



# Goosanders & Mergansers

## THE FACTS

### Introduction

Goosanders and red-breasted mergansers, collectively known as 'sawbill' ducks, breed on rivers and lakes in northern and western Britain. Many people with interests in the management of fisheries and angling activities are concerned that predation, especially by goosanders, can affect the viability of fisheries. Conservation groups are worried that any widespread effort to control the numbers of sawbill ducks could threaten the birds' conservation status. This leaflet sets out our knowledge of the effects of sawbills on fisheries in England and Wales and comments on the conservation status of both birds and fish.

### How many are there?

**Goosanders** were rare in Britain as a breeding species until the late 19<sup>th</sup> century, when they colonised Scotland. They spread into northern England in the 1940s, to Wales in the 1960s, and to Devon in 1980. There is no obvious explanation for the rapid expansion in their range. Exact numbers are not currently known but the last available figures indicate there are about 2,600 breeding pairs.

**Red-breasted mergansers** also expanded their range, colonising northwest England and north Wales in the 1950s, though spreading little beyond these areas. In 1988-91, there were an estimated 2,200 breeding pairs in Britain.

Not surprisingly, peak numbers occur when pairs are rearing young. Both species typically hatch 10 young, but only a few reach adulthood. In winter, there are around 16,000 goosanders and 6,500 red-breasted mergansers in Britain, including some from northern Europe and Russia. Wintering numbers of both species have fallen since the late 1980s, with red-breasted mergansers down significantly.

### Where are they?

Within their main areas of distribution in the UK, **goosander** breeding densities are highest in north-west England and southern Scotland (on average a pair every three miles of river), and lowest in central Scotland and north Wales, where there is, roughly, a pair every 20 miles. Some nest on large lakes too. In winter, birds disperse to lowland lakes and rivers across the whole of the UK, often forming small flocks. Summer densities of **red-breasted mergansers** are lower in most of Britain. Breeding numbers in northwest England and the Scottish Highlands appear to have fallen in the 1990s, for no obvious reason. Some also nest on estuaries and rocky coasts, their main wintering habitat.

### Are goosanders and mergansers protected?

Yes, like all wild birds, they are protected under the Wildlife and Countryside Act 1981. Birds cannot be killed, nor their eggs or nests (when in use or being

built) taken or destroyed, except under licence. This Act implements the provisions of the EU Birds Directive. Similar legislation exists throughout the European Union. In Britain, anyone found guilty of an offence can be fined up to £5,000, given six months imprisonment, or both.

If birds are causing serious damage to a fishery or to wildlife conservation interests, the landowner or manager of a site can apply for a licence to shoot a limited number of the birds as an aid to scaring. The advisory leaflets *Fisheries and the presence of cormorants, goosanders and herons* (WM14) available from the Department for Environment, Food and Rural Affairs (Defra) and *Protecting your Fishery from Cormorants* from the Moran Committee both contain advice about deterrents and licences, some of which is applicable to sawbills. Full details of where to apply for these leaflets or a licence are shown on page 4.

### What do goosanders and mergansers eat?

Both species have a similar feeding technique and diet. Sawbill ducks scan the surface, their head partially submerged, or dive from the surface, propelling themselves forward using their strong legs. The backward-facing 'teeth' on the edges of each mandible help the birds to hold any fish that are caught, while goosanders also use their bill to probe for prey under stones. **Goosanders** typically eat fish 8-15cm (3-6") in length, whereas **red-breasted mergansers** usually take fish around 5-12cm (2-5").

Both species are opportunist predators, so their diet commonly reflects the range of prey available at a site. Thus, since the birds mainly frequent more upland rivers, particularly in spring and summer, the main prey species tend to be brown trout, salmon parr, eels, minnows, bullheads and stone loach. The proportion of salmon in the diet varies widely between rivers (or stretches of the same river), related to its availability. In Scotland, for example, this varies with latitude. Here, it has been estimated that, on average, salmon

### Which is which?

These closely-related ducks are present in the UK throughout the year, have a long, elongated body, a round head (green in males, reddish-brown in females) and a narrow, red bill, with a serrated inner edge (hence the term 'sawbill'). Adult male **goosanders** have a white neck, breast, belly and flanks and grey/black wings, while adult females have grey flanks and wings, and a white throat patch. **Red-breasted mergansers** are smaller and have a shaggy crest. Males have a striking white neck band, rusty-brown breast, grey flanks and black and white wings. Females are similar in colour to female goosanders, but have no white on their body and the head colour is paler brown. After the breeding season, both species moult into eclipse plumage, so the males and females of both species look similar.



