Raptors

Naturally Scottish

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All of nature for all of Scotland
Nàdar air fad airson Alba air fad

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Osprey. Pete Cairns

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Inside front cover:
Common buzzard. Fergus Gill/NHPA

Raptors

Naturally Scottish

by Helen Riley

Foreword

There was a time not so very long ago when you could ask almost any visitor to the Scottish Highlands which species of bird they would like to see most. Invariably, the answer would be the golden eagle. For many, the image of this iconic bird is firmly bonded to that of the remote and wild landscapes which they perceive it inhabits. Enduring as this outlook may be, and thanks to the efforts of conservationists, the fortunes of some other species have changed for the better and now we all have the choice of enjoying sightings of other raptors, such as white-tailed eagles, red kites and of course, ospreys. Numbers of a few other species, most notably common buzzards, are also recovering and having spent my childhood growing up in the Scottish Borders, where once they were almost non-existent, I still find it remarkable that I am now able to see them here on a daily basis.

Coupled with the desire to see raptors, increasing numbers of people are now interested in photographing them too and there is no doubt that it is the sense of awe that these apex predators evoke which compels people to take advantage of any opportunity to get closer and record them. As a group of species, raptors are usually very wary, and sadly it seems that we are still living with a legacy created by centuries of persecution, so perhaps not surprisingly, falconry displays and captive birds at photographic workshops, provide the best outlets for those seeking instant results.

The advent of digital camera technology has certainly fuelled the explosion we have seen in the number of people taking up nature photography, but raptors remain challenging subjects for any nature photographer (amateurs and professionals alike) and getting close to them in the field is of course more about spending time and using field craft than just having long lenses. For the purist, there is little to compare with the immense sense of satisfaction to be gained from entering their world and successfully photographing raptors in the wild without them ever knowing.

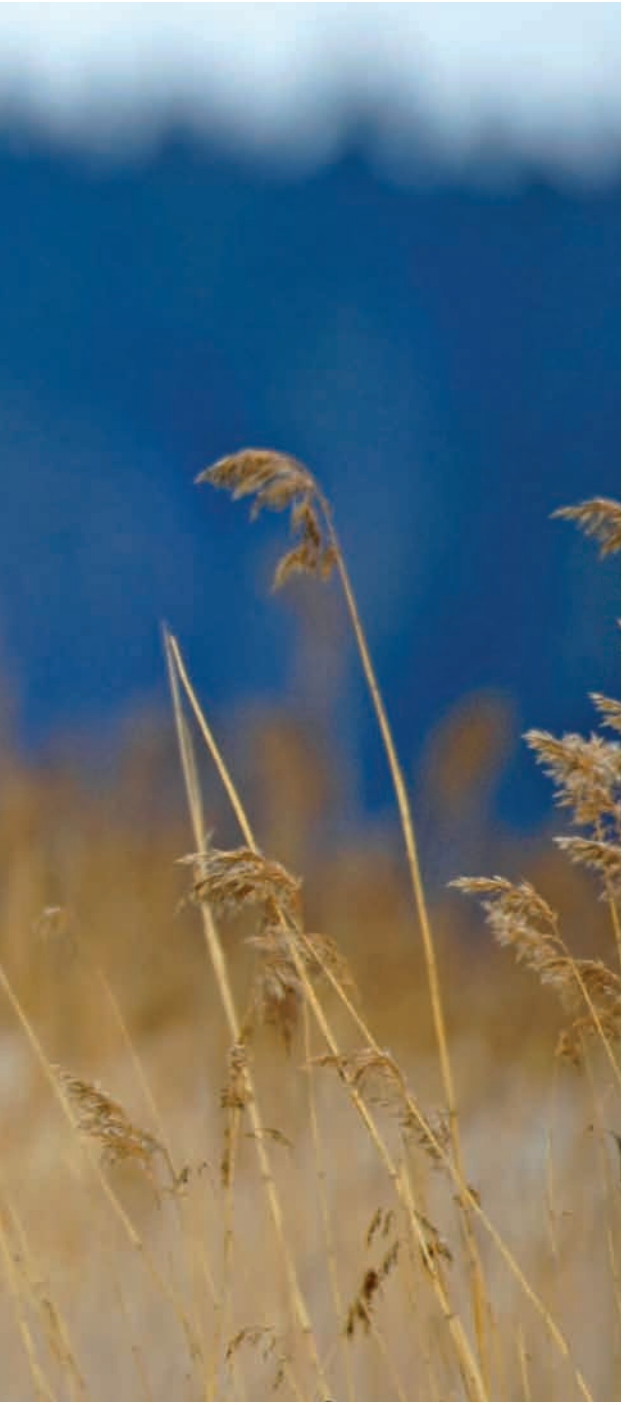
With some aspects of wildlife watching in Scotland still in their infancy, it is wonderful to see opportunities where the people can see and photograph raptors in ways that cause virtually no disturbance. Red kite feeding stations and boat trips to see white-tailed sea eagles are both good examples where local economies benefit too, and with that, perhaps a wider realisation as to the appreciation many of us have for Scotland's rich variety of raptors.

Reading publications such as this, which I've no doubt is the product of many tens of thousands of field observations, must certainly be a first step towards gaining an insight into their lives.

Laurie Campbell
Wildlife Photographer

1
Adult white-tailed eagle.

1



Contents

Adult male marsh harrier.

1

Introduction

Raptors, or birds of prey, comprise: the hawks, eagles, kites, buzzards, harriers, ospreys and falcons (the Accipitriformes) and the owls (the Strigiformes). All have one thing in common – they are predators, typically taking live prey – though some (but never owls!) also scavenge and subsist on carrion. The word 'raptor' is derived from the Latin verb *rapere*, to take by force.

As top predators they are superb indicators of the health of our countryside, reflecting the numbers and diversity of prey, as well as the condition of the food chain.

Scotland is one of the best places in Europe to see birds of prey. At least 19 species nest here regularly, and several more are occasional breeders or visit us on migration, as non-breeders or vagrants. Scotland supports more than 50% of the UK breeding population of six species: white-tailed eagle, hen harrier, golden eagle, osprey, merlin and short-eared owl.

Peregrines can reach speeds of upto 200mph when plunging from the sky after prey.

2

1
Tawny owl on a perch.
2
Peregrine falcon with a kill.

Scottish raptors

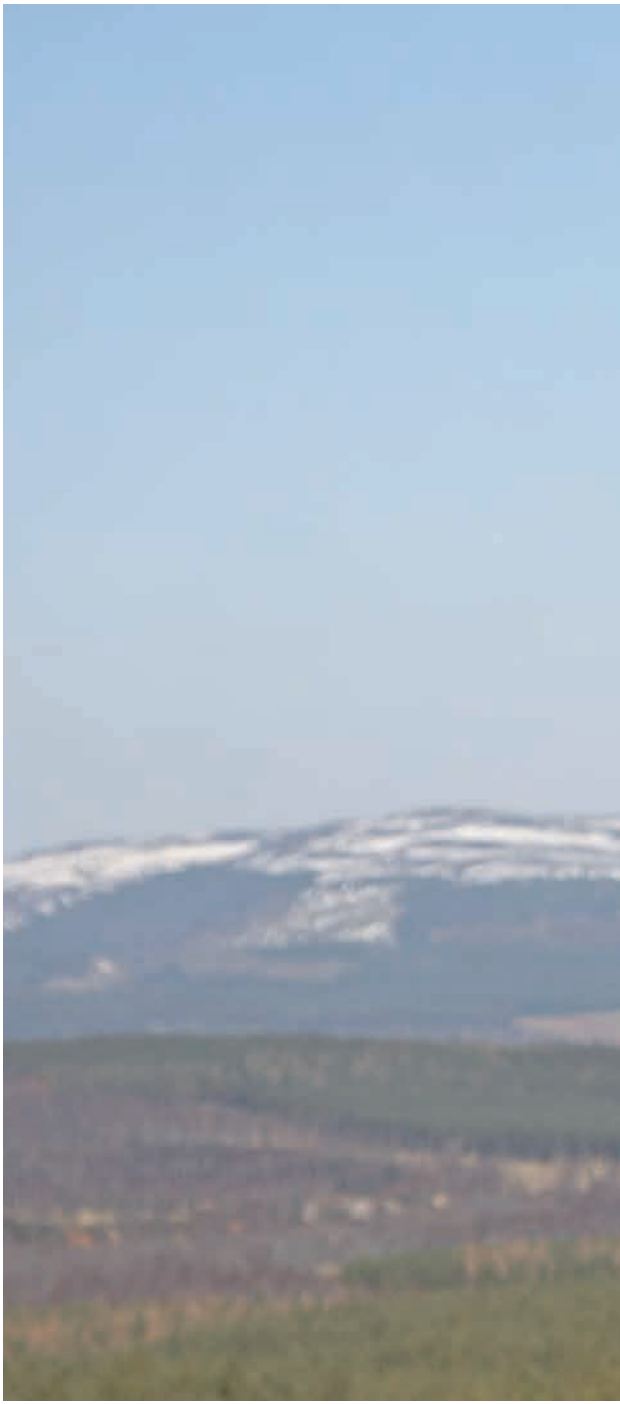
Eagles

Scotland's largest bird of prey, the white-tailed or sea eagle, was known in ancient times as the 'Erne' – Anglo Saxon for 'the soarer'; today, some people liken the large female to a flying barn door! Formerly extinct, it has been successfully reintroduced to Scotland. Today there is an expanding population in the west and north-west Highlands and Islands and there is an on-going reintroduction programme in the east of Scotland.

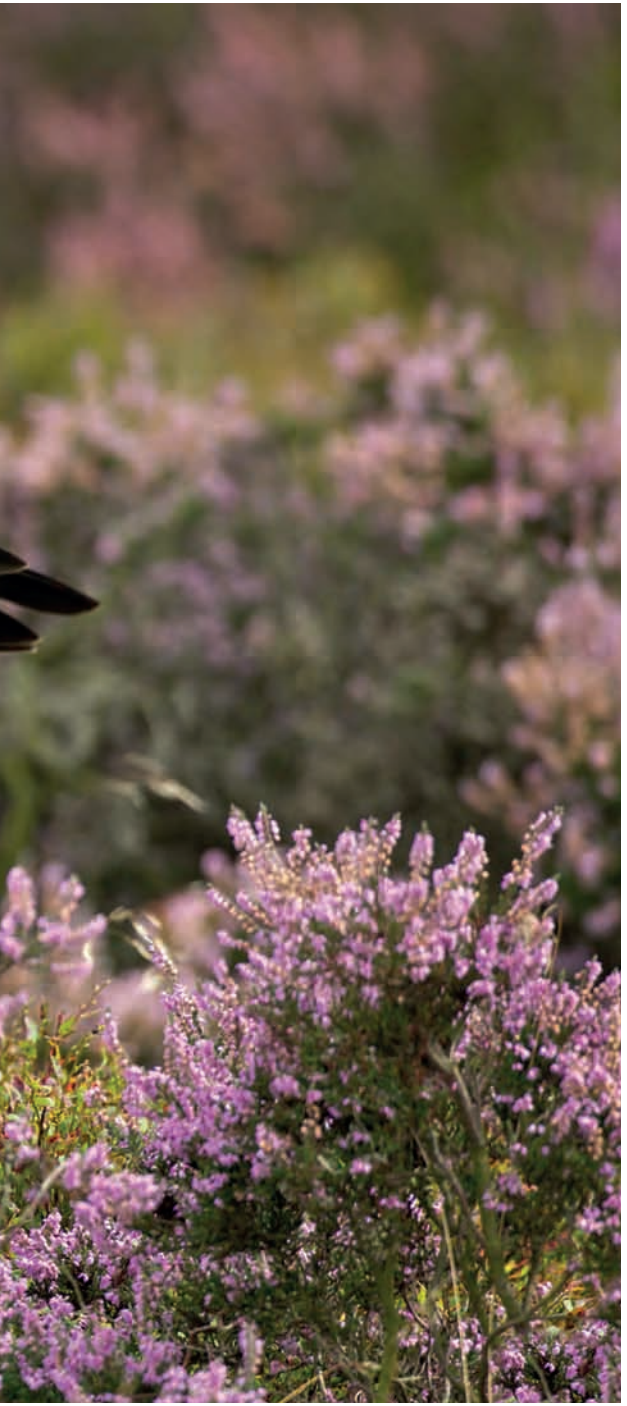
The majestic golden eagle reigns supreme in remote, wild hills and glens, nesting on rocky crags, sea cliffs or ancient Scots pines. Difficult to see except when soaring, golden eagles may appear only fleetingly over a high snowy corrie or towering rocky rampart.

