museum (Tring). His correspondence with Dr Albert Günther (1830-1914)[1] is in the archives of the Natural History Museum. In a letter to Günther dated 27 January 1865 Robson wrote:

> I have strong hopes of sending you more undescribed specimens of birds and varieties of species & feel certain that I have set up in my collection at Ortakeuy some 6 more undescribed species some of them very scarce.... I accept the price of 5/- each for common bird skins & trust that you will allow me all prices reasonably possible for the rarer ones, the Country is difficult to travel for want of roads, in the outlying districts, the people are rude & strangers to us & it is only by getting up shooting parties to go into the interior that we will be able to do much service & the prices offered will be a small surplus over expenses but as Englishmen we are anxious to serve our Country and any information on natural history we may glean you shall have it.

Further letters show that Robson had ideas about selling specimens that roused the wrath of Dr Günther. He wrote to Robson on 24 August 1865:

> I was very sorry to hear from Mr Gray[2] that you have disregarded my distinctly and repeatedly expressed advice to send collections which you wish to dispose of to Mr Stevens or any other agent you may choose. I see also from one of your letters that you have understood this, as you express intention of sending such collections to a relation of yours. I advised you to enter into correspondence with Mr G.R. Gray ... who could give you the information about various birds which you described in some of your letters but I never said to send a collection to him for the Brit. Mus. This being quite against the rules of the Establishment.... I told you distinctly that such specimens should be sent not to the Museum, but to an agent who would offer them to the Museum.

Agents and auction rooms were used extensively by museums and private collectors to obtain specimens for collections. Samuel Stevens (1817-1899) was one such agent whose premises were in Covent Garden, London. He was well known for the sale of Great Auk skins and for acting as the agent for Alfred Russell Wallace (1823-1913) (for example see Allingham 1924).

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[1] A C L G Günther of the Zoology Department was successively Assistant (1862-1872), Assistant Keeper (1872-1875) and Keeper (1875-?).

[2] G R Gray (1808-1872), Ornithologist and Assistant Keeper in the British Museum's Zoology Department.

Robson's letter of apology to Dr Günther is dated 8 September 1865. He wrote "I feel very much that I have acted improperly in forwarding the box of skins as I have done & sincerely trust that you will overlook the circumstance.... My nature has been to please, and to offer any unpleasantness to my friends I can assure you is my most distant desire.... I have wrote to Mr Gray & sincerely trust that he may overlook my indiscretion".

Overall, this response might have discouraged Robson, whose only gifts to the museum in 1865 were 20 specimens (but including two type specimens of the race of Long-tailed Tit *Aegithalos caudatus tephronotus*). The many other specimens he collected were acquired by the Museum in 1875. They were presented by Richard Bowdler Sharpe (1847-1909) who was an ornithologist appointed in 1872 following the death of G R Gray: as he pointed out, because curators were not allowed to own collections of the groups they worked on, he was obliged to pass his birds to the Museum (Lankester 1904-1912).

In E Ray Lankester's history of the natural history collections in the British Museum (Lankester 1904-1912), Bowdler Sharpe listed five batches, totalling 121 specimens, of birds presented by him but collected by Robson. Did Günther's petulant response cause Robson to sell his specimens to Sharpe?

Robson's most important find was a new race – then considered a new species – of Long-tailed Tit. Günther (1865) first wrote of its discovery in *The Ibis* (Figure 2). He wrote "I have lately received from the Asiatic side of the Bosphorus a male and a female of a Long-tailed Titmouse that differs so much in colouration from the common European and Japanese kinds that it appears to be entitled to the rank of specific distinction. I therefore designate it Orites Tephronotus". After a full description of the two birds Günther continued "Both specimens were received by me from Dr W Hoyland of Pera having been obtained in the month of December, by Mr Thomas Robson, near the village of Havancore". Henry Eels Dresser in Volume 3 of his monumental *A history of the birds of Europe* (1871-1896) would further describe Robson's discovery: "To Mr Robson of Constantinople, belongs the credit of having first called attention to the fact that a new species of Long-tailed titmouse, very distinct from the other allied European species, existed in the neighbourhood of Constantinople".

Richard Bowdler Sharpe was undoubtedly one of the most important ornithologists of the nineteenth century and founder of the British Ornithologists' Club. He continued to record the specimens sent by Robson, eventually to be included in the *Catalogue of the birds of the British Museum* (1874-1898). Sharpe was a prolific writer and in the Birds section of *The history of the collections contained in the Natural History Departments of the British Museum* (1906) he wrote of Robson: "Mr Robson was a well-known collector in Turkey, chiefly in the neighbourhood of Constantinople and the opposite coast of Asia Minor. He contributed many excellent notes to the early parts of 'Birds of Europe' and was discoverer of the Long-tailed tit".

Figure 2. Long-tailed Tit *Orites Tephronotus,* reproduced from *The Ibis*, Vol. 1 1865.

It is interesting also to note that in the *Catalogue of the Passeriformes or Perching Birds in the collection of the British Museum* (1883), Hans Gadow (1855-1928) recorded that two of the specimens of Long-tailed Tit shot by Robson had actually come from the collection of the renowned bird artist John Gould (1804-1881). Gould referred to Robson in his *The birds of Great Britain* part XXI, under the entry for Calandra Lark:

> Mr. Robson of Ortakeuy, informed Messrs Sharpe and Dresser that 'It is common in Turkey, in Europe, and in Asia Minor. In the winter they associate in large flocks; and many of them are shot by sportsmen for the table, as they are large plump birds, and in much request for eating. They affect mountains and large plains, but seem to prefer hilly tracts, and are found both on cultivated and uncultivated ground. They stay over the year and make their nests on the ground'.

Seebohm (1883) wrote an account of time spent with Thomas Robson under the entry for Great Reed Warbler:

> On one of my visits to Constantinople I spent a day at Ortakoi on the Bosphorus with the above mentioned Mr Robson, and listened with great interest to the account of his capture of this rare visitant to our shores. I found Mr Robson an excellent field-naturalist, well acquainted with the songs of our common birds. He told me that whilst he was a working mechanic at Newcastle he used to devote much of his leisure time to the study of field-ornithology.

In the year of Seebohm's publication, Thomas Robson returned home. He had never fully regained his health and was obviously quite ill, possibly dying, when he arrived back in England in December 1883. His time here would be short; he died on 5 January 1884. An obituary appeared in the *Newcastle Courant* on 11 January, which read:

> We have to announce the death of Mr. Thomas Robson who was for many years in the employment of Messrs Crowley, Millington and Co. The deceased was a keen and true observer of natural history, especially in zoology and natural history. He contributed to the 'Zoologist' and other papers. Twenty-two years ago he was obliged to leave this country owing to bad health and by the advice of his medical advisor he went to Constantinople where he derived great benefit, following his favourite pursuits with unabated resolution and collecting a large number of eggs and skins, a small portion of which he sent to this country to be disposed of amongst his numerous friends. In private life the deceased was unassuming and was a kind friend and genial companion.

He was interred at Winlaton where a headstone was erected to his memory.

CONCLUSION

Thomas Robson's contribution to ornithology is considerably more than he is credited for. It is hoped now that future avifaunas may recognise this and acknowledge the fact. He not only found Britain's first Great Reed Warbler and discovered a new sub-species of Long-tailed Tit, but to this day his specimens at the Natural History Museum with their distinctive, heavily creased blue-paper labels are still available to modern researchers.

ACKNOWLEDGMENTS

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APPENDICES

Appendix 1: Great Reed Warbler

The record of a Great Reed Warbler was published by John Hancock (1847):

> A male specimen of this fine warbler was shot, three or four miles west of Newcastle, near the village of Swalwell, by Mr. Thomas Robson of that place, on the 28th of last May. The attention of this gentleman who is perfectly familiar with the song of all our summer-visitants was arrested by a note which he had not before heard; and after some search he succeeded in getting a sight of the bird. It was concealed in the thickest part of garden hedge close to an extensive mill-dam which is bordered with willows, reeds and other aquatic plants. It would scarcely leave its retreat, and when it did so never flew far and always kept close to the herbage. Its habits resembles those of the Reed Fauvette [Sedge Warbler], being continually in motion, occasionally hanging with the body downwards or clinging to the branches and stretching forwards to take its prey. Its song was powerful, and resembled that of the Black Ougel [possibly Black Ousel, the Blackbird] but was occasionally interrupted with the harsh cracking note common to many of the Warblers, and at intervals it uttered a single shrill cry. The specimen was very fat, and when opened the testicles were found to be much enlarged; the stomach contained small beetles and flies. From the nature of the locality, from the time when captured and from the enlarged state of the testicles, there can be little doubt that this bird was breeding in the neighbourhood; and I have some reason for believing that the nidification of this species has occurred in another part of England.

Hancock ended by saying "... and even now it might have escaped detection had not the accurate ear and experienced eye of Mr. Robson been engaged in the pursuit".

Temperley (1951) summarised the find as "A very rare accidental visitor. This species owes its place on the Durham list to one specimen shot by Thomas Robson near Swalwell on May 28th 1847.This was the first recorded occurrence of this species in Great Britain".

The specimen came to the Hancock Museum in 1906 with the Thomas Thompson collection.

Appendix 2: Grey-headed Wagtail or Blue-headed Wagtail?

In the 1830s ornithologists recognised two forms of Yellow Wagtail *Motacilla flava* as occurring in Britain. As well as the common form, there were a few records of a second form, known as the "Grey-headed Wagtail" and given the Latin name *Motacilla neglecta.* Later in the nineteenth century all of the early records of the rarer form were assigned to the "Blue-headed Wagtail", and it was only later realised that the Blue-headed *M. flava flava* and Grey-headed *M. flava thunbergi* Wagtails were in fact separate subspecies of *M. flava* and that all three were found in this country.

Thomas Robson recorded a male bird, shot 1 May 1836 on Dunston Haughs (see Hancock 1837), which was published initially as a "Grey-headed Wagtail"; and again as the same thing in Howse's catalogue of the birds in Hancock's collection (Howse 1899). Later authors in the region (Tristram 1905; Temperley 1951) followed the national trend in discarding the "Grey-headed Wagtail" in favour of "Blue-headed Wagtail". However, since we now know that both of the rarer subspecies do occur in the North East (Bowey and Newsome 2012), the true identity of Robson's bird is open to question.

Appendix 3: Thomas Robson specimens in the Natural History Museum

The British Museum's manuscript accession registers record the following specimens collected by Thomas Robson. In the list below the modern-day Latin and English names are given to the right of the original listed names:

31 March 1865 (Two specimens presented by Thomas Robson via Dr W Hoyland)

Otites tephronotus	*Aegithalos caudatus tephronotus* (Long-tailed Tit) [These a

two are listed in Gadow (1993) as adult skins, the types of the species]

25 April 1865 (Two specimens presented by Thomas Robson)

Motacilla sulphurea	*Motacilla sulphurea* (Yellow Wagtail).

The difficulty of locating all of Robson's specimens in the British Museum is shown by this species. The registers record only these two specimens but six are listed in Sharpe's 1885 catalogue of Motacillidae in the British Museum: these two, plus three from the Salvin-Godman collection and one from the Gould collection.

10 September 1865 (16 specimens purchased from Stevens, collected by Robson)

Garrulus melanocephalus	*Garrulus glandarius atricapillus* (ssp. Jay, Middle East)
Garrulus glandarius	*Garrulus glandarius* (Jay)
Anthus cervinus (2 specimens)	*Anthus cervinus* (Red-throated Pipit)
Sylvia Bowman	*Sylvia melanocephala momus* (Sardinian Warbler)

28 January 1875 (11 specimens presented by Sharpe, collected by Robson)

Acredula tephronota	*Aegithalos caudatus tephronotus* (Long-tailed Tit)
Sitta caesia	*Sitta europaea caesia* (Southern Nuthatch)
Linota cannabina	*Acanthis cannabina* (Linnet)
Muscicapa parva	*Ficedula parva* (Red-breasted Flycatcher)
Passer salicicola	Subspecies of *Passer hispaniolensis* (Spanish Sparrow)

27 April 1875 (28 specimens presented by Sharpe, collected by Robson)

Emberiza cia	*Emberiza cia* (Rock Bunting)
Oriolus galbula	*Icterus galbula* (Baltimore Oriole)
Epupa epops	*Upupa epos* (Hoopoe)
Nisaetus pennatus	*Hieraaetus pennatus* (Booted Eagle)
Accipiter nisus	*Accipiter nisus* (Sparrowhawk)
Cerchneis tinnunculus	*Falco tinnunculus* (Kestrel)
Cerchneis vespertinus	*Falco vespertinus* (Red-Footed Falcon)
Buteo desertorum	*Buteo buteo vulpinus* (Common Buzzard, ssp. 'Steppe')
Circus cyaneus	*Circus cyaneus* (Hen Harrier)
Ampelis garrulus	*Bombycilla garrulus* (Bohemian Waxwing)

8 May 1875 (14 specimens presented by Sharpe, collected by Robson)

Sylvia nisoria eggs	*Sylvia nisoria* (Barred Warbler)
Hypolais olivetorum	*Hippolais olivetorum* (Olivaecous Warbler)
Lanius collurio	*Lanius collurio* (Red-backed Shrike)

21 May 1875 (25 specimens presented by Bowdler Sharpe, collected by Robson)

Rallus aquaticus	*Rallus aquaticus* (Water Rail)
Archibuteo lagopus	*Buteo lagopus* (Rough-legged Buzzard)
Buteo desertorum	*Buteo buteo vulpinus* (Common Buzzard, ssp 'Steppe')
Buteo lagopus	*Buteo lagopus* (Rough-legged Buzzard)
Corvus frugilegus	*Corvus frugilegus* (Rook)
Buteo vulgaris	*Buteo buteo* (Common Buzzard)
Cerchneis tinnunculus	*Falco tinnunculus* (Kestrel)
Cerchneis naumanni	*Falco naumanni* (Lesser Kestrel)
Milvus korshun	*Milvus migrans* (Black Kite)
Accipiter nisus	*Accipiter nisus* (Sparrowhawk)
Gallinago major	*Gallinago media* (Great Snipe)
Circus macrurus	*Circus macrourus* (Pallid Harrier)

Aquila maculate	*Aquila clanga* (Greater Spotted Eagle)
Nisaetus pennatus	*Hieraaetus pennatus* (Booted Eagle)
Scops giu	*Otus scops* (Scops Owl)
Circus cyaneus	*Circus cyaneus* (Hen Harrier)

11 October 1877 (43 specimens presented by Bowdler Sharpe, collected by Robson)

Turdus pilaris	*Turdus pilaris* (Fieldfare)
Corone cornix	*Corvus corone* (Carrion Crow)
Colceus collaris	*Corvus monedula soemmerringi* (ssp. Eastern Jackdaw)
Pica pica	*Pica pica* (Magpie)
Coracias garrula	*Coracias garrulus* (Roller)
Lanius auriculatus	*Lanius senator* (Woodchat Shrike)
Lanius collyris	*Lanius collaris* (Southern Fiscal)
Lanius minor	*Lanius minor* (Lesser Grey Shrike)
Cypselus melba	*Pytilia melba* (Green-winged Pytilia)
Melanocorypha calandra	*Melanocorypha calandra* (Calandra Lark)
Sylvia nisoria	*Sylvia nisoria* (Barred Warbler)
Erythrosterna parva	*Ficedula parva* (Red-breasted Flycatcher)
Hypolais icterina	*Hippolais icterina* (Icterine Warbler)
Anthus campestris	*Anthus campestris* (Tawny Pipit)
Puffinus yelkouan	*Puffinus yelkouan* (Yelkouan Shearwater)

Appendix 4: Thomas Robson Manuscript Catalogue

Robson's Manuscript Catalogue not only lists his collection of specimens in their display cases, it also gives a fascinating insight into various aspects of nineteenth-century ornithology. Three examples are of particular interest.

The entry for case 17 gives an interesting comparison to present day numbers of Bunting Lark (Corn Bunting): "A common bird in the neighbourhood of Swalwell and Winlaton, building in meadow fields and frequently alighting on Hemlock, adjoining which it generally has its nest". Under the entry for case 65 Robson gives a quite detailed account of the lengths he went to in order to obtain specimens of Corncrake:

> Shot in hay one male Corn Crake, but could not find female, although frequently hunted for with two Spaniels which pointed and rode but could not rise anything, female after loosing male a few days frequently cried at night and after a fortnight had elapsed another male craked as they usually do, I went and shot it immediately with dog pointing it, but still could not find female, when mowers came to cut meadow I attended and saw female and young of which their were great no [number], I took after grass was all cut, the above young and shot the above female and left a few young, and some were killed by mowers.

Case 117 had on display Robson's most famous find, the Great Reed Warbler. He wrote "May 28th 1847 Male Thrush Nightingale[3], Selby. Shot by Thomas Robson in Mr Nicholsons Garden Hedge by Damn Side, Bishops Mill".

[3] The use of the misnomer "Thrush Nightingale" is explained by William Yarrell (1874) as a footnote in *A history of British birds*, Vol. 1 page 320: "Failing to detect the blunder of an anonymous writer (Zool. p 1876) who applied this name to a very different bird, Mr. Morris [F.O. Morris, *A history of British birds*] has introduced the 'Thrush Nightingale' to his readers as a British Species, when the recorded occurrences on which he chiefly relies notoriously refer not to *Philomela turdoides*, Blyth but to *Sylvia Turdoides*, B.Meyer, of which though under a far older name an account will by-and bye be given here. There is no sufficient reason for supposing that the large Nightingale of Eastern Europe has ever visited this country".

Throughout the catalogue, Robson describes specimens often using vernacular names popular of that period. These are listed below:

Mountain Finch – Brambling *Fringilla montifringilla*
Hedge Warbler – Dunnock *Prunella modularis*
Bunting Lark – Corn Bunting *Emberiza calandra*
Hay Chat – Blackcap *Sylvia atricapilla*
French Linnet – Redpoll *Carduelis cabaret*
Oxe Eye Titmouse – Great Tit *Parus major*
Blue cap Titmouse – Blue Tit *Cyanistes caeruleus*
Field Lark – Skylark *Alauda arvensis*
Willow Wren – Willow Warbler *Phylloscopus trochilus*
Grey Bird – Song Thrush *Turdus philomelos*
Chimney Swallow – Barn Swallow *Hirundo rustica*
Tree Titlark – Tree Pipit *Anthus trivialis*
Reed Sparrow – Reed Bunting *Emberiza schoeniclus*
Rock Lark – Rock Pipit *Anthus petrosus*
Spotted Rail/Water Crake – Spotted Crake *Porzana porzana*
Grey Owl – Tawny Owl *Strix aluco*
Water Ouzel – Dipper *Cinclus cinclus*
Mountain Linnet – Twite *Carduelis flavirostris*
Brown Linnet – Linnet *Carduelis cannabina*
Ash coloured Shrike – Great Grey Shrike
Thrush Nightingale – Great Reed Warbler
Chatterer – Magpie *Pica pica*

Filed with the catalogue in the NHSN collection is a letter dated 23 March 1868 from Robson to his friend Thomas Thompson. The warmer climate of Turkey obviously suited his constitution. He wrote "God be praised I am as well as an old chap can crave. I am thankful to be so restored and I oftimes imagine my legs have got a little spice of youth in 'em". In the letter he comments on locations in northeast England where specimens have originated. He recalls a Montagu's Harrier being shot on Hedley Fell and Ring Ouzels coming to Winlaton Mill Scar to breed. He ends the letter offering his regards to Mr J Hancock and adds as a postscript "I never saw a Moor Buzzard in my locality". Moor Buzzard is an old name for a Marsh Harrier.

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THE REVEREND W J WINGATE 1846-1912 AND HIS CURIOUS HOBBY

John Kramer

31 Ash Tree Road, Oadby, Leicester LE2 5TE
john.kramer@btinternet.com

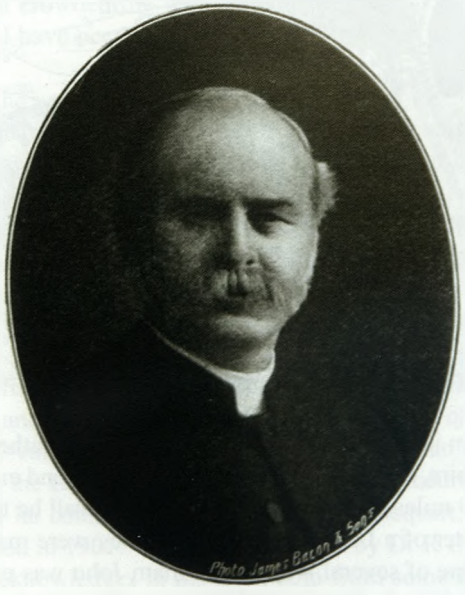
SUMMARY

The story behind the writing of "Wingate's Durham Diptera" is described to mark the centenary of the author's death.

DISCUSSION

The Reverend William John Wingate died in October 1912, a hundred years ago, as something of a local celebrity. In addition to his public duties as a vicar, appearing at Temperance Society and charity meetings and visiting parishioners, he wrote a book, *A preliminary list of Durham Diptera, with analytical tables*. This was published by the Natural History Society of Northumberland, Durham and Newcastle upon Tyne, in May 1906, when he was 60. Known as "Wingate's Durham Diptera", the book had a large sale and carried the name of Wingate (Figure 1) far beyond his local community in northeast England. It describes 2,210 species in 60 families of flies in the order of insects named the Diptera (two-winged flies). At the back of the book are seven plates illustrating the terminology and external structures of flies.

Figure 1. Portrait of the Reverend W J Wingate.



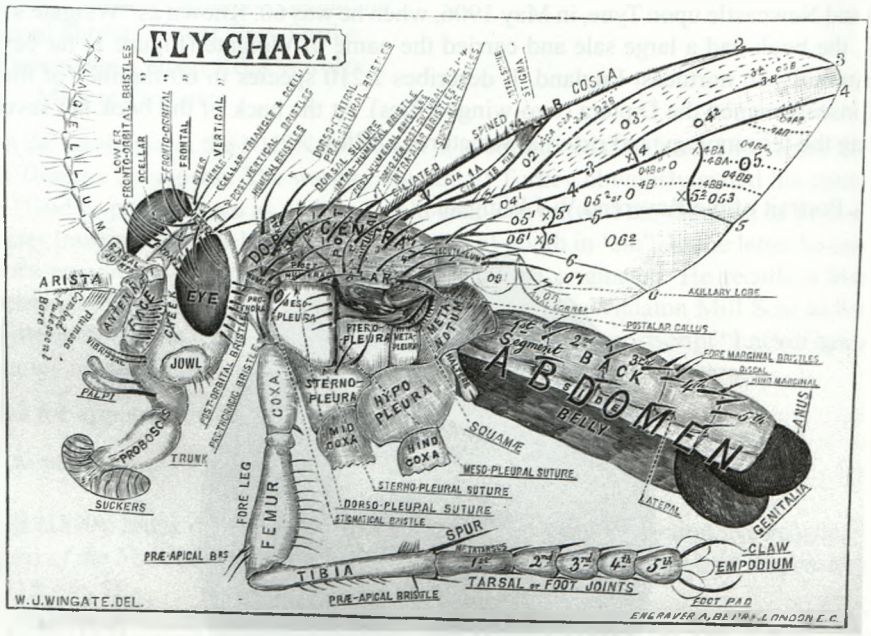
The book was reviewed in the journal of the Yorkshire Naturalists' Union, *The Naturalist*, where the reviewer (Anon. 1906) wrote:

> English dipterists (or dipterologists) have so little literature in their own tongue available ... that they cannot but feel grateful in the highest degree to Mr. Wingate for furnishing them with a work so well calculated in its plan to help the young dipterologist to make out his captures. The dichotomic or tabular method adopted here is a very useful one, as drawing attention to the diagnostic points, and likely to assist the beginner in making out, at any rate, the well-marked and more distinctly characterised species.

Wingate's Durham Diptera was also described in the *Transactions of the Natural History Society of Northumberland, Durham and Newcastle-upon-Tyne* (Anon. 1903), in a paragraph noting his death in 1912 as follows: "... his modestly named 'Catalogue of Durham Diptera', published as the second volume of the new series of Transactions, has had a large sale, as being the only real introduction to the study of Diptera in the English language".

Many young student dipterists must have owned and used a copy during the inter-war period and before the advent of the more advanced Royal Entomological Society keys to identify flies. The "Fly Chart" (Figure 2), used as Plate 1 in the book, also exists in the archives of the Natural History Society of Northumbria as a large chart, about a metre across. It was presumably used by Wingate as a visual aid for lectures to local natural history societies.

Figure 2. The Fly Chart.



Rev. W J Wingate was born in Glasgow on 19 August 1846. His father was William Wingate of Nether Croy, Dumbartonshire, a silk merchant, comfortably off and employing several servants. The village of Wingate, 10 miles southeast of Durham, may well be the family ancestral home. His mother was the daughter of a London solicitor and they were married in St Martin-in-the-Fields Church, London. One of several siblings, William John was educated at Glasgow High School, Merchiston, and St Aidan's, Birkenhead. He was ordained a deacon in 1879 when he was 33 years old, and then as a priest in 1880. Nothing is known of his life before this. He occupied

a curacy at St Paul's, Hendon, Sunderland, from 1879 to 1882, and was married there, aged 36, to Alice Durnford Iliff, on 1 June 1882. He then moved to a curacy at Gateshead from1882 to 1883 where his daughter Alice was born on 16 May 1883. From 1884 to 1892 he was vicar of St Jude, South Shields, where a son, William Iliff Wingate, was born in 1889, and a daughter, Ethel Wingate, in 1892. From 1892 to 1897 he was vicar of Marley Hill, and it was around 1896, when he was about 50 years old, that Wingate began to take an interest in the Diptera (two-winged flies). In 1887 he left Marley Hill and was appointed vicar of St Peter's, Bishop Auckland, where he remained for 23 years, until just before his death. In about 1910 he moved to the large vicarage at South Hetton, eight miles north of Wingate, and he died at the Northwood Nursing Home, Northwood, London, on 19 October 1912, at the age of 66. His probate record states that his effects were £1,927. 19s.9d. In a paragraph in the *Transactions of the Natural History Society of Northumberland, Durham and Newcastle-upon-Tyne* cited above, it says "he was a good botanist, and a good geologist as well, and by his energy as an organiser and lecturer he did great service to the local scientific societies of the county of Durham".

His portrait (Figure 1), by James Bacon and Sons, copied from an unknown source, is in the archives of the Natural History Society of Northumbria, and taken from Jamieson (1906). It seems to be the only remaining portrait and it would be good to hear of any others in existence. His daughter Alice became a teacher in Canada, and his son, an analytical chemist, seems to have died in Spain. There is, apparently, none of the Wingate family now remaining in the locality.

So how did the Reverend Wingate become interested in two-winged flies? After working for 10 years in the industrial towns of Gateshead and South Shields, in 1892 Wingate, aged 46, moved to the rural parish of Marley Hill. In a piece he wrote in 1903 under the heading "Durham Diptera" in the *Naturalist*, Wingate graphically describes his first stirrings of curiosity and interest in flies, which was stimulated by the countryside around him. He wrote:

> About six or seven years ago, when old Natural History tastes had been revived by country residence after years of town work, I thought how stupid it was not to know anything about the common flies which crowded the windows in summer. So I turned my attention to the Diptera, and since then I have been collecting in the County of Durham only.

In the Preface to his book, he writes:

> It does seem strange, that what I may call our 'Domestic Insects' should receive so little attention, that very few, even among entomologists, can point out with any certainty the common House-fly or distinguish between the Blue-bottles. ... And yet no order of insects has so many interesting and varied life histories, and none so deeply affects the human race, whether as protectors when acting the part of scavengers, or as depredators destroying crops, or as scourges carrying deadly micro-parasite.

So, in about 1897, when he was 50, he set about collecting and trying to put names to all of the local species of Diptera. His chief guides were Schiner's *Fauna Austriaca*, published in Vienna in 1862 (Schiner 1862), and George Verrall's (1901) *Checklists of British Diptera*. He also borrowed Zetterstedt's 12-volume work in Latin, on Scandinavian Diptera (Zetterstedt 1842-1860), from the library of the Dean and Chapter of Durham Cathedral, but had to return it after four years. Other authors he consulted included Becker, Macquart, Loew, and Verrall's book on the Syrphidae, published in 1901. Wingate was helped by Dr R H Meade in Leeds, and G H Verrall. In addition, he acknowledges in his book help from some of the leading Dipterists of the day: Mr Austen, Col. Yerbury, Mr Henderson, Mr Wainwright, Herr P Stein, Mr P Grimshaw and Mr Collin.

In 1901 he sent a letter to James E Collin, dated 12 March, asking for information about two species that he had found, and Collin wrote back offering to examine Wingate's specimens. Because of Wingate's persistent questions, he may later have regretted this! Without the considerable help given by Collin and others Wingate may well have been defeated by his self-imposed task to put names to all of the flies found locally, but with admirable tenacity he bothered Collin, and to his great credit Collin responded until many of Wingate's problems were sorted out. This relationship is documented in a series of letters to Collin and to George Verrall between 1901 and 1906, which are fortunately preserved in the Oxford University Museum of Zoology archives. Collin was the nephew, secretary and successor to George Henry Verrall, and these two men played a very important part in the development of the study of flies in the British Isles. From 1879 they lived at Sussex Lodge, Newmarket (Pont 2011).

From 1901 Collin was bombarded by questions from Wingate. He also wrote directly to Verrall on a number of occasions, but, perhaps because Collin was more responsive, he often addressed Verrall through Collin. Thanks to an efficient postal system he regularly exchanged specimens of flies with Collin and often included in the postal box specimens he found difficult to identify, "to fill up the space". So there was a strong link to the expertise residing in Newmarket, as well as to a wider supportive network. Wingate would freely admit that he was not himself an expert on the Diptera, not having a long experience of the subject, but he did rightly claim to know the problems faced by those beginning their study.

Wingate's initial project was to publish a list of the Durham Diptera, and this he did in the *Naturalist* of 1903, but by the time he came to write his book he had formed a broader educational aim. An important source of his motivation for writing his book came from his contact with the young naturalists around him. In a letter to G H Verrall dated 10 August 1905 he wrote: "I have had many enquiries from young fellows wanting to begin the Diptera and have always had to reply 'Do you read German, for there is no book in English except Verrall's Syrphidae and articles in entomological magazines?'", and again, in the same letter he writes:

> I am too much of a tyro at diptera to be likely to be of any service to specialists. The only thing I am hoping to do is to make it a little easier for young naturalists in our north counties to make a beginning with Diptera. I am only a beginner myself and I know a beginners difficulties. So in a local list that the Newcastle Natural History Society is now publishing I am giving a pretty full explanation of parts and terms and numerous tables.

Perhaps Wingate sometimes taught children at the local Church School. On many occasions he emphasises his role as a teacher rather than a specialist and was aware of the importance of this role to encourage beginners. In a later letter to Verrall dated 19 June 1906, in response to Verrall's worries about over-confident but inaccurate identifications by beginners, Wingate writes: "I do not see how that can be helped ... He is far better to go on and make mistakes than never to go on at all". The Reverend then goes on to coin an appropriate parable:

> All I want to be is like some fellow paddling in the shallows who calls out to another on the shore who is frightened to enter the water, "it is not cold, and it is not deep, come on." Once he is in and enjoys and wants to go deeper I leave it to you and other fellows farther out to teach him to swim. I cannot swim myself.

In his preface, in describing his battles with the literature available to him, Wingate writes:

> Many a time I have pounced upon some descriptive list of local species in transactions and magazines, hoping to be able to identify some specimens I had taken, only to find that the learned phraseology, the want of analysis indicating the points of difference, and the

unnecessary repetition of points of agreement, made it an almost hopeless task. Life is too short for this weary groping after the undefined, but a short life may be practically lengthened if one is able quickly to begin where a predecessor has left off.