Female goosander (photo courtesy of the Wildfowl & Wetlands Trust)

represent 9% (by mass) of goosander diet in southern Scottish rivers in winter and spring, but 41% in northern rivers. This is consistent with the higher proportion of salmon in the fish community in more northerly rivers.

At other sites, the diet will be different. For example, on stillwaters in winter, **goosanders** may eat mostly roach, perch and minnows, while **red-breasted mergansers**, feeding in the lower reaches of rivers, also eat marine species.

#### How much fish do they eat?

Goosanders need 240-520g (10-20oz) of food daily, although the weight of fish eaten each day can vary considerably. While it may seem simple to calculate the weight of fish taken by birds at a site or across the country, such figures are of limited value in isolation. Losses need to be viewed in relation to the available fish stocks, which can be difficult to estimate, and need to take into account other causes of mortality and the productivity of the populations (see *Battle for Survival*).

#### Are goosanders a problem for coarse fisheries?

They can be. In the spring and summer, when they are rearing broods and bird numbers are at their highest, goosanders feed mostly on upland rivers. However, in the winter months the birds become more widely distributed across the UK, including lowland areas, and numbers can be increased by the arrival of birds from north-west Europe, particularly during harsh winters. Over the winter, goosanders tend to aggregate in flocks to roost, often on larger stillwaters. These aggregations tend to be relatively short lived, with numbers at their peak in January and February. Birds may still use riverine areas to feed at this time, returning to the lakes to roost each night, but over this period they are more likely to consume coarse fish species. This may represent a temporary localised problem for specific coarse fisheries.

#### Are goosanders or mergansers responsible for declines in fish populations and catches?

Since **red-breasted mergansers** are more localised in their distribution, less abundant and take smaller fish, they are generally considered to be a minor problem in England and Wales. This section therefore focuses on the impact of **goosanders**. As noted above, goosanders feed on a wide variety of fish species, according to their location, but are mainly perceived as a problem for game (salmon and trout) fisheries in

upland rivers. However, since the birds mostly eat small fish, such losses occur at a time when mortality in fish is naturally high (see *Battle for Survival*) and usually before the fish are targeted in fisheries. The predation does not, therefore, tend to have an immediate direct effect on the numbers of catchable fish, and the indirect effects on catches can be difficult to determine. For salmon and sea trout, this is further complicated by the fact that the fish spend part of their life-cycle at sea before becoming available to fisheries.

In recent years, many populations of Atlantic salmon in the UK have undergone acute declines, as elsewhere around the North Atlantic. There are various reasons for this. Marine survival - the proportion of the emigrating smolts that return from the sea as adults - is currently much lower than in the past. A wide variety of factors, including predation, can impact on stocks in fresh water (see *Salmon Conservation*), so apportioning losses of fish to any single factor is extremely difficult.

Assessing the impact of goosanders on fish stocks is not straightforward, requiring data on the size of the fish population and an understanding of the species' population dynamics, in particular the annual

#### Battle for survival

To maintain a stock at a stable level, one spawning pair of salmon must, on average, produce one spawning pair in the next generation. In the wild, salmon lay many eggs, typically around 5,000 per female, as insurance against natural losses and to ensure a surplus production maximises opportunistic use of available habitat and food. From these, typically 4,700 will hatch the following spring as alevins in suitable spawning habitat, but perhaps only 360 will survive as parr at the end of the first year. Of these, only around 50 (1% of the eggs laid) will make it to the sea as smolts. Under 'normal' conditions around 10% of smolts (5 fish) might be expected to return as adults, although current marine survival rates are thought to be lower than this. So, only a small proportion of a salmon's eggs will become adults, even in the absence of fish-eating birds.

In a healthy population, the number of fry and parr normally exceed the available resources (the carrying capacity) and levels of natural mortality are high. Thus, in a process known as compensation, fish eaten by predators tend to be replaced by others that would otherwise have died of another cause, such as starvation. After the first few weeks of life, compensation rapidly reduces, becoming less effective at adjusting numbers and it is not thought to operate in the sea once they become smolts. As the intensity of compensatory controls reduces with age, so the relative importance of random factors such as environmental extremes or predation increases. Compensatory mortality also occurs in coarse fisheries, but is less well understood. The big population fluctuations seen in many coarse fish species suggest that recruitment and abundance is driven mainly by random events such as environment and predation.