Scotland's third 'eagle', the osprey, famously re-established itself as a breeding species in the middle of the 20th century, becoming a symbol of the burgeoning environmental movement. A summer visitor, which feeds almost exclusively on fish, the expanding Scottish population now numbers in excess of 200 pairs.

All raptors are carnivores with keen eyesight, hooked upper beaks, strong feet and sharp talons.



1
Golden eagle.



Buzzards and kites

Known as the ‘tourist eagle’ in some parts of Scotland, as it is sometimes mistaken for a golden eagle, the common buzzard has a wingspan only half the size of an eagle’s. It is now living up to its name as the most numerous bird of prey in Scotland.

The rare and secretive honey-buzzard does not eat honey and is best described by its old name of ‘bee hawk’. With us only in spring and summer, this migrant specializes in finding and digging out wasp nests to feast on the grubs. The ‘buzzard’ label reflects the fact that, on the wing, this species is easily confused with the common buzzard, although it is more closely related to the kites.

Like the white-tailed eagle, the red kite has been successfully reintroduced to Scotland. Since the first young birds were released in 1989, numbers have grown steadily to at least 177 pairs in 2010.

3

2
Common buzzard.
3
Red kite.

Harriers and hawks

Scotland is the stronghold for Britian's hen harriers, a predator of heath and bog. Sadly, hen harriers continue to be illegally killed and some of their nests destroyed because they prey on red grouse.

The second breeding harrier in Scotland, the marsh harrier, is one of our rarest raptors, found in only a few coastal marshes. There are less than ten pairs in Scotland, far fewer than the 350 or so pairs in England.

The sparrowhawk is often seen around gardens or parks, dashing over a bush or hedge, ambushing prey which it may even pursue on foot – penetrating far into the thicket to make a kill. Nesting mainly in mature woodland and preferring coniferous trees, this is one of the most abundant raptors in Scotland.

Its close relative, the goshawk, is almost half as large again, and a much more elusive forest dweller. A powerhouse raptor, the female may take prey as large as hares and wild ducks. This is another 'comeback' predator, exterminated in Britain by the late 19th century, but becoming a regular breeder from the mid-1960s – in many places following the 'escape' of falconry birds.

4
Adult male sparrowhawk.
5
Adult male common kestrel.

4

Falcons

The falcons are small to medium sized, with pointed wings and streamlined bodies making them agile and speedy. The peregrine falcon is the fastest animal in the world, often striking down birds after breathtaking stoops – reaching up to 200 mph in plummeting vertical dives.

Not much bigger than a blackbird, the merlin is Scotland's smallest falcon. It nests in the uplands, spending the autumn and winter by the coast. Handsome and pugnacious, the merlin feeds mainly on small birds and large insects caught on the wing after dashing chases.

The hobby numbers just over 2000 pairs in the UK, but no more than a couple of pairs nest annually in Scotland. A swift-like predator (but almost double the size) hobbies feed mainly on insects for much of the year, but switch to small birds when breeding, snatching their prey on the wing.

Until recently, the common kestrel was Scotland's most familiar raptor, typically seen hovering over roadside verges in search of voles, its main prey. It is now a species of conservation concern. There has been a 58% decline in the Scottish population between 1995 and 2010. The reasons for this are not clear; factors under investigation include the incorrect use of so-called 'second-generation anticoagulant rodenticides', which have been found in high concentrations in the tissues of kestrels. It is also possible (although unproven) that there is some competitive effect related to the recovery of some other raptor species, such as the common buzzard.

5

Owls

The five species of owls that nest in Scotland are mainly nocturnal hunters.

The tawny owl is the commonest and most widespread species on the Scottish mainland. A woodland specialist, nesting in tree cavities and also readily occupying nest boxes, they are absent from the more remote islands of the Outer Hebrides, Orkney, Shetland, as well as large parts of the far north-west Highlands.

Scotland's nesting barn owls are the most northerly in the world range of this widely distributed species. Today this is one of the most popular of birds, perhaps partly because of its habit of nesting in buildings (it also takes readily to nest boxes), but also because of its stunning white plumage, heart-shaped face, and graceful, almost floating, flight. Vulnerable to severe winter weather, when extended periods of snow-cover shields voles and shrews from hunting owls, the Scottish population is concentrated in the milder south and west of the country. Numbers appear to have been increasing in recent years, although two recent hard winters (2009/10 and 2010/11) may cause a set-back in the fortunes of the barn owl.

The two species of 'eared' owls – long-eared and short-eared – are secretive and difficult to study. The long-eared owl typically nests in trees in old crows' nests, and is strongly associated with woods where it feeds on field voles, wood mice and rats. This is the easiest bird of prey to overlook, with the adult spending daylight hours perched close to a tree trunk. The calls are distinctive, a quiet but penetrating "hoo-hoo-hoo-hoo" song, often repeated 20 to 30 times, and the chicks begging with loud, plaintive "pee-eh" calls (likened to a squeaky gate) audible at over a kilometre from the nest. The long-eared owl is scarce or absent in the north-west Highlands, the Outer Hebrides and the Northern Isles.

The slightly larger short-eared owl can sometimes be seen feeding by day, especially in the late spring and early summer, and is most likely to be encountered over moor and heath.

There are probably less than ten pairs of little owls in Scotland – a tiny fraction of the British population – all breeding close to the border with England.

6
Most owls are cryptically coloured to blend in with their surroundings. The ghostly white barn owl is an execption.

Occasional visitors

The gyrfalcon, an irregular winter visitor, is the world's largest falcon, feeding on ptarmigan and collared lemmings in its arctic and tundra breeding grounds. The rough-legged buzzard, another winter vagrant, feeds over lowland farmland, open woodland and moorland. Both species may establish winter territories and seem to appear more frequently in years when rodents are scarce in their north European breeding grounds.

The Montagu's harrier is an infrequent summer visitor which winters in Africa. A few nesting attempts were recorded in central and southern Scotland in the mid-20th century, but sadly many of the birds were shot and breeding was rarely successful. There have been only a few sightings since, and within the British Isles the species is currently restricted to the south of England. The Scottish breeding attempts took place in moorland or young forestry plantations, whereas in England the typical nesting habitat is arable farmland.

The Eurasian eagle owl is a formidable predator – capable of killing and eating all other birds of prey (including the eagles) found within its mountain or forest breeding range. A somewhat controversial species (there is a debate about whether it is native to Britain) it is regularly kept in captivity. There have been one or two nesting pairs in Scotland and a male was recently recorded calling in the north. All of these records may be escaped captive birds.

7

7
Adult male Montagu's harrier.
8
Snowy owl.
9
Female red-footed falcon.

8

The snowy owl is an Arctic nesting bird, with its nearest breeding grounds in Iceland and the Scandinavian mountains. In 1967 a breeding pair was recorded for the very first time in Scotland, on Fetlar in Shetland. They bred each year until 1975, when the male disappeared. He was never replaced, although one or more females remained on Shetland until 1993, sometimes laying infertile eggs. Snowy owls are recorded in other parts of Scotland occasionally during the summer, but there is no evidence of recent nesting.

In 1995, a male pallid harrier bred with a female hen harrier in Orkney (the eggs were taken by crows); normally, this harrier nests in Eastern Europe and beyond, in Russia and Ukraine, so its presence in Scotland was exceptional.

The most remarkable recent nesting record is that of a male black kite, found in April 2005, displaying with a red kite, and nest building a month later (but not breeding). The following year, a male black kite paired with a six-year old red kite, producing two flying young – the first ever record of a successfully breeding black kite in Britain and Ireland. Slightly smaller than red kites, and darker in plumage, they are widely distributed as a breeding species in continental Europe and eastwards into Asia.

Other vagrant raptors recorded in Scotland include the red-footed falcon, observed most frequently in the spring in the Northern Isles and north-east. Some birds have remained for several weeks but there is no suggestion that breeding has ever been attempted. There have also been 1–2 records of the lesser kestrel, American kestrel, and Eleonora's falcon.

9

Life cycle

Come the early spring, raptors are onto their nesting territories. Some may have been in residence all winter, like the golden eagle which is one of a handful of birds to remain in the Scottish uplands throughout the harsh winters. Tawny owls also stay put in their woodland territories all year round, defending their patches against neighbouring pairs and intruders, and in the autumn, noisily chasing off the fledged young of the year. Other birds of prey may move away from breeding areas in search of more productive foraging grounds, for example hen harriers, merlins and some peregrines abandon upland breeding territories and winter in lowland areas such as estuaries. The migratory species, such as osprey and honey-buzzard, make the longest journeys, flying several thousand kilometres, all the way to Africa.

As the breeding season begins, diurnal raptors make the most of their flying skills with spectacular nuptial display flights. Perhaps the most stunning is the skydance, performed by a number of species but most exuberantly by the hen harrier. This involves the male circling high over the breeding grounds before plummeting earthwards, only to sweep upwards at the last moment, roll over on his back at the top of the climb and dive earthwards again. This sequence will be repeated dozens of times and the display can last up to 15 minutes at a time.

Many species soar to great heights in their display flights, from where they must be able to see – and to be seen – by other members of their species – over long distances. Pairs of goshawks may circle together in early spring far above their woodland nesting grounds, flight-playing and diving on each other. This is the best time of year to catch sight of these otherwise secretive, forest-dwelling birds.

Owls may also make display flights. A male long-eared owl will sing to attract a female and fly to join her, zig-zagging with deep, slow wing beats, sometimes clapping his wings together beneath his body. Male barn owls quarter their territory, calling and changing direction frequently, and during courtship the male and female may chase after each other in low-level flight.