It may fairly be said that, in his attempt to introduce the fascination of the Diptera to a wider group of naturalists, Wingate was the forerunner of Charles Colyer and Cyril Hammond, authors of *Flies of the British Isles*, although unfortunately without the artistic skills of the latter. This popular book, part of the "Wayside and Woodland" series, first published by Warne in 1951, caused a significant surge of interest in the natural history of flies. From his own initial ignorance Wingate understood the problems of other beginners, and indeed of all naturalists, in becoming familiar with a new group. He had the vision, determination, and the opportunity to take a step to remedy this.

In 1902 Wingate founded the Durham County Naturalists' Union and became its secretary. He brought out a book of rules, and a set of nature notebooks in a case, which must have been the proud possession of many young naturalists in the district. It is said that the Union thrived for the 10 years up to Wingate's death, and it would be interesting to know if any of these notebooks, or records they contained, are still in existence today.

Most of Wingate's collecting was carried out in the four years between 1898 and 1902. He listed 17 sites where he collected (Wingate 1903), and wrote: "My collecting has been chiefly in two localities – one inland – round Bishop Auckland and up Weardale, and one near the sea". Some descriptions and grid references are as follows:

North Durham

Gibside – North Durham. NZ 176589. 100-400 ft. Wooded estate (Snipes Dene Wood) on the River Derwent, about 7 miles southwest of Newcastle.

Marley Hill, North Durham. NZ 203581, 500-700 ft. On the ridge east of Gibside; rather bare colliery district. (Wingate was vicar in this parish.)

South Durham

An interrupted strip 4-12 miles broad along the southern (Durham) border. Beginning from the sea:

1. Hesleden – South Durham. NZ 4438. [Perhaps a family home or where Wingate lodged]. Sea shore, flowery sea banks, sandhills, wooded dene and farm land, about three miles north of Hartlepool. Collected mostly during the holiday month of August.
2. Bishop Auckland. NZ 2228. 350ft. Practically the small plot of ground round this [*sic*] vicarage.
3. Belburn – River near Binchester. NZ 21649 31797. Strip of wood and stream below Auckland.
4. Escombe, 350 ft. Wooded Wear banks above Auckland.
5. Evenwood.
6. Gibsonees.
7. R Raby – Near Raby Castle and Park. NZ 129 218.
8. Barnard Castle. NZ 0516.
9. Harperley. NZ 175530, 400ft. Wooded Wear banks.
10. Shipley Moor, Shipley Glen – 400-700 ft. Wooded glen with bog at the top.
11. Shull – Near Consett. NZ 0765825, 600-900 ft. Pine woods with stream.
12. Bollinghope Common. NY 9834, 700-900 ft. A dale running into Weardale.
13. Stanhope. NY 9939, 700-900 ft. Wooded dene.
14. Waskerley. NZ 051 4544, 700-1,300 ft. Wooded glen and moorland.
15. Wearhead. NZ 176 534, 1,000-1,500 ft. High dales and moors.

Also, in his book, Wingate includes:
Bedburn. NZ 1032.
Brancepeth. NZ 2338.
Deepdale. NY 9615, in Yorkshire.

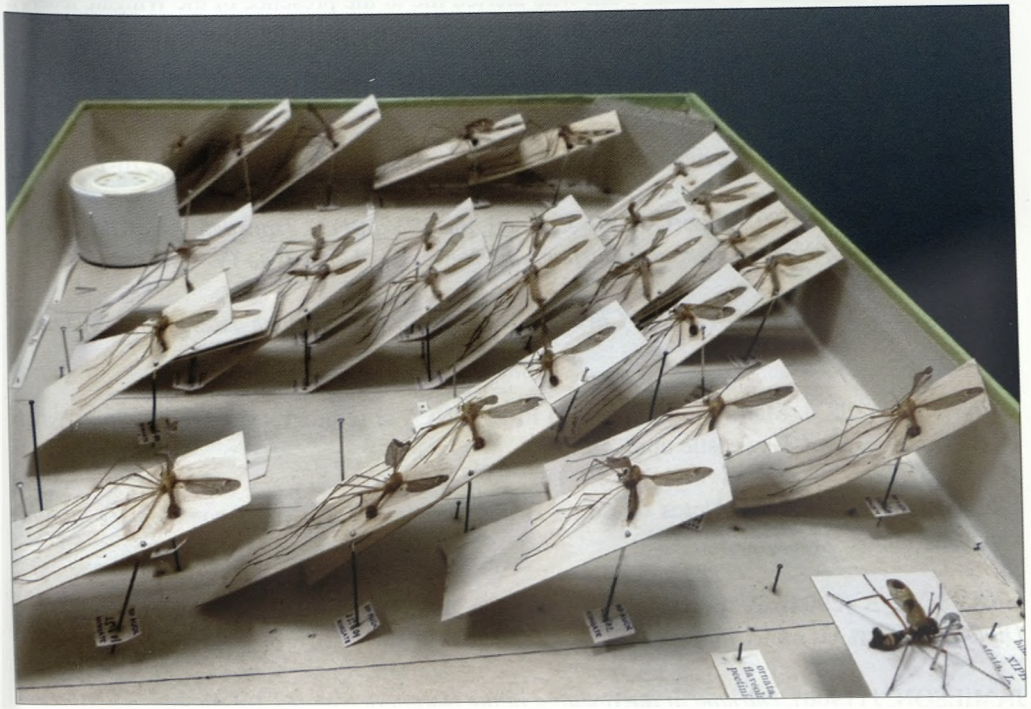
It would be very interesting to re-visit these sites and to compare their current fauna with that in Wingate's time.

Wingate's collection of local Diptera is housed in a glass-fronted cabinet, in 36 numbered glass-topped store-boxes, stacked on their sides like books on a shelf (Figure 3). To evaluate the collection as a whole would take a number of specialists many weeks of work. There are signs that the collection has been examined previously on many occasions, but the only publication that I am aware of is by Andrew Grayson (2004) who re-examined the seven species of Tabanidae (horseflies).

The author examined Wingate's collection of Craneflies (Tipuloidea), which is located in five glass-topped store-boxes numbered 5 to 9. The specimens are gummed to card and box numbers 5 and 6 contain the Limnobidae (*Limoniidae* and *Pediciidae*) while numbers 7-9 contain some 31 species and 150 specimens of the Tipulidae (Figure 4). It is presently stored in the Great North Museum: Hancock as part of the collections of the Natural History Society of Northumbria. A detailed report (Kramer 2012) is available from the author.

Figure 3. Cabinet of the Wingate Collection, Great North Museum: Hancock.

Figure 4. Store boxes from the cabinet of the Wingate Collection.



So what of Wingate's legacy? Since his time, the fascination with flies and their lives has increased and more people study flies than ever before. Progress has been made with their ecology, taxonomy and the discovery of new species. Wingate's educational purpose, perhaps the chief aim of his work, has been taken up by other authors and other books. Other important things that Wingate has left us are his records and his voucher specimens. If we want to know the rate at which our environment is changing, the disappearance of our native species is as good a sign as any. They act as indicators which allow us to identify changes in the environmental components for a given region. For example, decline in some species can signal a decline in ground water to dangerous levels. Sometimes the effect of climate change is positive, as on populations of some disease vectors. It is only by comparing today's species lists with well-curated collections of plants and animals recorded in the past that we will be able to make informed judgements and perhaps help species survive in the future. Wingate's carefully made, documented and curated collection is a rare and valuable dataset to help us. The curators of this collection are to be congratulated on conserving an important part of our heritage, and it would be interesting to follow in the footsteps of the Reverend Wingate to discover if the species which he identified and enjoyed are still to be found in their ancestral habitats.

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WILLIAM TURNER'S IDENTIFICATION OF HERB PARIS *PARIS QUADRIFOLIA*

Marie Addyman

14 Ordley Terrace, Cockshaw, Hexham NE46 3QX

SUMMARY

William Turner's efforts to identify Herb Paris *Paris quadrifolia*, which persisted for well over a 20 years, were a key component of his subsequent reputation as the first writer in English to identify approximately 300 native plants. This paper analyses the difficulties for him in aligning a plant seen locally with those described in available herbals, both the Greek and Latin texts of the classical world and the contemporary European accounts. Such difficulties were intrinsic to sixteenth-century parameters in natural history and its vocabulary. Utilising Scott Attran's concept of the "generic-specieme" in folk botany, Turner's description of *Paris quadrifolia* is shown to be typical of his general descriptive practice. It also demonstrates that this practice was aimed at considering plants for what was believed to be their medical qualities, and the additional difficulties which such contemporary usage generated.

> This kind hath leaves like concumbers or sowes bred, three or four together, but lesser and something rougher; the stalk is a hand breadth height, the roots resembleth a scorpion's tale, and shineth like alabaster... the herb hath ever four leaves like plantain, without any roughness and never hath three leaves ... (Turner's first description of *Paris quadrifolia* in *Herball* 1 [1551])

> Fuchsius taught us that the herbe that I call one berry, to be *Aconitum pardalianches* and then he thought it had ben so, and if he had knowen a better, he wold have shewed us it. But Matthiolus proueth that the herbe which Fuchsius setteth forth for Aconito pardalianches is herba paris of later writers. The herb that I cal One berrye, hath a rounde stalke, which is neuer aboue a span long, and oute of the middes therof commeth oute foure leaues, not unlike unto some Plantayne, and in the top of the stalke about a rounde black berrye come oute other foure small leaues, and there in is sede in color white. The roote is full of small thinges, like thredes: This herb groweth plentuously in a wode beside Morpeth, called Cottinge woode, and in manye other woddes. (Turner's final description in *Herball* 3 [1568])

DISCUSSION

The Morpeth physician William Turner (circa 1508-1568) is distinguished for his identification of English native plants, providing first records for about 300 species, several of them from his native county of Northumberland (Raven 1947).[1] Turner's work has rightly been subsumed

[1] Raven (1947) gives details of Turner's identifications of several Northumbrian plant species, as well as his records of the county's birds and fishes. There is also a great deal of information to be had from the William Turner Garden in Carlisle Park, Morpeth, and from the staff who run it (contact Northumberland County Council).

into subsequent developments in plant studies which look back to him as a founding father since, as with any true pioneer, in some essential ways he transcended his time. Nevertheless, it is an unhelpful distortion to divorce him completely from his context, which defined both his objectives and his methodology in ways very different from modern expectations. His aim was repeatedly and openly stated as the desire to provide accurate identification of medical plants. But although modern medical herbalism respects him as a founding father, for some modern commentators there is an unresolved tension between the possibilities inherent in his natural history and his immersion in the defunct world of sixteenth-century medical usage (Arber 1938).

Yet Turner's clearly focused aims were up-to-date in his own era, reflecting the best academic teaching of the 1540s which formed the core of his training in Italy and which were current in Germany while he was working and travelling there. In Europe he learnt that meticulous translation of and commentary on the classical texts were considered fundamental to the development of academic medicine. For Turner, these texts comprised the first-century Greek army doctor Dioscorides above all, as well as the Roman writers Pliny and Galen, and from much further back the Greek natural philosophers, Aristotle and his pupil Theophrastus. But in Italy and Germany, Turner found also that field studies were encouraged, in order to match up, and increasingly to distinguish, local flora and classical master-text. This enterprise, persisting right through the vagaries of Turner's adult life (Jones 1988),[2] was both constrained and facilitated by the kind of language Turner had available to describe plants, as well as by the nature of his stated purpose. Nowhere is this clearer than in what is perhaps his most famous identification, that of Herb Paris *Paris quadrifolia* (Figure 1), a Northumbrian native whose location in his home county was crucial to his entire mode of description.

Figure 1. Herb Paris *Paris quadrifolia* at Scardale (© John Richards 2011).

[2] W R D Jones offers the only existing full-length biography of Turner. A briefer account can be found in M Addyman (2008), and an extensive study by the same author is forthcoming.

The natural history which emanated from the medical departments of the Northern Italian universities in the early 1540s, when Turner was at Bologna and Ferrara, no longer adhered completely to the dictates of the medieval natural historian Albertus Magnus (died 1280). Albertus had stated categorically that "Philosophy cannot concern itself with the particulars, with individual species of plants, because 'it is not possible to make syllogisms about such particular natures. [Rather, one must] treat the things common to plants according to the order of nature, beginning with the more universal and descending to particulars.'"(Reeds 1991)[3] As a result of this long-held belief, the pioneers of the Renaissance found, as Gaspare Gabrieli, the University of Ferrara's first professor of simples, complained in 1543, that the "entire medicine of herbs is in the hands of the unlearned, the foolish, and superstitious wise-women" – a complaint which had a long history in the practice of medicine. Gabrieli's criticism targeted the incompetence of contemporary physicians, though it also entailed very little respect for the populace at large. Yet unlearned folk botany and academic natural history shared the same premises, and it would often be difficult to attribute some features of Turner's writing to one or the other. Both ultimately relied for plant description on information supplied by the unaided senses, supplemented by traditions of usage concerning plants particular to a locality. How those simple premises could be expanded to offer a rational schema of identification within a national or a European context, and one which accorded with the inherited framework of medical beliefs, exercised the explanatory skills of Turner and his contemporaries.

What is important to remember concerning the limitations of Turner's plant descriptions is that at this point within his culture there was no equivalent to what became codified under Linnaeus as genus and species, to say nothing of the larger botanical groupings (Ogilvie 2006).[4] The repercussions of this were both pervasive and considerable, as Turner's struggles to pinpoint *Paris quadrifolia* accurately will show. To explain those repercussions more clearly, it is useful to turn to Scott Attran's definition of "folk botany" (Attran 1990). Attran estimates that folk cultures can recognise between one hundred and five hundred different (living) things within the locality of any rural dweller. These beings are all defined as completely individual and self-sufficient entities: that is, as monotypical. Attran coins the phrase "generic-specieme" to pinpoint descriptions which contain what we would call both generic and specific elements locked together within them. This unfamiliar but useful term therefore relies on the fact that we have already integrated the technical terms genus and species into our everyday vocabulary, while it acknowledges that we need something different, yet something related, to be able to understand sixteenth-century habits of mind and the jargon prevalent then.

Attran shows that folk definitions of a generic-specieme are based on the idea of a plant being seen regularly in a familiar habitat – the basic criterion – supplemented by distinctive smell, taste, use or lore. A given plant is portrayed instinctively as a life-story set within the greater story of the individual and his community, since this kind of record, whether from home or away, relies on oral and conversational habits: "If you go up to A you can find..."; "When I was in B I saw...". Turner used this formula all the time, expanding it to take in his foreign travel as well as his reading. Even the short dictionary-type *Names of herbes* of 1549 abounds with phrases

[3] Albertus's approach to plant form and its place within natural history is also discussed in some detail by Arber (1950), chapter 3.

[4] Ogilvie (2006) tracks the gradual development of interest in botanical schema later in the sixteenth century: Turner, who is not mentioned by name (though Gerard is), would represent the transition between the second and third stages of this schema.

such as "I haue sene diuerse times organe which grewe in Candy"; or *Aristolochia* "growth very little in Englande that I haue sene, but about Bon in Germany it growth in many hedges by the vineyards" (Britten *et al.* 1965).

The on-the-spot note-taking which must have preceded these published entries is now appreciated as essential to subsequent developments in natural history. At first sight these notes might seem very limited. They provide no form of quantification such as we are used to, since they do not provide either the micro-reference of the grid notation for a specific plant or colony of plants, or the macro-reference of a distribution map showing overall patterns. But such on-the-spot note-taking nevertheless plays a part which Deborah Harkness insists should be recognised alongside the experimentation of the early modern period: "reading, writing, and experimenting supported and reinforced one another" (Harkness 2007). Nevertheless, Harkness is aware that the distinctions between what one has read, what one has been told, and what one has done or seen "became blurry" in the personal experience of making a note: all formed part of the writer's learning experience without necessarily being explicitly distinguished.

In Turner's case, while he kept as much as possible to the self-imposed rule that "men should not thynke that I write of it that I never sawe" (Britten *et al.* 1965), inevitably he could not be entirely consistent. When for instance he mentions a plant growing in Rome, a place he is highly unlikely to have visited, it is not surprising – though it is briefly confusing – that he refers to the plant in the same terms as one he clearly had seen near Morpeth or in Cologne. But what is more important is that while Turner's note-taking was undoubtedly goal-specific and highly selective, he could, if he so chose, use such notes, private or published, as a form of work-in-progress. Hence Part 3 of his *Herball* rephrases or expands some of his definitions in Part 1, *Paris quadrifolia*, as we shall see, being one of the most important.

Once something was defined, it could be redefined – though not, at that point, within the taxonomy to which we have grown accustomed. The word "genus", crucial to modern taxonomy, was in fact available to Turner and his contemporaries in the world of academia. It was there as "genos" in Theophrastus's writings on plants. Theophrastus, the pupil of Aristotle, took over this originally very abstract term from Aristotelian logic, to convey a sense of a natural hierarchy, at the very bottom of which was the "eidos", the indivisible and unchangeable being. "Species" would later be used as a translation of Theophrastus's "eidos". However, this was not the case in Turner's writings. Instead, what prevailed in Turner's and his contemporaries' time shows just how right Attran was to see folk elements underpinning early modern academic thinking. Rather than indicating some abstract genos and eidos to a few experts and baffling everybody else, the actual plant in its local habitat (Attran's generic-specieme) alerted the collector or passer-by to other plants with strong family resemblances: the Wood Cranesbill *Geranium sylvaticum* and the Meadow Cranesbill *Geranium pratense*, for instance. An amateur naturalist might say today on seeing one of them: "I think that is a kind of cranesbill", or "a sort of cranesbill"; and the English terms used to describe these family resemblances in the sixteenth century were "kindes", "formes", "sortes", "manneres".

These terms were the jargon of sixteenth-century natural historians: incorporated unnoticeably now into our own vocabularies, in Turner's time their meaning was debated across a range of fields, so they carried their own theoretical weight. Where medical herbalism was concerned, these terms pervaded all the herbals of the era because early modern plant description was impossible without them.

Overall, local plant knowledge was usually fairly safe. But when access to and comparison with foreign plants entered the equation as they did for a traveller and observer such as Turner, then the anomalies might overload the system. To prevent this, four strategies were available to the herbalist intent on recording useful medical material. These defined the possibilities of identifying "kindes" of plants, and all of them were employed in Turner's writing:

- The simplest tactic was to say that this plant is *X* – a Snowdrop, for instance.
- Secondly, a plant which was not completely identical to one seen previously but seemed to have some very similar characteristics could be described as a "kinde", "sorte", "forme", or "mannere" of *X*: "that is a sort of cranesbill".
- Thirdly, a plant could be distinguished as different from but in some way "like" *X*, a habit of analogy which was fundamental and to which we will return.
- Finally, a plant could be emphatically not *X*, either because an initial misidentification was being corrected, or because the writer, Turner, recorded that he had seen a plant. Water Hemlock *Cicuta*, in one distinct location – "in east Freslande by the sea side" – and nowhere else. Not-*X*, like the other categories, could be revised subject to additional data.

These four interchangeable methods expressed both likeness and difference, but in a non-specific way. They did not clarify whether kinship or variety consisted in sensory resemblance (appearance, taste, smell), habitat, or use. Plants exuding an unpleasant sap or having a similar savour, for example, might tend to be grouped together,[5] while at least some of the problems connected with *Paris* can be attributed to habitat. Elsewhere, Turner followed the practice of grouping by customary usage when he listed both *Chelidonium maius* and *Ranunculus ficaria* as "selendines" (celandines) in his *Herball* (Chapman *et al.* 1989). This situation was further complicated because at this period the reproductive mechanisms of the flower were not known, so the dominant criterion of usefulness and usage reduced inflorescence to a mere appendage. It was but a variegated form of foliage with a paucity of colour words to match, far less relevant to the analyst than roots, leaves, seeds, and fruit – the parts used in medicine, food and dyeing. The number of plants with "black" flowers in Turner's writing reflects this paucity of flower-terms.

Like his peers, Turner used "kinde", "forme", "sorte" and "mannere" in ways which blur modern generic definitions. Sometimes the accompanying illustration could help to clarify any resulting confusion, if the different species ("formes") were illustrated. This was the case with the "selendines", and to some extent with the other forms of *Aconitum* (*A. lycoctonum* and *A. napellus*) under which *Paris quadrifolia* was subsumed in Part 1. At other times, without suggesting the existence of a different genus, Turner made a clear verbal distinction between individual plants: he correctly identified the local "laus tibi" as a kind of narcissus, rather than as usually suggested a kind of asphodel. In theory, the three elements of his text – written description, visual illustration and name – all contributed to the overall identification. In practice, they sometimes reinforced and sometimes contradicted each other in defining the different "kindes", "sortes", "formes" and "manneres" of plants. But in every case, these tactics were underpinned by an absolute reliance on the validity of analogy.

It is difficult for a modern botanist to understand the structural importance of analogy in the natural history of Turner and his contemporaries. It underpinned the rationale of academic scholarship at the same time as it provided that scholarship's methodology. Analogy was a deep philosophical concept, showing that everything from stars to stones was linked together in the

[5] A practice which is far from obsolete: *Satureia douglasii* is sold in garden centres today as Indian Mint.

divine plan, and thereby supplying an ongoing narrative of the rational congruence of nature. Plant description was envisaged within this narrative, as emerges from innumerable minor details. One of these is the fact that sixteenth-century descriptions, like those before and for long after, included the verb: plants "do" things within nature. The verb in plant descriptions was only finally abandoned by Linnaeus in the mid-eighteenth century, an indication that he was not writing a dynamic history of nature, but compiling a static catalogue.

But if analogy in the early modern world was still a deep philosophical concept, it was also a very handy immediate tool for describing plant characteristics. Hence it was standard in the herbals of the period, which had no access to those methods of quantification based on microscopic phenomena that came to dominate later botany. Turner used analogy continuously – his plant descriptions would not exist without it. Sometimes his analogies piled up in effects that became bewilderingly clumsy. His attempt to define simultaneously representatives of what we now know are two entirely different genera under one word "selendine" in Part 2 of the *Herball* (1562) includes the following description of the Greater Celandine *Chelidonium maius*:

> Selendine ... the leaues are lyke crowfote leaues, but softer and blewish gray in color. The flowre is lyke the flowre of wall gelauore, otherwise called hartes ease... The iuice that is in it is lyke saffrone, bitinge sharps... It hath a small codde lyke unto homed popye and long, but it is euer smaller ... (Chapman *et al.* 1995)

No physician, apothecary, or householder would have time or inclination to decipher this when hastily looking for a speedy solution to an immediate problem. But at other times, when Turner looked outside plants to find his comparisons, they were vivid and brilliant. *Aristolochia* "bryngeth furth fruite lyke blacke peares and sede lyke mennes hertes"; rowan *Sorbus* berries are "lyke corall bedes growing in greate clusters"; dodder *Cuscuta* is "lyke a great red harpe strynge"; avens *Dryas* are "in forme lyke a little eye when the flower is gone"; the leaves of madder *Rubia* circle the stem "lyke unto sterres goyng roundabout"; and sage *Salvia* leaves resemble the "horenes [hoariness] of a worne cloth". These short verbal icons, which could be multiplied endlessly throughout the *Herball*, go well beyond the literal or the utilitarian. In terms of usefulness, it is doubtful whether they would help a person identify a plant he or she did not already know. But they could operate as *aide memoires* to fix an image of the plant retrospectively.

The difficulties inherent in Turner's task of achieving accuracy of identification within the available vocabulary help to explain the various descriptions he gave of *Paris quadrifolia*. The problems start with its name. Leah Knight (2009) has shown that, in the contrasting case of *Narcissus*, Turner realized the names already attached to the plant were unsuitable but did not offer a new substitute coinage. But with *Paris quadrifolia*, he preferred his own name "One berrye" (or "one bery"), even though more than one vernacular name for the plant already existed (Grigson 1955). The older name, "Herbe True-loue", which Gerard in the 1590s would say came from "the Antients" was ignored. Both it and "herba paris" (which Lyte, 10 years after Turner's death, said was an apothecaries' term and which would therefore have been of Latin origin) are derived from the distinctive pattern of the leaves, their "parity". Turner's name, on the other hand, refers to the fruiting habit and completely ignores the established tradition. This was not necessarily his usual practice; on the contrary, he regularly specified different regional and national variants. It begs the question therefore as to whether or not "One berrye" may have been a local name familiar from his childhood, since the recorded habitat is also from his early days in Morpeth. The question cannot be answered definitively, but it is interesting that the force of Turner's authority was sufficient for it to be retained by Gerard for his chapter heading more

than 30 years later. Eventually of course "herb paris" did win out in the vernacular, and *Paris quadrifolia* became the official *nomen triviale* of Linnaeus.

The term "one bery" first appeared in *The names of herbes* (1549), Turner's earliest work on plants in English, in an entry which serves as a reference point for the more complicated entries which appeared in his later work:

> Aconitum. There are ii kindes of the herbe called Aconitum, the one kynde is called Pardalianches, which we may call in englishe libard bayne or one bery. It is much in Northumberland in a wodde besyde Morpeth called Cottingwood. It hath foure leaues lyke unto a great plantaine, and in the ouermost top a little blacke bery lyke a black morbery, but blacker and greater (Britten *et al.* 1965).

It will be shown in what follows that some details provided here appeared nowhere else in Turner's work. What was an ongoing factor was the crucial interdependence Turner believed to exist between the terms "Aconitum", "pardalianches", "libard bayne" and "one bery". His coinage for this plant has therefore to be understood as a significant contribution to an ongoing debate among his fellow-writers concerning the lethal *Aconitum* and its "kindes". In fact, it is the puzzling nature of *Aconitum* which is the root of Turner's problems; *Paris quadrifolia* gets caught up in this muddle.

Following the brief reference to the plant in *Names, Paris quadrifolia* is a rarity among Turner's identifications in being listed twice during the couple of decades it took to produce the *Herball*, first in Part 1 (1551) and then among the herbs written up for surgeons in Part 3 (1564). As a result, readers of the final version of the *Herball* (1568) which contained all three parts would have two separate and significantly differing entries, neither cross-referred to the other, and each set out under a different chapter heading. The entry for Part I, under "Aconitum", took as its starting point a close translation of Dioscorides:

> This kind hath leaves like concumbers or sowes bred, three or four together, but lesser and something rougher; the stalk is a hand breadth height, the roots resembleth a scorpion's tale, and shineth like alabaster. (Chapman *et al.* 1989).

Turner was indeed translating Dioscorides, but his commentary reveals that this was Dioscorides filtered through the contemporary writings of the German herbalist and professor of medicine Leonart Fuchs. According to Turner, Fuchs thought he had identified the ancient "*Aconitum, pardalianches*" as what would come to be called *Paris quadrifolia*. A recognisable woodcut of *Paris* sourced from Fuchs's own herbal headed Turner's entry. However, the Englishman was doubtful of the German's identification of the Greek plant, stating that "the herb hath ever four leaves like plantain, without any roughness and never hath three leaves". This was evidence taken from the plants he has seen growing "plentuously beside Morpeth in Northumberland in a wod called cottyngwood".

At this point in 1551, the English name Turner rejected for this plant was "lyberdes bayne" [Leopard's Bane], which he believed to have been indeed Dioscorides's "Pardalianches", but which was an entirely different plant from his "One berrie". This he judged not on its appearance but by its effects on humans – an argument to which he returned in Part 3. Nevertheless, the vernacular name heading the illustration of "*Aconitum, Pardalianches*" was "One berrie". The English name would be the chapter title he gave in Part 3, in preference there over both existing vernacular names like the "herb paris" which would eventually become standard, or the "*Aconitum, Padalianches*", which he dismissed. The significant difference therefore is that "One berrye" is not classed as an *Aconitum* in 1568. This later entry carried no illustration, and the written description moved away from general reliance on Dioscorides and developed instead

those elements based on describing the actual plant he had seen growing near his home town:

> The herb that I cal One berrye, hath a rounde stalke, which is neuer aboue a span long, and oute of the middes therof commeth oute foure leaues, not unlike unto some Plantayne, and in the top of the stalke about a rounde black berrye come oute other foure small leaues, and there in is sede in color white. The roote is full of small thinges, like threde … (Chapman *et al.* 1995).

The analogy to plantain, now preferred exclusively over cucumber and cyclamen, goes back to *Names*, though it has turned into a far less helpful analogy 20 years later. Whereas the first use of this comparison had been specifically to "a greate plantaine", the later one is unhelpful, since it fails to define what "kinde" or "sorte" of English plantain is meant: the Common Ribbed Plantain *Plantago lanceolata*, for instance, would be positively misleading. What has also been dropped as something Turner must have decided was unhelpful or superfluous in both Part 1 and Part 3 is the comparison of *Paris quadrifolia*'s distinctive one black berry to the "morbery" cited in *Names*. The result is that, even allowing for the fact that the 1551 entry was accompanied by a reasonably clear illustration from Fuchs, it is Turner's final written description contained in those few lines in Part 3 which enabled subsequent botanists to identify the plant which has been known since the eighteenth century as *Paris quadrifolia*, and to cite this as an accurate first record. To achieve continuity in naming the plant, on the other hand, commentators have had to ignore Turner's idiosyncratic interpolation of "One berrye".

While for posterity that nugget of useful description may be enough, it was not the whole story where Turner's own medical brief was concerned. The context out of which those brief descriptive sentences struggled clear locked him in another way into the existing confusion and led him to make a fundamental and drastic medical error. We can understand this if we ask where that puzzling suggestion of the name "leopard's bane" for English "one berrye" and Latin *Aconitum* came from. The plant Fuchs, Turner and, by the time of part 3, many other great sixteenth-century natural historians were attempting to identify had been listed by Dioscorides as "Aconitum, which some call Pardalianches, some Cammarum, some Thelyphonum, some Mycocotonum, some Theriophon". The name which had emerged by the sixteenth century from this bewildering melee was *Aconitum pardalianches,* since what was still being perpetuated was the ancient confusion about what might be understood as an *Aconitum*. Over the centuries, this term had come to designate at least some actual species such as *A. napellus* and *A. lycoctonum,* which early modern natural historians could identify visually even if they often referred to them under one name (Chapman *et al.* 1989).[6] But neither Turner nor his contemporaries were able to designate clearly the various European species of *Aconitum*. On the contrary, the debate generated a non-existent form supposed to be an antidote for the others, over-labelled by Parkinson (1629) as "*Aconitum Salutiferum, Napellus Moysis, Antora* and *Anthora, quasi Antithora*... in English according to the title, eyther wholsome Helmet flower, or counterpoison Monkes hood".

What completed the confusion was that the label *Aconitum* was used as a general designation for a plant which was lethal in its toxicity: according to the Oxford English Dictionary, as late as the 1620s any poisonous plant might have been labelled *Aconitum*. This use derived from Pliny, for instance in writing of *Eryngium* as a counter-poison which was effective "*contra toxica et aconite*" (Jones 1959). His Latin pairing reflected Greek originals referring to the bow and the arrow, the

[6] The illustration of *Aconitum, Pardalianches Fuchsus,* or Oneberrie in Part 1 is alongside *Aconitum lycoctonum,* Blew Wolfsbayne (1989).

weapons of the hunt. Among the lethal qualities designated for any *Aconitum* was the capacity to kill animals (as recorded in *A. lycoctonum*, the Wolfsbane) including leopards. As Turner's later entry records, Fuchs and the Italian encyclopaedist Matthioli argued inconclusively about what was meant by this Leopard's Bane. Once free himself from any urge to restrict identification of the plant to Dioscorides's master-work, Turner's reference to the Fuchs-Matthioli argument in 1568 was fairly open-ended; but it hid a significant anomaly. What he did not record was the fact uncovered by Richard Palmer (1985) that in the 1550s both the natural historian Dodoens and the Paduan physician Cortusio were suggesting that a third plant, an entirely different one, neither a form of *Aconitum* nor the future *Paris,* was Dioscorides's Leopard's Bane.