So, the impact that predators have on a stock will depend on the relative size of that stock, the timing and extent of the predation, and the influence this has on the potential for compensation. The majority of salmon populations in England and Wales are currently in a depleted state, with insufficient numbers of returning adults for optimal production. Thus, in many cases there is likely to be lower potential for compensation and the impact of any factor that removes fish will, proportionally, be greater than in a healthy population.

production. Most research has been into the effects of predation on salmonids, rather than coarse fish. Studies show that on some stretches of river, broods of young goosanders can eat a large number of salmon parr. This may reduce smolt output. Since compensation (see *Battle for Survival*) is not thought to operate for smolts in the sea, predation by goosanders could therefore reduce adult returns and catches, and delay the recovery and re-establishment of fully viable fisheries at a time when salmon populations are low.

However, it is important that predation is viewed in context (see *Salmon Conservation*) and is recognised as a normal component of the interactions between species that occur in a healthy ecosystem. The mere presence of sawbill ducks does not necessarily indicate a problem. For example, on the River Tyne, where goosanders are seen frequently, the river has consistently exceeded its target for returning adult salmon over recent years and the fishery has been improving following water quality improvements. This suggests that where a stock is healthy, goosanders and salmon can coexist.

### How many goosanders will prevent a recovery in salmon stocks?

At sites where the fish population is already in decline, predation of juvenile salmon may be a problem, but there is no definable level of predation, which if exceeded, will cause a serious decline. Impacts vary according to site conditions and the status and dynamics of the particular salmon stock.

### Can the impact of predation be reduced?

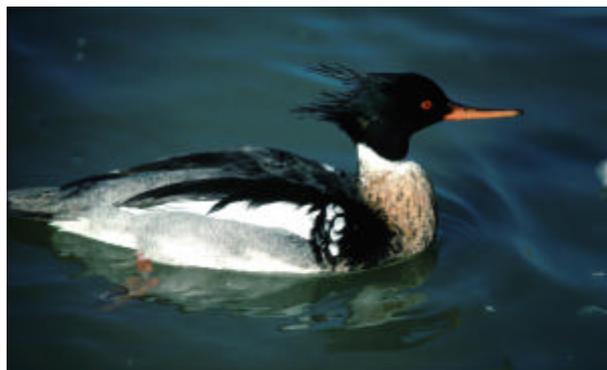
A range of measures can reduce predation by fish-eating birds, though most are of limited use on rivers, where sawbill ducks occur in spring and summer. Human disturbance is consistently effective, though the effect of scaring is short-lived once it has ceased and, unless co-ordinated over a wide area, probably only moves

#### Salmon conservation

Conservation organisations and angling interests are concerned about declines in salmon, which is a priority species under the EU Habitats Directive. Due to their migratory life-cycle, salmon are vulnerable to environmental pressures across a range of habitats, freshwater, estuarine and marine. Predation has been identified as one such pressure, but other factors include:

- poor water quality in streams and rivers;
- reduced river flow and altered flow patterns, due to water abstraction, river regulation, catchment land-use changes and drought;
- increased silt in streams, which reduces breeding success (smothering of eggs);
- salmon farms, by increasing eutrophication and encouraging the spread of parasites, in particular sea-lice;
- changes in climate and oceanic temperatures, affecting growth and survival at sea.

Their migratory behaviour means they may also be exploited in a number of fisheries, including as by-catch in pelagic trawl fisheries and targeted fisheries operating in distant waters, coastal areas, estuaries and rivers.



Male red-breasted merganser (photo courtesy of Wildfowl & Wetlands Trust)

birds a short distance up- or downstream. Shooting can also be effective as an aid to scaring, but the overall effects on goosander numbers at a particular site are usually short-term, with birds returning to a good feeding area within a few days. Goosanders, except when broods are very young, are highly mobile, and use a number of feeding sites. Such measures, therefore, have to be continuous and probably catchment-wide to be effective, and are therefore labour intensive. In winter, when goosanders are often on stillwaters, a wider range of deterrents are suitable, including many which are effective for scaring cormorants.

In the short term, the impact of predation needs to be assessed and prioritised alongside other limiting factors. Where a problem is identified, action such as the co-ordinated use of deterrents may be appropriate. Habitat enhancement may also reduce vulnerability to predators by ensuring suitable cover, for example by the addition of in-stream features such as stones, boulders, or woody debris.