1

1
Peregrine falcon eggs.
2
Female hen harrier showing the distinctive white rump or ‘ringtail’.

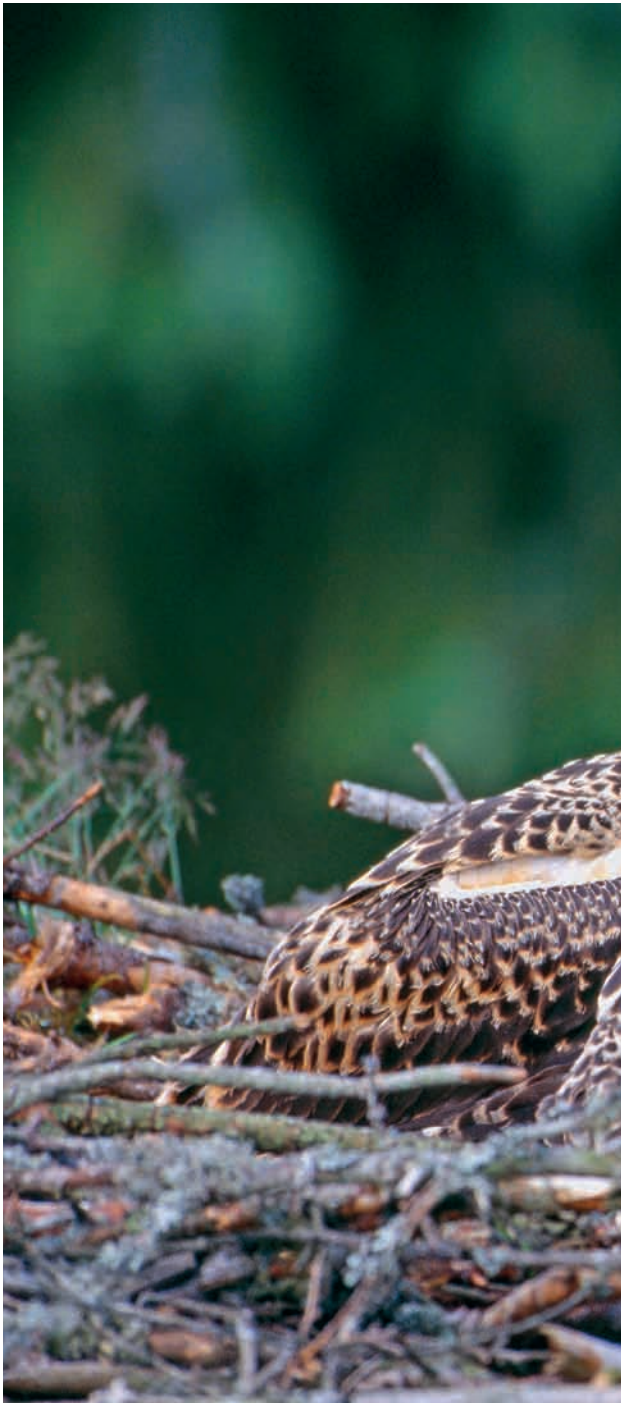
2

Unusually amongst birds (and animals in general), female birds of prey tend to be bigger than males, a phenomenon known as reverse sexual dimorphism. This may be linked to the female's role as chief defender of the nest and young chicks during incubation and early chick rearing. At this time males of many raptor species take on the role of sole provisioner, feeding the female while she lays and incubates eggs. After the chicks have hatched, the male will often continue to provide food to the female and the nestlings, until the chicks are large enough to be left on their own in the nest. Reverse sexual dimorphism may also allow male and female raptors to take different prey, which may reduce the size of breeding territory required by a pair. It is most marked in raptors that prey on birds, and reaches its most extreme in the sparrowhawk where the female is nearly twice as heavy as the male. In fact male sparrowhawks fall within the size range of prey taken by females, and instances of cannibalism have been recorded.

A variety of sites are used for nesting: rock ledges, trees, marshes, buildings and other man-made structures, and sometimes the ground. Established pairs of golden eagles, white-tailed eagles and ospreys almost always re-use a nest from a previous year, building it up with new sticks and a fresh lining.

3
Barn owl brood with chicks of different ages.
4
Osprey and chicks.

3



5
Long-eared owl chicks.

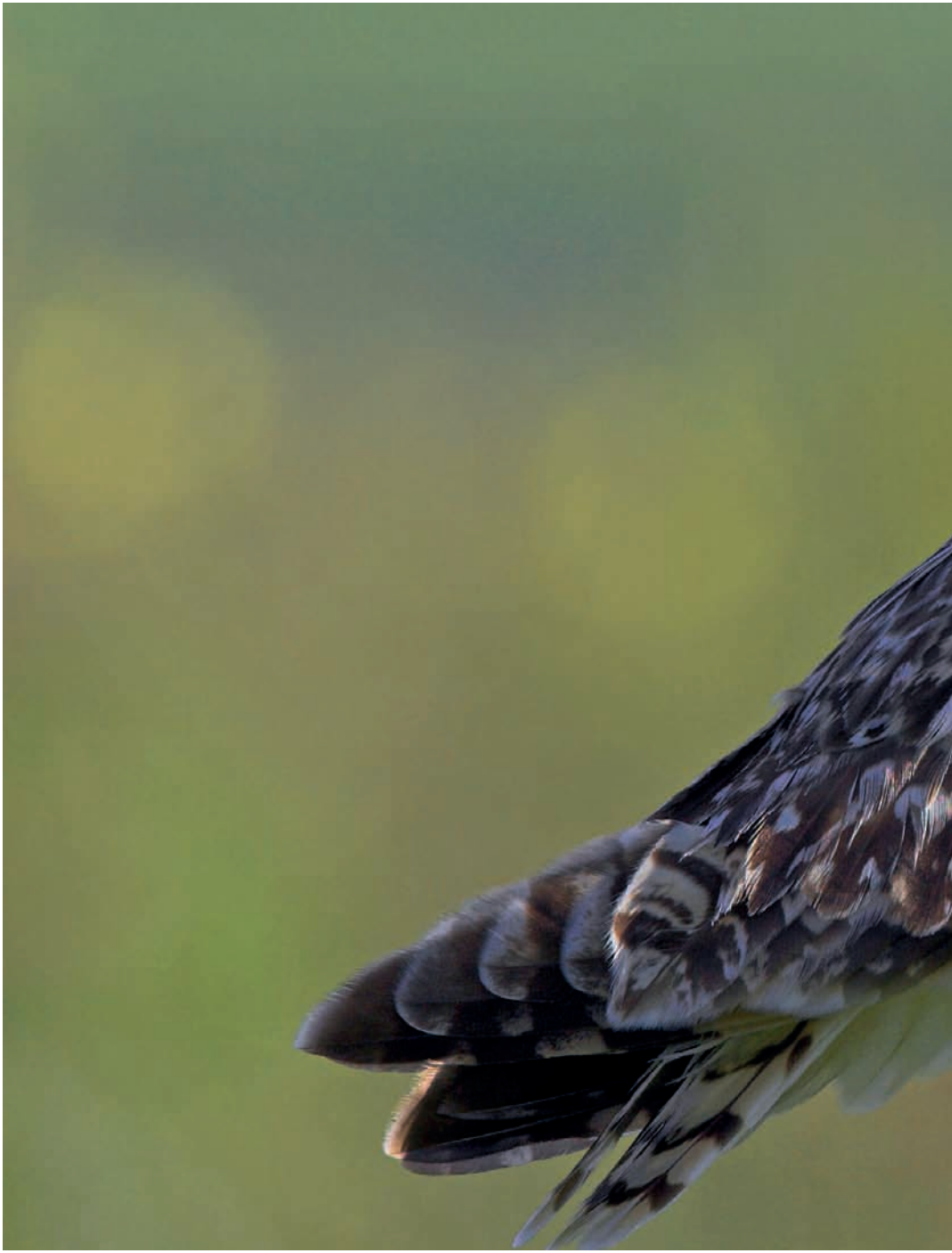
Marsh and hen harriers, essentially ground nesters, build new nests each year. Honey-buzzards, red kites, goshawks, sparrowhawks and common buzzards build nests in trees, sometimes starting from scratch but often refurbishing a nest from a previous year. Falcons and most owls do not build a nest but scrape a depression in the nesting substrate – whether it is a rocky ledge, a cavity in a tree or building, a nest built by another species, a nest box, or the ground. Some species, like common buzzard and common kestrel, may use a different nest site depending on what is available, including trees, ledges, man-made structures and the ground.

Egg laying takes place between mid-March and early June, with the largest species – the white-tailed and golden eagles – beginning earliest. These species have the longest incubation and chick development periods.

In the nests of many raptors, the eggs hatch asynchronously, a few days apart, because females begin to incubate the eggs before the clutch is complete. So chicks in the same brood may be of different ages. This is most marked in barn and short-eared owls where nests may contain nestlings at very different stages of development, from those with feathers near full-grown to more recently hatched, downy chicks. The youngest chicks may not survive if there is not enough food to go round, and are often bullied and sometimes even eaten by their older siblings.

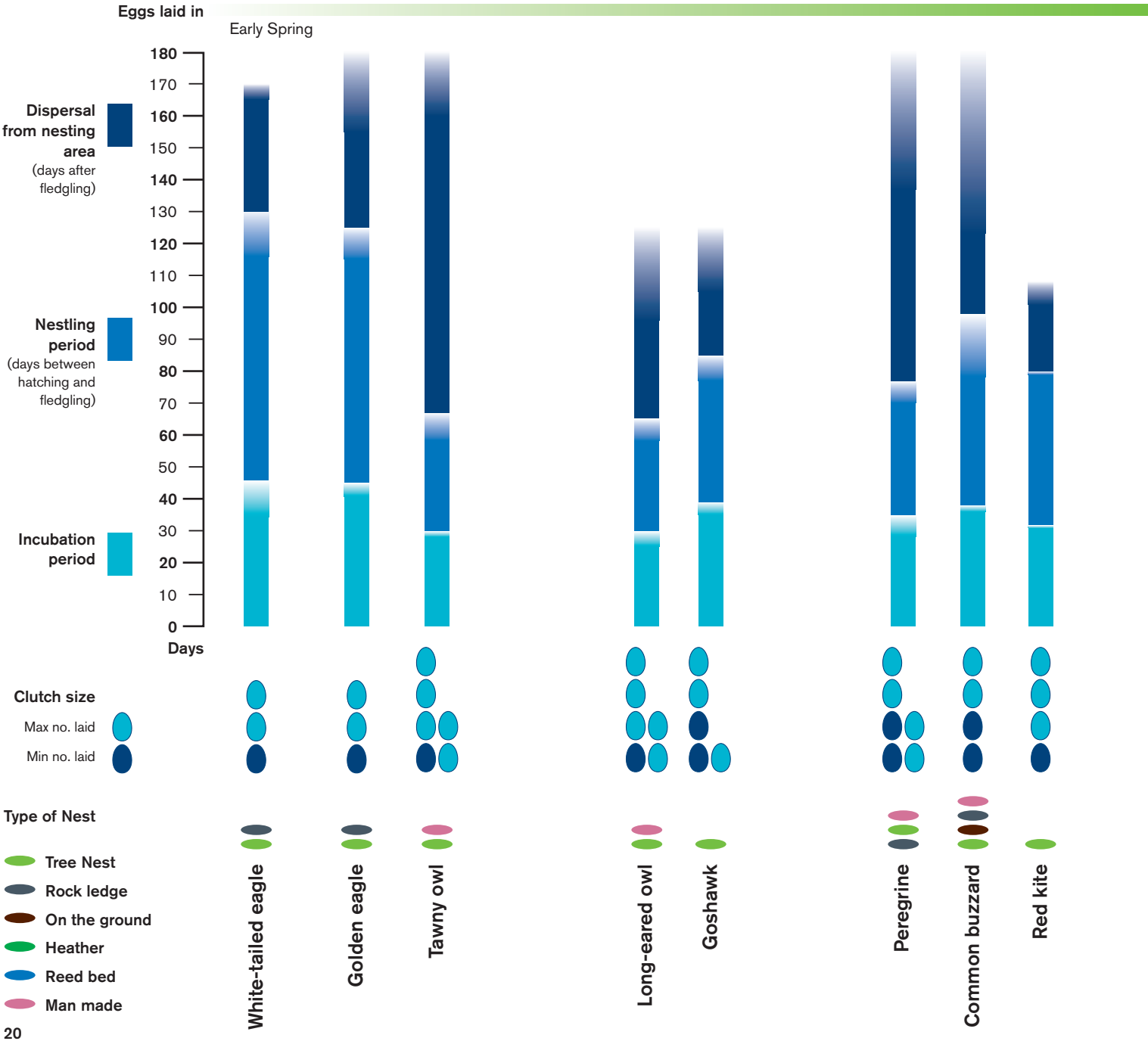
During midsummer, diurnal birds of prey with nests bursting full of hungry mouths can take advantage of the long days and short nights to provision their broods. At this time, the normally nocturnal owls may be seen foraging during daylight hours, especially the short-eared owl.