The newcomer was *Doronicum*, a plant introduced into western medicine by Arab physicians and already codified in medieval herbals (Malandin 1990).[7] While testing their hypotheses about what constituted an *Aconitum* in the usual Renaissance fashion – experiments on animals and condemned criminals – a group of Turner's European contemporaries including Matthioli tested *Doronicum* on animals, and the intrepid Swiss naturalist Konrad Gesner tried a small dose of it on himself (Palmer 1985). As a result of all this activity, by the time Gerard was composing his herbal in the 1590s, he could sum up the origins of the mistake and the problems it had caused:

> Of this plant *Doronicum*, there be sundry kindes. *Dodonaeus* unproperly calleth it *Aconitum Pardalianches*, which hath happened through the neligence of *Dioscorides* and *Theophrastus*, who in describing *Doronicum*, have not onely omitted the floures thereof, but have committed that negligence in many and divers other plants, leaving out in many plants which they have described, the speciall accidents; which hath not a little troubled the study and determination of the best Herbarists of late yeares, not knowing certainly what to determine and set downe in so ambiguous a matter, some taking it one way, and some another, and some esteeming it to be *Aconitum*.

Gerard himself continued to use *Aconitum* to mean a plant that was "malignant and venomous", poisonous both to man and to "wilde and noysome beasts" (Gerard [1633], 1975).

Turner's entries on "One berrye" included the *pardalianches* epithet, but made no reference to this other plant. Yet he must surely have seen *Doronicum*, a common plant in Northumberland, and generally he kept abreast with European developments in identification. However, his 1568 entry continued to conflate by name three plants eventually pertaining to three different genera: *Aconitum, (Doronicum) pardalianches*, and the "herbe called Paris". This mix-up indicates that for him, as for his contemporaries, both mistakes and successes in identifying like groups of plants arose from the nature of those folk-botany methods referred to previously. In particular in this instance, habitat may have been of some importance in Turner's analysis, since all three species grow in woodlands, especially in the damp areas beside streams and rivers. In one respect however his reference to habitat in this case looks to the future rather than to the past. He did not introduce *Paris quadrifolia*'s habitat by the kind of autobiographical phrase which he and his contemporaries regularly used to indicate reliable evidence ("I found"/"I have seen"). He used instead the neutral third person ("this herbe growth") to give both a specific location (Cottingwood) and a general habitat ("manye other woddes"). In this way his entry for *Paris quadrifolia* inadvertently provides an early example of what would later become an important empirical principle in natural history: repeatability is more important than individuality.

[7] See for instance Malandin (1990): the derivative late-medieval *Le livre des simples medecins* produces what the editor calls "une chimere botanique", a more or less schematic representation of *Ranunculus thora*, where the text is supposed to describe *Anthora, aconite-anthora*; but it also describes "Deronici, doronic" – that is, *Doronicum pardalianches* – illustrated by a sterile plant of *Aconitum*.

The chief criterion for Turner and his contemporaries in describing a plant was to explain its function in the world of man. *Aconitum* was conflated with *Doronicum* because both were listed specifically as wolf-killers. As a result, on the principles available to Turner, a given plant could be confused with any species believed to fulfil the same function, though it was (for us) from an entirely different genus. Ultimately, Turner failed in his immediate task of describing what he believed to be a useful medical plant. But the way he failed demonstrates how inseparable a proper botanical identification and a secure medical usage should always be. In this case, this is because *Paris quadrifolia* is toxic. A modern description highlights the existence of "long, creeping, scaly" rhizomes in order to warn that it is there and in the fruit that its poisonous saponins are concentrated (Stary 1983). While "serious cases of poisoning are not common" they typically occur in children who have eaten the berries mistaking them for large bilberries. Two berries are enough to cause poisoning, but fortunately "they have a repulsive taste and so are unlikely to be eaten after the first bite". It seems odd that Turner did not know at least some of this, since the plant was regularly used with other poisons in the preparation of purgatives. Yet in 1551 he trotted out the familiar contemporary tactic of evoking "credyble persones" to state specifically that children could eat the fruit "without any ieopardy" – citing this as an indication that the plant therefore might not be Dioscorides's Leopard's Bane. In 1568 he dropped the mention of children and instead quoted Matthioli's assertion that "the berrye of the herbe called Paris" was "so far from hurtinge or poysoninge" that people "wasted" by other poisons had "well recouered" by using it. Such a claim continued to link *Paris quadrifolia* to the old mythical idea regurgitated for *Aconitum* in Part 1, that there existed within this group a plant which neutralised other poisons.

Turner's recommendation of a toxic plant as a harmless purge shows how conventional his fundamental medical beliefs were. Purgation was the undisputed basis of early modern medicine. Recommendations throughout the *Herball* require that "filthy matter" be "scoured" away, leaving the humours (the four basic bodily fluids) flowing freely. As Lynn Thorndike repeatedly pointed out many years ago, *scientia* and religion were inseparably intertwined at the roots of sixteenth-century physic (Thorndike 1941), and the emphasis on cleansing through expulsion was not only a medical process but a spiritual mainstay of contemporary culture. Exorcism and purgation relied on exactly the same concept – the body as a house for evil matter – and used the same procedures and the same materials. This is not surprising if we remember that this Christianised concept tacitly relied on ancient classical beliefs and procedures. Writing for his own civilisation, Dioscorides had described how for instance the poisonous hellebore *Elleboros melas* had originated as a purge and cure for royal madness, while *Oinos elleborites* could be given as a drastic purge for women. Digging up either of these caused death unless accompanied by the right prayers to the gods Apollo and Aesculapius (Osbaldeston and Wood 2000).[8]

The religio-medical tradition concerning hellebore is important *à propos* of Turner's struggles with *Paris quadrifolia* because, if botanically its identification was confused by the debate about *Aconitum*, medically its usage was determined by the ideas about purgation which clustered round hellebore. Turner himself, while habitually cautious about blindly basing the secure identification of plants on Dioscorides's template, nevertheless followed medical tradition in identifying Dioscorides's Black Hellebore with *Helleborus niger* and his White Hellebore with

[8] T A Osbaldeston and R P A Wood (2000), *Dioscorides: de materia medica,* English translation. This modern translation is based on the scholar R T Gunther's edition of the early version of Dioscorides produced in the seventeenth century by John Goodyer but not printed in his lifetime.

a species from an entirely different genus, *Veratrum album*. It was this latter which became the normal "hellebore" used in both religious and secular purgation, and the details for its recommended use were described clearly but briefly by Turner:

> Nesynge pouder purgeth by vomite and bringeth furth diuerse thinges... It is geuen fasting by it self, or with sesame sede, or the broth of sodden barley, or with mede, or with potage, or with a lentil broth, or any suche lyke suppynge. Some do geue this with a great deale of broth or much suppinge, and som geue a little meat immediately before the patient take it, if to be to feared that he shoulde be in any ieperdye of stranglynge [constriction], or if he be weyke. They that take it after thys maner, maye take it without ieperdy. If a man make a suppository of thys, and put it into hys fundament, it will make hym vomit. (Chapman *et al.* 1995)[9]

Piero Camporesi (1988) has demonstrated in great detail how "the antidotarium of the apothecary became, in the hands of the exorcist ...*Antidotario contro li demoni*". It is true that Camporesi's argument concentrates on Catholic Italy, but the right to cast out demons was recognised as a prerogative of the true Church on earth by all participants in the Reformation dispute and therefore was claimed by all contestants. This is not to say that Turner conducted or was present at exorcisms – there is no evidence either way – but he operated within a culture in which the role of the physician and the role of the clergyman were in some respects interdependent. He himself continually demonstrated his own belief in that interdependency, using the metaphor of purgation to define the necessary cures for the socio-moral diseases dissected in the tract called *Spirituall Physik* (1555). And the methods he described briefly, quoted above, were, writ large, literally identical to those of Camporesi's exorcist.

If the belief in purgation linked both secular medical and religious practice then hellebore was, according to Camporesi, "the exorcist's plant" *par excellence*. Helleborism was a holy "ritual of liberation by purge" which relied in its execution and in its preparatory stages on a range of medical techniques such as "lotions, baths to induce sweating, moistening of the body, poultices, enemas, fomentations and special diets" (Camporesi 1988). The procedures which Turner described are deceptively bland compared to the warnings that his Italian contemporary Florian Canale offered against exorcisms undertaken using hellebore. He urged that the age and strength of "the patient" [*sic*] should be taken into account; that another milder purgative should be employed to prepare for this drastic one; that food should be taken in accompaniment to mitigate the effects; and that evacuation through the bowels was less dangerous to the system than violent vomiting. Compared to this, it is clear that Turner's entry does not tell the whole story involved in prescribing White Hellebore. In this case and in that of *Paris quadrifolia* – that is, with all plants used in the purgation process, whether intended to operate on body or soul – he has put a drug which was known to him and his contemporaries as dangerous and potentially lethal into the public arena of a book explicitly intended for both lay and trained readers.

The best that can be said perhaps is that Turner's writings endorsed the not uncommon sixteenth-century belief in the capacity of the human frame to undergo very rigorous treatment, as well as demonstrating other medical beliefs which are now condemned as erroneous. But such beliefs should not be forgotten. At the least, they show how early modern medical habits of thought

[9] Chapman *et al.* (1995): 2: 343. "Nesinge" means sneezing. Although Turner recorded a purportedly empirical observation here, in both classical and Anglo-Saxon medicine sneezing related to divine or demonic possession (hence "Bless you" in response to a sneeze). In this case as in many others in sixteenth-century therapeutics, although the religio-superstitious rationale has been dropped, the associated phenomenon remained, written up as if it were a purely mechanical event.

constrained Turner's ongoing struggle to offer what, in the case of *Paris quadrifolia* and other plants, would become primary reference points in the different discipline of botany. And what also makes the struggle so fascinating to subsequent readers of Turner's work is that he insisted, obstinately and unremittingly, on the integration of his own experience, originating in his early years in his native county, as an essential part of learned description.

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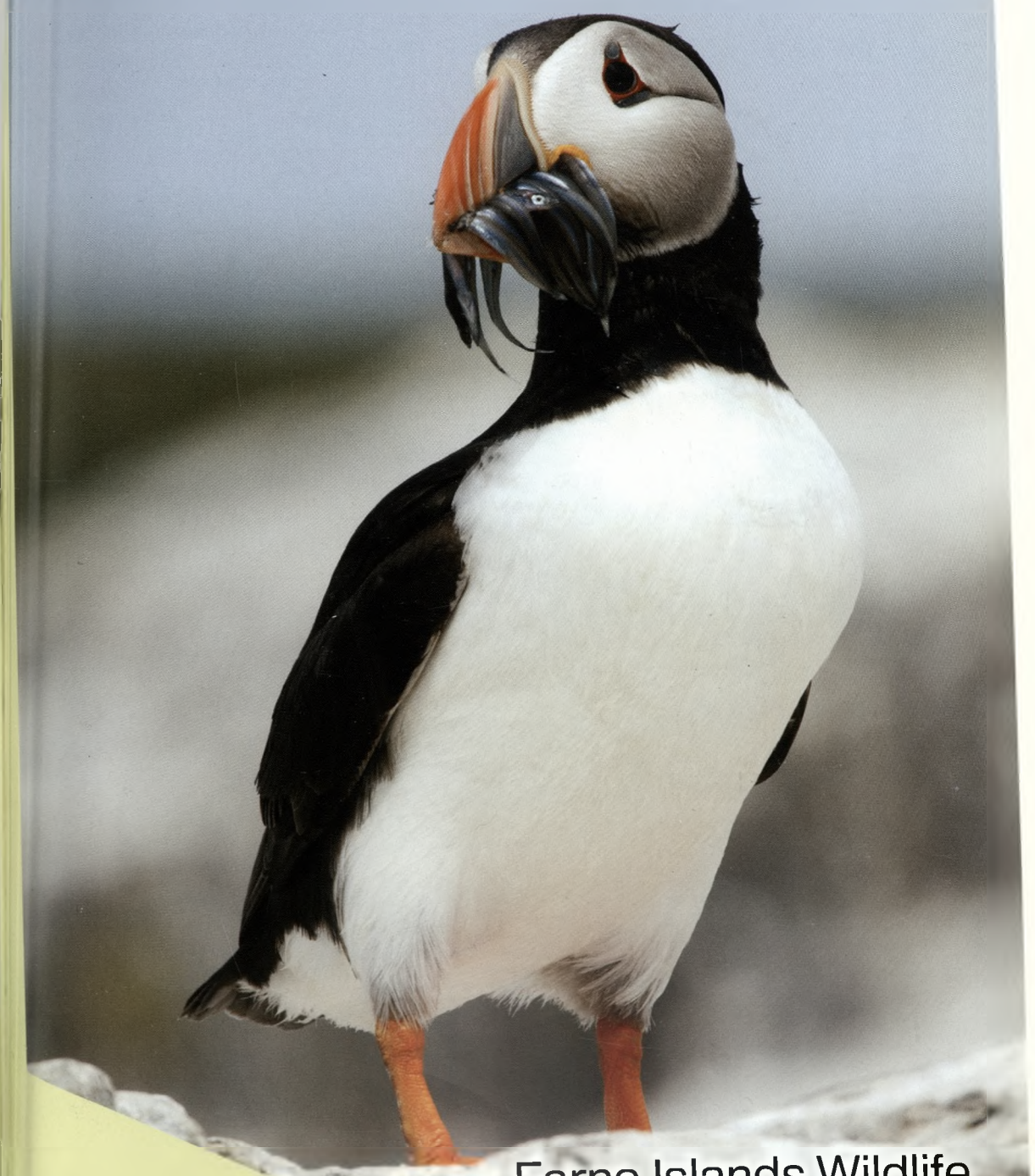

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Guillemot colony (Anne Wilson)

Kittiwake (Hazel Makepeace)

Shag feeding young (Keith Cochrane)

Black-headed Gull colony (Ann Wilson)

Sunset from the islands (Graeme Duncan)

PREFACE and ACKNOWLEDGMENTS

The National Trust Ranger team sailed on 21 March and manned the islands for 254 days until 7 December. In total, 192 bird species were recorded (a new record) and 23 bird species bred on the islands, including 84,141 pairs of seabirds.

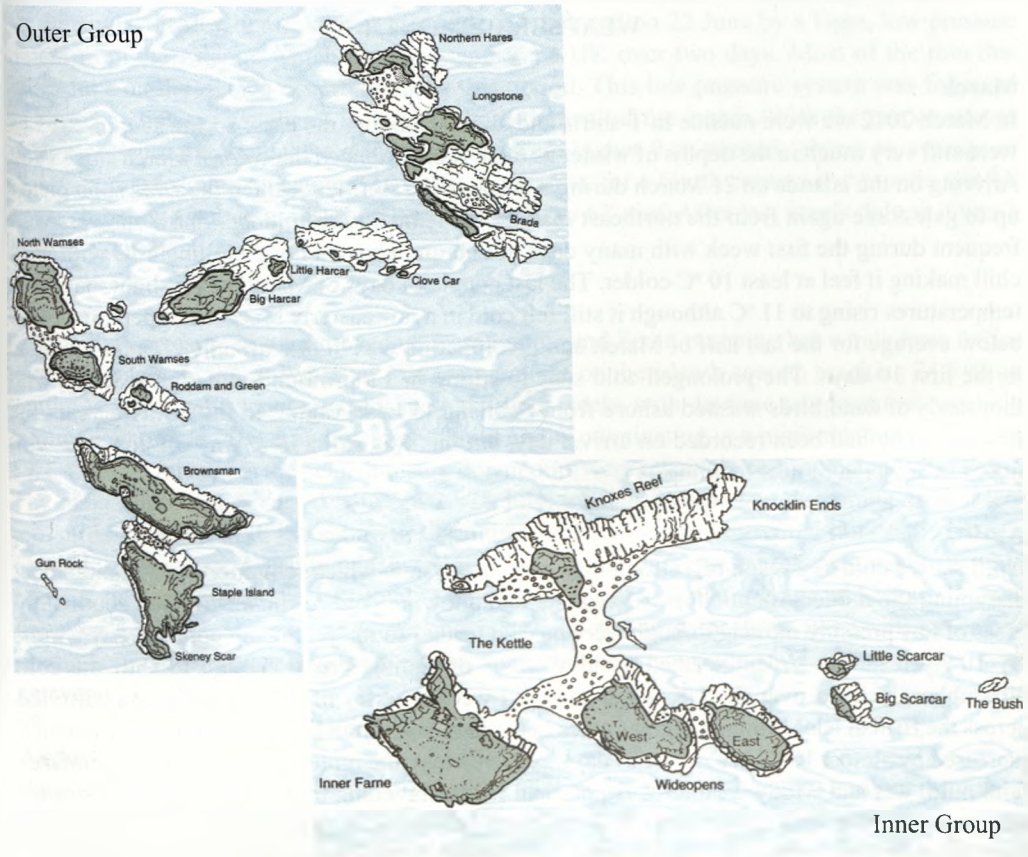
Throughout this report numbers shown in brackets are the figures for 2012 unless stated.

Thanks go to the 2013 Ranger team of Andy Denton, Graeme Duncan, Jonathan Finch, Ciaran Hatsell, David Kinchin-Smith, Samantha Morgan, Bex Outram, William Scott and Laura Shearer who, with the author, provided most records from the islands during the year.

Thanks also go to several observers for submitting records during the season to help complete this report, including Jamie Coleman, John Dawson, Andy Douglas, Bill Holland, Bobby Pearson, David Parnaby, Craig Pringle, Chris Redfern, William Shiel, John Walton and Anne Wilson amongst others.

Final thanks go to the unseen hard work of James Littlewood, Chris Redfern, John Walton, Margaret Patterson, Joan Williams and Anne Wilson for advice, support and editing the report.

David Steel, Head Ranger, National Trust. March 2014.



WEATHER ON THE FARNE ISLANDS IN 2013

Andrew Denton
National Trust Ranger, Farne Islands, Seahouses, Northumberland NE68 7SR

INTRODUCTION

The Farne Islands' weather is integral to everything that lives, breeds and migrates to these rocky shores; it dictates the day-to-day lives of the Rangers and has a major role in seabird productivity and the prevalence of moths and butterflies. In 2013 the weather was recorded on Brownsman (outer group) as well as on Inner Farne (inner group) throughout the Rangers' stay on the islands. However, no Rangers were on Brownsman for most of April so data was not consistently recorded there. Temperatures and the rain gauge were checked at 09:00 and cloud cover, visibility, wind speed and direction were logged at 09:00, 14:00 and 19:00 each day. Wind speed and direction were interpreted using the Beaufort scale and a compass. Long-term averages for comparison were for Seahouses as there are no historical datasets available for the islands, only casual observations.

WEATHER BY MONTH

March

In March 2012 we were outside in T-shirts and shorts enjoying the early spring sun; in 2013 we were still very much in the depths of winter as the UK experienced the coldest March since 1962. Arriving on the islands on 21 March during a break in the stormy weather, the wind soon picked up to gale force again from the northeast making the temperatures plunge. Snow showers were frequent during the first week with many days not getting above a bone-chilling 4 °C with wind chill making it feel at least 10 °C colder. The last couple of days of March saw a slight thaw with temperatures rising to 11 °C although it still felt cold in a raw easterly breeze. Temperatures were below average for the last half of March and precipitation was light with only 2.2 mm recorded in the first 10 days. The prolonged cold start to spring had a profound effect on seabirds with thousands of dead birds washed ashore from Scotland to East Anglia. In the last two years the first Shag egg had been recorded on arrival day, but this was still a long way off this year with not even any sign of nest building.

April

April started cold as a result of a strong high pressure system which remained over Scandinavia, disrupting the milder Atlantic flow of weather and allowing cold Arctic air to flood south. Any areas of low pressure moving through were pushed further south, producing cold easterly winds. By 10 April the jet stream seemed to show signs of getting strong enough to shift the cold air stubbornly fixed over the UK. Over the next week a series of deep depressions barrelled across the British Isles bringing regular gales to the Farnes and much milder temperatures, which increased by almost 10 °C in a matter of days. Nevertheless, the replacement of low temperatures with mild, wet and windy weather was not ideal for the breeding birds. April remained stormy until the end but despite these depressions very little rain fell with only 13.4 mm compared to an average of 63 mm. Temperatures recovered to a little above average for the time of year.

May

May was a changeable month. At the start a polar maritime air mass dominated the UK producing northwesterly or northerly winds and giving an unseasonably cold feel to the islands. This persisted for most of the month with brief calm respites when high pressure nudged in between low pressure systems. Towards the end of the month the jet stream was generally south of the UK leaving the Farnes on the dry and cold side of low pressure systems, which tracked just south of the islands. Ridges of high pressure brought springlike weather and the highest temperature of 19.8 °C was recorded on 25 May. As the month ended high pressure began to build from the east and the weather calmed, becoming sunny and dry; the occasional sea fogs during this period generally burnt off during the day. The average temperature during May was 13 °C; rainfall at 35 mm was just over 70% of the May average.

June

June was characterised by warm settled weather. The Azores high, usually anchored in the mid-Atlantic, had become detached and started to build into Britain from the southwest. As it moved over France and Britain very warm air flowed north from the continent and temperatures on the Farne Islands began to rise. The high pressure remained over the UK for the first three weeks of June, bringing occasional warm and blustery southerly winds to the islands, but nothing in the way of rain. The temperature routinely hovered around 20 °C, but felt much warmer, and the calm weather brought hazy, foggy conditions at times. This "blocking high" lasted until late June when it slowly meandered east and was replaced on 22 June by a large, low pressure system from the Atlantic which travelled across the UK over two days. Most of the rain that fell in June on the islands occurred during this period. This low pressure system was followed by blustery, showery weather which lasted until the end of the month. With the predominance of high pressure throughout June temperatures were higher than normal, giving an average of 18.4 °C compared with an average of 16 °C. In contrast, for a fourth consecutive month, rainfall was well below average at just 23.6 mm compared to 62 mm. After last year's deluge it was a welcome relief!

July

A large high pressure system moved up from France and Spain pumping hot winds from Africa towards Britain. In the early part of July temperatures on the islands soared, reaching 24.5 °C on 9 July. Warm weather continued for the next three weeks with daytime temperatures regularly into the low to mid-20 °Cs and extremely mild nights culminating in a minimum temperature of 19.2 °C on 21 July. With the heat, thundery downpours were relatively common in the afternoons. The main rain event occurred between 27-28 July: a small, intense and deepening area of low pressure moved up from the subtropics bringing strong winds and torrential rain to the islands. From this one event, 42.1 mm of rain fell in a 24 hour period, representing most of the monthly rain for July and taking the July total to 62.4 mm compared to the average of 52 mm. Despite the intense rainfall, breeding birds were not badly affected as many chicks were well grown and on the verge of fledging. July temperatures were well above average at 22.4 °C compared with an average of 18 °C.

August

August was a strange month as the British Isles appeared to be stuck between weather patterns. A weak area of high pressure lingered over the UK bringing regular sea fog with warm temperatures leading to muggy conditions. Occasional decaying weather fronts drifting across from the west carried drizzle to the Farnes but on 6 August a more organised weather front nudged high pressure out of the way and brought heavy rain. Even so, the high pressure conditions produced

yet another month of below-average rainfall: only 56.8 mm compared with an average of 67 mm. Temperatures were slightly above the 19 °C average at 20.9 °C, and night time temperatures were uncomfortably warm.

September

September was similar to August with warm, muggy conditions prevalent over the islands. Temperatures were over 2 °C above average at 18.6 °C and rainfall was again low at just 33.3 mm compared with the average of 48 mm. Throughout the month occasional low pressure systems passed south of the slowly weakening high pressure mass over the UK. These brought brisk northeasterly winds to the Farnes and the associated weather fronts dumped small amounts of rain. This was the case on 6 September when low pressure travelled up the English Channel bringing strong winds and 11.3 mm of rain, the most notable weather event of the month. As the end of the month approached the high pressure which had been present for most of the summer moved east into continental Europe as it decayed further. At the same time, the Atlantic weather which had been very quiet over the summer started to fire up again as a reinvigorated jet stream set us up for a stormy autumn.

October

Stormy! The powerful jet stream undulating across the Atlantic drove storms at ever increasing speeds over the British Isles. The first of these made its impression on 9 October; with high pressure building over Iceland influencing northwest Scotland, a low pressure system passed down the North Sea bringing strong northerly winds gusting up to 50 mph. As it stalled over the German Bight, cold easterly winds from Scandinavia gave the islands their first taste of winter. This weather system affected the Farnes for the next week as it slowly weakened over the southern North Sea. After this storm, attention turned from the east to the west as some extremely violent storms were brewing in the Atlantic, fed by an abnormally strong jet stream. On 28 October, the damaging St Jude's storm made landfall along the south coast of Britain but remained fairly localised to the English Channel. Areas of low pressure continued to flow over northern Scotland resulting in very little bird migration as strong westerly winds were the norm on the Farnes. Temperatures were a little above average and, with the turbulent weather, rainfall was above average for the first time in months with 76.1 mm compared with an average of 52 mm.

November

The jet stream remained strong throughout November, driving low pressure systems across the UK from the Atlantic resulting in mild, windy and rainy conditions. As the Farnes are in the rain shadow of the mainland, most rain had dissipated before reaching the islands, giving a below-average rainfall of 46.5 mm, but the windy conditions made it difficult to move between islands and get to the mainland. Temperatures were above average due to the mild origin of the air mass. At the end of the month the winds came from the north, reducing temperatures. Travelling up over the northern tip of Scotland and plunging down the North Sea the jet stream was set to deliver the biggest weather event of the year.

December

In early December high pressure lingered over southern Britain bringing calm, cloudy and chilly conditions to the islands. This was short lived as a rapidly deepening area of low pressure moved southeastwards down the North Sea on 5 December fed by the strong jet stream. The intense low pressure generated winds of over 80 mph developing a storm surge which pushed south down the North Sea; exacerbated by high Spring tides, this caused coastal flooding and widespread

disruption from Aberdeen to London. The surge inundated the low lying areas of the islands and left the Rangers cowering in the relative safety of the buildings. Despite the destructive power of the waves there was fortunately no damage and as it occurred late in the seal season only a few seals were lost. A cold front moved down with the storm and introduced bitter Arctic air behind it. Conditions had calmed down enough to allow the Rangers to depart on 7 December.

COMPARISON OF INNER AND OUTER GROUP WEATHER

Rainfall was similar between the inner and outer group islands (Table 1) with many rainfall episodes resulting from organised and widespread fronts, although there was some day-to-day variation in showery episodes between islands. Temperature differences between the islands were as expected due to their differing exposure to mainland and North Sea conditions: in spring and summer, Inner Farne, which is closer to the warmer mainland, was consistently warmer compared with Brownsman with its greater exposure to the cooling conditions of the North Sea. As a result, Inner Farne shows greater variation between day and night time temperatures whereas Brownsman maintains a more consistent temperature. In the winter this effect is reversed as the mainland gets colder, influencing Inner Farne much more than Brownsman. The North Sea is often warmer than the air temperature above it and acts like a blanket to keep the islands mild during the winter, an effect much more pronounced on Brownsman, situated further out to sea. This blanket keeps the islands frost free most of the time during the winter and as a result the islands are home to a variety of wintering birds including Robins and Wrens.

Table 1. Rainfall variations between Inner Farne and Brownsman and the comparison with Seahouses average.

	April	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Total**
Inner Farne Rainfall (mm)	13.4	35.3	23.6	62.4	56.8	33.3	76.1	46.5	**347.4**
Brownsman Rainfall (mm)		26.9	34	64.5	49.4	30.3	66.5	66.8	**338.4**
Seahouses Average (mm)	54	44	62	52	67	48	52	63	**442**

SUMMARY

The weather in 2013 was quite abnormal. Blocking high pressure systems dominated for most of the year, prolonging the winter well into spring as cold air was allowed to flood south from the Arctic. As summer arrived, a slight change in position of the high pressure allowed hot air to be pumped up from Africa producing a hot dry summer and early autumn in almost every part of the British Isles. It was only from October onwards that the weather came from the prevailing direction. However, the speed of the jet stream and intensity of many of the Atlantic depressions that affected the UK culminated in the worst storm surge on the North Sea coast since the devastating floods of 1953. Overall, it was a completely different year to the deluge conditions of 2012, with the islands in drought conditions at times and the freshwater ponds almost completely dried out. The weather allowed a good breeding season for the seabirds and a bumper year for moths and butterflies.

BIRDS ON THE FARNE ISLANDS IN 2013

David Steel
National Trust Head Ranger, Farne Islands, Seahouses, Northumberland NE68 7SR

SEABIRD OVERVIEW 2013

The season got off to one of the worst starts on record: continued easterly gales for two weeks in late March resulted in mountainous seas and temperatures struggling to get above freezing, with the wind chill factor giving the islands a truly Arctic feel. It was the coldest March since 1962 with snow showers throughout the month. The detrimental effects of the weather on seabirds was very evident: over 3,000 Puffins were washed up dead along the east coast alongside Shags and many other seabirds in the worst seabird "wreck" for 60 years. The majority of these birds appeared to have starved as a result of the combined effects of low temperatures and extremely difficult feeding conditions in the turbulent seas.

To add to the early season woes, an 80-foot container ship the MV *Danio*, carrying 1,500 tonnes of timber from Perth to Antwerp, ran aground on the back of the Harcar group of islands in the early hours of 16 March. Only slightly damaged by the impact, the flat bottomed shape and double hulled design ensured that the boat remained intact on the flat rock. The ship was grounded due to adverse weather until it was finally refloated without incident in the early hours of 28 March. Luckily, the accident occurred before the seabird season was under way and the wildlife of the islands was unaffected.

As a direct result of the weather, the breeding season was slow to commence: few seabirds were evident in breeding colonies in late March, a stark contrast to the early nesting seasons in recent years. With the late onset of spring, the first Guillemot eggs were only discovered on 29 April. compared to 10 April in 2012, and Shags were on eggs 37 days later than the previous year. Despite the slow start the season was very successful for most species, aided by an abundant supply of Sandeels and one of the warmest and driest summers in recent memory.

This year the entire population of Puffins was surveyed for the first time in five years. The results show that the population has increased by 8% since 2008 with 39,962 pairs nesting. As ever, the birds proved very popular and a live television link from a nesting burrow into the Information Centre on Inner Farne allowed visitors and Rangers alike the chance to look in on the secret lives of our most colourful inhabitants.

Two other members of the auk family also had excellent years with Guillemot and Razorbill nesting in record numbers and also enjoying bumper breeding seasons. Breeding terns had a good year and populations of Arctic, Sandwich and Common Terns remained stable. Once again Roseate Terns were evident throughout the summer and although courtship was observed, no breeding attempt was made; the last attempt was in 2009.

The number of nesting Eiders increased on the previous year and breeding success was improved with the settled summer weather. Other successes included a record number of nesting Fulmar and successful breeding for Shelduck, with at least three young surviving to fledge. Mallard also had a good year and Northumberland's only pair of Red-breasted Mergansers successfully hatched a brood of nine which departed for the open sea in mid-July. Black-headed Gulls also continued to increase in numbers with the colony going from strength to strength each year.

In contrast the early spring weather had a hugely detrimental effect on Shag survival and the population decreased by 40%, leaving just 582 nesting pairs, the lowest since 1980. The Cormorant population, which has been declining over the last 15 years, continued to plummet with only 87 pairs nesting. The reasons for this decline are unclear although a ringing scheme on chicks, which started this year, will hopefully help to find out. Kittiwakes were also badly affected by the weather and the first eggs were discovered 21 days later than the previous season. The number of nesting attempts decreased drastically and breeding success was below average after inclement weather in August; while the numbers of Kittiwakes present on the cliff ledges appeared normal, many hundreds of pairs occupied nests but made no attempt to breed.