In the long term, the key objective is to ensure that the freshwater environment is managed so that fish habitat is optimised. Thus issues relating to water quality and quantity, habitat degradation and catchment-use need to be addressed. Considerable effort is required from governments, other agencies and stakeholder groups to counter the main factors driving the decline in salmon and to achieve sustainable populations. Much is already being done, but some problems will require major effort and it will be some years before the benefits will be seen in rivers.

Large-scale shooting to reduce the goosander population size is not an option. Sawbill ducks, like their fish prey, are an important part of our biodiversity and threatening their conservation status is neither legal nor acceptable.

### Will scaring sawbill ducks move them to other sites?

The aim of scaring is to move a predator away from a fragile site. If successful, birds will move and use other feeding areas, provided there are suitable sites nearby. When scaring along a river, birds will often move to a different stretch of river, and this will not necessarily reduce predation pressure in the catchment overall. Where predation 'bottlenecks' are identified, or a stock appears to be particularly vulnerable, there may be a case for co-ordinated control of fish-eating birds, as part of a package of measures designed to achieve a recovery in a fish population.

### Fisheries Action Plans

FAPs provide a new process for fisheries development across England and Wales. These will incorporate Salmon Action Plans (SAPs) and other species-specific plans that may be needed in the future. Their objective is to maximise sustainable development of fisheries and associated ecological, social, economic and recreational benefits. Developed in partnership between the Environment Agency and local angling and fisheries interests, with input from conservation bodies, FAPs will result in realistic deliverable plans for local fisheries.

### The Way Forward

Experience has shown that a local approach offers the best chance of resolving conflicts. Fisheries Action Plans, incorporating Salmon Action Plans, will play an important role in England and Wales by looking at, and prioritising, problems on a catchment basis. The Moran Committee has produced guidance on ways to deter fish-eating birds, and promotes the use of the licensing system for fisheries with a demonstrable problem.

Fisheries, angling and conservation organisations are committed to championing the conservation of freshwater habitats and the fish, birds and other wildlife, which depend upon them. We will work with government and non-government organisations to manage conflicts where they occur and try to find sustainable solutions that are acceptable to all.

### For Further Information...

In **England**, further information on scaring techniques and licences can be obtained by contacting:  
Dept. for Environment, Food & Rural Affairs (DEFRA),  
Wildlife Management Team,  
Administration Unit, Burghill Road,  
Westbury-on-Trym, Bristol, BS10 6NJ.  
Tel: 0845 601 4523 (local rate).

In **Scotland**, contact:  
The Scottish Executive  
Environment & Rural Affairs Department (SEERAD)  
Pentland House, 47 Robb's Loan,  
Edinburgh EH14 1TY.  
Tel: 0131 556 8400

In **Northern Ireland**, contact:  
The Environment & Heritage Service,  
Commonwealth House,  
33 Castle Street, Belfast, BT1 1GH.  
Tel: 028 9054 6558.

In **Wales**, contact:  
Food & Farming Development Division 1,  
Welsh Assembly Government,  
Environment, Planning & Countryside Department,  
Cathays Park, Cardiff CF10 3NQ.  
Tel: 02920 825317.

### ***This information leaflet is a product of the Moran Committee and sponsored by:***

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Angling Trades Association  
Association of Stillwater Game Fishery  
Managers  
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National Federation of Anglers  
National Federation of Sea Anglers  
Royal Society for the Protection of Birds  
Salmon & Trout Association  
Specialist Anglers Alliance  
Welsh Federation of Coarse Anglers Ltd  
Welsh Salmon & Trout Angling Association

### Useful websites ...

**www.cormorants.info** - This website contains all of the information found in the booklet – *Protecting your fishery from Cormorants* – in a simple, easy-to-find format. Although the techniques are designed to protect fish from cormorants, some are just as effective for sawbill ducks. Also, should non-lethal control methods fail, there is advice on completing the Defra application for a licence to shoot a limited number of birds as an aid to scaring.

This booklet, together with electronic copies of this leaflet and our other leaflet - *Cormorants: The Facts* - can also be downloaded here.

This site will be updated and expanded as new information and advice becomes available.

**www.defra.gov.uk/wildlife-countryside/vertebrates/default.htm** - This website provides information on the legal status of fish-eating birds, together with further information on non-lethal management techniques.

Information is also available on the licensing system and copies of the application form can be downloaded here.

***For general advice on angling and fish-eating birds please contact the National Angling Alliance on 020 7283 5838***