In contrast to the majority of diurnal raptors, most owls have feathered legs down to their toes.



6
Short-eared owl.

Timing of breeding in Scottish raptors



Late Spring
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
Days
Barn owl
Osprey
Hen harrier
Marsh harrier
Common kestrel
Short-eared owl
Sparrowhawk
Merlin
Honey-buzzard

1

Hunting methods

Diurnal birds of prey have excellent eye sight so they can locate their prey from a distance (often from the air), and follow and capture fast-moving prey. Most raptors have a prominent ridge extending above and in front of the eye, providing protection from wind, dust and excessive glare, and (for the human observer) lending intensity to their piercing stare. The eyes are large (1.4 times bigger than average for birds of the same weight), with densely packed light-receptor cells in the retina, giving high visual acuity, so that small objects can be distinguished at a distance. For example, common buzzards probably have distance vision that is 6–8 times better than humans. Colour perception, however, is probably similar to that of humans. Some species can detect ultraviolet light; common kestrels can see the ultra-violet trails of scent marks and faeces used by voles to mark their runways, and may use these signs to identify areas where prey is abundant.

Owls have even bigger eyes, 2.2 times larger than the average bird, also packed with light-receptor cells, but lacking colour-receptors as colour vision is not needed at night. Yet despite their high-tech and enchanting eyes, owls locate their prey mainly by sound, and often in pitch-blackness. Hunting from perches or from flight, the heart shaped face channels sound waves. Asymmetric placement of their ears allows owls to triangulate sounds enabling acutely accurate detection of the location and movements of prey. Feeding mainly on voles, barn owls prefer to hunt along woodland edges, fences, ditches and even roadsides, where prey are most abundant.

The ‘ears’ of a long-eared owl are in fact tufts of feathers which are raised to express alarm.

1
Classic image of a hovering kestrel.
2
Long-eared owl.

Scotland's 'big six'

Golden eagle

Scientific name: *Aquila chrysaetos*
Wingspan: 187–225cm
Body length: 75–93cm
Weight: 3.6–5.2kg
Sexual dimorphism: females wings are about 10% longer than those of males, females are 40–50% heavier than males.

1

1
Subadult golden eagle (note the white on the wings and tail) mantling a dead fox.

2
The shiny feathers on the head and neck give the golden eagle its name.

In a 2004 poll by '*The Scotsman*' newspaper, the golden eagle was voted Scotland's favourite bird, a symbol of the wild landscapes and great outdoors.

Adult golden eagles are almost uniformly dark brown, with a golden crown and hind neck. The species is slow to mature and birds do not breed until they are 4–5 years old. In its first year of life, a young bird has large white wing patches, and a white tail fringed black. These distinctive white patches may allay the aggression of adult birds, should a juvenile wander into an occupied territory. The extent of white on the wings and tail diminishes as birds approach breeding age.

The 440 or so pairs of golden eagles in Scotland are distributed across the highlands and western islands, with only a handful in the borders and the south-west uplands. Pairs occupy more or less exclusive territories throughout the year, with home ranges varying in size from about 9 to 75 square kilometres. Golden eagles breed at higher densities in parts of the west yet more successfully in the east, where live prey is more plentiful.

Golden eagle pairs usually have two or more alternative eyries within their territory, sometimes as many as 10 and often a mile or much more apart. Most nests in Scotland are built on rock ledges; very rarely in trees, almost always Scots pine. Nests may be decades old, with nest material – branches and twigs and then a lining of green vegetation – added year on year. Nest-building tends to begin in autumn and continue through the winter, and a pair may refurbish more than one eyrie in their territory before selecting a site for breeding the following spring.

Territorial display flights, including high soaring and undulating 'skydancing', are most frequent during the late winter and early spring. Courtship behaviour is rarely seen and may only occur when a new pair is establishing, allowing each bird to judge the other's aerial skills. Golden eagles have been observed carrying sticks, stones or prey high into the air, dropping them and diving swiftly to catch them again, all the while watched by their partner.

Golden eagles in Scotland typically lay two eggs but rarely raise two chicks to fledging. Twins are most common in areas where prey is more abundant. On Skye, the abundance of rabbits and seabirds results in a significantly higher proportion of eagle pairs raising two chicks than on the adjacent mainland.

Eagles feed mainly on rabbits, hares and grouse as well as sheep and deer carrion, but a wide spectrum of prey has been recorded including other raptors eg. hen harriers, common buzzards and peregrines, seabirds, foxes, badgers and snakes.

Hen harrier

Scientific name: *Circus cyaneus*
Wingspan: 97-121cm
Body length: 44–55cm
Weight: 300–700g
Sexual dimorphism: females wings are about 10% longer than those of males, females are 40–50% heavier than males.

3

3
A male han harrier carrying prey to feed an incubating female or chicks.

4
The streaked brown plumage of the female hen harrier helps conceal her on the nest.

Hen harriers are unusual amongst birds of prey because of the striking differences in appearance between the sexes – so much so that historically people thought they were two different species! The larger female is a cryptic brown above and streaked off-white below, with a long barred tail and striking white rump, giving her the popular nickname of a 'ringtail', a description shared with immature males which also sport brown plumage. The adult male is ghostly grey above, unblemished white below and with black wing tips, sometimes mistaken for a gull.

4

Nesting hen harriers are found primarily in the west and north, distributed throughout Argyll, the Inner and Outer Hebrides, the far north in Sutherland and Caithness, and on Orkney. Their typical habitat is rolling heather moorland. Young plantations of coniferous trees that were planted over extensive areas of Scotland in the mid- to late 20th century provided good habitat for breeding hen harriers – particularly because in these areas the birds were relatively free from persecution. As the plantations grew up and the canopies closed, it was thought that hen harriers would no longer be able to occupy these areas because of a lack of open ground for nesting and hunting, but in the west of Scotland hen harriers are increasingly occupying woodland habitats. In all habitats nests are built on the ground, usually concealed in stands of tall, leggy heather. In Northern Ireland, however, some hen harriers have recently started nesting in trees, so it is possible this habit might spread to Scotland.

Male hen harriers may establish harems, pairing with two or more females. Polygyny is most common on Orkney, where some males provide for three or more females (one exceptionally ambitious male had seven!). In common with many raptors, the female incubates the eggs and broods small young whilst the male does all the hunting. He will deliver his catch to the female in a spectacular aerial food pass, releasing it as she flies up from the nest to snatch it out of the air. Fledgling chicks also learn the skill of the aerial food pass. During the breeding season, males range over larger areas (about 7 square kilometres) than females (about 4 square kilometres).

Most hen harriers leave their upland breeding areas in the early autumn, moving south to lowland farmland and coastal marshes. At this time of year they roost communally in reed beds, marshes or on heaths. With up to a dozen or so harriers circling over the roosting site as darkness falls, this is one of Scotland's finest but increasingly rare wildlife spectacles. Some birds, mainly males, cross to the Continent to winter in France and Spain.

Harriers hunt by quartering low over open ground and snatching prey with their long legs and sharp talons. They feed primarily on voles, rabbits and small birds such as meadow pipits, skylarks and red grouse chicks.

Peregrine falcon

Scientific name: *Falco peregrinus*
Wingspan: 87–115cm
Body length: 37–50cm
Weight: 580–1300g
Sexual dimorphism: females wings are about 15% longer than those of males, females are 60–70% heavier than males.

5

The peregrine is the most widespread bird of prey in the world, owing its success to its ability to thrive in almost all habitats except high mountains, polar regions and most tropical forests.

The largest falcon breeding in Scotland, it is a stocky and powerful bird, with slate-blue upperparts, a black 'moustache' contrasting with a pale throat and collar, barred underparts and yellow legs and feet. The male and female are similar in appearance, but the female is considerably larger; she also has a lower pitched alarm call. Juveniles are dark brown above with a moustache and pale streaks on the nape and behind the eyes, and heavily streaked (not barred) below.

5
Adult peregrine showing the pointed shape of its outstretched wings.

6
If bird prey is not killed by the initial strike from a peregrine, it is dispatched with a bite to the base of the skull.

Scotland has traditionally been a stronghold for the peregrine in Britain. During the Second World War peregrine populations were deliberately eradicated, under the Destruction of Peregrine Falcons Order 1940 (which expired in 1946), to prevent predation of military carrier pigeons. In Scotland the persecution was less intense and virtually absent in the north, where a reduction of gamekeeping activities actually allowed the species to gain ground. After the war, the recovery of peregrines was stopped in its tracks by the toxic effects of DDT and other new organochlorine pesticides, although populations in the north and east highlands remained largely unaffected.

Today, peregrines are found throughout Scotland with the exception of the Shetland Isles (where the species has not bred since 1999), occupying upland, lowland and coastal areas and increasingly spreading into towns and cities. The most recent national survey in 2002, indicated an overall decrease of 8% in the Scottish population since 1991. The decline is under investigation as it may reflect habitat deterioration and a reduced prey supply, as well as the persistent effects of toxic chemicals in coastal areas.

Peregrines do not hold exclusive home ranges, but instead hunt over extensive areas which overlap with the ranges of neighbouring pairs. Adults tend to stay on their home ranges year round, though upland areas with a poor winter food supply may be abandoned.

Courtship displays begin in early March, with the male or tiercel (derived from the latin for ‘third’, reflecting the fact that it is about one third smaller than the female) launching from the eyrie with vibrating wings, performing figure of eights, switchback flights and loop-the-loop aerobatics. Together, the pair may high circle and flight play, sometimes making contact in mid-air, briefly grasping talons or touching breast-to-breast or bill-to-bill in an ‘aerial kiss’.

Peregrines do not build a nest but scrape out a hollow 3–5cm deep for their eggs. The nest site is usually a bare rocky ledge but peregrines may also occupy the nests of other birds (on cliffs or crags or less frequently in trees), ledges on buildings, electricity pylons or other man-made structures, or even nest on the ground.

Peregrines feed almost entirely on birds – mainly medium sized species such as pigeons, gamebirds and waders, but taking a wide range from goldcrests to geese. Prey is usually captured in the air, with the peregrine performing a high speed stoop to strike down its victim.

Osprey

Scientific name: *Pandion haliaetus*
Wingspan: 145–173cm
Body length: 52–60cm
Weight: 1.1–2.0kg
Sexual dimorphism: females wings are about 5% longer than those of males, females are about 15% heavier than males.

7

A summer visitor to Scotland, the homecoming of ospreys each spring is eagerly awaited, and the fortunes of nesting birds feature annually in the news.

Ospreys are large, long-winged birds with pale heads and underparts, dark brown upperparts and grey legs and feet. They have a distinctive dark eyemask extending down the sides of the neck and a mottled band across the chest. Males can be distinguished from females as they are slightly smaller and whiter below with less marked breast bands. Experienced observers can recognize individual birds by subtle variations in feather patterning.