Overall, it was a mixed breeding season with major highs and lows. Excellent food availability and dry, sunny weather during the summer provided ideal seabird breeding conditions. However, against a background of declines in many seabird populations across the British Isles, the knock-on effects of the storms in early spring, leading to high mortality and delayed breeding, should not be underestimated. It is more important than ever for the Ranger team on the Farne Islands to continue to monitor one of the most important sites in the UK for breeding seabirds.

MIGRATION OVERVIEW 2013

This was a phenomenal year for rare and scarce migrants - arguably the best on record. In total, 192 species were recorded, beating the previous record of 189 set in 2005. The inner group had a particularly outstanding season with 180 species recorded against 168 for the outer group. Without doubt the highlight was a summer-plumaged **Bridled Tern,** a "first" for the islands, discovered in early July and seen on 19 days throughout July and early August. Almost as noteworthy, two long-awaited and often predicted "firsts" were a **Red Kite** in late July and a **Pectoral Sandpiper** in early September, the latter being the 300th species for the Farne Islands list. Other top-drawer rarities included a **White-rumped Sandpiper** in late September and a lingering **Bonaparte's Gull** during the early winter. The "seawatching" season was quiet, although two **Fea's Petrels** were recorded (in July and September) bringing the Farnes total for this species to seven; few sites within the British Isles can boast that!

Amongst the passerine migrants it was a classic "bunting year" with a spring **Black-headed** and a **Yellow-breasted** for four days in September; the latter was the UK's first since 2011. Other eastern rarities included two **Citrine Wagtails** and three **Greenish Warblers**, all within the final week of August. Other notable records were an **Olive-backed Pipit** which stayed for four days, a **Nightjar**, an obliging **Hoopoe** and a spring **Marsh Warbler**. The diversity of the season was shown by other good "Farnes" birds including **Hawfinch**, an invasion of **Great Spotted Woodpeckers** and a good showing of continental drift migrants including 20 **Yellow-browed Warblers**.

Some species were noticeable by their absence including Pochard (third omission in 18 years), Moorhen (fifth omission in 18 years), Sabine's Gull (first omission in five years), Wryneck (first omission in six years) and Waxwing (first omission in four years).

In order of record status for the Farnes, the highlights this year were: **1st** Bridled Tern, Pectoral Sandpiper, Red Kite; **2nd** White-rumped Sandpiper, Bonaparte's Gull; **4th-5th** Citrine Wagtail; **5th-6th** Little Egret; **6th** Black-headed Bunting, Hawfinch; **6th-7th** Fea's Petrel; **8th** Olive-backed Pipit; **10th** Nightjar, Hoopoe, Marsh Warbler; **11th** Yellow-breasted Bunting; **11th-13th** Greenish Warbler.

Other highlights were: Balearic Shearwater (minimum of four), Leach's Petrel, Spoonbill, Marsh Harrier, Osprey, Corncrake, Wood Sandpiper (two), Grey Phalarope, Iceland Gull, Glaucous Gull, Cuckoo (two), Red-backed Shrike (three), Hooded Crow (two), Firecrest, Shorelark (two), Pallas's Warbler, Yellow-browed Warbler (20), Wood Warbler, Barred Warbler, Icterine Warbler (three), Bluethroat (two), Red-breasted Flycatcher (three), Richard's Pipit, Mealy Redpoll (invasion), Common Crossbill and Common Rosefinch (two).

SYSTEMATIC LIST

The status of each species is classified using the following categories:

Abundant	More than 1,000 occurrences per annum
Common	101-1,000 occurrences per annum
Well represented	11-100 occurrences per annum
Uncommon	no more than 10 occurrences per annum but more than 20 in total
Scarce	11-20 occurrences in total
Rare	6-10 occurrences in total
Extremely rare	no more than 5 occurrences in total

Mute Swan *Cygnus olor*. An uncommon visitor.
The majority of Farnes reports involve local movement through Inner Sound and all three records were in this area. On 25 April an immature flew west, close to Inner Farne, with two adults drifting on the sea on 12 July. Another adult was on the sea heading north on 12 September.

Whooper Swan *C. cygnus*. An uncommon winter and passage visitor.
Spring passage has been noteworthy in the previous four years, but with easterly gales in late March there was just one record this spring: an adult on the sea off Inner Farne on 22 March. Autumn produced six juveniles over both island groups on 19 October, three west on 24 and 29 October, with the biggest herd of the season being 19 birds south on 9 November.

Pink-footed Goose *Anser brachyrhynchus*. A well represented winter and passage visitor.
One spring report of 12 east over Inner Farne on 19 April. 14 west over Inner Farne on 12 September signalled the start of autumn passage with day counts of between 3-108 on 17 dates between 16 September-3 December. Peak passage was 129 west on 17 September, 144 west on 18 September and 169 west on 23 October.

Greylag Goose *A. anser*. An uncommon passage and winter visitor.
Movements around the Farnes involve feral and wild birds. A skein of 13 flew over the inner group on 21 March with one-five on four dates between 7 April-8 May. Two north over Brownsman on 11 June and one with Eiders in Staple Sound on 3 July could be assumed to be feral. The only autumn record involved seven south over Inner Farne on 27 October.

Greater Canada Goose *Branta canadensis*. An uncommon passage visitor.
Four north through Inner Sound on 31 March were the first of the season, all other records occurring during late May-early June when birds move north to moulting grounds in the Beauly Firth. Day counts included 14 on 27 May, four on 3 June, 27 on 6 June, 31 on 7 June and 10 on 13 June, all on northerly passage.

Barnacle Goose *B. leucopsis*. A well represented passage and winter visitor.
A quiet year for this species with late spring passage involving 32 north over the outer group on 24 April, one over West Wideopens on 1 May and two large skeins totalling 212 north through Inner Sound on 23 May. Autumn passage was represented by 62 west over Inner Farne on 26 September and four north though Inner Sound on 10 October. An individual arrived on Staple Island on 11 October and commuted around the outer group favouring Staple Island and the Wamses. The bird was still resident (and moulting) when the Rangers departed on 7 December.

Brent Goose *B. bernicla hrota*. A well represented passage and winter visitor.
Scarce on spring passage; 30 landed on the sea off the inner group on 30 March with a single roosting on Knoxes Reef on 19 April before departing west the following morning. Birds returning to wintering grounds at nearby Lindisfarne were seen during September (Table 1). Late passage involved 15 north through Inner Sound on 22 November and 21 over the outer group on 29 November.

Table 1 Northerly passage of Brent Geese, September 2013.

September	**4**	**5**	**6**	**12**	**19**	**22**	**25**
Count	25	16	22	37	20	6	45

Shelduck *Tadorna tadorna*. A well represented visitor and occasional breeder (Steel 2012).
As usual, birds were evident on the islands from late March, with breeding behaviour observed throughout the spring. At least two pairs made nesting attempts, with females attending burrows on Inner Farne and Staple Island. Their secretive nature makes it difficult to confirm success but the Staple Island pair were seen with four young from 2 July until early August, with at least three going on to fledge. Although the adults had moved on, at least two fledglings were still present around the islands until 13 September. As usual, light passage of one-five was logged on eight spring and eight autumn dates with a peak of seven north through Staple Sound on 9 July.

Wigeon *Anas penelope*. A common passage and winter visitor.
Up to 21 in mid-January on the outer group, over a five day period, indicated that small numbers overwintered on the islands. As usual, spring passage was light with 1-16 on 13 dates between 28 March-2 May with a peak of 18 north on 30 March. The first returnees arrived on 3 July with six on Knoxes Reef, and from early September birds became regular on passage or stopping over on favoured areas including Knoxes Reef and Brownsman. Numbers generally involved 1-119 with peaks of 490 north on 25 September, 206 north on 27 September and 149 north on 18 November. Small numbers again overwintered, with up to 75 on Knoxes Reef and 14 on the outer group.

Gadwall *A. strepera*. An uncommon visitor.
Recorded for the fourth consecutive year with an adult female flying south through Inner Sound on 25 April and another north over Knoxes Reef on 9 September.

Teal *A. crecca*. A common passage and winter visitor.
Reasonable numbers were present on Knoxes Reef, Brownsman, Staple Island and North Wamses during the autumn and winter months with passage logged through both Inner and Staple Sounds. A snapshot of overwintering numbers included 150 on Knoxes Reef on 12 February and 35 on Brownsman on 12 January. As expected, spring passage was light with one-five noted on nine dates from 23 March-24 April with a peak of eight north on 12 April. After the first autumn record on 3 August numbers increased, especially on Knoxes Reef with 42 on 14 September, increasing to 70 on 20 September and 200 from 24 September, although numbers stabilised at

100 in October-November. On the outer group up to 54 were present throughout the autumn. Peak passage included 101 north on 6 September and 113 north on 12 September.

Mallard *A. platyrhynchos*. A common winter and passage visitor and well represented breeder. It was another mixed season for the small breeding population and good numbers were seen throughout the year with an increase in late autumn. The first eggs were discovered on 5 April and 15 (17) pairs nested as follows: Inner Farne 6 (7), West Wideopens 2 (3), Knoxes Reef 1 (0), Staple Island 2 (3), Brownsman 1 (2), North Wamses 1 (1), South Wamses 1 (0), Big Harcar 1 (1). The first ducklings hatched on 12 May on Staple Island and 17 May on Inner Farne although breeding success was limited by predation and inexperienced mothers (nests abandoned). Nine chicks fledged from three different nests, all on the inner group, including five which did not fledge until 11 November. During the autumn numbers started to build on the inner group, favouring Knoxes Reef with 49 on 11 September increasing to 84 on 29 September and up 80 present throughout October-November. Small numbers (up to 18) were present on the outer group during the autumn.

Pintail *A. acuta*. An uncommon passage and winter visitor.
A good autumn for this species with reports on 13 dates between 7 September-17 November. Small numbers of one-three were recorded on passage mostly though Inner Sound although a small number were seen amongst other wildfowl on Knoxes Reef and Brownsman. Peak counts included seven north through Inner Sound on 21 September and nine off Knoxes Reef on 24 September.

Garganey *A. querquedula*. A scarce passage visitor.
An adult male was seen flying north through Inner Sound with 40 Common Scoter on 3 August, representing the first ever August record.

Shoveler *A. clypeata*. A well represented passage and winter visitor.
A reasonable year with one-two noted on five spring dates between 16 April-13 June, including a male on Brownsman pond on 12 May and Inner Farne top meadow pond on 13 June. Autumn passage was represented by one-three on nine dates from 8 September-19 November generally involving birds on Knoxes Reef. Peak passage during this period included five over the inner group on 19 September and 15 on to Knoxes Reef on 29 October with 11 the following day.

Tufted Duck *Aytha fuligula*. A well represented visitor.
A quiet year with just four confirmed records: two males south on 21 April through Inner Sound, three north on 24 May, three north over Knoxes Reef on 5 October, and a single north through Staple Sound on 12 October.

Scaup *A. marila*. An uncommon passage and winter visitor.
There were three confirmed sightings this year: a flock of six (four males, two female types) flew north off Longstone on 9 November, and on 22 November three (two males, one female type) flew north through Staple Sound while a separate pair were on the sea in Inner Sound before flying off north.

Eider *Somateria mollissima*. A breeding resident.
Small numbers were present throughout January-February and courtship was very evident. The first prospecting birds arrived in late March and the first eggs were found on both Inner Farne and Brownsman on 27 April. After the disastrous breeding season of the previous year, the number

of nesting attempts increased this year and breeding success was high. A total of 552 (443) pairs nested as follows: Inner Farne 318 (267), West Wideopens 30 (9), East Wideopens 7 (2), Knoxes Reef 4 (2), Staple Island 37 (23), Brownsman 130 (126), North Wamses 7 (1), South Wamses 7 (4), Big Harcar 5 (2), Northern Hares 0 (0), Longstone 1 (3), Longstone End 6 (4). The first ducklings started hatching from 20 May, but again predation proved an issue. The Rangers monitored 381 nests which produced 889 young (at hatching stage the females take the one-day old ducklings to sea). This gives an overall productivity of 2.33 chicks per nest, a marked improvement on the 1.58 of 2012. Late breeding birds departed with young on 1 July. As usual, good numbers remained around the islands throughout the autumn and winter with displaying drakes noted in late November. Interestingly, heavy passage was logged on 22 November with a total of 571 north (229 through Inner Sound and 342 through Staple Sound).

Long-tailed Duck *Clangula hyemalis*. A well represented passage and winter visitor.
Small numbers winter around the islands and this was noted in midwinter with two (female and immature) in Brownsman Haven from 10-16 January and up to seven at the traditional wintering area of West Wideopens. This latter area held birds into mid-April while easterly gales blocked migration north. During this period numbers peaked with eight on 25 March, while a female type on 14 April and another on 25 April were late stragglers. Autumn passage produced one-three on 16 dates from 10 October-5 December including birds returning to the wintering area behind West Wideopens. Peak counts included 24 on the inner group on 21 November with a female/ immature bird resident in Brownsman Haven from 2-17 November.

Common Scoter *Melanitta nigra*. A common passage and winter visitor.
Well represented throughout the year with records on an impressive 125 dates. Small numbers were recorded around the islands, although Inner Sound again attracted the largest flocks with 160 resident from 24 April-25 May, peaking at 228 on 28 May and 190 on 29 May. Numbers declined rapidly with just 40 present on 10 June, increasing in July with 300 from 12-26 July, peaking at 415 on 29 July. Passage included 260 north on 2 July, 100 north on 13 July, 118 north on 12 September, 110 north on 17 November and 139 north on 22 November.

Velvet Scoter *M. fusca*. A well represented passage and winter visitor.
Well reported, with the bulk of records during the autumn months. The first of the year was flying south through Staple Sound on 21 March with a single in Inner Sound on 25 May and five south through Staple Sound on 28 May. A single male north on 4 August was followed by one-three on 10 dates from 24 September-2 December, with peaks of eight north through Inner Sound on 11 October and four north on 21 November.

Goldeneye *Bucephala clangula*. A common passage and winter visitor.
Small numbers winter around the islands, favouring the traditional locality behind West Wideopens on the inner group, and occur on passage. Up to 20 were still present in late March, although numbers then dwindled to eight on 1 April declining to four by 4 April with two present until 13 April. During this period 13 were recorded on 9 April. The final spring record was two males south through Inner Sound on 20 April. The first autumn birds arrived on 10 October with one-three favouring the Wideopens. Passage saw seven north on 11 October and 31 north through Inner Sound on 21 November.

Red-breasted Merganser *Mergus serrator*. A well represented passage and winter visitor and rare breeder (Steel 2007).
Recorded on passage in small numbers with nesting confirmed for the eighth consecutive year.

Spring passage produced one-two on six dates from 23 March-15 May, most involving local movements in Inner Sound. The breeding pair was first seen around Inner Farne on 5 May and was present throughout the rest of May and June. The duck was discovered on a nest with 10 eggs on 15 July. Nine chicks hatched on 20 July and were led to sea by the attentive mother; the remaining addled egg was later predated. Autumn passage was light with one-two on five dates from 30 September-31 October and a peak of three north on 21 November.

Goosander *M. merganser*. An uncommon passage visitor.
The islands produce a handful of records each year despite Goosander being regarded as predominantly an inland waterways bird. There were only two reports this year: six on the sea in Inner Sound on 14 August, and a female/immature west off Inner Farne on 27 September.

Red-throated Diver *Gavia stellata*. A common winter and passage visitor.
The Farnes produce between 70-80 records annually with wintering numbers bolstered by spring and autumn passage (Table 2). Small numbers of one-four were present throughout January-April with five noted on 25 March, 20 April and 26 April. As expected, the species became scarce during the late spring and summer with singles on five May dates and on 9-10 June. From early September, one-nine birds were resident until the end of the season.

Table 2. Peak autumn passage of Red-throated Diver, Farne Islands 2013.

	September				**October**			**November**		
	5	**19**	**25**	**26**	**11**	**12**	**27**	**21**	**22**	**23**
Inner Sound	10	14	13	13	12	10	11	28	31	18
Staple Sound	0	0	0	0	3	1	1	1	4	1
Total	**10**	**14**	**13**	**13**	**15**	**11**	**12**	**29**	**35**	**19**

Black-throated Diver *G. arctica*. A well represented winter and passage visitor.
A reasonable year with records on nine dates; unusually, there were reports during the summer months. The first of the year were two north through Inner Sound on 26 April followed by summer plumage individuals through Staple Sound on 24 May and Inner Sound on 2 June and 9 July. More in keeping with the species, singles were reported through Inner Sound on 11 and 31 October, on the sea behind Knoxes Reef on 15 November and Staple Sound on 22 November and off Brownsman on 30 November.

Great Northern Diver *G. immer*. A well represented winter and passage visitor.
Late spring birds included singles north through Inner Sound on 22 March, a moulting adult in Staple Sound on 2 April and further singles north through Inner Sound on 6 and 30 April. The first autumn returnees were two south through Inner Sound on 26 September. Thereafter one-two were recorded on 15 dates between 11 October-6 December including individuals on the sea in Inner Sound, Staple Sound and in the Kettle off Inner Farne. Peak passage during this period included seven through Inner Sound on 21 November and eight the next day (six north and two on the sea).

Fulmar *Fulmarus glacialis*. A common breeder, abundant on passage.
Compared to a poor breeding season the previous year Fulmars bounced back in style with a record number nesting. After discovery of the first eggs on 16 May on Brownsman, 316 (233) pairs nested as follows: Inner Farne 27 (17), West Wideopens 13 (10), East Wideopens 21 (21), Knoxes Reef 20 (23), Staple Island 58 (36), Brownsman 80 (54), North Wamses 37 (28), South Wamses 38 (33), Big Harcar 16 (6) and Longstone End 6 (5). The first chicks hatched

on Brownsman on 5 July and on Inner Farne on 9 July. After the breeding season birds became scarce on the islands, until good numbers returned from 11 November remaining until the year end. An individual of the northern race (known as "Blue Fulmar") was noted over the outer group on 23 April before settling amongst Fulmars on Staple Island and then departing. An unprecedented 22 of these northern birds were recorded during heavy Fulmar passage off the south end of Brownsman on 11 October between 17:45-18:30.

Fea's Petrel *Pterodroma feae*. An extremely rare visitor.
This incredibly rare "Gadfly" petrel has only been recorded on 47 occasions in the UK but this year the islands boasted two. On the morning of 22 July an individual was discovered flying close inshore off Newbiggin then Beadnell further down the coast. Just after 11:00 the bird was rediscovered in foggy conditions off the south end of Staple Island, but despite showing very well it was only seen by one observer due to the conditions. Remarkably a second bird was seen on 6 September as it moved north through Inner Sound, giving incredible views for the lone observer before being lost to the north of the islands. As a result the Farnes can now lay claim to seven records (some 14% of all British records), with previous Farne sightings in September 1993, September 1996, November 1999, September 2002 and October 2009.

Sooty Shearwater *Puffinus griseus*. A well represented to common passage visitor.
It was another quiet season for this southern oceanic wanderer with the first of the year seen flying north off the south end of Brownsman on 13 July. Overall 1-20 were seen on 15 dates between 29 August-13 October with peak counts of 32 north on 28 August, 56 north on 11 September and 36 north on 11 October.

Manx Shearwater *P. puffinus*. A common passage visitor.
A record number were counted from the islands this year. Spring passage was typically light with singles north on 19, 24, 25 and 26 April and three north on 27 April. Thereafter 1-45 were recorded on five dates in May, eight dates in June and 15 dates in July; peak monthly counts are in Table 3. A small feeding flock started to congregate around the islands from early August which grew in numbers through the month: 23 on 5 August, 66 on 17 August, 240 on 19 August and around 400 feeding by Megstone the following day. Over the next few days more arrived and the flock contained 986 on 26 August, peaking at a new Farnes record of 1,008 in Inner Sound on 29 August. This flock remained into the first week of September with 1,000 present by Megstone on 6 September, but declined thereafter with only 50 noted on 11 September. Late records included 24 north on 11 October and two north through Staple Sound on 12 October.

Table 3. Peak spring counts of Manx Shearwater north off the Farne Islands, 2013.

27 April	24 May	24 June	22 July
3	75	62	56

Flock of Manx Shearwater feeding (Bex Outram)

Balearic Shearwater *Puffinus mauretanicus*. An uncommon passage visitor.
A very noteworthy year as an individual was discovered in the large Manx Shearwater concentration to the north of the islands on 20 August with two present on 26 August. Both birds remained over the following two weeks and were last recorded on 10 September. These were the first ever records of birds lingering around the islands and good views were obtained from boats. They were also the first Farne records since 2010; they had been recorded annually from 1993-2010. More typical was a single north through Staple Sound on 11 October.

Balearic Shearwater (Graeme Duncan)

Storm Petrel *Hydrobates pelagicus*. An uncommon passage visitor.
The majority of records were from evening tape-luring sessions: three were caught on Inner Farne on 18 July, and trapping on Brownsman produced five on 6 August, four on 7 August and three on 25 August. The only sighting on a seawatch involved a single feeding at the south end of Brownsman on 10 July.

Leach's Petrel *Oceanodroma leucorhoa*. A scarce visitor.
For the third consecutive year this oceanic wanderer was recorded from the islands when one was seen in heavy seas off the south end of Brownsman on 11 October. This represents the twenty-second record for the Farnes.

Gannet *Morus bassanus*. Abundant passage and non-breeding summer visitor.
Recorded almost daily throughout the season. Early records included a single on 11 January with three on 15 January. Passage was heaviest in April and September with large concentrations during the autumn months including 1,500 feeding in Staple Sound on 6 September. This was eclipsed by a new record hourly count on 17 September when 2,238 were logged moving north.

Cormorant *Phalacrocorax carbo*. A breeding resident.
It was another desperate season as the breeding population plummeted to an all-time low. As usual birds were present in the colonies in March (one was seen eating an Octopus on 24 March) with displaying noted on 31 March. Nest building commenced from 3 April with birds on eggs by late April. A total of 87 (135) pairs nested as follows: East Wideopens 52 (72), North Wamses 15 (18) and Big Harcar 20 (45). The first chicks were on East Wideopens and North Wamses on 26 May. For the first time since the 1980s, nine youngsters were ringed on Big Harcar on 15 August. The first birds fledged on 15 July, and although not monitored the breeding season

appeared to have been good. Small numbers remained around the Farnes during autumn and winter, with a typical count of 16 on 20 November.

Shag *P. aristotelis*. A common breeding resident.
Difficult feeding conditions caused by prolonged stormy conditions in January and March, combined with sub-zero temperatures, resulted in a high mortality rate: 3,000 were picked up dead along the east coast during this period. Very few birds were present when the Rangers arrived in late March and the breeding season was slow to start. Few nests were constructed by mid-April and the first eggs on Inner Farne were found on 29 April (37 days later than the previous season) and on the outer group on 7 May. A total of 582 (965) pairs nested as follows: Inner Farne 181 (263), West Wideopens 58 (92), East Wideopens 50 (88), Megstone 12 (19), Skeny Scar 35 (62), Staple Island 93 (162), Brownsman 61 (108), North Wamses 29 (42), South Wamses 17 (41), Rodham and Green 6 (5), Big Harcar 25 (64) and Longstone End 15 (19). The first chicks hatched on Inner Farne on 2 June and Brownsman on 10 June with the first fledglings from mid-July. The Rangers monitored 370 nests (64% of the population) which produced 335 fledged young, giving a productivity of 0.97 chicks per nest (compared to 1.03 last year). Although a productive breeding season, the population was at its lowest since 1980. As usual, large groups congregated around the islands throughout the autumn with 565 counted on 28 November.

Little Egret *Egretta garzetta*. A scarce visitor.
Despite the population boom in the UK, this species remains scarce on the islands although the number of records is gradually increasing. Two were seen flying south through Inner Sound on the evening of 1 July representing the fifth record, after individuals in 1994, 2003, 2011 and 2012.

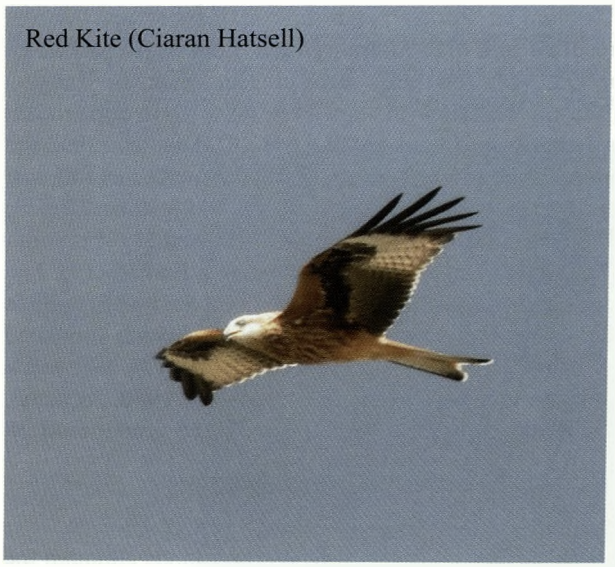
Grey Heron *Ardea cinerea*. A well represented visitor. Bred 1894 (Paynter 1894).
The islands continue to attract good numbers with a presence throughout the year, especially on the undisturbed islands of Knoxes Reef and Longstone. The season produced records on 57 dates, the majority during the autumn: eight records from March-July and 49 records from August-December. Most records involved one-two individuals although six in fog on Longstone on 25 September was more unusual.

Spoonbill *Platalea leucorodia*. A scarce visitor.
An individual was watched flying low over Brownsman on the evening of 27 May, representing the first record since 2011 and the twelfth island record.

Great Crested Grebe *Podiceps cristatus*. An uncommon visitor.
The species still remains a scarcity on the Farnes with records in only three of the previous five years. The only record of the year concerned an adult north through Inner Sound on 4 August.

Red-necked Grebe *P. grisegena*. A well represented winter and passage visitor.
This grebe is starting to become scarcer, reflecting the changes seen in Northumberland and there were only three records, all during the autumn. A winter plumage adult was observed sitting on a stormy sea in Inner Sound on 30 September and there were two north through the same area on 21 November. The only other report was of a single bird which landed on the sea off Staple Island on 23 November.

Slavonian Grebe *P. auritus*. An uncommon winter and passage visitor.
Despite good numbers wintering in Northumberland, the species remains scarce on the islands. s
Early winter produced two records, singles north through Inner Sound on 21 and 23 November. r


Red Kite (Ciaran Hatsell)

Red Kite *Milvus milvus*.An extremely y
rare visitor.
An adult flew lazily west, low over r
Staple Island, on 30 July, being g
harried by large gulls. It then used l
the thermals from an approaching g
thunderstorm to disappear high into
the clouds. The bird was untagged
and represents the first ever record
for the islands. With the increase in
numbers in the UK due to successful
reintroduction programmes (including
in the North East at Gateshead and in
eastern Scotland) it was only a matter
of time before the islands claimed its
first, although it is not known whether
this bird was from the UK or further
afield.

Marsh Harrier *Circus aeruginosus*. An uncommon passage visitor.
The species is enjoying an upturn in fortunes nationally and this has been reflected in records from the islands. An adult female was watched being heavily mobbed by gulls over Knoxes Reef on 2 August before landing on the island. Eventually the bird attempted to fly out towards the outer group, before turning back and heading west to the mainland. This represents the sixth consecutive year the islands have produced records.

Sparrowhawk *Accipiter nisus*. An uncommon visitor.
The British population is relatively sedentary, and is augmented by migrants from northern Europe. It was a quiet year with just nine reports, the majority during spring. An adult female was seen on Inner Farne on five dates between 28 March-21 April and on the outer group on 13 April. The only other record during this period involved a male on Brownsman on 30 March. Autumn passage was very quiet with just two records: a male over Inner Farne on 4 August and a male on Brownsman on 19 October.

Osprey *Pandion haliatus*. A scarce passage visitor.
An individual was discovered by boatmen as it flew east over East Wideopens in strong southwesterly winds on 17 September. Just over an hour later it was seen flying west over the inner group and made landfall at Seahouses just after midday. This was the seventeenth Farnes record and the ninth in the past 10 years.

Kestrel *Falco tinnunculus*. A well represented passage visitor. May have bred in 1916 (March 1916).
Kestrels are partially migratory within their range and birds move from the near continent during autumn. A single west over the inner group on 20 April was the only spring record, although a long-dead individual found on Brownsman on 1 May might have been present since the previous

Curlew *N. arquata*. A common passage and winter visitor.
Recorded throughout the year with large numbers gathering on Knoxes Reef. Numbers have reduced on the islands in recent years and in the past Knoxes Reef would regularly attract up to 400 compared with the peak this year of 169 (Table 6). Only small numbers were recorded on the outer group with a peak of 24 on 30 April.

Table 6. Monthly peak Curlew count on Farne Islands, 2013.

	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Inner Group	169	43	2	24	109	150	86	50	85	130
Outer Group	5	24	3	1	7	20	20	6	15	6

Black-tailed Godwit *Limosa limosa*. An uncommon passage visitor.
Recorded on five dates in midsummer with a flock of 37 west over the islands on 7 July representing the third highest ever count. Other records were 23 south on 15 July, 12 south on 18 July, 10 south on 5 August and 14 south on 18 August.

Bar-tailed Godwit *L. lapponica*. A well represented passage visitor.
Well represented with 1-23 on 26 (six spring and 20 autumn) dates during the season, the majority of records from Knoxes Reef on the inner group. Peak counts included 25 on Inner Farne on 1 May, 68 north on 24 September and 23 over the inner group on 6 December.

Turnstone *Arenaria interpres*. A common passage and winter visitor, uncommon in summer.
Present all year with peak passage in August (Table 7); 406 were counted across the islands on 21 August.

Table 7. Peak monthly Turnstone counts, Farne Islands 2013.

	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Inner Group	64	69	23	70	95	206	45	100	70	100
Outer Group	40	20	30	30	155	200	250	60	42	30

Knot *Calidris canutus*. A well represented passage visitor.
This high-Arctic breeder can be found on the islands in good numbers during summer. Spring passage was light with one-two on Inner Farne on 12 and 17 April and on Knoxes Reef on 30 May. Thereafter there was a daily presence between Longstone and Knoxes Reef of 1-79 from 16 June-20 September (Table 8). Numbers decreased from early October with 50 on 8 October and two-five on three dates in November.

Table 8. Peak counts of Knot on the Farne Islands 2013.

	July		August					
Date	**15**	**28**	**2**	**3**	**4**	**11**	**23**	**24**
Count	112	105	170	160	120	121	179	170

Ruff *Philomachus pugnax*. A well represented passage visitor.
The autumn produced four reports: a single landed on West Wideopens on 4 August, another on Inner Farne on 19 August, with two west over the inner group on 21 August. The only outer group record was one north over Brownsman on 25 September.

Sanderling *Calidris alba*. An uncommon passage visitor.
A quiet year with just two records, both from the inner group: two moulting adults were discovered on the beach of St Cuthbert's Cove on 5 August and another on the south rocks of Inner Farne on 21 August.

Little Stint *C. minuta*. An uncommon passage visitor.
The only record was two calling over the Inner Farne lighthouse on the evening of 8 October.

White-rumped Sandpiper *C. fuscicollis*. An extremely rare visitor.
An individual was seen flying from Brownsman on to nearby Nameless Rock accompanied by two Dunlin on 25 September. Before other team members could be summoned the bird took flight and departed west towards the mainland. This was only the second ever Farnes record, following a long-staying bird in September 2002, and while it was an outstanding record it left many of the team disappointed!

Pectoral Sandpiper *C. melanotos*. An extremely rare visitor.
Often predicted and long overdue, this highly migratory sandpiper is recorded annually in Northumberland and it was only a matter of time before the species was seen on the Farnes. An individual was flushed off the top meadow pond on Inner Farne and flew off west calling on 4 September. This bird has the distinction of being the 300th species to be recorded on the Farne Islands.