7
Ospreys have long, curved claws and reversible outer toes allowing them to grasp slippery fish with two toes in front and behind.

8
On close view the ruffled feathers at the nape of the neck give the appearance of a crest.

8

Most ospreys breed for the first time at three years of age and fidelity to both the nest site and mate is thought to be strong. Those surviving to breeding age live for an average of eight years – sometimes much longer. The oldest known female in Scotland, nicknamed 'Lady' and thought to be 26 years old, resides at the Loch of the Lowes in Perthshire. So far she has raised 48 chicks! In June 2010, bird lovers around the world watched anxiously on a webcam as she lay sick in her nest for several days, barely able to move, but incredibly she recovered, survived the long migration to Africa, and returned to breed for the 21st time in 2011.

The Scottish osprey population has grown from a single pair in the 1950s to more than 200 pairs in recent years, and the species is now widely distributed in Scotland. The majority of the population nests north of the central belt, but there appears to be a marked expansion occurring in the south-west and borders.

Typically built on the top of a tree, some nests have been used for decades. The Loch Garten site – where recolonization of Scotland began – has been occupied for more than 50 years with three different nests used. Nest trees tend to be in a prominent position in their surroundings and usually within 10 kilometres of lochs, rivers or estuaries fished by the adults. Ospreys have also nested on ruined buildings and rocky islands in lochs, and will readily use artificial nest platforms which have been used successfully to attract birds into new areas.

Ospreys feed almost entirely on fish, taking a range of freshwater and sea fish, including brown and rainbow trout, pike, flounder and sea trout. They rely on catching fish close to the surface, swooping down and snatching prey with their talons.

From late August, adults and juvenile ospreys disperse and begin migratory journeys of 5-6,000 km to wintering areas in west Africa, travelling individually and not as a family group. Some Scottish ospreys have been satellite-tracked to their wintering grounds. This has shown some extraordinary feats of endurance, including a juvenile osprey swept out into the Atlantic which flew non-stop over the ocean for 60 hours before making landfall in Portugal. Young ospreys may remain in their wintering areas for their first and sometimes second summers, before beginning regular spring journeys to breeding areas.

Common buzzard

Scientific name: *Buteo buteo*
Wingspan: 110–130cm
Body length: 48–57cm
Weight: 420–1365kg
Sexual dimorphism: wing length is similar between sexes, females are 20–30% heavier than males.

9

Common buzzards have undergone a spectacular expansion in their Scottish range over the past 20–30 years. In most areas they are now the most frequently encountered bird of prey, offering a close-up view while perched on a telegraph pole next to a road, or soaring effortlessly over a belt of woodland with tail fanned. They can be vocal, especially during the breeding season, with a distinctive, wailing, “peea-ay-peea-ay” call.

Males and females are similar in appearance, the male being slightly smaller. Adults are typically medium to dark brown, with a pale crescent across the breast, dark brown eyes, and broad, dark trailing edges to the tail and wings. Plumage can vary considerably, however, and some birds may be very pale on the head and body. Juveniles have paler eyes, teardrop-like streaks on their underparts, and lack the dark trailing edge (or subterminal band) to the tail.

9
In flight, common buzzards appear compact with short necks, broad wings and fanned tails.
10
Adult common buzzards have penetrating dark brown eyes.

10

The common buzzard is a resident breeding species throughout most of mainland Scotland, the Western Isles and Orkney. It does not breed on Shetland although migrant birds may be observed there in spring or autumn. Heavy persecution, beginning in the early 19th century and persisting in some areas throughout much of the 20th century restricted common buzzards to the more remote areas of north and west Scotland. Population recovery was hindered in the 1950s and 1960s by the effects of disease (myxomatosis) in rabbits, a key prey species for common buzzards, and to a lesser extent, pesticide contamination. The current Scottish distribution represents a recovery of the species' former range, and indications of declines in some areas since 2003 may mean that common buzzards have reached carrying capacity in some parts of Scotland.

Common buzzards thrive in a wide range of habitats including heather moorland, forestry plantations and farmland. Pairs occupy home ranges of 2–3 square kilometres, within which a core area of up to 1 square kilometre is defended against other common buzzards, except close relatives. Home range size tends to be smaller in areas where prey, in particular rabbits, are more abundant.

Display flights occur throughout the year but there is a peak of activity in spring. Territorial displays typically involve one or both members of the pair in soaring, high-circling flight, which may be followed by bouts of skydancing. Sometimes, groups of common buzzards from neighbouring territories come together to soar in ever-rising, encircling parties. Pairs may indulge in flight play, with the male plummeting towards the female who turns over and raises her talons towards his. In late summer, fledged juveniles may join in the fun, 'mobbing' a parent bird who will flip over and raise talons to its pestering offspring.

Nests are usually built in mature trees, situated close to a clearing, ride or the woodland edge. Common buzzards will also nest on cliff ledges, bushes, buildings and the ground.

Voles and rabbits are the main prey, but common buzzards also feed on birds, amphibians, reptiles, invertebrates such as earthworms and large beetles and, particularly in the non-breeding season, carrion.

Short-eared owl

Scientific name: *Asio flammeus*
Wingspan: 95–110cm
Body length: 33–40cm
Weight: 200–400g
Sexual dimorphism: females wings are very slightly longer than those of males, females are up to 20% heavier than males.

11

In summer, it is not uncommon to encounter a short-eared owl hawking and hovering over heather or 'white' moor in the morning or evening, although sightings of this long-winged wanderer appear to be less frequent in recent years.

Short-eared owls are strikingly beautiful birds, with pale buff faces and intense yellow eyes set in dark surrounds. The short 'ear-tufts' on top of the head, which give the species its vernacular name, are usually invisible, raised only when agitated or curious. The overall colour scheme is a mixture of brown, chestnut and off-white, mottled on the upper body, paler and streaked below, and with barring on the flight feathers of the wings and tail. The sexes are similar in size and appearance, although males tend to have paler faces and underparts. Juveniles are darker but moult quickly into adult plumage by late autumn of their first year and can breed at one year old.

11
Hunting short-eared owls frequently hover momentarily before pouncing or flying on.

12
Dark eye patches give the short-eared owl a 'masked' appearance.

The short-eared owl is widely but somewhat patchily distributed throughout Scotland. The highest nesting densities occur in the south, central and eastern uplands, as well as Islay, Mull, the Uists and the Orkney Isles. The species is absent from Lewis, Shetland and large parts of the north-west Highlands.

Short-eared owls have been described as 'nomads who camp where the table is laid', because the numbers settling to breed can vary markedly from one year to the next, reflecting cycles in abundance of their main prey, field voles. Extreme examples of this relationship were the so-called 'vole-plagues' in the south of Scotland in the late 1800s, when witness accounts describe the ground as alive with scurrying and squeaking voles and the air thick with short-eared owls. During these times an estimated 200–500 pairs nested in Dumfries and Galloway alone; whereas now in the best 'vole years' there may be about 2,000 nesting pairs in Scotland as a whole, and only a few hundred in poor years. Because of this potential for extreme fluctuations in numbers, long-term population trends are difficult to assess. However, short-eared owls seem to have undergone an increase in the first half of the 20th century.

Male short-eared owls perform elaborate display flights, most often in the early morning or late afternoon and evening. A bird will fly skywards with rhythmic wingbeats, interrupting the ascent from time to time by clapping wings beneath the body and dropping downwards. Having gained a good height, the male may soar or hover while calling, and then finish with a series of glides and wing claps, and finally a near-vertical stoop.

Short-eared owls nest on the ground in open habitats such as tall heather or rushes, lining a shallow scrape with sticks or vegetation. In common with many owls, the eggs hatch asynchronously and a nest may contain chicks which vary widely in age. At about two weeks old, before they can fly, chicks leave the nest and conceal themselves in nearby vegetation. They will emerge from their hiding places to attract the attention of parent birds carrying food: ruffling their body feathers, vibrating their wings and uttering a hissing call.

At the end of the summer, short-eared owls tend to move away from breeding areas, seeking out open, lowland areas such as estuaries, coastal grasslands and inland marshes. At this time they hunt mainly at night and often roost communally during the day. Some birds may winter in England, Ireland or even continental Europe.

13
The merlin is the smallest of Scotland's raptors, not much bigger than a blackbird.

Reintroductions

The white-tailed eagle was lost to Britain in 1918. Its reintroduction to Scotland was one of the earliest modern examples of a translocation programme for a large raptor. The first two phases took place between 1975–1985 on the Isle of Rum, and between 1993–1998 in Wester Ross, using young birds taken from nests in Norway. The first eggs were laid in the wild in 1983, with flying young produced two years later. The population grew slowly at first but has expanded more rapidly in recent years, with 55 pairs in 2011. Released birds tend to have lower survival rates and produce fewer young than wild-bred birds. This is not unexpected, as fledgling white-tailed eagles normally spend several weeks on their natal territory, probably learning survival techniques – in particular hunting – from their parents; young birds released into new areas do not have this opportunity. This provides a useful lesson for future reintroductions, indicating that the best strategy is to maximize the productivity of early breeding attempts and ensure as rapid as possible a shift to a population dominated by wild-bred individuals. A third phase of reintroduction of white-tailed eagles began in 2007, with the aim of introducing a self-sustaining population in east and central Scotland.

1

1
White-tailed eagles have a varied diet including fish snatched from the surface of the water.
2
Claire Smith RSPB project officer with a reintroduced young white-tailed eagle.
3
RSPB field worker fitting radio transmitter to red kite chick.


2

The reintroduction of white-tailed eagles has not been without controversy, and there remain concerns amongst some people – particularly farmers – about their impacts on lambs and other livestock. White-tailed eagles do indeed take lambs, though many of these are dead already when taken. Fish, seabirds, waterbirds, rabbits and carrion are their main prey.

The reintroduction of red kites to Scotland began in 1989, with young birds taken from Sweden. The first release site was the Black Isle, near Inverness, followed by further releases in central Scotland, Dumfries and Galloway, and on the outskirts of Aberdeen. In the north of Scotland the species has struggled to re-establish itself compared with reintroductions further south and in England. The lower growth rate of the north Scottish population has been attributed to illegal poisoning, with 40% of red kites found dead proving to be victims of illegal killing. Released red kites are provided with supplementary food at feeding stations. Public viewing hides placed at feeding sites have proved a popular visitor attraction, giving people the chance to get close views of these buoyant and social birds, with their ever-twisting forked-tails – a spectacle of aerial manoeuvrability.

As well as receiving reintroduced birds of prey from elsewhere, Scotland has also provided raptor chicks for two reintroduction projects in other areas of the British Isles.


3

Golden eagle chicks from Scottish eyries have been reintroduced into Ireland to establish a new population. Before any chicks were taken, a demographic analysis of the Scottish population was undertaken to ensure that taking young birds would not threaten the status of the source population. Chicks are only taken from eyries which produce twins.

Scottish osprey chicks have also been translocated, this time south to Rutland Water to seed an English population. A small breeding population has now been established, and has even spilled over into North Wales.

Threats to raptors

Land-use changes

Wild as some parts of Scotland may seem, few areas are beyond the influence of humans. Key recent events which have shaped the Scottish landscape began with the cutting down of native forests, starting in Neolithic times and culminating in widespread felling for industry and charcoal in the 17th and 18th centuries. The 19th century saw the notorious Highland clearances, when people were evicted from large swathes of land and great flocks of sheep were introduced, replacing cattle as the principal livestock. At the same time, the popularity of grouse shooting and deer stalking was on the rise and large sporting estates were established.

High densities of grazing animals, principally domestic sheep and the native red deer, have had a profound influence on the Scottish uplands. Excessive grazing pressure is thought to have caused a long-term reduction in fertility over large areas, resulting in reduced populations of small grazing animals such as mountain hares and grouse – species which provide food for birds of prey. Changes in habitat have taken place, with heather moorland lost to grassland or bare slopes of scree, and the natural regeneration of woodland prevented.

A direct link between grazing pressure and the fortunes of the hen harrier has been identified on the Orkney Islands. Hen harriers on Orkney began declining in the late 1970s due to a shortage of food during the early part of the breeding season. The Orkney vole is a major prey item for hen harriers and rough grassland areas on the fringes of heather moorlands are important foraging areas for hen harriers in search of voles. Large numbers of sheep grazing over rough grassland areas were removing the base layer of vegetation used by the voles for cover and reducing the food supply for hen harriers. As sheep numbers on the islands have reduced, the hen harrier population has recovered.

A more complex relationship exists between grazing animals and the golden eagle. During the winter months, the carcasses of red deer and sheep which have succumbed to harsh conditions provide a valuable food source for golden eagles, when live prey is scarcer or harder to find. The availability of carrion allows golden eagles to occupy their home ranges all year round, particularly in the most remote, mountainous regions of Scotland. But high densities of sheep and red deer also influence the numbers of smaller herbivores – such as grouse or hares, which are present in an area – by

1
Carrion is an important source of food for golden eagles, especially in winter.

reducing the amount of plant food available. Smaller prey is important for golden eagles to feed to their chicks during the nesting season. Areas with high densities of sheep and deer may support dense populations of adult golden eagles but these birds may not be very successful in rearing young if smaller prey animals are scarce.

In recent years sheep numbers have declined in many areas of Scotland. This is largely a result of changes to subsidy payments for agriculture, in particular a de-coupling of the link between the numbers of sheep in a given area and the amount of money paid to farmers. In terms of relieving grazing pressure and the potential for recovery of native vegetation and more diverse communities of plants and animals, this is good news. However, in the absence of competition from sheep, there is the potential for red deer populations to increase, which presents a challenge in terms of managing the numbers of this native herbivore.

Wind farms

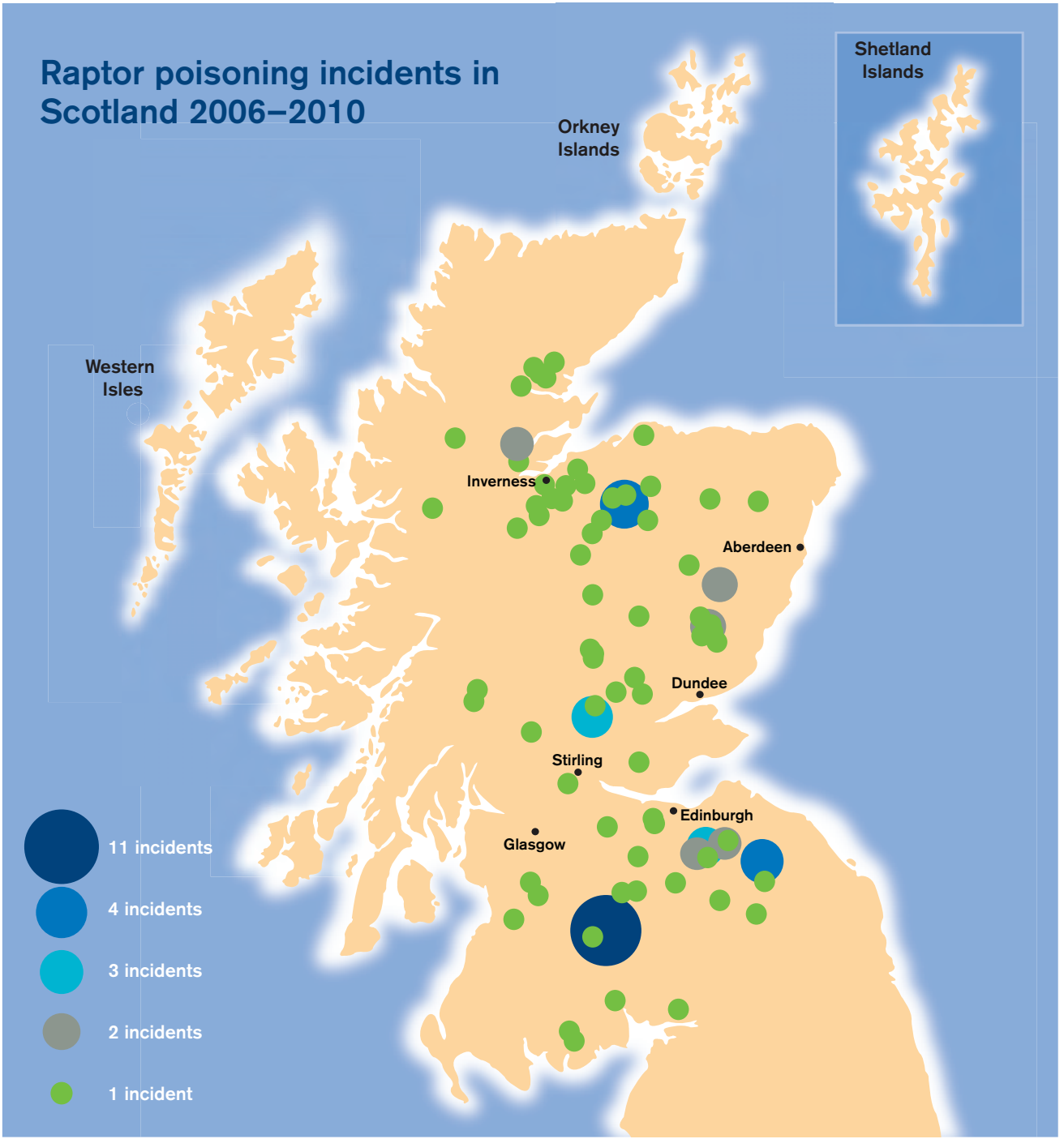
Clusters of wind turbines are an increasing feature of the Scottish uplands as the demand for renewable energy grows. They are a cause of some concern for raptors because birds can be struck and killed by the circling blades. In some areas of the world, large numbers of raptor casualties have been found at wind farms. At Altamont Pass in California, the largest wind energy facility in the world, an estimated 40–60 golden eagles are killed per year. Key factors in eagle mortality were found to be the siting of particular turbines, turbine design (with old-style lattice bases providing perching sites) and the high abundance of prey in some areas of the wind farm. However, it appears that high bird mortality rates are restricted to a relatively small number of windfarms and that the location of sites is key. Because of this, very careful consideration is given to the siting of wind farms in Scotland. Each proposed development has to undergo an Environmental Impact Assessment (EIA) including a consideration of possible impacts on birds. This involves 1 or 2 years of surveys of bird flight activity from vantage points overlooking the area where the wind farm is to be built, to assess the collision risk or possible displacement of some birds.

Persecution

Many species of raptor were extirpated in Scotland in the late 19th or early 20th centuries, in part due to habitat change but mainly due to deliberate and systematic persecution. Populations have been in recovery from the mid- to late 20th century (in some cases with a blip associated with pesticides), some species returning of their own accord, others with a helping hand from conservationists. The loss of so many birds of prey was associated with the rising popularity of game shooting in the 1800s. This led to the spread of gamekeeping and the extermination of predators (or vermin), to remove any competitors which might reduce the surplus of gamebirds for the guns. Before the invention of shotguns, people had used birds of prey to hunt for game; now, not only out of a 'job', raptors found these new weapons turned on them. Outside the sporting estates, birds of prey were also persecuted as potential predators of livestock, domestic fowl and racing pigeons, and, to cap it off, collecting specimens of birds and eggs was popular too. As birds of prey became rarer, so their eggs became more prized by the 'eggers' who would go to great lengths to secure a clutch.

The association of hen harriers with moorland and the fact that they prey on red grouse has greatly affected the bird's fortunes over the past 200 years. Quickly exterminated throughout the Scottish mainland, by the end of the 19th century, hen harriers were found only in Orkney and the Hebrides.

2
Wind turbines near Huntly.


Raptor poisoning incidents in Scotland 2006–2010
Orkney Islands
Shetland Islands
Western Isles
Inverness
Aberdeen
Dundee
Stirling
Edinburgh
Glasgow
11 incidents
4 incidents
3 incidents
2 incidents
1 incident

From these island strongholds, the species briefly returned during the two World Wars when many gamekeepers enlisted, only to lose ground on their return. However, after the Second World War, harriers were able to establish a foothold in the young conifer forests that were increasingly being planted, many on former grouse-moors. Protected by forest rangers, who viewed harriers as beneficial in reducing rodent abundance, the number of breeding pairs increased rapidly. The population probably reached a peak in the 1960s and 70s, but as these forests matured, hen harriers spread back to the open moor. Here they again faced intolerance by some gamekeepers, which gathered momentum during the 1990s, and currently shows little sign of abating. Despite full legal protection, most hen harriers breeding on grouse-moors fail.

Today, there is no doubt that persecution is greatly reduced, but there are still pockets of resistance where illegal practices continue, with quite profound effects. Even though persecution is much reduced, the common buzzard is still the most frequent victim of illegal killing, with 357 confirmed cases of poisoning and 137 of shooting, trapping or nest destruction between 1989 and 2010. Over the last 30 years, reported incidents of illegal poisoning in Scotland have tended to be associated with areas of 'strip-muirburn' – a form of upland land management unique to grouse moors, where areas of moorland are burnt

3

4

periodically to allow regeneration of young heather which provides food for red grouse. In these areas, which should provide good habitat for golden eagles, there are now fewer territories occupied by breeding pairs, evidently because of persecution. This moorland habitat may be attracting dispersing juvenile eagles, looking for good feeding areas which are not already occupied by adult birds, but putting them at risk of poisoning. An example of this was an immature golden eagle (called Alma) hatched in a nest in the Cairngorms in 2007, and fitted with a satellite transmitter so her movements could be followed. At two years of age, after ranging more than 100km from her natal territory, her radio-signal stopped moving and she was found dead in Glen Esk in south-east Scotland, a victim of poisoned bait. Presently, the range of the golden eagle in Scotland appears to be contracting northwards, with very few pairs remaining in the borders and the south-west, and a worrying lack of sightings of wandering juvenile eagles in these areas, a potential source of recruits for new breeding territories.

As well as deliberate persecution, the increasing public enthusiasm for outdoor activities such as hill-walking and mountaineering raises the possibility that people might cause unintentional disturbance to raptors. This is most likely in the breeding season in areas close to a nest site. Such disturbance usually reflects a lack of knowledge about the location and sensitivities of vulnerable species, and can generally be addressed through providing information on places to avoid. For example, the Scottish Outdoor Access Code includes advice on avoiding damage to the environment and disturbance to wildlife, and the Mountaineering Council of Scotland provides guidance to climbers aimed at preventing disturbance to birds nesting on crags, with particular reference to golden eagle and peregrine.

Although not strictly persecution, birds of prey were traditionally taken from the wild for falconry. Until relatively recently, this could be done legally as long as a licence was obtained, but such licences are no longer granted, and there may be some ongoing illegal theft of young birds from nests.

3
Roy Dennis with a poisoned young golden eagle (Alma).
4
Disturbance of nesting birds by mountaineers can be avoided if they follow the guidance available.