Curlew Sandpiper *C. ferruginea*. An uncommon passage visitor.
There was a good showing on autumn passage: an adult in summer plumage was seen briefly on Inner Farne on 25 July, and it or another arrived on Brownsman and remained for eight days from 28 July-5 August. The final record was one on Knoxes Reef on 21 August.

Curlew Sandpiper (Graeme Duncan)

Purple Sandpiper *C. maritima*. A common passage and winter visitor.
The Farnes are a significant site for this species and the islands hold nationally important numbers during the year (threshold for nationally important is 130). The highest counts of the year occurred during the autumn months (Table 9) with 250 regularly seen across the islands from October-early December. Reports were received from all months except June although six were still present on 30 May on the inner group.

Table 9. Peak counts of Purple Sandpipers on the Farne Islands during 2013.

	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Inner Group	108	100	90	0	2	43	80	150	90	150
Outer Group	30	35	104	0	29	56	90	100	120	40

Dunlin C. *alpina*. A common passage and winter visitor.
Well represented with spring passage producing one-five birds on 29 dates from 21 March-1 June, with the majority in summer plumage. After the arrival of a single on Longstone on 23 June and Inner Farne on 8 July, 1-19 birds were seen regularly until the end of the season. Peak passage produced 48 across the islands on 15 July, 32 on Knoxes Reef on 25 July and 93 north through Inner Sound on 22 November.

Jack Snipe *Lymnocryptes minimus*. A well represented passage visitor.
The first of the year was discovered on Inner Farne on 22 September, followed by a small influx with three on the islands on 24 September and seven the following day (three on Brownsman, three on Inner Farne and a single on Longstone). Further records included singles on 12 dates from 26 September-23 November (including one found dead on Brownsman on 27 September) but three were on Staple Island on 3 October.

Snipe *Gallinago gallinago*. A well represented passage visitor.
Well represented with an individual on Brownsman on 10-16 January suggesting overwintering birds. Spring passage produced singles on eight dates from 30 March-1 May. The first autumn birds were seen from 5 August with 1-7 recorded on 43 dates until 3 December. During this period a count of 38 across the islands broke the previous island highest count of 35 in 1991.

Woodcock *Scolopax rusticola*. A well represented passage visitor.
Typical light spring passage produced one-two on 10 dates from 21 March-15 April. The first autumn records were singles on Brownsman and Inner Farne on 12 October with one-two on 22 dates until last seen on 24 November. A major influx on 11 November (Table 10) produced 41 across the islands including 18 on Inner Farne, 12 on Brownsman, 10 on Staple Island and one on Knoxes Reef.

Table 10. Peak Woodcock counts, Farne Islands 2013.

	October				November				
	14	**18**	**16**	**19**	**3**	**11**	**18**	**20**	**21**
Inner Group	0	0	2	2	2	19	4	1	5
Outer Group	3	3	1	1	2	22	2	6	7
Day Total	3	3	3	3	4	41	6	7	12

Woodcock (Ciaran Hatsell)

Common Sandpiper *Actitis hypoleucos*. A well represented passage visitor.
It was a below-par showing this year with records on four spring and 19 autumn dates. The first was discovered on Longstone on 1 May followed by singles on 8, 9 and 18 May. The first returning bird arrived on Brownsman and Inner Farne on 28 July and thereafter one-two were present until last seen on Brownsman on 30 September. During this period a modest peak of four occurred on 24 August.

Green Sandpiper *Tringa ochropus*. An uncommon passage visitor.
An individual was on Staple Island then Brownsman on 31 July; one was on Brownsman on 2 August, two on Staple Island on 6 August and another over Brownsman on 11 August. The only inner group record was one west over Inner Farne on 9 September.

Greenshank *T. nebularia*. A well represented passage visitor.
A quiet year with records on only six dates including singles on three dates from 22-27 August and two on Brownsman flats on 26 August. September produced three on the inner group on 7 September and the last record of the year on 24 September.

Wood Sandpiper *T. glareola*. An uncommon passage visitor.
Since the turn of the century the islands have produced annual records (apart from 2004) and that run continued with two individuals this year. A vocal bird flew south over the inner group on 22 August and another was flushed off Brownsman on 25 September.

Redshank *T. totanus*. A common passage and winter visitor; bred in nine years 1901-1943 (Wilson and Noble-Rollin 2010).
Well represented during the year although scarce in June with records on only five dates. The biggest influx of the season occurred on 13 July (Table 11) with 72 on Longstone and 56 on West Wideopens the same day.

Table 11. Peak monthly counts of Redshank, Farne Islands 2013.

	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Inner Group	7	25	1	1	56	30	17	5	7	3
Outer Group	4	3	4	1	72	12	10	6	4	2

Grey Phalarope *Phalaropus fulicarius*. An uncommon autumn passage and winter visitor, extremely rare in spring.
This specialist surface feeder is now expected annually although it was left late to claim the only record of the year: a check on the islands on 29 December produced one feeding in Staple Sound, the final species for the year list.

Pomarine Skua *Stercorarius pomarinus*. A well represented passage visitor, common in some years.
Seawatching produced reports on 15 autumn dates. An adult with full tail "spoons" flew north on 20 July. Apart from three north on 6 September, there was no noticeable passage with all other records referring to one-two north from 5 September to 21 November.

Arctic Skua *S. parasiticus*. A common passage visitor.
The first of the year was noted flying north through Staple Sound on 17 May with one-three north on 18, 23 and 30 May. The spring peak occurred on 24 May with 12 north. The first returning birds were seen from 24 June and thereafter one-five were seen on either passage or loafing around the islands attacking the local seabird population throughout July and August. Peak passage was 22 north on 6 September and 14 north on 7 September. The number of records declined throughout September and October with the final records of late birds south on 14 and 21 November.

Long-tailed Skua *S. longicaudus*. An uncommon passage visitor.
A national influx occurred in late May and two stunning adults were recorded, one north on the evening of 23 May and another through Staple Sound the following morning. These represented only the second and third ever spring records for the islands after an adult in June 2006. A dark-phase juvenile south through Staple Sound on 29 October was the only autumn record.

Great Skua *S. skua*. A common passage visitor.
Good numbers were seen on spring passage with singles north on 10 and 28 April, 12, 14 and 23 May, 6 and 18 June. The only exception during this period involved seven north on 24 May. Two north on 20 and 21 July were the first autumn birds with one-two on five dates in August and one-nine on 12 dates in September. There were impressive numbers in October with 1-17 north on eight dates, and 21 south on 10 October. The season peak (and a new Farnes record) occurred on 11 October with 216 north throughout the day. Thereafter the number of records declined; late records included two north on 21 and 22 November.

Puffin *Fratercula arctica*. An abundant breeding summer and passage visitor.
It really was the year of the Puffin although proceedings did not start well. After continuous easterly gales and sub-zero temperatures in early spring, large numbers were found dead along the east coast mainland in late March. The first birds returned to the islands on 5 April and the first eggs were discovered on 1 May on Inner Farne and 2 May on Brownsman. The full breeding population across all the islands was surveyed for the first time in five years, and although still someway short of the 55,000 pairs in 2003, the population showed an 8% increase on the 2008 survey with 39,962 (36,835) pairs nesting as follows: Inner Farne 11,271 (9,813),

West Wideopens 4,768 (4,257), East Wideopens 1,459 (1,362), Staple Island 11,151 (10,672), Brownsman 10,047 (9,015), North Wamses 691 (1,083), South Wamses 515 (541), Big Harcar 60 (92). Media interest was huge and a live Puffin camera beamed images from inside a burrow into the Information Centre on Inner Farne for the first time. The first chicks hatched on 12 June with the first fledglings departing in early July. The breeding season was very successful with 137 chicks fledging from 148 monitored nests, an average productivity of 0.93. Late chicks were still being fed on Brownsman on 28 August, and as usual small numbers were seen around the islands in early winter.

Black Guillemot *Cepphus grylle*. A well represented winter and passage visitor; bred in 17th and possibly 18th centuries (Gardner-Medwin 1985).
The Farnes continue to support a small wintering population and this was evident as an adult in winter plumage was present in Staple Sound on 5 and 11 January. An adult moulting into summer plumage was seen on the outer group near Brownsman from 30 March-2 April and then switched to the inner group where it was often seen sitting on Ladies Path on Inner Farne from 11 April-4 May. During this period the bird gradually moulted into full summer plumage and could occasionally be heard calling to the nearby Eiders. After a four month absence, singles were recorded on 19, 26 and 28 September in Inner Sound and again regularly from 21 November-28 December in Staple Sound.

Razorbill *Alca torda*. A common breeding resident and passage visitor.
This species goes from strength to strength, and the island population surpassed 500 pairs for the first time. Small numbers returned to the cliff ledges in late March although the first egg was not discovered until 8 May. A record 505 (420) pairs bred as follows: Inner Farne 244 (193), West Wideopens 99 (85), East Wideopens 25 (21), Skeney Scar 17 (16), Staple Island 58 (48), Brownsman 20 (17), North Wamses 13 (7), South Wamses 15 (16), Big Harcar 12 (16) and Longstone End 2 (1). The first chicks hatched on 10 June and the first "jumpers" (chicks fledge at just 18 days of age) were seen leaving the lighthouse cliff on Inner Farne in early July. Numbers gradually declined as adults took small young out into the relative safety of the North Sea with the last fledglings in early August. Productivity suggested a reasonable year with 19 chicks fledging from 32 monitored nests, an average productivity of 0.59 (previous year 0.70). As usual, small numbers returned to winter around the islands during the early autumn.

Little Auk *Alle alle*. A well represented winter and passage visitor.
A very quiet year by Farne standards (the islands set the all time British record in 2007) although there were two spring records: a partial summer-plumage bird north through Inner Sound on 24 March and a summer-plumage individual on the sea off Inner Farne on 25 March. More typical records were one-two in Staple Sound on 10, 11 and 22 November and 12 north through Inner Sound on 21 November. The only other record was one caught in a rock pool on South Wamses on 23 November before being released successfully back to sea.

Guillemot *Uria aalge*. An abundant breeding resident and passage visitor.
It was another great season as the population topped the 50,000 individual mark for the first time. Due to the inclement weather it was a later than expected start with the first eggs not discovered until 29 April on Inner Farne and 30 April on Staple Island. A new record of 50,048 (49,076) individuals nested as follows: Inner Farne 6,891 (6,784), West Wideopens 2,101 (2,232), East Wideopens 2,540 (3,096), Megstone 280 (420), Skeny Scar 1,658 (2,216), Staple Island 24,225 (23,665), Brownsman 8,978 (8,360), North Wamses 1,960 (1,317), South Wamses 657 (489), Roddam and Green 138 (97) and Big Harcar 620 (400). The first young hatched on 3 June and

the first "jumplings" were off Staple Island on 24 June and Inner Farne on 25 June. Although not monitored it was another great year with thousands of youngsters making it to fledgling stage. As the breeding season started late, birds remained on the cliffs later than usual although most had departed by 28 July. The last fledgling on the islands jumped from Inner Farne on 5 August. Small numbers returned to winter around the islands from September with counts of up to 30 in late October.

Bridled Tern *Onychoprion anaethetus*. An extremely rare visitor.
Unequivocally the "Bird of the Year". An adult in summer plumage was discovered amongst roosting terns on Inner Farne on 1 July. Initially the bird departed after 20 minutes but returned that evening to roost and was seen on 19 dates on the Farnes: 1-4 July, 13-24 July and 15-19 August. During its stay the bird favoured the rocks to the south of the Inner Farne jetty and was observed on several occasions in vocal displays with Sandwich Terns. On at least three occasions it was seen sitting on the lighthouse boundary wall on the islands. Over 600 birders from as far away as Kent and Cornwall travelled to see the bird on the islands. This was the first record for the Farnes and the twenty-fourth for the UK. The final sighting of the bird was on 19 August as it departed in a southeasterly direction out to sea.

Bridled Tern (Ciaran Hatsell)

Bridled Tern (Tom Tams)

Little Tern *Sternula albifrons*. A well represented passage visitor.
The majority of records refer to the traditional evening roost at St Cuthbert's Cove, Inner Farne, which peaks in mid-May before birds disperse to nearby breeding grounds. After the first record on 28 April, the roost attracted birds throughout May with a peak of 81 on 14 May (Table 12). More unusually, an individual was seen near the outer group in Staple Sound on 10 May.

Table 12. Little Tern evening roost counts, Farne Islands 2013.

	April		May							June
Date	**28**	**29**	**7**	**9**	**10**	**13**	**14**	**17**	**26**	**1**
Count	4	5	59	55	57	49	81	19	18	5

Black Tern *Chlidonias niger*. An uncommon passage visitor.
There were only two records of this marsh tern, both seen fishing with other terns in Inner Sound: a juvenile was noted on 15 August and another was present from 5-8 September.

Sandwich Tern *Sterna sandvicensis*. A breeding summer and passage visitor.
Due to the weather the season was very slow to start with an individual in Inner Sound on 2 April being the first record of the year. Thereafter numbers slowly increased at the evening roost at Knoxes Reef (Table 13). The first birds started to settle in the main colony on Inner Farne on 27 April and the first eggs were discovered on 10 May. All 824 (966) pairs nested on Inner Farne with none on Brownsman. An attempt to nest on the Inner Farne picnic site was made with two eggs laid on 24 June but these were soon predated. The first fledglings were seen from 12 July and for the first time 100 chicks were ringed with lettered plastic coloured rings to allow easy reading in the field. Small numbers remained throughout August and September with a late bird north through Inner Sound on 10 October. However this was not the last: an individual favouring Staple Sound was seen from 15 November-7 December (when the Rangers departed). This is the first ever overwintering record for the Farne Islands.

Table 13. Sandwich Tern evening roost counts in April 2013, Farne Islands.

April	3	4	7	12	13	14	15	16	22
Count	2	4	9	18	30	99	195	213	300

Common Tern *S. hirundo*. A breeding summer and passage visitor.
Three birds fishing off Inner Farne on 13 April were the first of the year, with numbers gradually increasing in the nightly roost thereafter. Aerial displays commenced from late April and the first eggs were discovered on 29 May. For the third consecutive year there were no breeding attempts on the outer group: all 94 (88) pairs nested on Inner Farne. The first chick hatched in mid-June with the first birds fledging from 12 July, and birds started moving away from the islands in early August. There was a surge of birds on the inner group in early September with 57 and 61 birds on 9 and 11 September respectively. The final record was a single on 16 September.

Roseate Tern *S. dougallii*. A well represented summer and passage visitor, uncommon breeding species.
It was another disappointing breeding season as no attempts were made although record numbers were counted in August. The first birds of the year (a pair) arrived on Inner Farne on 3 May and throughout May, June and July pairs were present almost daily, favouring Inner Farne. Courtship display flights and adults landing in suitable nesting habitat were all observed, but no breeding took place; there has now been only one breeding attempt in the previous seven seasons. Post-breeding dispersal from the main breeding colony on Coquet Island brought good numbers to the Farnes in August with a peak of 116 on 14 August (Table 14). Late passage was logged in September with one-six noted daily until 12 September and the final record off Brownsman on 28 September.

Table 14. Roseate Tern roost counts in August 2013, Farne Islands.

August	3	7	12	14	15	16	17	18	19	23	25	26
Count	2	11	29	116	38	50	74	76	31	11	4	5

Roseate Terns (Will Scott)

Arctic Tern *S. paradisaea*. An abundant breeding summer and passage visitor.
Another good year as the islands support a breeding population of nearly 2,000 pairs. The first bird was discovered feeding off Inner Farne on 13 April although it was a very slow and gradual increase in numbers over the following weeks (Table 15). The first nest scrapes were found on 14 May with the first eggs discovered on Inner Farne on 19 May and Brownsman on 22 May. A total of 1,921 (1,866) pairs nested as follows: Inner Farne 1,201 (1,282), Staple Island 21 (11) and Brownsman 699 (630). The first chicks hatched on Inner Farne on 13 June and Brownsman on 16 June, with the first birds fledging on 9 July. The Rangers monitored 1,321 nests which fledged 851 young, an average productivity rate of 0.64 (compared with 0.65 last year). As usual, the late summer saw a build up of first-summer birds with a peak of 67 on 26 June. After the breeding season numbers dwindled in August and September with late birds seen on 16, 26 and 29 October. However, an adult seen daily between 1-19 November on both island groups was the latest ever recorded on the Farne Islands.

Table 15. Arctic Tern evening roost counts, Farne Islands 2013.

	April				May		
Date	**15**	**23**	**28**	**30**	**3**	**5**	**9**
Count	3	3	64	143	430	1,530	4,000+

Kittiwake *Rissa tridactyla*. An abundant breeder and passage visitor, well represented in winter. It proved to be a difficult year for this species and the relentless storms in early spring hampered the start of the breeding season. Nest building did not commence until 7 May and the first eggs were discovered on Brownsman on 22 May (21 days later than the previous season). Some birds did not even attempt to nest this year and the breeding population declined with 3,443 (4,241) pairs nesting as follows: Inner Farne 1,079 (1,275), West Wideopens 159 (198), East Wideopens 229 (229), Skeney Scar 129 (141), Staple Island 868 (1,197), Brownsman 940 (1,130), North Wamses 11 (20), Roddam and Green 0 (10) and Big Harcar 28 (41). The first chicks hatched from 15 June (when some birds were still nest building) with the first fledglings on 25 July. The Rangers monitored 722 nests which produced 448 fledged young with an overall productivity of 0.62, the lowest in five years. After the breeding season small numbers were recorded throughout the late summer and autumn with heavy northerly passage documented on 11 October.

Black-headed Gull *Chroicocephaleus ridibundus*. A well represented breeding species from 1972 onwards and common visitor.
It was another good year as the island population increased to a new record high. The evening roost on Knoxes Reef gradually increased with 217 on 28 March increasing to 528 on 30 March and peaking at 681 on 8 April. Birds were landing back in the main colony on Inner Farne from 4 April and the first eggs were found on 28 April. All nested on Inner Farne with 565 (461) pairs; the last breeding on the outer group occurred in 2011. Chicks started hatching on 31 May with the first fledglings noted from 22 June. The colony continued to be heavily predated by large gulls although it still appeared to be a successful season. After the breeding season good numbers were still evident, especially during November with 200 on the inner group and up to 40 on the outer group.

Little Gull *Hydrocoloeus minutus*. A well represented passage and winter visitor.
As usual first-summer birds appeared during the summer with singles on four dates between 4-29 June and four dates from 16-21 July. The autumn months produced singles on 10 dates from 17 August-30 November with two adults feeding in Staple Sound on 10 November. The final record was a first-winter bird in Staple Sound on 29 December.

Bonaparte's Gull *Chroicocephalus philadelphia*. An extremely rare visitor.
An adult of this rare North American gull was discovered at nearby Bamburgh on 29 October and then found feeding off Knoxes Reef with other gulls on 1 November. It showed extremely well when enticed with bread from the Inner Farne jetties and it was seen in the same area the following day and on 18 November. On 9 November it was sitting on Gun Rock off Staple Island. This was the second Farnes record after one in 2003.

Bonaparte's Gull (Graeme Duncan)

Mediterranean Gull *Larus melanocephalus*. An uncommon passage and winter visitor.
Records continue to increase on an annual basis as the UK and Northumberland population continues to grow. A first-winter bird was on the inner group on 17-23 April and was joined by a first-summer bird on 24 April with displaying observed between the pair. Further sightings (involving at least three different birds) were made daily from 27 April-7 May including a displaying bird in the Black-headed Gull colony on Inner Farne. The autumn produced another good run of records with a first-winter bird in the Kettle off Inner Farne on 1-2 November, while an adult winter was seen on 18, 22 and 27 November at various locations on the inner group. The outer group rarely attracts Mediterranean Gulls, but a second-winter bird was seen feeding in Staple Sound on 19, 20 and 24 November, the first outer group record since 2008.

Great Black-backed Gull *L. marinus*. An uncommon breeder, common winter and passage visitor.
The breeding population continues to increase slowly and small numbers were evident in late March on breeding territories. The first mating behaviour was seen on 13 April with the first eggs discovered on 1 May. A total of 15 (14) pairs nested as follows: West Wideopens 2 (1), East Wideopens 3 (3), Knoxes Reef 1 (1), Staple Island 1 (1), Brownsman 2 (2), North Wamses 3 (2), South Wamses 2 (2), Big Harcar 1 (1) and Longstone End 0 (1). The first chicks hatched on Brownsman on 22 May and the first fledglings were seen on 4 July. After the breeding season up to 300 were present across the islands during the autumn.

Common Gull *L. canus*. A common visitor; bred in four years 1910-14 and probably in 1916, with attempted breeding in 1974 (Booth 1911, 1912; Miller 1911-1914; Paynter 1914; March 1916; Hawkey and Hickling 1974).

The evening roost on Knoxes Reef attracted the largest numbers during the spring (Table 16) with a peak of 127 on 19 April. Numbers dwindled in early May with the only summer records including one on Longstone on 31 May, West Wideopens on 24 June and Inner Sound on 18 July. Numbers increased from late August with up to 40 on the outer group and 50 on the inner group during November and early December. A bird showing characteristics of the eastern race *kamtschatschensis/heniei* was reported briefly in Staple Sound on 7 October but not confirmed.

Table 16. Evening roost counts of Common Gulls on Knoxes Reef, 2013.

	March			April									May	
Date	**21**	**23**	**26**	**6**	**10**	**13**	**14**	**16**	**17**	**19**	**21**	**28**	**7**	**13**
Count	2	10	14	19	33	71	85	103	102	127	49	34	26	12

Lesser Black-backed Gull *L. fuscus*. A common breeding summer and passage visitor.
The Farnes population migrates south for the winter and good numbers arrived back with 200 in a feeding frenzy on 29 March. Nest building commenced in mid-April and the first eggs were discovered on 8 May. A total of 765 (744) pairs nested as follows: Inner Farne 18 (16), West Wideopens 215 (216), East Wideopens 124 (133), Knoxes Reef 13 (25), Staple Island 64 (34), Brownsman 22 (12), North Wamses 97 (97), South Wamses 134 (134), Roddam and Green 3 (2), Big Harcar 70 (70) and Longstone End 5 (5). The first chicks hatched on 26 May with the first fledgling seen on 16 July. As usual birds departed for southern Britain and beyond during September, with a very late individual noted on West Wideopens on 31 October.

Herring Gull *L. argentatus*. A common breeding species, abundant winter and passage visitor.
It was another strong year with the population increasing. Copulation and breeding behaviour was observed from 8 April with the first eggs discovered on Staple Island on 7 May. A total of 874 (882) pairs nested as follows: Inner Farne 8 (8), West Wideopens 145 (139), East Wideopens 150 (152), Knoxes Reef 110 (120), Skeney Scar 24 (24), Staple Island 55 (55), Brownsman 8 (7), North Wamses 168 (168), South Wamses 45 (45), Roddam and Green 20 (18), Big Harcar 100 (98), Longstone Main 2 (3), Longstone End 17 (18) and Northern Hares 22 (27). The first chicks hatched on North Wamses on 26 May with the first fledglings on the wing from 16 July. After the breeding season good numbers remain to winter around the islands with influxes of northern European birds during the late autumn.

Iceland Gull *L. glaucoides*. An uncommon winter and passage visitor.
Spring passage produced a first-winter bird on Knoxes Reef on 7 April which was seen the following evening on West Wideopens. Two birds (both first-winters) were attracted to a large feeding frenzy of gulls in Staple Sound on 27 November. Both birds were present all day and moved off Inner Farne before heading to roost later that day. Both were seen again in Staple Sound on 29 November. These were only the second autumn records in 15 years and only the third outer group records since 1997.

Glaucous Gull *L. hyperboreus*. An uncommon winter and passage visitor.
A good showing on passage with a first-winter bird roosting on Knoxes Reef on 22 and 24 March. It or another was seen heading towards Inner Farne on 13 April. The autumn produced a single record: on 15 October an immature flew east over the inner group before circling the outer group, and was present in the roost on Knoxes Reef that evening.

Feral Pigeon *Columba livia*. A common breeding resident.
Abundant throughout the year and breeds in small numbers; large flocks form during the autumn months. Various predators, including Peregrine and Greater Black-backed Gull, take advantage of old, weak and slow individuals.

Wood Pigeon *C. palumbus*. An uncommon passage visitor.
A better year for this species with one on Staple Island on 1 April, and one-two on nine dates between 24 April-27 May including one for five days on the outer group. Autumn passage was represented by one-two on four dates from 11-19 October including a juvenile which visited both island groups.

Collared Dove *Streptopelia decaocto*. An uncommon passage visitor.
A quiet year with just two records: a single flushed from Brownsman cottage roof on 6 May with another on Brownsman on 9 May, seen the following morning on Inner Farne.

Cuckoo *Cuculus canorus*. An uncommon passage visitor.
Recorded in five of the previous seven years, the good run continued with two records: a juvenile west over the inner group on 15 August, and a juvenile on Inner Farne on 26-29 August. This bird moved to the outer group where it remained until 5 September.

Long-eared Owl *Asio otus*. An uncommon passage visitor.
One was flushed off Staple Island and then Brownsman on 12 January. With Rangers rarely present at this time of the year this is the first ever record for January. Spring records were scarce with one on Staple Island on 19-20 May. More typically: one over West Wideopens on 10 October, one roosting on Brownsman on 11 October, then two on Inner Farne on 12 October.

Short-eared Owl *A. flammeus*. An uncommon passage visitor.
The species is scarce on spring passage so three records from Inner Farne were of note on 3 and 7 April and 15 May. Autumn passage was quiet with singles on Inner Farne on 18-19 August, and one-two across the island group on seven dates from 25 September-15 October.

Nightjar *Caprimulgus europaeus*. A rare passage visitor.
A female/immature was flushed from the "flats" area of Brownsman on 2 October and was relocated near the cottage before departing west, low over the sea. This is the second consecutive year the species has been recorded (a male was on Brownsman in June 2012) but only the fifth since 1954.

Swift *Apus apus*. A well represented summer and passage visitor.
After the first arrival on 16 May, 1-10 were recorded on 16 dates until 18 August. Peak counts were 35 southwest over the inner group on 3 August and 28 over Brownsman on 5 August.

Hoopoe *Upupa epops*. A rare visitor.
One of the highlights of the year: an individual was discovered on the north rocks of Brownsman on 15 October (alongside Great Spotted Woodpecker and Blackcap!) before moving to a feeding area by the vegetable garden. This obliging bird showed well for the Ranger team, and was the tenth island record but the first since 1996.

Hoopoe and Blackcap
(Graeme Duncan)

Northern race Great Spotted Woodpecker
(Graeme Duncan)

Great Spotted Woodpecker *Dendrocopus major*. An uncommon passage visitor.
A major irruption down the east coast of the UK resulted in a noticeable influx on the Farnes. The majority of birds are believed to belong to the northern race *D.m.major* which is slightly bulkier with long wings. One arrived on Inner Farne on 11 October and later that day two more arrived on Brownsman. Eight were present across the islands the following day (as shown in Table 17) including six on Brownsman. A total of nine different individuals were recorded during the invasion with a single lingering from 16-24 October on Brownsman. Two were ringed on 15 October and one of these was recaptured on 22 October having put on 11.1 grams of weight in eight days.

Table 17. October influx of Great Spotted Woodpeckers by date, Farne Islands 2013.

October	11	12	13	14	15
Inner Farne	1	1	3	0	0
Brownsman	2	6	5	2	2
Staple Island	0	1	0	0	0
Day total	**3**	**8**	**8**	**2**	**2**
'new' birds	**3**	**6**	**0**	**0**	**0**

Red-backed Shrike *Lanius collurio*. An uncommon passage visitor.
A good year for this migratory "butcher bird" as three were recorded, all on the inner group of islands. Spring produced an adult female on West Wideopens on 18-19 May and a striking male on Inner Farne on 29 May-1 June (caught and ringed on 31 May). An immature bird roamed Inner Farne on 25-28 September.

Jackdaw *Corvus monedula*. A well represented visitor; former breeder, last in 1966 (Hawkey 1991).
As usual the majority of records were in spring with one-three on five dates from 29 March-26 April with a peak of six flying west over Inner Farne on 4 April. Autumn records included one east over Brownsman on 23 September and two on Inner Farne on 16-17 October.

Rook *C. frugilegus*. A well represented visitor.
Typically, the majority recorded were spring migrants from the nearby mainland, with one-three on 12 dates between 27 March-4 May. Autumn passage was lighter with one-three on seven dates from 21 September-20 October with a peak of five over Brownsman on 23 September.

Carrion Crow *C. corone*. A well represented visitor and rare breeding species.
Well represented throughout the year with good numbers on passage, especially during April with peaks of 13 on 13 April and 20 on 28 April. A nest was part-constructed on the disused Brownsman light–tower in early April; previous nesting attempts were in 2002 and 2007. A pair summered on the outer group, predating eggs and chicks and generally unsettling the breeding seabirds.

Hooded Crow *C. cornix*. An uncommon visitor.
Recorded on both spring and autumn passage. A single flew west through Inner Sound on 20 April and on 30 September one was on Knoxes Reef and then North Wamses, which was the first autumn record since 2000.

Goldcrest *Regulus regulus*. A common passage visitor.
A light spring passage this year and one-three were noted on nine dates between 13-24 April with a peak of four on 15 and 20 April. The first of the autumn arrived on 7 September but numbers were generally low compared with last autumn. The peak count during an influx in mid-October was 33 on 12 October. Late records were singles on 26 and 30 October.

Firecrest *R. ignicapillus*. An uncommon passage visitor.
An adult female was discovered on Inner Farne on 3-5 October and remained loyal to the vegetation to the north of the Pele Tower. This was the first record since October 2009 and the twenty-sixth in the past 40 years.

Firecrest (Bex Outram)

Skylark *Alauda arvensis*. A common passage visitor; may have bred in 1865 and *circa* 1900 (Brown 1866; Pike 1902).
Small numbers were reported on spring passage but most records were in autumn. A single on Brownsman on 16 January was unseasonal whilst spring produced one-four on 18 dates between 21 March-18 May, with peak passage involving six flying north on 7 April. Autumn passage commenced with a single on Brownsman on 14 September with regular records throughout the autumn and early winter. Peak passage included 25 on Inner Farne on 25 September and 27 across the islands on 13 October.

Shorelark *Eremophila alpestris*. An uncommon passage and winter visitor.
One was discovered on Brownsman on 20 October a few hours before dusk and was not seen subsequently. It, or another, was found on Inner Farne on 24 October. These are the first records since 2010 and only the third year the species has been recorded in the previous 10.

Sand Martin *Riparia riparia*. A well represented summer and passage visitor.
Recorded on seven spring dates: the first of the year was seen flying along Ladies Path, Inner Farne, on 15 April with four the next day. Thereafter one-three were noted until 4 May. The only autumn record was a single west over Inner Farne on 9 July.

Swallow *Hirundo rustica*. A common summer and passage visitor; scarce breeder.
Spring passage was light, the first of the year being two over Knoxes Reef on 13 April with a peak of 14 on 4 May. The breeding population remained solid with 5 (4) pairs nesting including Inner Farne 1 (2), Staple Island 1 (0), Brownsman 1 (0) and Longstone 2 (2). All nesting attempts were successful and the Longstone and Inner Farne pairs had second broods. Nest sites were inside a lighthouse, chapel, pump hut and garden shed! Autumn passage produced 1-14 during August and September with a peak of 18 on 21 August and 17 south on 26 August. Seven flying east over Inner Farne on 10 October was the final record.

House Martin *Delichon urbicum*. A well represented summer and passage visitor; six pairs attempted to breed in 1950 (Watt 1950).
An average year with 15 records: 10 in spring and five in autumn. The first was seen flying over Inner Farne on 15 April with one-two until 2 June. Autumn was quieter with one-two between 26 August-25 September including five on 3 and 20 September.

Greenish Warbler *Phylloscopus trochiloides*. A rare visitor.
August is the prime month for this rare drift migrant and the islands hosted three: a pale bird on Brownsman on 24-25 August was ringed, an unringed individual was on Brownsman on 28 August, and one on Inner Farne on 31 August. These were the eleventh-thirteenth Farnes records with nine having occurred since 2004.

Pallas's Warbler *P. proregulus*. A scarce visitor.
For the second consecutive year the islands welcomed one of these rare Siberian waifs. A confiding individual was present on Inner Farne on 11-12 October and represented the nineteenth Farnes record; 15 have occurred in the last 20 years.

Yellow-browed Warbler *P. inornatus*. An uncommon passage visitor.
An impressive showing with no fewer than 20 individuals recorded during the autumn (Table 18) of which five were ringed by the Rangers.

Yellow-browed Warbler (David Steel)

Table 18. Yellow-browed Warbler influx to the Farnes, 2013.

	September							October		
	24	**25**	**26**	**27**	**28**	**29**	**30**	**1**	**2**	**19**
Inner Farne	3	4	4	1	4	3	1	1	1	0
West Wideopens	0	1	1	0	0	0	0	0	0	0
Brownsman	4	3	1	3	2	3	3	0	0	1
Longstone	0	1	0	0	0	0	0	0	0	0
Day total	**7**	**9**	**6**	**4**	**6**	**6**	**4**	**1**	**1**	**1**
'new' birds	**7**	**3**	**0**	**4**	**2**	**2**	**1**	**0**	**0**	**1**

Wood Warbler *P. sibilatrix*. An uncommon passage visitor.
A confiding individual was discovered on Inner Farne on 20 May before moving to the nearby West Wideopens that evening. This was the first record in two years and the first spring record since May 2008.

Chiffchaff *P. collybita*. A common passage visitor.
The first arrived on the slightly late date of 9 April, on Inner Farne. Spring passage produced one-three on 29 dates with a peak of seven on 8 May and four still present the following day. The final spring bird was on Brownsman on 31 May. The first autumn birds arrived on 19 August and birds were recorded throughout autumn with two peaks (as shown in Table 19). The final record was a single on Inner Farne on 1 November. Two individuals of the eastern race *P. c. tristis* were identified on Inner Farne on 13 and 25 October.

Table 19. Peak Chiffchaff counts during 2013, Farne Islands.

	September		October				
	24	**25**	**12**	**13**	**14**	**15**	**16**
Inner Group	2	1	2	5	10	4	4
Outer Group	10	8	7	12	8	12	8
Day total	**12**	**9**	**9**	**17**	**18**	**16**	**12**

Willow Warbler *P. trochilus*. A common passage visitor.
The first of the year arrived on 15 April with spring passage represented by one-seven on 34 dates. Peak spring passage is shown in Table 20 with the final spring record on 1 June. The first autumn returnees, involving "bright" juveniles, arrived from 4 August with peaks shown in Table 20. The autumn produced records on 55 dates with late stragglers on Inner Farne on 22, 24 and 27 October.

Table 20. Peak Willow Warbler counts during 2013, Farne Islands.

	May				August			Sept
	8	**9**	**10**	**18**	**17**	**25**	**26**	**25**
Inner Group	7	4	3	7	12	12	14	11
Outer Group	22	6	5	11	17	10	10	8
Day total	**29**	**10**	**8**	**18**	**29**	**22**	**24**	**19**

Blackcap *Sylvia atricapilla*. A common passage visitor.
Well represented on passage with the first arrival on Inner Farne on 9 April, with reports on 22 spring dates until last seen on Brownsman on 24 May. During this period, peak counts included 10 on 1 May and four on 18-20 May. The first autumn bird was discovered on Brownsman on

17 August with one-nine reported on a further 39 dates. Peaks were 12 on 3 October, 11 on 12 October and 12 on 14 October. Very late individuals were noted on Brownsman on 19 November and Inner Farne on 21 November.

Barred Warbler *S. nisoria*. An uncommon passage visitor.
Nationally it was a quiet autumn for this species and this was reflected on the islands with just a single record; an elusive individual was on the dock bank on Inner Farne on 22 September but did not stay for long.

Garden Warbler *S. borin*. A common passage visitor.
After the first on Inner Farne on 8 May, one-two were recorded on a further 13 dates until last seen on 14 June. As expected, autumn passage was more productive with reports on 20 dates between 23 August-26 October with a peak count of six on 25 August.

Lesser Whitethroat *S. curruca*. A common passage visitor.
Spring birds were seen on 11 dates from 7 May-1 June, while autumn produced one-two on 10 dates from 25 August-12 October. During this period a modest peak of three occurred on 25 September.

Whitethroat *S. communis*. A common passage visitor.
After the arrival of six across the island group on 1 May, one-four were recorded on 18 spring dates with late stragglers noted on 2 June. Autumn was quieter with one-two on 13 dates from 23 August-29 September, with three recorded on 7 September.

Grasshopper Warbler *Locustella naevia*. A well represented passage visitor.
A quiet year with just three records: singles on Brownsman on 1 May, Inner Farne on 8 May and the only autumn record involving one on Longstone End on 23-24 August.

Icterine Warbler *Hippolais icterina*. An uncommon passage visitor.
Another productive year with three recorded during the season. An individual was discovered in the Information Centre on Inner Farne on 8 June but, having escaped the confines of the building, it was not seen again. Two autumn records involved singles on West Wideopens on 25 August and Brownsman on 12 September.

Sedge Warbler *Acrocephalus schoenobaenus*. A well represented passage visitor.
Spring passage produced one-two on 10 dates with a peak of three on 8 May. Autumn passage involved one-two on nine dates from 6 August-28 September.

Marsh Warbler *A. palustris*. A rare visitor.
An elusive individual arrived on Brownsman on the afternoon of 12 June and was seen by all Rangers present. This was the tenth record for the Farnes, the first since 2008 and, interestingly, all have occurred from 29 May-4 July and all on the outer group islands.

Reed Warbler *A. scirpaceus*. A well represented passage visitor.
A single on Brownsman on 29 May was the first spring record since June 2010. There was a reasonable showing during the autumn, with singles on eight dates from 23 August-12 October and two noted on 3, 4 and 12 October.

Wren *Troglodytes troglodytes*. A common visitor and passage migrant; a rare breeder (Steel 2009).
A well represented winter, spring and autumn visitor: midwinter records included five on Inner Farne, two on Brownsman and a single on Staple Island. With the onset of spring, numbers gradually decreased with the final records involving singles on Inner Farne on 23 April and Brownsman on 1 May. The first autumn birds arrived on Inner Farne on 20 September, with a noticeable autumn peak of 22 across the island group on 12-17 October. Thereafter numbers levelled off until, as expected, small numbers settled to overwinter with at least eight on Inner Farne and four on Brownsman.

Starling *Sturnus vulgaris*. A common visitor; extremely rare breeder.
The spring produced a handful of records with a peak of 11 on 7 April. As usual, few were recorded in May and early June and the first family parties arrived from 17 June. Thereafter there was an almost daily presence until the Rangers departed in early December. Peak monthly counts included 63 in July, 56 in August, 70 in September, 44 in October and 88 in November. As usual, immigration from the near continent was noted during the autumn months.

Ring Ouzel *Turdus torquatus*. An uncommon passage visitor.
After the impressive tally last season this year proved more typical with two spring and two autumn records. A male arrived on Inner Farne on 15 April with a female on Brownsman on 19 May. Autumn produced a female on Inner Farne on 25 September and a male on Brownsman on 30 September-1 October.

Blackbird *T. merula*. An abundant passage visitor; bred in the 1880s then 1893-1914, 1934, 1962 and then annually 1964-74 (Kearton 1898; Miller 1911-1914; Pike 1902; Thorp 1935; Hawkey 1991).
Small numbers overwintered on the islands with light passage recorded in spring, whilst autumn witnessed the largest movements: one-three were present on Inner Farne in January-February with one-eight recorded on spring passage throughout March and April. Peak counts included 18 on 21 March and 25 on 12 April. Late spring migrants were recorded on 8 and 18 May, while a female on Inner Farne on 29 June was unusual. The first autumn bird arrived on 1 October, with steady westerly passage logged over the islands throughout October, peaking with 97 west on 19 October. However, this was all eclipsed by an impressive movement of 2,579 west on 11 November, the third highest count for the islands. Thereafter small numbers were recorded with two-three appearing settled to overwinter on the islands in early December.

Fieldfare *T. pilaris*. A common passage visitor.
Well reported on passage with one-three on the outer group between 11-15 January followed by one-four on five dates from 12-15 April. Autumn passage commenced from 25 September with the arrival of two on Inner Farne and a single on Longstone, with 1-77 recorded on 22 dates in October. Peak passage included 123 west on 31 October and 188 west on 11 November. Thereafter numbers dwindled with the final record involving a single west on 23 November.

Song Thrush *T. philomelos*. A common passage visitor.
Small numbers of northern breeders move through the islands during spring and autumn migration but are often overlooked in the large concentrations of other thrushes. It was a reasonable spring with one-eight noted on 21 dates between 21 March-19 May. Autumn saw the bulk of records with the first on 12 September. Peak passage involved 76 on 25 September, 89 on 1 October and 66 on 2 October, with smaller numbers recorded throughout October-November. Two individuals lingered on Inner Farne in early December and may have overwintered on the islands.

Redwing *T. iliacus*. An abundant passage visitor.
As expected, small numbers were recorded on spring passage with good numbers reported during the autumn as birds make their way into the UK to overwinter. Spring produced one-five on 18 dates from 14 January-1 May with a late individual seen on 8 May. The first autumn birds were discovered on 24 September with three on Brownsman and a single on Inner Farne, and recorded frequently thereafter. Passage generally involved from 1- 66 west with peaks of 145 on 25 September, 138 on 11 October, 151 on 19 October and 145 on 11 November.

Mistle Thrush *T. viscivorus*. An uncommon passage visitor.
The species remains scarce with three records in the year, all on the inner group. Two were on Inner Farne on 21-22 March and one of these birds was missing its tail! Autumn produced singles west over Inner Farne on 12 and 26 October.

Spotted Flycatcher *Muscicapa striata*. A well represented passage visitor.
In complete contrast to the previous season, it was a quiet year with only two spring and five autumn records. The first of the year arrived on Brownsman on 18 May with another on Staple Island on 31 May. Autumn records included singles on Inner Farne on 24-25 August, Brownsman on 27-28 August, Inner Farne on 31 August and 3 September, and one on Longstone on 25 September.

Robin *Erithacus rubecula*. A common passage visitor; bred in 1951 (Watt 1951b).
Spring passage was light with peaks of 12 on 7 April and 16 on 12 April. As spring advanced, numbers dwindled with the final records involving singles on Staple Island on 20 May and Inner Farne on 27 May. The first autumn bird arrived on 18 August and thereafter there was an almost continual presence until the end of the year. Passage never reached the dizzy heights of 2012, but there were peaks of 27 on 12-13 October and 18 on 14 October. Once again, one-two were present when the Rangers departed in early December.

Bluethroat *Luscinia svecica*. An uncommon passage visitor.
The Farnes remain the number one North East locality for this stunning migrant with the islands hosting two individuals. A pair arrived on Brownsman on 18 May and remained until 20 May, although they could be elusive during their stay. In 60 years of recording, the Farnes have boasted records in every year apart from nine seasons, with recent "blanks" only in 1982, 1983, 1999 and 2005.

Red-breasted Flycatcher *Ficedula parva*. An uncommon passage visitor.
The Farnes' good run for this species continued with 2013 producing three records, all on autumn passage. First-winter individuals were discovered on West Wideopens on 12 September, Brownsman on 11 October and Inner Farne on 14 October. This brought the total number of records to 17 in the last 10 years, including an impressive six last year.

Pied Flycatcher *F. hypoleuca*. An uncommon passage visitor.
This attractive black and white flycatcher has become a scarcity on spring passage so two were noteworthy. A first-summer male was on Inner Farne on 8-9 May with a female on Staple Island on 18 May. The first autumn birds arrived during a southeasterly weather front in late August (Table 21). Thereafter, one-two were noted on 17 dates during September including a ringed individual on Brownsman which stayed for nine days until last seen on 5 October.

Table 21. Pied Flycatcher influx in late August 2013, Farne Islands.

August	23	24	25	26	27	28
Inner Group	0	2	4	0	0	0
Outer Group	6	6	5	2	2	1
Day total	**6**	**8**	**9**	**2**	**2**	**1**

Black Redstart *Phoenicurus ochruros*. A well represented passage visitor.
Another good showing for this species. After two arrivals on Inner Farne on 7 April, singles were recorded across the islands on 11 spring dates until last seen on Longstone on 31 May. During this period two were on Brownsman on 8 May with three across the island group on 15 May (two on Brownsman until 17 May, and a single on Inner Farne). Autumn passage was restricted to October with singles recorded on nine dates with two noted on 3, 20 and 21 October. Typically, some individuals linger including an immature on Brownsman on 20-24 October.

Redstart *P. phoenicurus*. A common passage visitor.
Well reported on passage, with the majority of records occurring during the autumn months. Spring passage was light with a male on Inner Farne on 29 April, and five different individuals recorded on Inner Farne, Staple Island and Brownsman between 15-18 May. The first autumn bird arrived on 17 August with a male on Brownsman followed by one-three on 15 dates until 29 September when the islands experienced a small influx (Table 22). The final record of the year was a single on Brownsman on 7 October.

Table 22. Redstart peak autumn counts, Farne Islands 2103.

	September		October				
	29	**30**	**1**	**2**	**3**	**4**	**5**
Inner Group	0	1	0	2	2	2	2
Outer Group	2	4	5	3	4	1	1
Total	**2**	**5**	**5**	**5**	**6**	**3**	**3**

Whinchat *Saxicola rubetra*. A common passage visitor.
As usual, spring passage was light with one-two recorded on 1, 8, 9, 19 and 20 May. Autumn was better, with the first arrivals noted from 23 August (Table 23) with one-two on nine September dates. The final record of the season involved a juvenile on Inner Farne on 26 September.

Table 23. August influx of Whinchat, Farne Islands 2103.

August	23	24	25	26	27	28
Inner Group	1	3	5	2	0	0
Outer Group	2	5	7	3	3	2
Total	**3**	**8**	**12**	**5**	**2**	**2**

Stonechat *S. torquata*. An uncommon passage visitor.
After a good run of records in the 2000s, two severe winters in 2010-11 reduced numbers locally. As a result, a juvenile on Inner Farne for five days from 9-13 October was the first island record since 2010.

Wheatear *Oenanthe oenanthe*. A common passage visitor; bred in six years 1931-59 (Wilson and Noble-Rollin 2010).
There was a delayed arrival of migrants due to "blocking" weather fronts, with a male arriving

on Inner Farne on 9 April being the latest "first arrival" since 1977. After an individual on Brownsman on 10 April, there were reports on 47 spring dates until last seen on 1 June. Autumn produced records on 51 dates from 19 August-10 October. Peak counts during the season included 16 on 18 April, 20 on 28 August and 16 on 3 September.

Dunnock *Prunella modularis*. A common passage visitor; may have bred in the 1890s (Pybus 1903).
There were small numbers during spring and autumn passage with one or two overwintering on Inner Farne. Early spring produced a peak of seven on Inner Farne on 22 March, although numbers declined by mid-April with May producing only singles on Inner Farne and Brownsman. The first of the autumn arrived on 1 October with modest peaks of three on several dates. Once again the islands supported overwintering individuals with at least one on Inner Farne in early December.

Yellow Wagtail *Motacilla flava flavissima*. An uncommon passage visitor.
This nationally declining summer migrant was recorded on six dates during the year. The first, a male, arrived on Brownsman on 2 May before departing for the nearby South Wamses. Other spring records included singles over the outer then inner group on 2 June and Staple Island on 7 June. Autumn produced singles over Inner Farne on 29 August, 25 September and a late bird on 8 October.

Blue-headed Wagtail *M. f. flava*. An uncommon passage visitor.
A stunning male was discovered feeding on the muddy fringes of the central meadow pond on Inner Farne on 8 May. The bird showed well (down to 5 feet) before eventually departing west. This represents the first record of this sub-species since 2009 and the twenty-eighth overall.

Blue-headed Wagtail (David Kinchin-Smith)

Citrine Wagtail *M. citreola*. An extremely rare visitor.
It was a great autumn for this rare eastern wagtail as the islands recorded two individuals in late August. A first-winter bird was discovered on the north rocks of Inner Farne on 23 August and stayed all day (although elusive at times). Another was found on Brownsman on 27 August and was seen going to roost with other wagtails that evening. The bird was present the following morning but soon departed. Both birds were very vocal and the high pitched call often gave away the birds' presence. These represent the fourth and fifth Farnes records after individuals in 1989, 2000 and 2003.

Citrine Wagtail (David Steel)

Grey Wagtail *M. cinerea*. An uncommon passage visitor; may have bred in the 1890s (Miller 1911-14).
Small numbers were recorded on passage with spring singles over Inner Farne on 31 March and 2, 7 and 8 April. A quiet autumn produced singles over Brownsman (then Inner Farne) on 4 October and Inner Farne on 8 and 11 October.

Pied Wagtail *M. alba yarrelli*. A well represented summer and passage visitor and uncommon breeding species.
The breeding population remained strong and they were recorded in small numbers on passage this year: spring produced one-six moving north through the islands while the breeding pairs established territories across five islands. A total of 8 (7) pairs nested, including: Inner Farne 3 (3), West Wideopens 1 (0), Brownsman 2 (2), Staple Island 1 (1) and Longstone Main 1 (1). Breeding success appeared good. Small evening roosts developed on Inner Farne and Brownsman, with both attracting up to 12 in late August and early September. As usual, the species became scare in the autumn months with the final record on 24 October.

Spring produced small numbers of the continental sub-species **"White Wagtail"** *M. alba alba* on the islands with singles on Staple Island on 22 April, Inner Farne on 30 April, 1 and 5 May, Brownsman on 6 and 19 May and Longstone on 7 May.

Richard's Pipit *Anthus richardi*. A scarce visitor.
The impressive Farnes run continues and the islands remain the number one locality along the North East coast for these large Siberian pipits. A vocal individual arrived on Inner Farne on 30 September but quickly departed west. This represents the sixteenth record in just the past 10 years of this rare pipit.

Olive-backed Pipit *A. hodgsoni*. A rare visitor.
The increasing presence in the UK of this rare skulking Asiatic pipit cannot be demonstrated any better than on the Farne Islands. After the first ever record in 2001 (involving two birds), singles occurred in 2010 and 2011 with three in 2012. For the fourth consecutive year the islands hosted another as an individual was seen briefly on Brownsman before relocating to Inner Farne on the morning of 15 October. The bird favoured an area near the vegetable garden and stayed for four days until 18 October, allowing mainland birders to see it.

Olive-backed Pipit (David Steel)

Tree Pipit *A. trivialis*. A common passage visitor.
A typical year with a scattering of records: spring produced an early single on Inner Farne on 14 April, followed by individuals on Staple Island on 8 May, Inner Farne on 15 May, West Wideopens on 18 May and Longstone on 19 May. Late August produced the first autumn birds with a single on Inner Farne on 23-26 and two on Brownsman on 24-26 August. Thereafter one-two were recorded on six dates until last seen on 25 September.

Meadow Pipit *A. pratensis*. A common passage visitor; bred *circa* 1901 and in 11 of the years 1946-1973 (Pike 1902; Wilson and Noble-Rollin 2010).
As usual, the species was one of the most numerous passage migrants on the islands with good numbers on both spring and autumn passage. Spring produced 1-11 from 21 March-8 May with peaks of 25 on 7 April and 40 on 13 April. Autumn passage commenced from 18 August with peaks of 59 on 4 September, 80 on 24 September and 103 on 25 September. The final record concerned a single on Brownsman on 14 November.

Rock Pipit *A. petrosus*. A common resident well represented as a breeding species.
Breeding birds were evident on the islands in late March with territorial behaviour and singing from 6 April. Nest building began the following week and the breeding population remained strong, although surveying the population is always difficult. A total of 26 (24) pairs nested as follows: Inner Farne 5 (7), West Wideopens 2 (2), East Wideopens 1 (1), Staple Island 5 (3), Brownsman 9 (7), North Wamses 1 (1), South Wamses 1 (1), Longstone Main 1 (1) and Longstone End 1 (1). The breeding season was successful with good numbers of young fledging. During the autumn months the local population was supplemented by immigrants, with up to 40 present in late October.

Chaffinch *Fringilla coelebs*. A common passage visitor.
Recorded in small numbers on passage with one-two on Inner Farne on nine dates from 21 March-20 April. Autumn produced the bulk of records with the first noted on Brownsman on 24 September and thereafter one-six were noted on 17 dates between 26 September-25 October with a peak of 15 on 1 October.

Brambling *F. montifringilla*. A common passage visitor.
Light spring passage produced singles on Inner Farne on 21 March and 7, 12 and 20 April. Autumn passage commenced on 24 September with the arrival of 11 on Inner Farne and two on Brownsman; one-seven were noted throughout the autumn months with peak counts shown in Table 24. The final record was a male on 30 November.

Table 24. Peak Brambling passage in the autumn of 2013, Farne Islands.

	September	**October**						
	30	**1**	**2**	**3**	**4**	**12**	**13**	**14**
Inner Group	4	14	1	1	1	7	5	1
Outer Group	16	40	28	12	11	12	7	7
Total	**20**	**54**	**29**	**13**	**12**	**19**	**12**	**8**

Greenfinch *Chloris chloris*. A well represented passage visitor.
Another quiet year for this large seedeater as all records were from the inner group. Spring passage produced singles flying over on 3, 7 and 13 April. Autumn produced singles west on 30 September and 1 October with five together on 21 October. The final record involved one west over Inner Farne on 24 October.

Goldfinch *Carduelis carduelis*. A well represented passage visitor.
As usual, spring produced the bulk of records with one-three noted on 21 dates between 31 March-17 May with a peak of five north over Inner Farne on 23 April. Autumn was quiet with two on Inner Farne on 29 September.

Siskin *C. spinus*. A common passage visitor.
A quiet season for this migratory finch with records on 11 dates and only one confirmed report from the outer group all year. Spring produced one-three flying over between 7 April-1 May with a peak of 10 west over Inner Farne on 16 April and seven north on 19 April. Autumn passage was light with records of one-six on three dates between 12-30 September.

Linnet *C. cannabina*. A common passage and winter visitor; bred in the 1890s (Kearton 1898).
Spring passage produced one-seven on 31 dates until late May with a peak of 11 west on 21 April. Late spring passage involved a single on Inner Farne on 17-18 June. As usual, autumn was more productive with almost daily records after the arrival of the first on 4 September. Up to 50 were recorded daily on the islands in October and November, favouring Brownsman, Inner Farne and West Wideopens, with a peak of 54 on 26 October.

Twite *C. flavirostris*. A well represented passage visitor.
An individual overwintered on the islands having arrived on Inner Farne in November 2012. The bird, a male, was noted on several dates throughout January-February and was still present when the Rangers returned in late March. In early April it was heard singing daily (often from the top of buildings) and was last recorded on 13 April. Autumn passage produced one-two on 10 dates, all on Brownsman, between 12 October-16 November.

Lesser Redpoll *C. cabaret*. An uncommon passage visitor.
A very quiet year as there were no spring reports. An individual was on Inner Farne on 24 September, and October produced the bulk of records with one-three on seven dates between 12-20 October.

Common Redpoll *C. flammea*. An uncommon passage visitor.
It was a good showing on autumn passage for this northern species. A very pale individual discovered on Brownsman on 30 September stayed for five days. The following week a noticeable influx occurred after a northeasterly weather front (Table 25).

Table 25. October influx of Common Redpoll, Farne Islands 2013.

October	12	13	14	15	16	17	18	19
Inner Group	2	1	7	1	1	1	1	1
Outer Group	1	4	7	20	6	1	3	6
Total	**3**	**5**	**14**	**21**	**7**	**2**	**4**	**7**

Redpoll spp.
As Common and Lesser Redpoll species cannot be distinguished in flight and/or call, birds flying over the islands could not be put down to a particular species. During the season one-four were noted flying over on four dates in May, one day in September, six dates in October and one day in November.

Crossbill *Loxia curvirostra*. An uncommon passage visitor.
A confiding juvenile male was discovered on Inner Farne on 24 September and was still present the following day, but found dead a few days later. This represents the first record since 2009.

Common Rosefinch *Carpodacus erythrinus*. An uncommon passage visitor.
The islands produced two records, with an elusive individual on Brownsman on 24-25 August and Inner Farne on 28 September. The species was annual between 1999-2011 but recent years have produced a dip in records.

Hawfinch *Coccothraustes coccothraustes*. An extremely rare visitor.
An individual flew low over Brownsman during heavy thrush passage on 11 November representing only the sixth Farnes record. Previous records involved individuals in 1953, 1991, 1995, 2005 and 2007. This was only the second ever autumn bird, after one over Brownsman on 9 October 2007.

Snow Bunting *Plectrophenax nivalis*. A well represented passage visitor.
Well represented with a build-up on the inner group of islands during the late autumn. Spring produced a single record, one over Inner Farne on 23 March. The first autumn birds arrived on 24 September with two east over the inner group, and a male on Longstone the following day. Thereafter, one-five were recorded on 11 dates until 28 October with peaks of eight on Inner Farne on 9 October and 12 west over Brownsman on 12 October. Numbers increased on Knoxes Reef with eight on 28 October increasing to 21 on 1 November and up to 17 present daily until 18 November. During this period the birds would feed during the day on the island before departing to the mainland at dusk to roost. Thereafter one-six were noted on seven dates until last recorded on 6 December.

Lapland Bunting *Calcarius lapponicus*. An uncommon passage visitor.
A typical spread of records with autumn producing reports on nine dates; the first of the year was on Brownsman on 12-13 September, followed by two on Inner Farne on 1-4 October. Individuals were seen flying over Inner Farne on 8 and 12 October whilst a bird on Brownsman on 15 October was watched feeding alongside a Hoopoe!

Yellowhammer *Emberiza citrinella*. An uncommon passage visitor.
The species remains uncommon with most years producing just one or two records. An adult female was discovered on Longstone End on 19 May, only the fourth spring record in 15 years. More typical was an individual on Brownsman on 20-22 October.

Little Bunting *E. pusilla*. An uncommon passage visitor.
It was an impressive autumn for this rare eastern bunting, as the islands produced four records. An individual was discovered on Brownsman on 30 September before departing west and seen flying over Inner Farne. As this event was unfolding another was found on Brownsman which stayed until 3 October. After a spell of easterly winds the "double" was repeated when an individual on Brownsman on 12 October was joined by a second on 15 October. Both remained together on the island until last seen on 20 October. The Farnes have boasted 42 records since the first in 1977 and this was the best showing since five in 2000.

Little Bunting (David Steel)

Reed Bunting *E. schoeniclus*. A well represented passage visitor.
Spring passage was typically light with singles recorded on 6, 11-13 April and a late individual on Brownsman on 24 May. After the first autumn record, a single on Inner Farne on 11 September, good numbers were recorded on passage especially during mid-October (Table 26). Thereafter one-three were recorded until last seen on 24 October.

Table 26. Autumn passage of Reed Bunting, Farne Islands 2013.

	September	October						
	30	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Inner Group	4	8	9	11	8	4	1	1
Outer Group	5	8	8	12	15	7	3	3
Total	**9**	**16**	**17**	**23**	**23**	**11**	**4**	**4**

Yellow-breasted Bunting *E. aureola*. A rare visitor.

An impressive record which was a good candidate for "Bird of the Year": a skulking first-winter bird was discovered on Brownsman and remained for three days from 5-7 September. This rare eastern Bunting has been going through a dramatic decline in its range and as a result the number of records in the UK has decreased. This was the first confirmed report since one in Shetland in September 2011 and the first English record in eight years. It represents the eleventh record for the Farne Islands - the last was in 2003 - which remains the best locality in England for the species.

Yellow-breasted Bunting (Ciaran Hatsell)

Black-headed Bunting *E. melanocephala*. An extremely rare visitor.
One of the major highlights of the spring involved the appearance of one of these rare eastern Buntings. An adult female was present on Brownsman for four days between 30 May-2 June and showed well throughout its stay. This represents the sixth record for the Farnes, three of which have occurred in the last five years. Previous records were in July 1971, July 1999, August 2004, September 2009 and May 2011.

Black-headed Bunting (David Kinchin-Smith)

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Storm Petrel being weighed (Graeme Duncan)

FARNES RINGING AND RESEARCH REPORT FOR 2013

Ciaran Hatsell[1] and Chris Redfern[2]
[1]National Trust Ranger, Farne Islands, Seahouses, Northumberland NE68 7SR
[2]School of Biology, Newcastle University, Newcastle upon Tyne NE2 4HH

INTRODUCTION

With the Farnes hosting around 80,000 pairs of breeding seabirds, attaching leg rings and obtaining biometric data has an increasingly important role in monitoring local breeding success and the population biology of these birds with respect to their breeding and non-breeding activities. This research is largely project driven, aimed at facilitating the monitoring of nestling survival and food supply (from nestling biometrics), adult survival and body condition, and annual survival rates and causes of mortality. In addition to the use of metal rings, additional techniques and marks are being used to discover more about the birds. Data from fitting GPS loggers to Kittiwakes breeding on Brownsman have now been analysed and published and provide a unique insight into their foraging ranges and behaviour.[1] Analyses of similar studies on Puffins and Shags are in progress and are allowing us to understand how different foraging strategies enable the marine environment of the Farnes to sustain large numbers of seabirds of species which all depend to a great extent on Sandeels as a food resource. Plastic rings with easier to read three-letter codes, used alongside metal rings, are allowing faster accumulation of data, particularly on the long-term behavioural strategies of individual birds. The use of such rings on Shags, in a project coordinated by the researchers from the Centre for Ecology and Hydrology, Edinburgh, is revealing the connectivity of breeding and wintering areas in northeast UK Shag populations in much greater detail.

RINGING TOTALS IN 2013

Ringing and recapture totals for the year are summarised in Table 1 (seabirds, including Mallard as an honorary seabird) and Table 2 (non-seabird species). The total seabirds ringed in 2013 (2012 in brackets) was up to 2,120 (1,843). A decrease in the number of Kittiwake chicks ringed was more than compensated for by increases in Arctic Terns, Fulmars, Shags and Puffins. For several species, Farnes ringing totals are important in a national context. National totals for 2012 are now available and show that Farnes ringing for 2012 accounted for 40% and 43% of the national totals for Arctic Tern chicks and adults, respectively, and our effort on retrapping breeding Arctic Terns for specific population studies accounts for 87% of the adults retrapped in the UK last year. Similarly, Farnes ringing of nestling Kittiwakes, Sandwich Terns, Puffins and Fulmars in 2012 represents 25%, 10%, 11% and 15%, respectively, of national totals.

Although the number of Sandwich Tern chicks ringed this year was slightly down on the 2012 total, the majority of the chicks were fitted with lettered plastic rings in addition to the conventional metal ring. The aim of this new colour-ringing project is to build up a population of breeding colour-ringed Sandwich Terns on the Farnes which will allow us to estimate the extent of breeding dispersal (year-to-year variation in breeding location) of adult Sandwich Terns once

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the chicks (or at least some of them) return to breed in their third year. However, the (relative) ease with which these rings can be read in the field is leading to sightings away from the colony which helps us to track their migration.

Table 1. Seabird ringing and recapture totals on the Farne Islands 2013.