Pesticides

Organochlorine pesticides (such as DDT and dieldrin) came into widespread agricultural use in the mid-1940s. The extent of their harmful effects on the environment became apparent in Britain after the first national survey for peregrines in 1961 and 1962. Ironically, the stimulus for this survey was representations to the Home Office by racing pigeon interests alleging excessive losses of birds to an increasing peregrine population. However, contrary to expectations, the survey results showed catastrophic declines in peregrine populations in southern Scotland as well as England and Wales. This, along with accumulating evidence of egg-shell thinning and breeding failure in other birds (including other raptor species such as merlin and sparrowhawk), was a catalyst for the phased withdrawal of organochlorine pesticides. In Britain, a voluntary ban on the use of dieldrin, aldrin and heptachlor for dressing spring-sown cereals came into effect in 1962, and was reinforced from 1964 onwards by further restrictions on agricultural use. In time, bans were imposed by the European Union for dieldrin in 1981, DDT in 1986 and others in 1991.

As a result of the pesticide saga, raptors became recognized as indicator species of the health of the environment. Today, levels of pesticides and other contaminants in the carcasses of raptors (and other wild birds and animals) are routinely monitored. In Scotland, this is done through the Wildlife Incident Investigation Scheme operated by Science and Advice for Scottish Agriculture (SASA). The results are used to monitor the effects and use of various pesticides, for example anticoagulant rodenticides which are a subject of ongoing investigation. Evidence of contamination in birds of prey indicates that these pesticides are not always used according to instructions, which require the collection and disposal of rodent carcasses and inspection of baits. The raptors most frequently affected are common kestrel, red kite and barn owl, species which specialise in scavenging or feeding on small mammals. In the north of Scotland, deaths of red kite chicks have resulted from rodenticide poisoning, with parent birds unwittingly feeding contaminated mice and voles to their nestlings.

Owls have specially adapted flight feathers that means they can fly almost silently and sneak up on their prey.

5
Barn owl.

5

Climate change

There is now a scientific consensus that the earth is warming and that recent changes have been profoundly influenced by human activities. In Scotland, long-term projections are for warmer, drier summers, and wetter and warmer winters. Key habitats likely to be affected are coastal, marine and freshwater areas, as well as the upland, montane habitats.

Most raptors in Scotland have successfully adapted to a wide range of climate conditions throughout their world ranges, for example peregrines breed over a wide latitudinal range between the south of South America, South Africa and Australia as far north as the Arctic. Species which occupy montane and tundra environments, such as the snowy owl, however, may be less likely to recolonize Scotland, but other species such as hobby and Montagu's harrier may take advantage of warmer climates to spread northwards. Honey-buzzards may also benefit if the abundance of wasps and bees increases during warmer summers, and barn owls could extend their range if winter snowfall is reduced.

Weather has been found to influence the breeding success of birds of prey. The productivity of hen harriers across Scotland has been found to increase in warmer summers, and in Wales warmer weather has been a factor in the recovery of this species. Spring rainfall has been found to have a negative effect on the breeding success of hen harriers on Orkney. Excessive rain appears to reduce the time that males can spend hunting at a time when they are provisioning females who have stopped hunting and settled to lay eggs. Especially if a male is polygynous, he may struggle to provide enough food for more than one female during prolonged periods of wet weather.

For golden eagles, one of the earliest nesting Scottish raptors, there is a tendency for breeding success to increase after warmer winters and to decrease with the amount of spring rainfall. On Skye, the proportion of golden eagle pairs fledging two chicks is lower in years when May rainfall is high. If climate change in the west of Scotland results in wetter springs, this may affect some of the most productive populations on the Western Isles.

Climate change may also affect the behaviour of migratory species. It may be a reason why, in recent years, increasing numbers of Scottish ospreys appear to be wintering in Spain and Portugal rather than travelling further south to west Africa.

6
Sparrowhawk.

Raptor conservation

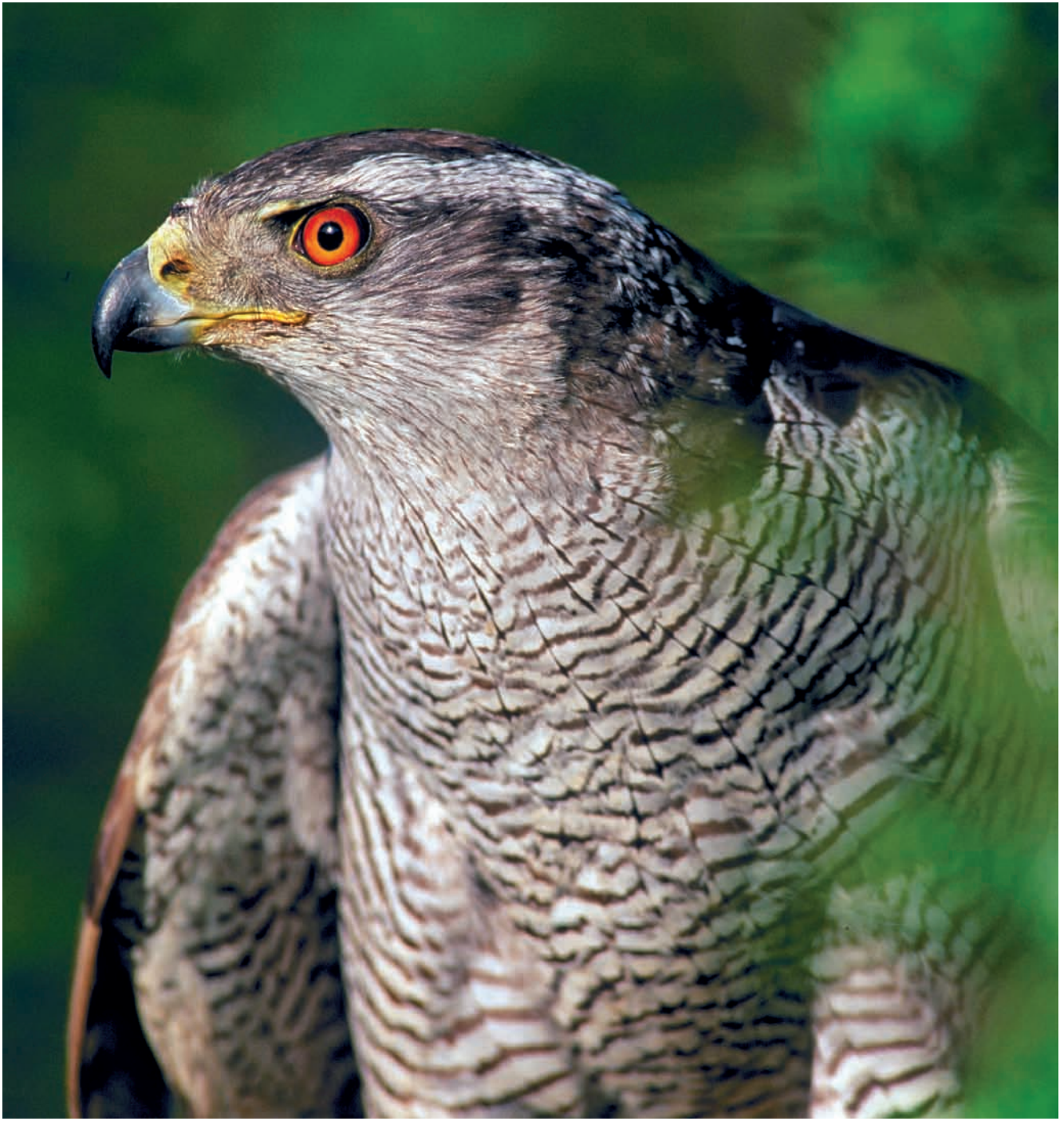
Legal protection

Back in the 1950s, when ospreys began to breed regularly at Loch Garten, near Aviemore, it was necessary to post round-the-clock guards to stop egg collectors from plundering the nest and preventing the species from re-establishing itself in Scotland. The Protection of Birds Act (1954) was a landmark piece of wildlife legislation. It protected the nests and eggs of all wild birds, making egg collecting illegal, and provided legal protection from deliberate killing to all wild birds in Britain (with some exceptions including game birds). Rarer species such as the honey-buzzard, goshawk, hen harrier, golden eagle, merlin and peregrine received special protection, with a liability for increased fines or imprisonment if an offence was committed.

Twenty-five years later came another landmark, when the then European Economic Community passed a Directive for the Conservation of Wild Birds (Directive 79/409/EEC), commonly known as the Birds Directive. This required all Member States to impose strict legal protection for wild birds, and provided for the establishment of a network of Special Protection Areas for rare and migratory birds within Europe. The United Kingdom responded to this Directive with the Wildlife and Countryside Act 1981, which repealed and re-enacted the provisions of the Protection of Birds Act with some amendments, for example making it illegal to possess the eggs of wild birds. Further amendments and strengthening of legal protection for birds in Scotland was subsequently provided by the Nature Conservation (Scotland) Act, passed by the Scottish Parliament in 2004, and most recently the Wildlife and Natural Environment (Scotland) Act 2011.

Today in Scotland it is illegal to, intentionally or recklessly kill, injure or take any wild bird (with the exception, in season, of certain game birds and waterfowl); take damage or destroy the nest of a wild bird while it is in use or being built; take or destroy eggs; or obstruct or prevent a wild bird from using its nest. These provisions apply to all birds of prey, with no exceptions. Special penalties for these offences apply to scarcer species listed on Schedule 1 of the Act. For Schedule 1 species it is also illegal to intentionally or recklessly disturb a bird whilst building its nest, or in, on or near a nest with dependent young; or to disturb dependent young. It is illegal to harass any bird listed on Schedule 1A, and to damage or destroy the nest of a species listed on Schedule A1 at any time of year. At present a single species, the white-tailed eagle, is listed on the latter schedules, but Scottish Ministers have powers to add more species to these lists in the future.

1
There are only around 130 breeding pairs of goshawk in Scotland.



1

Legal protection of raptors in Scotland

Species	Wildlife and Countryside Act 1981			EU Birds Directive
	Schedule 1	Schedule 1A	Schedule A1	Annex 1
Honey-buzzard	√			√
Black kite				√
Red kite	√			√
White-tailed eagle	√	√	√	√
Marsh harrier	√			√
Hen harrier	√			√
Montagu's harrier	√			√
Goshawk	√			
Golden eagle	√			√
Osprey	√			√
Merlin	√			√
Hobby	√			
Peregrine	√			√
Gyr falcon	√			√
Barn owl	√			
Snowy owl	√			√
Long-eared owl	√			
Short-eared owl	√			√

The following birds are not listed on any of the shedules of the C&W Act or Annex 1 of the Birds Directive: sparrowhawk, common buzzard, rough-legged buzzard, common kestrel, little owl and tawny owl.

In the Scottish winter, fish spend little time near the water surface. As ospreys specialise on fish they must migrate south to better feeding grounds.

2

There is no doubt that persecution has diminished since birds of prey were given full legal protection in 1954; for example, egg collecting now appears to be in decline. However, persecution still threatens the conservation status of a number of species, which indicates that more needs to be done to enforce the law. After much debate, an offence of vicarious liability for certain wildlife crime offences was included in The Wildlife and Natural Environment (Scotland) Act 2011. This means that landowners or land managers can, in certain circumstances, be held culpable for wildlife crimes committed by their employees or agents. The aim is to extend the arm of the law to people who direct their employees or agents to commit persecution, or those who are aware of illegal practices on their land but do not take steps to prevent them.