	Full Grown				Chicks	
	Ringed		Retrapped		Ringed	
	2012	2013	2012	2013	2012	2013
Storm Petrel	3	12	0	3	-	-
Fulmar	6	6	0	2	94	122
Cormorant	-	-	-	-	0	9
Shag	20	23	11	15	99	142
Mallard	-	4	-	-	-	-
Eider	0	5	6	14	-	-
Puffin	115	133	2	2	40	96
Razorbill	4	2	0	1	8	5
Guillemot	1	3	0	0	0	6
Kittiwake	6	2	22	5	248	116
Black-headed Gull	-	-	-	-	4	4
Lesser Black-backed Gull	-	-	-	-	0	10
Sandwich Tern	-	-	-	-	136	120
Common Tern	1	0	2	0	1	0
Arctic Tern	110	108	123	152	940	1187
Oystercatcher	-	0	-	-	2	2
Ringed Plover	-	-	-	-	5	3
Total	**266**	**298**	**166**	**194**	**1577**	**1822**

Table 2. Ringing and recapture totals for non-seabird species on the Farnes Islands 2013.

	New	Re-trap	Total
Redshank	1		**1**
Turnstone	1		**1**
Great-spotted Woodpecker	2	1	**3**
Swallow	11		**11**
Meadow Pipit	1		**1**
Rock Pipit	22	2	**24**
Pied Wagtail	4		**4**
Wren	8		**8**
Robin	26	1	**27**
Black Redstart	3		**3**
Redstart	3		**3**
Blackbird	13		**13**

	New	Re-trap	Total
Fieldfare	1		**1**
Song Thrush	3	1	**4**
Sedge Warbler	1		**1**
Reed Warbler	3		**3**
Lesser Whitethroat	1		**1**
Whitethroat	1		**1**
Garden Warbler	7		**7**
Blackcap	8		**8**
Greenish Warbler	1		**1**
Yellow-browed Warbler	5		**5**
Chiffchaff	6		**6**
Willow Warbler	45	2	**47**
Goldcrest	15	2	**17**
Spotted Flycatcher	1		**1**
Pied Flycatcher	9		**9**
Red-backed Shrike	1		**1**
Starling	7		**7**
Brambling	2		**2**
Common Redpoll	5		**5**
Common Crossbill	1	1	**2**
Total	**218**	**10**	**228**

RINGING RECOVERIES

Recoveries in 2013 have been dominated by two factors: prolonged periods of cold easterly winds in winter and early spring which primarily affected Shags and Puffins, and the colour-ringing project started on Sandwich Terns this year. From March, 22 Farnes Puffins were found dead along the east coast from the adjacent Northumberland coast to Aberdeen. These included a bird ringed as a chick on Inner Farne in 1982, making it over 30 years old. Mortality was not confined to old birds however, and all ages were represented amongst the dead recoveries, which included a bird ringed as a chick on Inner Farne in 2012 and two from 2010. Similar numbers of Shags were also reported dead, and were found on the east coast from Aberdeen to Suffolk. Although the majority of Farnes Shags travel north for the winter, some do go south and this pattern of recoveries mirrors the data from previous years. The colour-ringing of Shags also produces interesting reports, and this year two sightings of live birds in the Netherlands (one was 100 km up a river!) indicate that the wintering range of Farnes Shags is wider than we thought.

Colour-ringed Sandwich Tern chicks were initially reported from sites further north along the east coast from the Firth of Forth to Findhorn on the Moray Firth; a sighting from Troon in southwest Scotland suggest that some birds may cross from the east to the west coast of the UK via the Firths of Forth and Clyde before travelling south to winter off Africa. One of the Inner Farne birds seen near Aberdeen was seen later in the Gambia on 19 November and was our first colour-ring sighting from Africa.

autumn. Autumn passage began with an immature on Inner Farne which was mobbed repeatedly by breeding seabirds on 17 July and disappeared to the mainland soon after. Thereafter singles were recorded on five dates in August, seven dates in September and 12 dates in October. A male became resident on Brownsman from 14-26 October and was seen to take a Goldcrest during its stay.

Merlin *F. columbarius*. A well represented passage and winter visitor.
This small falcon breeds in the uplands of Northumberland and winters in the lowlands, and the Farne Islands regularly support one-two overwintering birds. Birds were reported on four dates between 10-16 January, with singles on 18 dates from 22 March-17 April. The first autumn birds returned to the islands from 28 August; thereafter one-two were resident throughout the autumn and early winter. Prey included Turnstone, Blackbird, Rock Pipit, Brambling and Snow Bunting. One was seen knocking a Turnstone into the sea off Brownsman on 4 December before collecting its kill and taking it to a nearby rock to eat.

Peregrine *F. peregrinus*. A well represented passage and winter visitor; may have bred *circa* 1925 (Watt 1951a).
Birds were resident from January-April and late July-December; up to four different individuals were involved (potentially more) as adults and youngsters patrolled the islands. Late spring records included singles on 11 and 13 April with another on 1 May. More unusually, a female was seen flying west over Brownsman on 9 June; more regular sightings did not occur until the arrival of a female on 30 July. Thereafter birds were noticeable on both the inner and outer groups throughout the autumn with prey items including Redshank, Woodcock, Turnstone, Feral Pigeon, Blackbird, Redwing and Song Thrush. Impressively, a large female Peregrine forced a Black-throated Diver into the sea through Inner Sound on 31 October, although the diver was unharmed.

Water Rail *Rallus aquaticus*. An uncommon passage visitor.
Although recorded annually, autumn produces the majority of reports as birds migrate into the UK. This year there was only a single record: an individual was flushed on Inner Farne on 1 October and was seen again the following morning.

Corncrake *Crex crex*. An uncommon passage visitor.
An individual was flushed from the vegetable garden on Brownsman on 6 September before flying along the east side but was not seen subsequently. This represents only the twelfth record in the last 40 years; four have occurred since 2010.

Oystercatcher *Haematopus ostralegus*. A common winter and passage visitor and well represented breeder.
Numerous throughout the season with passage birds supplementing the breeding population. The cold start to spring delayed the breeding season although copulation was noted from 29 March. However the first eggs were not discovered until 8 May on both Inner Farne and Brownsman. A record number of 41 (40) pairs nested as follows: Inner Farne 7 (7), West Wideopens 3 (4), East Wideopens 1 (2), Knoxes Reef 1 (3), Staple Island 6 (7), Brownsman 12 (7), North Wamses 1 (1), South Wamses 2 (1), Big Harcar 1 (1), Northern Hares 2 (1), Longstone 2 (3) and Longstone End 3 (2). The first chicks hatched from 1 July with fledglings noted from 2 August. As usual, the breeding season produced mixed results with heavy predation by large gulls. After the breeding season good numbers were seen on passage (Table 4).

Table 4. Monthly peak counts of Oystercatcher, Farne Islands 2013.

	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov
Inner Group	51	97	68	18	42	120	112	72	198
Outer Group	16	14	10	13	41	82	170	13	24

Golden Plover *Pluvialis apricaria*. A well represented passage visitor.
The first record of the year involved 40 over the inner group on 24 June and from mid-July reports became regular especially from the favoured Longstone area (Table 5). Numbers quickly declined from mid-October with the final record involving a single on 2 December.

Table 5. Golden Plover peak counts on the Farne Islands during autumn 2013.

July		August			September				October	
7	**13**	**2**	**10**	**23**	**1**	**9**	**20**	**25**	**9**	**18**
20	40	120	340	540	300	390	900	900	660	400

Grey Plover *P. squatarola*. A well represented passage visitor.
It was a good year, and after one west over the inner group on 26 August, one-two were recorded on seven dates in September, four dates in October and two dates in November. During this period a very approachable immature was present on Brownsman flats on 24 September. The final record was one north off Inner Farne on 5 December.

Lapwing *Vanellus vanellus*. A well represented passage visitor; sporadic breeder in the past, last attempt in 1962 (Wilson and Noble-Rollin 2010).
Hard weather in early spring had pushed birds out to the islands with eight on Inner Farne on 21 March and one-two present over the next few days. During this period two were found dead on Brownsman. Other spring records included singles on 1, 8 and 14 April. Autumn produced one-two on five dates from 25 September-19 October with 17 west over Inner Sound on 18 November.

Ringed Plover *Charadrius hiaticula*. A common passage visitor, uncommon and declining as a breeding species.
Displaying birds were seen from early April with the first eggs found on Inner Farne and Brownsman on 8 May. The population showed a slight increase and 6 (4) pairs nested as follows: Inner Farne 2 (1), Brownsman 3 (3) and Longstone 1 (0). The first chicks hatched on Brownsman on 7 June and Inner Farne on 30 June. Two chicks fledged from Inner Farne and four from Brownsman; tides, wind and predation all contributed to nest failures. A post-breeding flock of one-seven was on Inner Farne during August-September with a peak of 15 on 21 September. Nine were on Longstone on 5 September, with 11 present on 25 September.

Whimbrel *Numenius phaeopus*. A well represented passage visitor.
This migratory wader was recorded on 13 spring and 37 autumn dates. The first of year arrived on Inner Farne on 19 April with one-three noted until last seen on 24 May; seven were together on Northern Hares on 23 April. An individual was present on Longstone from 18-28 June and thereafter one-eight were recorded on nine dates in July, 21 dates in August and three dates in September until last recorded on 11 September. Peak counts included 16 on 27 July, 15 on 2 August and 16 on 3 August.

Colour-ringed juvenile Sandwich Tern at Findhorn (Richard Somers Cocks)

An Arctic Tern recovery of note this year was rather closer to home: one ringed as a chick in June 1982 was killed by a Fox in the Long Nanny colony, just short of 31 years from ringing. This was not a longevity record however, as our previous Farnes record was beaten in 2012 by an Arctic Tern retrapped in Scotland at just over 31 years old!

ACKNOWLEDGEMENTS

We are especially grateful this year to all the ornithologists who have observed and photographed our colour-ringed Sandwich Terns: these sightings have been an unexpected bonus for the project. As in previous years, we are extremely grateful for all the National Trust Farne Rangers for their help with the ringing and research projects, and Chris Redfern is especially grateful for the lifts across to the islands and for the Rangers' generous hospitality. He also thanks the skippers and crew of all the Farnes visitor boats for lifts back to Seahouses. Head Ranger David Steel has enthusiastically directed and participated in the ringing studies and we are grateful for his support and encouragement. We also thank John Walton, Fiona Fell and the Local Management Committee for their interest and support. Francis Daunt of the Centre for Ecology and Hydrology, Edinburgh, provided the lettered plastic rings used for Farnes Shags and we are grateful for the opportunity to participate in their important research project. We also thank the Natural History Society of Northumbria for the bird rings.

CETACEANS AROUND THE FARNE ISLANDS IN 2013

David Kinchin-Smith
National Trust Ranger, Farne Islands, Seahouses, Northumberland NE68 7SR

INTRODUCTION

Despite a low diversity of cetacean species, with only Minke Whale, Bottlenose Dolphin, Common Dolphin and Harbour Porpoise confirmed, the 138 sightings make 2013 a record-breaking year. As in recent years, a combination of casual sightings and regular morning surveys were the recording methods used. Confirmed sightings from boat operators are also included in this report because their time at sea around the islands produces important records which would be missed by the Ranger team, for example their record of Common Dolphins is the first confirmed sighting of this species in Farnes waters since 1989.

Surveys carried out from the islands were typically between 07:00 and 09:00 and usually lasted for a minimum of 30 minutes. The majority of these "seawatches" were carried out from either Lighthouse Cliff or the picnic site on Inner Farne, both of which give the clearest views of Inner Sound. Although casual sightings produced the majority of records, morning surveys, together with two 12-hour surveys on 3 and 4 August for the National Whale and Dolphin Watch (NWDW), yielded 16 sightings in 65 hours of seawatching between 1 May and 4 August. These survey results equate to one sighting every 4.1 hours of seawatching, comparable to the previous two years.

Perhaps the most notable result for the year is the number of Minke Whale sightings (Table 1). These small baleen whales became a familiar sight in July with 17 sightings, more in this month than the total seen in any of the last 11 years (Table 2). Despite being the commonest whale species seen around the Farnes, the total of 30 sightings this year was exceptional and may have been due to the plentiful food supply around the islands during the very warm summer.

Table 1. Cetacean sightings on the Farne Islands by month 2013.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Total
Minke Whale	-	-	-	1	2	3	17	5	1	1	-	**30**
Bottlenose Dolphin	-	-	1	-	-	6	-	-	-	2	1	**10**
Common Dolphin	-	-	-	-	-	-	-	-	-	-	1	**1**
Dolphin spp.	-	-	-	-	-	-	-	-	1	1	-	**2**
Harbour Porpoise	2	2	4	10	6	7	31	8	12	6	7	**95**
Total	**2**	**2**	**5**	**11**	**8**	**16**	**48**	**13**	**14**	**10**	**9**	**138**

Table 2. Comparison of number of cetacean sightings in 2013 to previous years.

Species	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Humpback Whale	-	-	-	-	-	1	-	-	-	-
Minke Whale	8	14	1	7	6	5	2	3	11	30
Risso's Dolphin	-	-	1	1	-	1	-	1	-	-
Bottlenose Dolphin	8	10	3	5	3	7	1	-	13	10
Common Dolphin	-	-	-	-	-	-	-	-	-	1
White-beaked Dolphin	1	1	2	2	2	-	-	1	2	-
Dolphin spp.	-	-	-	-	-	-	2	1	-	2
Harbour Porpoise	50	59	42	49	26	24	37	93	61	95
Basking Shark	-	-	-	5	-	-	-	-	2	-
Total	**67**	**84**	**49**	**69**	**37**	**38**	**42**	**99**	**89**	**138**

SPECIES ACCOUNTS

Minke Whale *Balenoptera acutorostrata*

The first of the 30 sightings this year was by *Glad Tidings III* of an individual heading south through Inner Sound on 30 April. This was a very early record, especially given the harsh winter and the low sea temperature - towards the end of April waters around the Farnes were around 3.5 °C and food supplies likely to have been minimal.

It was not until 17 May that there was a second sighting made by two of the Ranger team from the boat in Inner Sound. This was another early record and was the only confirmed record of an immature Minke Whale for the year. There was another sighting on 23 May in very rough seas, followed by a further three records in June. The June sightings included the first record of a whale in the outer group of islands, observed by *Serenity II* half a mile off Longstone.

Many of the 17 sightings in July, spread across 16 days, were likely to be of the same individuals taking advantage of an abundant food supply around the islands. The frequent seabird feeding frenzies observed over the summer, often close to the islands, were evidence of productive waters. Highlights in July included one Minke feeding in Inner Sound on 13 July, observed by the Ranger team from their boat. The whale surfaced six times, once close to the boat when the engine was off: a spectacular yet nerve-racking sight of an animal 1½ times the length of the boat! On 22 July, *Glad Tidings I* observed two Minke whales travelling south through Inner Sound; one of these was smaller, possibly a calf. If so, it would have been an animal born in the winter and in the latter stages of suckling or starting to feed for itself, a rare sight for the Farnes and the only record for the year of two Minkes together.

The five records in August, including a sighting on 2 August of one feeding in Inner Sound, and another on 8 August feeding by Longstone End, suggested that the food supply remained plentiful around the Farnes. *Serenity II* also observed a Minke feeding on Herring by Knivestone on 12 September, the most easterly point of the Farne Islands. A late, final record on 20 October, again by Knivestone, concluded this record-breaking year for the Minke Whale.

Bottlenose Dolphin *Tursiops truncatus*
Despite being lower than the 2012 total, it was a good year for Bottlenose Dolphins with 10 sightings of this playful cetacean. The first record was on 2 March before the Ranger team had arrived on the islands, with more than 30 heading south through Inner Sound, observed by *Serenity II*. It was not until 6 June when there was another sighting with a pod of 11, again in Inner Sound. These dolphins were travelling in circles and so were presumed to be feeding. With pods of similar size observed in Inner Sound on 7, 8 and 9 June, it was assumed that these were the same animals, perhaps benefiting from the abundant food supply around the islands. The pod on 7 June was seen breaking clear of the water, exhibiting the playful nature of this species. On 10 June, *Glad Tidings I* observed a pod of eight Bottlenose Dolphins in Inner Sound, including one calf in the group. As well as being a highly sociable species, these dolphins are strongly maternal, and the calf will often stay with its mother, and associated caring females, for well over a year (Shirihai and Jarrett 2006). On 22 June *Serenity II* followed a pod of six animals west from Crumstone to the harbour, the only outer group sighting of this species.

There were a further two sightings in October, with a large pod of more than 30 travelling south through Inner Sound on 22 October. The final record of the year was of a mixed-aged pod of around 20 animals, observed by *Glad Tidings VI* on 16 November. These dolphins passed close in to Lighthouse Cliff on Inner Farne, but unfortunately the Ranger team were in the outer group of islands so had to be content with watching a video of them taken from the boat!

Short-beaked Common Dolphin *Delphinus delphis*
On 27 October *Serenity II* observed 20 dolphins heading south through Inner Sound. These had well-defined pale patches down their flanks and were identified as Short-beaked Common Dolphins. Due to the rarity of this species in Farnes waters, photographic evidence is needed to substantiate the record. Although this was not obtained on this occasion, the well-defined "pale panel" on the flanks suggest that they were not White-beaked Dolphins *Lagenorhynchus albirostris* which have more diffusely pale flanks, and the proximity of the pod to the mainland suggests that these animals were not the highly pelagic Atlantic White-sided Dolphin *Lagenorhynchus acutus*. The first confirmed record of this species since 1989 was finally provided on 17 November by photographic evidence of two Common Dolphins near to the Blue Caps. These two dolphins then followed the boat back to (and into!) the harbour at Seahouses before moving on.

Harbour Porpoise *Phocoena phocoena*
Each year there is increasing evidence that this shy species uses the Farne Islands and surrounding waters as breeding grounds, with regular sightings of juveniles and calves. On this basis the Harbour Porpoise should be valued as a breeding species and an indicator of the health of the Farnes marine ecosystem.

It was a record-breaking year for sightings of this small cetacean, with 95 in total. The first four sightings of the year were by *Serenity II* in Inner Sound when two groups of three animals, one of which was feeding, were seen on 5 January. March brought a further four sightings and the first two records of juvenile porpoise with adults in attendance. Despite the wintery start to the year, fairly regular porpoise passage continued with 10 sightings in April and six in May.

Harbour Porpoise are generally born between May and August (Shirihai and Jarrett 2006) and the first calf was spotted from the Farnes on 20 June with one adult in attendance. One of the most interesting porpoise sightings of the year was on 21 June when two adults and one juvenile were feeding in the tidal stream off the west face of Inner Farne.

As with Minke Whale, July was the peak month for Harbour Porpoise with 31 sightings (Table 1). All but two of these records were through Inner Sound, showing a clear bias to more coastal waters for this species. This is a similar pattern to previous years, but whether it reflects the distribution of porpoises at sea or observer bias remains to be determined. The largest pod of the year was seen on the evening of 9 July, with 10 travelling north through Inner Sound observed by *Glad Tidings I*. Calves were observed on four occasions, making July also the peak month for sightings of young porpoises, with only one subsequent record on 11 September.

The only cetacean sighting during the NWDW in August was of a pod of seven Harbour Porpoise, in Inner and Staple Sound. This group comprised four adults and three juveniles, possibly a family party. Steady passage continued in the final few months of the year with a further seven sightings in August, 12 in September, six in October and seven in November; the final record of the season was of two travelling south through Inner Sound on 28 November.

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Shirihai, H and Jarrett, B (2006). *Whales, Dolphins and Seals – A Field Guide to the Marine Mammals of the World*. London.

Grey Seal (Martin Kitching)

GREY SEALS ON THE FARNE ISLANDS IN 2013

David Steel
National Trust Head Ranger, Farne Islands, Seahouses, Northumberland NE68 7SR

PUP PRODUCTION

It was another successful year for the Grey Seals with a total of 1,575 pups born on the islands – this compares with 1,603 in 2012 and may indicate that the population is levelling off after increasing since 2007 (Fig. 1). The first pup was found on the shingle beach of South Wamses on 27 September, with the second week of November experiencing the peak counts. Pupping continued into the New Year with the final pup discovered on 14 January 2014 (Table 1).

Staple Island continues to be the main nursery, with almost 500 pups: it and adjacent Brownsman now account for 55% of the total pup production on the Farnes, compared with just 8% a decade ago. Interestingly this is reverting to the pattern of the 1960s and early 1970s when these two islands were traditionally the main colonies. Together, Staple Island, Brownsman, South Wamses and North Wamses have accounted for 92-94% of pup production over the past four years (Table 2).

Figure 1. Farne Islands seal pup production since 2003.

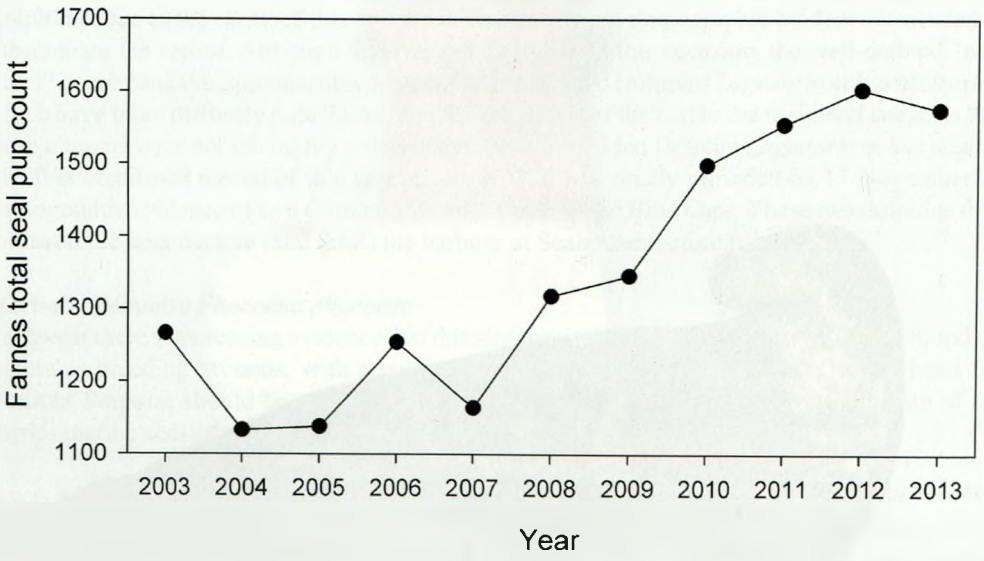


Table 1. Individual Grey Seal pup counts by month and island 2013.

	B'man	Staple	South Wamses	North Wamses	North Hares	Big Harcar	Longst	Knoxes	Wide-opens	Inner Farne
8 Oct	0	0	5	2	0	0	0	0	0	0
18 Oct	0	2	8	18	0	0	0	0	0	0
23 Oct	0	6	36	33	0	0	0	0	0	0
28 Oct	7	48	61	44	0	0	0	0	0	0
1-2 Nov	41	55	68	39	0	0	0	0	0	0
5-6 Nov	72	128	67	26	0	0	0	0	0	0
10-11 Nov	45	85	50	8	10	0	1	0	0	0
16-17 Nov	72	81	41	20	6	0	0	0	0	0
23 Nov	41	49	23	20	7	2	0	7	0	0
28 Nov	24	15	13	14	2	0	0	3	11	0
3 Dec	22	10	10	6	6	0	1	2	15	0
6-7 Dec	16	5	0	0	0	0	0	0	0	0
29 Dec	28	12	0	0	0	0	0	3	17	5
14 Jan	0	1	0	0	0	0	0	0	0	0
Total	**368**	**497**	**382**	**230**	**31**	**2**	**2**	**15**	**43**	**5**

Table 2. Pup production on the main Farne colonies over the last four years.

	2013	2012	2011	2010
Staple Island	497	463	475	343
South Wamses	382	380	374	418
Brownsman	368	373	334	358
North Wamses	230	279	253	293
% of total	**93.8**	**93.2**	**92.3**	**94.2**

MORTALITY RATE

Generally, the autumn weather remained settled with no serious storms at the crucial time; a storm surge in early December had minimal impact. The mortality rate decreased again this year (Table 3) with the relatively sheltered islands of Staple Island and Brownsman recording very low mortality rates. Overall, the islands saw a 26% mortality rate with 277 pups unaccounted for (disappearing from the colonies, presumed washed into the sea whilst still too young to fend for themselves).

Table 3 Mortality statistics for the last four years.

	2013	2012	2011	2010
Successful	1,165	1,266	1,077	806
Unsprayed dead	55	54	62	56
Sprayed Dead	78	71	61	54
'Missing'	277	312	355	583
Mortality rate	26.0%	27.20%	30.7%	48.2%

ENGLISH EAST COAST COLONIES

Although the Farnes recorded a slight decrease in pup numbers in 2013, the two other major colonies on the east coast of England had record numbers. Donna Nook in Lincolnshire has increased by almost 10% year-on-year to a record breaking 1,676 pups this year (Rob Lindstone-Scott, Lincolnshire Wildlife Trust, pers. comm). The mortality rate at this site remained low despite the storm surge with an estimated loss of 10%. It was a similar story along the Norfolk coast where Blakeney Point, first colonised in 1993, had record numbers with a total of 1,566 pups born, a 28% increase (Eddie Stubbings, National Trust, pers. comm.).

EVENTS AND ISSUES

Storm Surge

On 5 December, an Atlantic storm tracked east to the north of Scotland overnight, bringing very strong winds gusting up to 80 mph across northern parts of the UK. Combined with a "spring" high tide of 5.13 metres at 16:05 that day, the Farne Islands were engulfed. Amazingly, not a single seal pup was lost from the major colonies of Brownsman or Staple Island, as protective mothers pushed youngsters further up the islands to safety. However, low-lying islands, such as the shingle ridge of the South Wamses and Northern Hares, were completely submerged with the removal of all pups. This loss was mitigated by the fact that the seal season was drawing to a close, and the impact was marginal as the majority of pups were washed off at an age when they could survive. Further down the coast at the main Lincolnshire and Norfolk colonies, hundreds of pups were displaced and infrastructure was damaged. Overall it was fortunate that the storm had not hit just a few weeks earlier, when the pupping season was at its height.

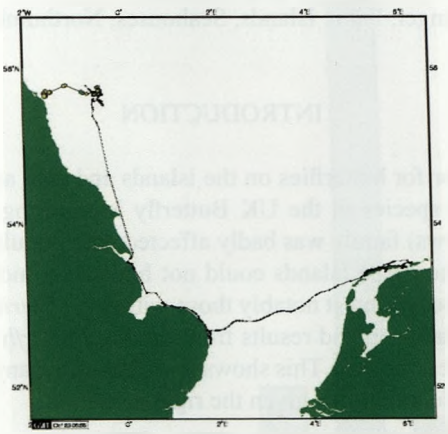
Going Dutch

In recent years, we have become accustomed to Farne pups coming ashore on the Dutch coastline. Studies in the Netherlands are showing that it is not only pups that commute. An adult cow and bull were satellite-tagged by researchers at the Institute for Marine Resources & Ecosystem Studies (IMARES), Wageningen University, and ended up on the Farnes a few weeks later (Fig. 2):

27 September	Left the Netherlands at 23:00
29 September	British east coast, Suffolk 23:00
5 October	Donna Nook (Lincolnshire)
6 October	Headed north
9 October	North East England
21 October	Farne Islands
22 October	Hauled out on Brownsman (Farne Islands)
4 November	Still on Farnes, satellite tag retrieved

Interestingly, the bull followed a similar course a few days later and remained on/around Big Harcar throughout November. We have known for a number of years that Grey Seals move between colonies and across the North Sea. With ever-improving technology we can now follow individual seals on a daily basis to help us understand these fascinating animals. What will the next discovery be?

Figure 2. Movement of a satellite-tagged Grey Seal from the Netherlands. Data courtesy of Geert Aarts, IMARES Wageningen UR & AEW Wageningen University, Netherlands.



Moulting seals on Brownsman

As usual, a final pup count was undertaken in the New Year with a visit made on 14 January. It came as no surprise to find large numbers of adults hauled out on Brownsman for their annual moult. Some 800-1,000 animals were congregated across the low-lying southern end of the island, and the degree of damage suggested that they had been using two thirds of the island: many areas were little more than mud-baths with no vegetation evident. In 2012, such areas recovered well given the clemency of the weather, but in 2011 some areas did not recover and many Puffins were unable to use their burrows.

Brownsman provides nesting sites for 25% of the Farne Puffins – but for how much longer? Do we take a short term view and try to prevent access by the seals, or a longer term view which lets nature take its course? Professors Mike Harris and Sarah Wanless, world experts on the Puffin, and good friends to the Farnes, conclude their monograph *The Puffin* (Harris and Wanless 2011) with these words:

> Environmentalists are often accused of being alarmists and taking a glass half empty rather than a glass half full view of the world. Over the years, there have been repeated claims that Puffins were doomed. Up until recently, the majority of these were undoubtedly scaremongering, and in the mid-1980s all the evidence indicated that the general state of Puffindom was better than it had been at any time in the 20th century. However, 25 years later prospects for Puffins at many colonies in the east Atlantic seem very different and seeing a thriving Puffin colony in 50-100 years time may involve travelling much further north than the Isle of May.

REFERENCE

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BUTTERFLIES ON THE FARNE ISLANDS IN 2013

Bex Outram
National Trust Ranger, Farne Islands, Seahouses, Northumberland NE68 7SR

INTRODUCTION

The previous year was poor for butterflies on the islands and also across the UK with declines recorded for 52 of the 56 species in the UK Butterfly Monitoring Scheme; in particular the *Pieridae* (Whites and Yellows) family was badly affected with population declines of more than 50%. However, 2013 on the Farne Islands could not have been more different with a record-breaking year for several species, most notably those within the *Pieridae* (Table 1). The increase was also recorded on the mainland and results from the *Big Butterfly Count 2013* showed most species increasing on last year's count. This shows that although many species are on the decline they are resilient insects able to flourish given the right conditions.

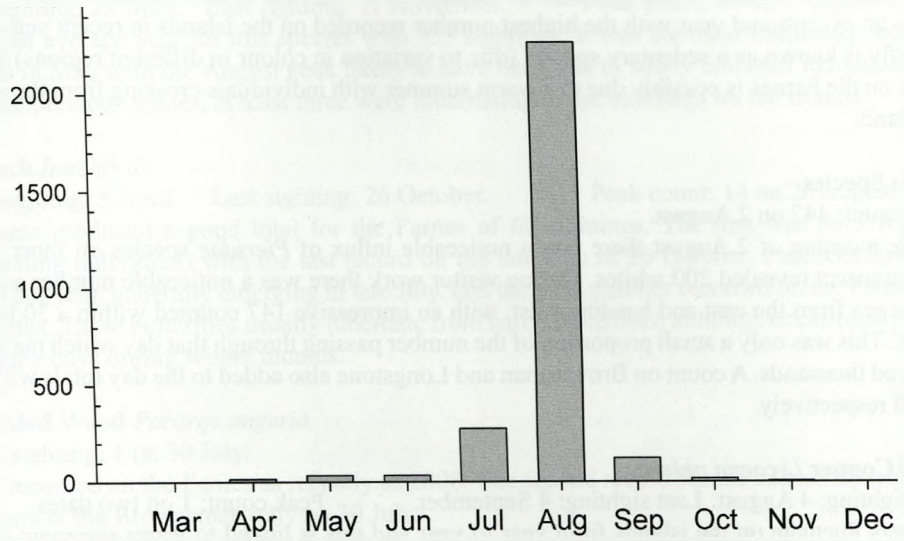
This report covers butterfly sightings during the nine months that Rangers were resident on the islands (21 March-7 December) with a total of 13 species recorded. The first sighting was a Small Tortoiseshell on 28 March on Inner Farne and the last sightings involved hibernating insects with two Small Tortoiseshell in the Inner Farne Pele Tower and a Red Admiral in Brownsman cottage. The latest recorded butterfly "on the wing" was a Red Admiral in the Inner Farne courtyard on 9 November.

Table 1. Farne Islands butterfly counts for 2013 (2012 figures shown in brackets).

	Inner Group	Outer Group	Total
Large White	384 (58)	24 (20)	408 (78)
Small White	598 (129)	104 (147)	702 (276)
Green-veined White	138 (18)	13 (5)	151 (23)
White Species	542	362	904
Small Copper	2 (0)	0 (0)	2 (0)
Common Blue	0 (0)	1 (0)	1 (0)
Red Admiral	77 (331)	33 (182)	110 (513)
Painted Lady	16 (5)	8 (3)	24 (8)
Small Tortoiseshell	285 (328)	70 (63)	355 (391)
Peacock	54 (90)	8 (12)	62 (102)
Speckled Wood	0 (2)	1 (0)	1 (2)
Wall	34 (12)	3 (1)	37 (13)
Meadow Brown	4 (4)	0 (0)	4 (4)
Ringlet	10 (0)	3 (0)	13 (0)
Total	**2,144**	**630**	**2,774**

August was the most productive month, with 82% of the total sightings, as it proved to be warmer and drier than average with temperatures rising to 24.4 °C on 4 August (Figure 1). This period also brought an eruption of caterpillars on the islands, mainly of *Pieridae* species.

Figure 1. Monthly butterfly totals.



The year also brought some surprises: a Common Blue on Brownsman was only the second record for the islands, the first being seen in 1998. Ringlet and Small Copper were also recorded for the first time since 2010. As in most years, the inner group of islands recorded more butterflies than the outer with 77% of the total sightings. This is most likely due to the close proximity to the mainland and the fact that Inner Farne is the largest island (16 acres) with a wider variety of suitable butterfly habitat.

RECORDING METHODS

Two recording methods were used during the year: casual sightings across all islands and transects. Transects were undertaken on Inner Farne when the numbers of butterflies started to increase and a transect was completed on most days in the period from 17 July to 9 September when numbers start to decline.

SYSTEMATIC LIST

Large White *Pieris brassicae*
First sighting: 25 July. Last sighting: 28 September. Peak count: 60 on 12 August.
It was a good year for this species with a total of 408 sightings across all islands, the highest total for several years. This is probably an underestimate of the numbers involved as during influxes large numbers constantly move through the islands.

Small White *P. rapae*
First sighting: 9 May. Last sighting: 29 September. Peak count: 120 on 12 August.
As with the Large White, this was a record-breaking year for the number of sightings with a peak day count of 120, making it the most numerous butterfly species on the islands during the year.

Green-veined White *P. napi*
First sighting: 12 May. Last sighting: 22 August. Peak count: 58 on 2 August.
It was an exceptional year with the highest number recorded on the islands in recent years. This butterfly is known as a sedentary species (due to variation in colour in different regions) but the influx on the Farnes is possibly due to a warm summer with individuals crossing from the nearby mainland.

White Species
Peak count: 447 on 2 August.
On the morning of 2 August there was a noticeable influx of *Pieridae* species on Inner Farne and a transect revealed 200 whites. During visitor work there was a noticeable number arriving off the sea from the east and heading west, with an impressive 147 counted within a 30 minute period. This was only a small proportion of the number passing through that day which may have involved thousands. A count on Brownsman and Longstone also added to the day totals with 150 and 50 respectively.

Small Copper *Lycaena phlaeas*
First sighting: 4 August. Last sighting: 4 September. Peak count: 1 on two dates.
Numbers fluctuate on the islands from year to year and this is linked to warm summers as the species favours warm and well-drained soils. Singles on 4 August and 4 September were the first on the islands since 2010 and may have come from the nearby mainland colony at St Aidan's dunes.

Common Blue *Polyommatus icarus*
Only sighting: an individual on 3 September.
Rangers were stunned by the sight of a blue butterfly on Brownsman on 3 September, a rarity on the Farne Islands. Although being the most widespread blue butterfly, this was only the second record (the first was seen in 1998). This species is common along the sand dunes of the mainland and it was probably blown in from the west on the strong winds the previous day. It was only seen once, favouring Sea Mayweed *Tripleurospermum maritimum* around Brownsman cottage.

Red Admiral *Vanessa atalanta*
First sighting: 18 June. Last sighting: 9 November. Peak count: 6 on several dates.
Surprisingly, given the drier and warmer than average summer, the year produced a disappointing 110 sightings, only 10.5% of the total recorded in 2011 (Table 2).

Table 2: Annual totals of Red Admiral since 2010.

Year	Total No. Sightings
2013	110
2012	513
2011	1053
2010	323

Painted Lady *V. (Cynthia) cardui*
First sighting: 2 August. Last sighting: 14 October. Peak count: 8 on 25 August.
There was an increase compared with the previous year, with 24 records (compared with eight in 2012). The number of sightings can increase significantly during invasion years, such as those in 2011 (147 sightings) and 1999 (614 sightings).

Small Tortoiseshell *Aglais urticae*
First sighting: 28 May. Last sighting: 11 November. Peak count: 49 on 2 August.
It was an average year for this species with 355 sightings. It was the most frequently recorded species in May with the August peak likely to have been due to newly emerged individuals. As with the previous winter, at least three were hibernating in the buildings on the islands.

Peacock *Inachis io*
First sighting: 5 April. Last sighting: 26 October. Peak count: 14 on 20 August.
The year produced a good total for the Farnes of 62 sightings. The first was on 5 April (a hibernating individual) with the last record on the late date of 26 October. Peacocks have one brood per year, generally emerging in late July, and the peak number recorded on the Farnes was in August. These butterflies usually hibernate from early September, although occasionally noted on sunny days during winter months.

Speckled Wood *Pararge aegeria*
Only sighting: 1 on 30 July.
First recorded on the Farnes as recently as 2008. The second record for the islands fluttered past Rangers at the Brownsman jetty on 30 July.

Wall *Lasiommata megera*
First sighting: 1 June. Last sighting: 8 September. Peak count: 8 on 20 August.
The 37 sightings and peak of eight on Inner Farne on one day represent an exceptional season for this species. Although not a regular visitor to the islands, there has recently been an upsurge in sightings with annual records since 2007. The only two sightings in early June were probably the same individual; other sightings were in August and early September at around the time of the second brood period for this species.

Meadow Brown *Maniola jurtina*
First sighting: 15 July. Last sighting: 4 August. Peak count: 1 on several dates.
This widespread butterfly is not noted annually on the Farnes and is generally seen in low numbers, with the exception of 2011 when 17 were recorded. The four sightings this year probably involved only two individuals, one in July and one in early August.

Ringlet *Erebia medusa*
First sighting: 17 July. Last sighting: 25 July. Peak count: 8 on 17 July.
With 13 sightings and a peak day count of eight individuals (the first sightings since 2010) this was the best showing ever for this species on the Farnes.

REFERENCE

Big Butterfly Count (2013) http://www.bigbutterflycount.org/2013mainresults (accessed 8 March 2014)

FARNE ISLANDS MOTH REPORT 2013

William Scott
National Trust Ranger, Farne Islands, Seahouses, Northumberland NE68 7SR

INTRODUCTION

In 2013, moth recording on the Farne Islands reached its twentieth season since efforts began in 1991. During this time an amazing 263 species have been recorded, a surprisingly high figure considering the northerly latitude, small size, isolation from the mainland and frequently inclement weather of the islands. The number of moth species found reaffirms their importance in the Farnes and Northumbrian ecosystems, while their aesthetic beauty entertains and enthrals.

The wet and cool weather of 2012 caused the numbers of many moth species on the Farnes to crash. After a long cold winter much of the late spring and summer of 2013 was hot, sunny and still. Cold winters are known to kill moth pathogens, increasing overwinter survival rates, while hot, calm summertime weather aids emergence and dispersal. Both of these factors work to increase numbers of moths on the wing, and as a consequence 2013 was a record year for abundance and species diversity. In addition, a consistent power supply allowed increased trapping effort this season with moth traps (two 15w Actinic and one 125w MV) being used 185 times (129 times on 111 dates on Inner Farne and 56 times on 56 dates on Brownsman). Other data were from daytime casual sightings (92 dates) and night time dusking sessions (5 dates) resulting in a record 12,465 moths of 138 species (Table 1).

As well as macrolepidoptera species, microlepidoptera were recorded for the fourth consecutive year and accounted for 941 individuals, 7.5% of the total number of moths recorded. A heavy inner group bias saw all but 24 microlepidopterans found there. Compared to Inner Farne, lower numbers of moth species and individuals were recorded on the more isolated and florally less diverse Brownsman Island and the species assemblage on each island differed substantially.

Table 1. Summary of 2013 totals for numbers of moths and species recorded for Inner Farne (IF) and Brownsman (Br), according to technique and the number of dates (or nights in the case of moth traps) that moths were found.

	No. Moths			**No. Species**			**No. Days of Recording**		
	IF	Br	Total	IF	Br	Total	IF	Br	Total
Casual Daytime	867	141	945	40	9	43	92	23	115
Casual Dusking	874	-	874	13	-	13	5	-	5
125w MV Trap	2,611	-	2,611	74	-	74	18	-	18
15w Actinic Trap	7,154	818	7,971	115	37	114	108	56	164
Total:	**11,506**	**959**	**12,465**	**138**	**39**	**138**	**148**	**67**	**149**
2012:	*3,925*	-	*3,925*	*124*	-	*124*	*151*	-	*151*

MOTH HIGHLIGHTS IN 2013

An unprecedented 23 species were recorded for the first time in 2013. A prolonged heatwave during July and August provided a catalyst for many mainland species to disperse, some of which reached the Farnes and are listed as follows: ***Epermenia chaerophyllella*** (20 July), ***Elachista argentella*** (6 July), ***Agonopterix umbellana*** (10 September), ***Chrysoesthia sexgutella*** (15 July), ***Pandemis heparana*** (29 July), ***Acleris bergmanniana*** (21 July), ***Acleris notana*** (16 August), ***Endothenia quadrimaculana*** (29 July), ***Phycitodes saxicola*** (7, 17 and 20 July), **December Moth** ***Poecilocampa populi*** (17 November), **Chinese Character** ***Cilix glaucata*** (16 August), **Oblique Carpet** ***Orthonama vittata*** (18 August), **Rivulet** ***Perizoma affinitata*** (6 July), **Sandy Carpet** ***Perizoma flavofasciata*** (15 July), **Clouded Border** ***Lomaspilis marginata*** (23 July), **Early Thorn** ***Selenia dentaria*** (29 July), **Light Emerald** ***Campaea margaritata*** (29 July), **Sallow Kitten** ***Furcula furcula*** (6 July), **Double Dart** ***Graphiphora angur*** (23 July), **Green Arches** ***Anaplectoides prasina*** (21 July), **Red Sword-grass** ***Xylena vetusta*** (17 April), **Green-brindled Crescent** ***Allophyes oxyacanthae*** (12 and 24 September) and **Small Angle Shades** ***Euplexia lucipara*** (15 July).

A number of other species were recorded for only the second time including **Shoulder-stripe** ***Anticlea badiata*** (5 May), **Brimstone Moth** ***Opisthograptis luteolata*** (21 June), **Small Quaker** ***Orthosa cruda*** (15 May), **Double-lobed** ***Apamea ophiogramma*** (3 August), **Bulrush Wainscot** ***Nomagria typhae*** (4 October), **Narrow-bordered Five-spot Burnet** ***Zygaena lonicerae*** (17 July and 3 August), **Coxcomb Prominent** ***Ptilodon capucina*** (7 July and 20 July) and **Beautiful Golden Y** ***Autographa pulchrina*** (20 June and 22 July). Species recorded for the third time were **Swallow-tailed Moth** ***Ourapteryx sambucaria*** (23 July), **Least Yellow Underwing** ***Noctua interjecta*** (29 July), **Barred Straw** ***Eulithis pyraliata*** (recorded five times from 7-20 July) and **Plain Golden Y** ***Autographa jota*** (recorded three times from 21-26 July). Finally an array of oddities made up the supporting cast including the fourth **Flame Carpet** ***Xanthorhoe designata*** (6 July), fifth **Straw Dot** ***Rivula sericealis*** (21 July and 24 July) and fifth **Shuttle-shaped Dart** ***Agrotis puta*** (16 August).

Interestingly, despite the number of notable moths from the mainland, the abundance of migrant species in 2013 was average with three species found: **Diamond-backed Moth** ***Plutella xylostella*** (104), **Dark Sword-grass** ***Agrotis ipsilon*** (two) and **Silver Y** ***Autographa gamma*** (154) with the latter the most frequently encountered throughout the year.

SYSTEMATIC LIST OF BREEDING SPECIES IN 2013

Ideal conditions saw many species increase vastly in numbers while some remained stable and only a few declined. Typical island effects were once again present, where low numbers of species are compensated for by some being superabundant: four species accounted for 53.5% of all moths seen, while most other species remained uncommon or scarce on the islands. At least 11 additional resident species were confirmed in 2013 on the basis of good numbers seen over time periods that suggested almost certain residency (finding larva is the only way to achieve complete confirmation but this is not practicable for most species). Like many of the already established moths, these new species are mainly generalists continuing to track the increased presence of Ragwort *Jacobaea vulgaris*, Common Nettle *Urtica dioica* and dock species on the islands. Conversely, no species were lost this year, further cementing 2013 as a great year for moths.

As in previous years, fleeting resources provided by the short growing season on the islands restricted the flight periods of many species, usually to around a month, with peaks in late June to August, presumably coinciding with best nectar availability and egg laying opportunities as well as the warmest conditions.

In the following species accounts, all records are from Inner Farne unless otherwise stated; * indicates a new resident species; counts for 2012 are given for comparison in brackets immediately after the 2013 figure.

Ghost Moth *Hepialus humuli humuli* – This charismatic species, known for its lekking behaviour, remained stable in 2013 with 14 (20) individuals recorded. Females were attracted to moth traps including three on 7 July, two on 10 July with singles on 26 June and 5, 6 and 9 July. Males were found lekking at dusk on 1 July and a pair was observed copulating on 6 July. The most interesting sighting was the first record for Brownsman in the moth trap on 5 July which, considering that their food plant is absent from the island, probably involves a disperser.

Common Swift *H. lupulinus* – An outstanding year saw this species increase by 172% with 136 (50) adults found on Inner Farne in 29 moth traps on 20 dates. Mainly low numbers were recorded, with double-figure counts of 10 on 26 June and 7 July and 13 on 22 June.

Map-winged Swift *H. fusconebulosa** – A newly-suspected resident found annually since 2006. A trend for gradual increase continued in 2013 with 35 moths compared to 12 in 2012 and 23 in 2011. The peak of 10 on 7 July was the highest count ever. It was recorded on 13 dates.

Tinea pallescentella – This hard-to-find species is surely under-recorded with singles noted as usual inside Brownsman cottage between 5 June-20 October.

Nettletap *Anthophila fabriciana* – An unassuming and unique moth that was regularly disturbed by day from Common Nettle clumps on both Inner Farne and Brownsman. Present continually but counted on 10 dates between 19 June-10 August totalling 32, just shy of the 44 found in 2012.

Brown House Moth *Hofmannophila pseudospratella* – In contrast to previous years, most of 30 records for this species were from moth traps (27) compared to only three in their usual haunt of the Pele Tower, with all records between 22 June-14 August.

Agonopterix alstromeriana – Ever-increasing Hemlock *Conium maculatum* has increased the abundance of this Farnes speciality with a record 356 observed in 2013, a 1013% increase on 2012. Numbers found casually (307 records on 25 dates) far outweighed the moth traps (46 records on 20 dates). Found on a total of 36 dates that spanned seven months between the first on 3 April and last on 26 November, with no records in July indicating two generations. Often seen in ones and twos, the highest counts were seen by day with 21 on 16 April and 100 on 14 September and 4 October. Traditionally an inner group species, the first outer group record was in Staple Island shed on 18 November.

Metzneria lappella – Breeding of this uncommon species was confirmed when two were observed displaying around Burdock *Arctium minus* in the evening of 17 July with two also found in the 15w Actinic trap on 6 July.

Chrysoesthia sexgutella* – A new resident that was discovered around its dock spp. food plant during Inner Farne's nest count day (9 June), where 30 were noted. Small numbers were seen by day thereafter along with a single in the 15w Actinic trap on 15 July.

Aethes rubigana – 2013 saw a plateau after the increased numbers of 2012 with 58 (52) recorded. Casual and moth trap counts of one to six came from 10 dates between 6 July-18 August with a peak of 30 by day on 17 July.

Timothy Tortrix *Aphelia paleana** – Newly established, this generalist species was attracted to light on 19 and 26 June and found by day on 11 July. All were singles, and recorded over sufficient time to suggest residency of this nationally common and widespread species.

Grey/Light Grey Tortrix *Cnephasia stephensiana/incertana* – Individuals from this highly similar complex were recorded as singles on 21, 26 and 29 July in the Inner Farne moth trap.

Cnephasia longana – In 2013 only one (five) was attracted to light on 3 August, a poor showing. Interestingly, this and the following two related species all declined in 2013.

Celypha lacunana – This species declined in numbers to only 15 in 2013 compared to 33 and 115 in 2012 and 2011 respectively. It may be under-recorded due to nesting seabirds that inhibit access to the favoured meadow habitat during their flight season. It was recorded on 11 dates.

Eucosma cana – Another declining species with only 16 recorded in ones and twos on 10 dates between 6 July-1 August with all but the peak count (two via dusking on 16 July) at light.

Chrysoteuchia culmella – A grass moth that maintains a low level occurrence with one, five, eight, and one attracted to light on 18 June, 6 and 7 July with one also by day on the latter date.

Agriphila straminella – The commonest Farne "Pyralid" was well down on last year's total as only 100 (279) were found in small numbers at light from 11 July-15 August. The peak of 75 disturbed from the Inner Farne meadows on 2 August suggests that the true abundance of this "grass moth" is disguised by lack of access in these areas during the seabird nesting season.

Agriphila tristella – Since the boom of 34 found in 2011 this species has become scarce with only four (three), a three and a single attracted to light on 29 July and 1 August all on Inner Farne.

Eudonia lineola – An outstanding year was had by this lichen specialist with 66 (24) found in the moth traps on Inner Farne on 15 dates between 7 July-8 September. Peak counts of 11 and 19 on 21 and 22 July bucked the established trend of low frequency encounters while the relatively protracted flight season of over two months indicates several generations were observed, probably due to all year round availability of lichen for larvae.

Small Magpie *Eurrhypara hortulata* – First recorded in 1995, but not again until 2010 and annually since, with 2013 conforming to the uncommon nature of this species' occurrence. Five were recorded between 26 June-8 July both by day and at light, all singles apart from two in the Actinic trap on 7 July and all on Inner Farne except for one casual record from Brownsman on 8 July.

Udea lutealis – A previously rare resident with 19 (3) individuals found in 2013, mostly casually on Inner Farne on six dates between 7 July-7 August.

Udea olivalis – A better season was had by this *Rumex sp.* feeder despite fewer dusking sessions that have traditionally produced the most sightings. A total of 41 (21) were recorded after being first found on 28 June. Occasionally disturbed by day (three dates) or seen at dusk (one date), but mainly found in low numbers in both moth traps on eight dates until 23 July, peaking at nine on 21 July.

Mother of Pearl *Pleuroptya ruralis* – A species that is increasing in synchrony with the abundance of Common Nettle on the Farnes. Moth traps placed near the food plant on Inner Farne held a total of 13 (3) moths on 10 dates all occurring as ones or twos between 21 July-18 August.

Drinker *Euthrix potatoria** – 2013 saw continued colonisation by this charismatic grass feeder with 9 (14) singles recorded at light on Inner Farne from 21 June until 19 August, a long flight season by Farnes standards.

Silver-ground Carpet *Xanthorhoe montanata montanata* – A return to form after a poor 2012 as 73 (19) were found across 22 dates almost equalling the 109 recorded in 2011. Moths were on the wing in late June and July with 26 flushed by day peaking at 10 on 11 July while the remainder were attracted to light, the highest count being 13 extracted on 26 June.

Garden Carpet *X. fluctuate* – This long-serving resident had a good season with numbers up 358% to 45 (10) records over five months, representing several generations. Frequently (23 dates) encountered only in small numbers, the peak count was five on 7 June.

Common Carpet *Epirrhoe alternata alternate* – A species that is scarce on the Farnes, this year records were unusually early: three singles on 20 May, 20 and 27 July respectively with two on the more typical date of 17 August.

Yellowshell *Camptogramma bilineata bilineata* – Two (six) were recorded from Inner Farne, singles on 16 and 17 July. This species was one of a handful that declined in 2013.

Dark Spinach *Pelurga comitata* – A bumper year for this, the third most numerous Farnes resident, saw 1,664 (359) adults recorded almost daily between 17 June-15 September by all methods, accounting for 11.6% of the annual moth total. In contrast to previous years, the moth traps obtained all peak counts amongst the vastly fluctuating nightly numbers with 245 and 311 on 21 and 29 July. Further evidence of the boom came when 300 larvae were found whilst clearing a small area of *Orache spp.* at Inner Farne lighthouse.

Lime-speck Pug *Eupithecia centaurareata** – A potential resident, captured in the highest ever numbers this year with five (one) found on four dates from 6-27 July.

Plain Pug *E. simpliciata* – The meteoric rise of the Pug over the past four years continues in line with other *Orache spp.* feeders, as a total of 1,554 (361) adults were encountered, frequently in triple figures, making this species the fourth most numerous in 2013, comprising 10.6% of the annual moth total. Although recorded numerously via all methods, it was visits to thistles at dusk that produced the highest count of 322 on 21 July, in the middle of the flight season of 16 June-13 September. Like Dark Spinach, many larvae were found during habitat work at Inner Farne lighthouse, demonstrating the success of this most northerly UK population.

Common Footman *Eilema lurideola* – A naturally scarce species on the islands that despite being recorded in 13 years since 1991 has never reached double figures. 2013 stayed true to this with singles in Brownsman moth trap on 11 July and in Inner Farne moth trap on 24 and 26 July.

Garden Tiger *Arctia caja* – The long cold winter seemed to favour this species which has suffered from the mild winters of recent times. As such, numbers were up from seven in 2012 to 64 (on 18 dates) this year. Encouraging catches of one to four were common between 10 June-4 August, with a peak of nine on 21 July the highest since 2002.

White Ermine *Spilosoma lubricipeda** – Found in 11 years since 1991 this potential resident was captured in record numbers this summer with seven singles found between 17 June-7 July.

Cinnebar *Tyria jacobaeae* – The newly established population on West Wideopens remained strong with up to 20 adults (in June) and 400 larvae (in July) noted on visits to the island. Wandering adults were also found as singles on Inner Farne on 3-9 June and Staple Island on 9 July.

Garden Dart *Euxoa nigricans* – This long-term resident has declined considerably over the past two years with only 25 (18) recorded in 2013 compared to 203 in 2011. The moth traps contained one or two on 13 occasions between 20 July-17 August, peaking at four on 29 July.

Flame *Axylia putris** – Moth trapping on Brownsman revealed this species to be resident on the island. A total of 47 were attracted to light after emerging on 31 May right through to 22 July, peaking at seven on 17 June; a northerly range expansion in recent years is a possible explanation for this sudden increase. Inner Farne was poor by comparison, with only two singles on 10 and 21 July demonstrating the value of coverage on both islands. It will be interesting to see if Inner Farne follows suit and whether the Brownsman colony persists.

Large Yellow Underwing *Noctua pronuba* – After a record year in 2012, this nationally abundant species increased further to 124 (120) on 36 dates from 10 July to the typically late date of 7 October, while 14 found on 16 and 17 August was just shy of the highest count of 19 last year.

Lesser Yellow Underwing *N. comes* – Another autumnal species whose abundance remained stable this season. The 18 records of 107 moths spanned three months from 15 July to 13 September, bar an unseasonal single caught on 14 May, and peaked at 33 on 15 August, double the peak of 16 on the later date of 1 September last year.

Lesser Broad-bordered Yellow Underwing *N. janthe* – 24 adults were recorded on nine occasions between 27 July-19 August, peaking at six on 4 August.

Square-spot Rustic *Xestia xanthographa* – 2013 failed to live up to the record total of 2012; with a lack of trapping in its peak season in August, only 11 (53) were caught between 15 August-22 September with the Actinic once again producing the peak of 4 (12) on 16 and 17 August.

Cabbage Moth *Mamestra brassicae* – A brief bout of stability in 2011 and 2012 changed to a large increase of up to 111 (31) in 2013 with a peak of nine (three) on 9 June. However, the total of 46 records from moth traps on both Inner Farne and Brownsman between 2 June-16 August was probably inflated by increased trapping effort.

Bright-line Brown-eye *Lacanobia oleracea* – This annually recorded *Orache spp.* feeder underwent astronomic increases this year reaching 83 records of 731 (76) adults found from 3 June until 4 August. Numbers were consistently high throughout this flight period with the peak of 87 - a figure higher than the entire 2012 total, adequately reflecting this species' success - confirmed by a record 1,100 larvae found at the Inner Farne Lighthouse on 13 and 15 September.

Marbled Coronet *Hadena confuse* – Since 1992 this Sea Campion *Silene maritime* feeder has undergone a 99% decline as only 10 moths were recorded on eight dates between 9 June-16 July. Unlike moth species that depend upon *Orache spp.*, Common Nettle and dock spp., which are flourishing under the changing Farnes habitat, those moths that are dependent on Sea Campion may be losing out as the occurrence of this plant on the Farnes subtly changes.

Lychnis *H. bicruris* – Like the Marbled Coronet, this Sea Campion feeder continues to suffer on the islands with only two singles (five) attracted to light on 7 and 9 September, down from 10 in 2010.

Antler Moth *Cerapteryx graminis** – Having been annual since 2006, and six times previously, it has become clear that this rough-grass species has colonised the Farnes meadows. This is demonstrated by the 10 records of 45 moths covering 21 July-17 August, peaking at 12 in the moth trap on 29 July.

Hebrew Character *Orthosia gothica* – The total of 47 adults recorded in 2013 is comparable to the 41 in 1992, showing that trapping intensity in early spring is needed to reveal the true abundance of this species. All records fell in early spring between 19 April-25 May with a peak of 12 on 12 May.

Smoky Wainscot *Mythimna impura* – This cryptic grassland moth has been increasing almost annually since 2005 (except in 2012), with 54 (39) this year fitting nicely into the trend. A count of 11 in the 15w Actinic moth trap on 21 July was the highest of 17 records between 10 July-17 August.

Lunar Underwing *Omphaloscelis lunosa* – A classic autumn moth that once again increased in 2013 where 181 (80) were attracted to 19 15w Actinic Traps between 8 September-8 October. Despite this month-long flight period, the majority (72%) of records fell in the period 20-25 September with the peak count of 32 (22) on 23 September.

Mouse Moth *Amphipyra tragopoginis* – In recent years this scuttling moth has become increasingly uncommon despite being an almost annual fixture. The 17 records this season involved 39 moths in moth traps on both Inner Farne (37 moths) and Brownsman (two moths), and was a new high since 161 were recorded in 1992.

Angle Shades *Phlogophora meticulosa* – Once again this moth possessed the longest flight season on the Farnes being recorded every month that Rangers resided on the islands except August and December, indicating three generations. After the first singleton found in the Information Centre on 15 May, the other nine records all referred to singles in moth traps on nine dates, with the last on 16 November.

Dark Arches *Apamea monoglypha meticulosa* – The second most abundant species in 2013 with 1,682 on Inner Farne and 242 on Brownsman, equating to an impressive combined tally of 1,924 moths, which made up 13.4% of the islands' annual moth total. The hot summer encouraged a far longer flight season with 70 records evenly spaced between 27 June-7 October and all from the three moth traps. Both Inner Farne and Brownsman attained consistently high counts; the peak of 191 was in the 15w Actinic trap on Inner Farne on 17 August.

Clouded-bordered Brindle *A crenata** – A surprising new resident with only one previous record (in 2011). Although it arrived under the radar, the 17 records of 21 moths from 9 June-20 July clearly demonstrate this species' almost certain colonisation. All records bar one came from Inner Farne 125w MV and 15w Actinic moth traps and involved one to three specimens, perhaps indicating that this otherwise common species is relatively early in the colonisation process.

Dusky Brocade *A. remissa** – Another species that was previously only recorded in 2011, the 23 attracted to light on Inner Farne in 2013 hint at a new-found breeding status. Records were similar to Clouded-bordered Brindle with 12 records of one to four from 19 June-22 July, again indicating that this usually common species has just begun to colonise the Farnes.

Middle-barred Minor *Oligia fasciuncula* – The most abundant species in 2013 with an outstanding 2,536 (225) found on 27 dates across Inner Farne and Brownsman accounting for 17.7% of all moths sighted on the Farnes. Numbers started low from 19 June but quickly rose into triple figures recorded in the moth traps on 10 occasions before the last record on 29 July. Of these, three counts were huge: 304, 279 and 353 on 13, 15 and 16 July respectively with warm, still night time conditions during this period encouraging large catches.

Rosy Minor *Mesoligia literosa* – An increasingly annual species that has had no blank years in the past 10. There was a respectable total of 49 (23) moths. All were attracted to light on Inner Farne with counts falling between one and eight individuals.

Common/Lesser Common Rustic *Mesapamea agg* – Besides differences in larvae and genitalia, these species are virtually identical and are grouped together. Once again, larvae of Lesser Common Rustic were discovered albeit in small numbers, with singles found on 17 April and 10 May. Adults were on the wing on Inner Farne and Brownsman from 15 July, being recorded on 33 occasions until 23 September with a total of 658. The peak was 90 in the 15w Actinic on Inner Farne on 16 August, showing that this species complex did well in the warm summer.

Flounced Rustic *Luperina testacea* – After a dismal 2012, this once superabundant species made a modest increase with 39 recorded in counts of one to seven, mainly on the Inner Farne 15w Actinic trap between 29 July-23 September.

Rosy Rustic *Hydraecia micacea* – This potato pest had an above average year with a total of 682 (375) encountered regularly from 26 July until 8 October, trapped frequently in double figures. The Inner Farne 15w Actinic trap obtained the bulk of records, including the peak count of 67 on 24 September.

Frosted Orange *Gortyna flavago** – A third species that seems to have colonised unnoticed, being seen in only five years since the first in 1998, and not in 2012. An ongoing increase in food plants such as Ragwort and Burdock on Inner Farne may explain why a record 74 were trapped on dates between 7-29 September. Sixteen dates produced catches of one to six with peaks of nine and 10 on 7 and 11 September indicating that this species did well in 2013.

Mottled Rustic *Caradrina Morpheus* – Yet another species which fared well this year with an increase of 190%, represented by 125 (43) adults attracted to light between 8 June and 26 July. Of the 31 records, all from Inner Farne, most were in low numbers typical of this species; however 18 on 20 July was notable.

Burnished Brass *Diachrysia chrysitis* – An iridescent annual species that has matched its food plant Common Nettle in ever-increasing abundance on the islands, with 2013 bringing a record 101 adults to light. This excellent total was spread across Brownsman (three moths) and Inner Farne (98 moths) on the summer dates of 6 July-3 August, again representing a flight season for the Farnes of almost exactly a month. Four double figure counts were obtained in the moth traps with 16 on 22 July the peak.

Spectacle *Abrostola tripartite* – After the crash of 2012 when only six were found, it was encouraging to achieve 40 records of 97 moths, showing that it is possible for species to bounce back from a bad year. All were attracted to moth traps on both Inner Farne and Brownsman, most frequently in counts of one to four. However eight were recorded on four occasions: 17 June and 5, 7 and 13 July.

Snout *Hypena proboscidalis* – Another Common Nettle feeder that has increased in synchrony with its food plant. Formerly quite scarce, 2013 saw 14 records of 26 individuals with all bar one in the moth trap. However, in a nod to the natural scarcity of this species on the Farnes, no counts exceeded five, with an increased number of recording days demonstrating its true frequency.

Beautiful Golden Y Moth (Will Scott)

Sallow Kitten Moth (Will Scott)

Northumbrian *Naturalist*

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Natural History Society of Northumbria

National Trust

Great North Museum: Hancock
Newcastle upon Tyne, NE2 4PT
www.nhsn.ncl.ac.uk