Another strategy to enhance the protection of birds of prey is through environmental education of the value of raptors. In some cases this can be measured economically, for example, visitors travelling to the Isle of Mull to see white-tailed eagles are estimated to contribute nearly £5 million to the local economy each year. Similarly, an estimated 290,000 people visit osprey-watching sites in the UK each year, spending an estimated extra £3.5 million in the local economy around nine of these sites, helping to support local income and employment.

Protection against killing, capture and disturbance is only one element of a conservation strategy for birds of prey. Other measures that are required include the protection of suitable habitats for the species throughout its geographical range. Key areas supporting concentrations of a particular species may be included in protected sites. In Scotland, Special Protection Areas (SPAs) have been established for golden eagle, osprey, hen harrier, marsh harrier, peregrine, merlin and short-eared owl. These sites can cover extensive areas, for example 12 SPAs have been selected for golden eagles in Scotland, covering a total area of about 7,000 square kilometres.

2
Osprey male in an alder tree.

Raptor Study Groups and the Scottish Raptor Monitoring Scheme

Raptors are a source of fascination for many people and there is a long tradition in Scotland of field study of birds of prey. Seton Gordon began long years of observation of Scottish golden eagles in the late 1800s, and went on to publish two seminal books on the species in 1927 and 1955. Jeff Watson, who used his Scottish studies as a foundation for his golden eagle monograph, first published in 1997, mused on the challenges presented by raptors as an object of study, and described the qualities of raptor enthusiasts: "first… tenacity, and a preparedness to pursue their interest despite the frustration caused by the elusiveness of the birds they study and

3

the frequently inclement conditions and difficult terrain in which they work. Then… a single-mindedness of purpose and a related tendency to be at ease with solitude."

Bird-watching is gaining popularity as a pastime and, increasingly, efforts are being made to encourage volunteers to record their observations and submit them to schemes which provide valuable information on the numbers and distribution of birds. Long-established schemes include the Breeding Bird Survey (formerly the Common Bird Census), the Nest Record Scheme, the Wetland Birds Survey, a network of County Bird Recorders and the Rare Breeding Birds Panel. None of these schemes provide comprehensive coverage for birds of prey.

Raptors are particularly challenging to study. They are sharp-eyed (they will usually spot you long before you see them); often elusive, because they rely on stealth to surprise prey; they range over large areas; and of course owls are mainly active at night. Rarer species may be confined to remote and inaccessible areas far from human habitation. Sightings may be infrequent and distant so a fieldworker must learn to identify birds from flight silhouettes and calls, and find and interpret signs of presence such as plucks and prey remains, moulted feathers, pellets (the regurgitated remains of prey which cannot be digested) and droppings. All this said, the rewards of becoming a raptor 'detective' are immense, and will lead to some amazing personal encounters with Scotland's top predators.

Today there are 11 regional Raptor Study Groups in Scotland. Formed from the 1980s onwards, originally to coordinate fieldwork for national surveys of golden eagle and peregrine, these groups of committed volunteer raptor fieldworkers collect valuable long-term data sets on birds of prey in Scotland.

In 2002 a Scottish Raptor Monitoring Scheme was launched to bring together the expertise of the Scottish Raptor Study Groups and other Scottish organizations with a scientific interest in birds of prey. In addition to the SRSGs, partners to the Scottish Raptor Monitoring Group are Scottish Natural Heritage, the Joint Nature Conservation Committee, the British Trust for Ornithology Scotland, the Rare Breeding Birds Panel, the Royal Society for the Protection of Birds, Scotland and the Scottish Ornithologists' Club . The aims of the Scheme are to promote cooperation between those gathering information on Scottish birds of prey; to collect and publish robust information on numbers, distribution, trends and causes of change in raptor populations in Scotland; and to promote common standards for survey methods and data analysis. Six annual reports on Raptors in Scotland have been published from 2003 onwards, and work is ongoing to investigate raptor trends.

3
Red kite.

4

4
Langholm moor.

The Langholm Project

Although they are popular with some people, others have deep concerns about raptors, especially as populations in Scotland recover from the effects of persecution and pesticide use. Those whose interests are affected by birds of prey include pigeon fanciers, some farmers, and game shooting interests, particularly those involved in managing moorland for red grouse. A key problem for raptor conservation is a lack of communication and understanding between stakeholders with opposing opinions, and attempts are being made to address this. One example is the Langholm Project.

Research into raptor predation on red grouse, carried out in Scotland in the early 1990s, was widely interpreted as indicating that hen harriers protected from illegal disturbance increased rapidly in number and took sufficient red grouse chicks to make a shooting estate economically unsustainable for driven grouse shooting. After this study, the opposing positions of conservationists and the game-shooting lobby became somewhat entrenched, and declines of hen harriers in grouse moor areas of Scotland and elsewhere suggested that illegal persecution had intensified in these areas (in 2008 there were only five successful hen harrier nests on UK grouse moors, whereas this area of moorland habitat would be expected to support 500 pairs).

The Langholm Project was established to address the perceived conflict between birds of prey – in particular the hen harrier – and the management of moors for red grouse shooting. Key elements of the project involve restoration of the quality of heather moorland that has been subject to intense grazing by sheep and infestations of heather beetle, legal predator control (of foxes, crows, stoats and weasels), intensive treatment of red grouse populations for parasites, and the provision of supplementary food to hen harriers during the breeding season, to divert them away from taking red grouse. Over its ten year lifespan, the Langholm Project aims to establish a commercially viable driven grouse moor, restore the nature conservation value of Langholm Moor, and demonstrate that hen harriers and other raptors can breed on moorland managed for driven shooting of red grouse.

Mythology

Raptors have long been a source of fascination for people, inspiring, over the span of history, both reverence and awe, and hatred and mistrust.

The eagle has been adopted as a symbol of the power of armies and empires. Roman legions marched behind an eagle standard, and the eagle is bound up in one of the most enduring stories of Roman Britain, the loss of the Ninth Legion early in the 2nd century AD. Legend has it that this elite Roman force was massacred in Scotland as they marched north to put down a rebellion, and the tale of a young officer, who ventured into Caledonia to reclaim his legions' eagle standard, is told in a best-selling book and more recently two block-buster movies. Historians argue about the archaeological evidence, but some have speculated that the legacy of the Ninth Legion and their lost eagle standard was the creation of Hadrian's Wall, an enduring reminder of the divide between Scotland and the rest of Britain.

Today the eagle standard features in the cap badge of the Royal Scots Dragoon Guards, representing the French Imperial Eagle captured from Napoleon's 45th Regiment at the Battle of Waterloo in 1815.

White-tailed eagles have sometimes been depicted in history as 'less noble' than golden eagles. Perhaps this is at least in part due to a predilection for scavenging on human corpses. The Anglo-Saxon poem, the Battle of Brunanburgh, describes white-tailed eagles scavenging on the bodies of the slain after the Saxons defeated the Scots in 937. On Orkney, the Neolithic islanders may have taken advantage of this habit in preparing their dead for burial. A chambered tomb at Isbister on the island of South Ronaldsay, dating from about 3150 BC, was found to contain 16,000 human bones and 725 bird bones, mostly of white-tailed eagles. It has been suggested that the bodies of the dead were laid out for a 'sky-burial', whereby their bones were picked clean by scavenging birds, and that the inclusion of white-tailed eagle bones in the Tomb of the Eagles suggests a reverence for these mighty birds.

5

6

The largest golden eagle nest found in Scotland was nearly 5m high – built in an old Scots pine.

Falconry – the art of hunting with birds of prey – was practised as far back as 2000 BC in ancient Egypt and China. In Britain, from Saxon times onwards, it was the preserve of nobility – with the peregrine for a prince, an eagle for an emperor, a gyrfalcon for a king, a merlin for a lady, and a kestrel for a knave (from The Boke of St Albans 1486). Mary Queen of Scots was a keen falconer and one of her frustrations during her years of imprisonment was that she could no longer fly her merlins at skylarks. Her grandfather, James IV, favoured the peregrine, a species whose breeding cliffs were jealously guarded because of its value for falconry. This may be the reason why so few Scottish places are named Creag an t'Seabhaig or Falcon Crag.

The chillingly beautiful screech of the barn owl is frequently used in the soundtrack of films to set the scene for scary events in dark places. This, along with its ghostly white appearance, probably contributed to a long history of superstitious persecution of this innocent bird, which only ended in the middle of the 20th century.

More recent mythology features another ghostly owl, and occasional visitor to Scotland, the snowy owl, as Hedwig, the pet and magical familiar of Harry Potter. The fact that snowy owls are rarely seen in Britain hampered Hedwig in her desire to help Harry Potter send messages to his godfather, Sirius Black, while in hiding from the Ministry of Magic; the exotic Hedwig would have attracted too much attention!

5
The Cap Badge of The Royal Scots Dragoon Guards.

6
Tomb of the Eagles, South Ronaldsay, Orkney.

Breeding population estimates for raptors

Species	Breeding population (pairs)		Year	% of UK population in Scotland*
	Scotland	United Kingdom		
Common buzzard	7,100–25,600	31,100–44,000	2000	40 %
Sparrowhawk	7,000–12,000	41,000	2002	23 %
Common kestrel	6,900–7,800	36,800	2000–2003	20 %
Tawny owl	3,900–6,000	19,400	2000–2007	26 %
Barn owl	545–1,000	4,000	1995–2007	20 %
Long-eared owl	450–2,200	1,460–4,770	1988–2007	43 %
Short-eared owl	125–2,700	1,000–3,500	1988–2007	63 %
Merlin	733	1,162	2008	63 %
Peregrine falcon	544	1,437	2002	38 %
Hen harrier	505	622	2010	81 %
Golden eagle	441	442	2003	99 %
Red kite	177	1,500	2007–2011	12 %
Osprey	205–210	210–215	2007–2008	98 %
Goshawk	130+	410	1994–2007	32 %
White-tailed eagle	55	55	2011	100 %
Honey-buzzard	1–20	33–69	2000–2007	20 %
Little owl	0–10	5,800–11,600	2000–2007	<1 %
Marsh harrier	4–9	363–429	2005–2009	2 %
Hobby	0–3	2,200	2003–2008	<1 %

7
The eagle owl is a formidable predator.

Scottish/Gaelic names for raptors

Honey-buzzard, Clamhan-riabhach

Red kite, Clamhan-gobhlach

White-tailed eagle, Lolaire-mhara

Marsh harrier, Clamhan-lòin

Hen harrier, Clamhan-nan-cearc, Goshaak (Orkney)

Goshawk, Glas-sheabhag

Sparrowhawk, Speireag

Common buzzard, Clamhan

Rough-legged buzzard, Bleidir-molach

Golden eagle, Iolaire-bhuidhe

Osprey, Iolaire-iasgaich

Common kestrel, Speireag-ruadh, Moosie haak (Orkney)

Red-footed falcon, Seabhag-dhearg-chasach

Merlin, Mèirneal, Peerie hawk (Shetland)

Hobby, Gormag

Gyr falcon, Geàrr-sheabhag

Peregrine falcon, Seabhag-ghorm

Barn owl, Comhachag-bhàn

Snowy owl, Comhachag-gheal

Little owl, Comhachag-bheag

Tawny owl, Comhachag-dhonn

Long-eared owl, Comhachag-adharcach, Catyogle (Shetland)

Short-eared owl, Comhachag-chluasach, Cataface (Orkney) Catyogle (Shetland)

Finding out more

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Raptors
Naturally Scottish

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