



**The Impact of Cormorants on Fish Populations of
Economic Importance and Conservation Significance**

**A case for cormorants to be included on the revised
General Licences**



September 2019

Executive Summary

- The biodiversity of our rivers and still waters is at serious risk from excessive predation from cormorants.
- The abundance and range of cormorants have both increased dramatically in recent decades to often unsustainable levels in many areas, with an influx of the migrant European sub-species *Phalacrocorax carbo sinensis* from mainland Europe.
- 86% of rivers in the UK are failing to meet the standard of good ecological condition measured against the Water Framework Directive – with part of the assessment based upon general fish assemblage.
- It is an accepted fact that predation by Cormorants is a significant factor in fish population declines, particularly in the context of low flows, loss of spawning habitat, barriers to migration and pollution that threaten the regeneration of fish populations.
- Modification of our rivers by man has resulted in all coarse and game fish species being increasingly vulnerable to cormorants as they try to migrate up and down rivers through weirs, hydropower plants and other man-made barriers to complete their life cycles.
- Cormorants pose a direct threat to designated endangered fish species protected under European legislation, including European eel, Atlantic salmon, lamprey and bullhead.
- Over wintering cormorants in England are now estimated at over 30,000. Each individual requires approximately 500g (in excess of 1lb) of fish every day.
- The Eel Management Plans submitted and accepted by the European Commission estimate that between 29 & 43 tonnes of endangered eels are eaten by cormorants every year in England and Wales.
- The government's Moran Committee acknowledged the damage that cormorants can do to inland fisheries.
- We believe that cormorants should be included on the revised General Licences, under section 16(1) of the Wildlife and Countryside Act 1981, subsection (k) *preventing serious damage to livestock, foodstuffs for livestock, crops, vegetables, fruit, growing timber, fisheries or inland waters*, in order to enable fishery managers to adequately protect their fish stocks and their livelihoods.
- We believe that cormorants should be included on the revised General Licences under section 16(1) of the Wildlife and Countryside Act 1981, in order to protect Fauna & Flora in respect of those endangered fish species.

Introduction

The Great Cormorant (*Phalacrocorax carbo*) is a common, fish-eating bird found across Eurasia and North America. It is listed on the International Union for the Conservation of Nature's (IUCN) 'Red List' as a species of *least concern*, with a population trend of increasing abundance¹. The population is formed from two separate sub-species: *Phalacrocorax carbo carbo* and *Phalacrocorax carbo sinensis*. *P. carbo carbo* is traditionally thought of as a coastal bird and, until fairly recently, was the dominant sub-species found in the UK. Conversely, *P. carbo sinensis* was traditionally found across mainland Europe and hunts largely inland on freshwater rivers and lakes. 2014 population data show a population in excess of 1.2 million. However, during recent decades we have witnessed an increasing migration of the continental sub-species from mainland Europe to the UK (particularly over the winter months) and this has led to a dramatic increase in the abundance of cormorants found in the UK.

Figures on cormorant abundance from the British Trust for Ornithology (BTO) suggest that the UK population has undergone a 53 per cent range expansion since 1981-84². The first inland breeding site in the UK was established at Abberton Reservoir in Essex in 1981, but they have since expanded and inland breeding colonies of cormorants are now widely distributed across the UK^{2,3}. The continental sub-species is acknowledged to have played an important role in establishing these inland colonies but colonies in England today are now comprised of a mix of both *P. carbo sinensis* and *P. carbo carbo*. In 2012, these inland colonies alone comprised 2,362 breeding pairs of cormorants across 48 sites. Furthermore, between 1981 and 2018, the overwintering population of cormorants in Great Britain grew dramatically from just a few thousand birds to a staggering 62,000 individuals⁴, with over 50 per cent of these birds based in England.

Evidence from Britain and Europe shows a massive and unsustainable increase in cormorant numbers over the last 30 years with the consequent impact on wild fish populations which are already under stress from multiple factors.

Legislative Background

Protection of wild birds (including cormorants) stems from the Convention of European Wildlife and Natural Habitats 1979 (the Berne Convention), which the EU and Member States signed up to and Article 2 of the Berne Convention states: "*The contracting parties shall take requisite measures to maintain the population of wild flora and fauna at, or adapt it to, a level which corresponds to ecological, scientific and cultural requirements, while taking account of economic and recreational requirements and the need of sub species, varieties or forms at risk locally*".

This definition has been translated into European law via Article 2 of the Wild Birds Directive (1979) and Article 9 allows derogations for Member States in order to conform to the requirements to control populations including, "*to prevent serious damage to crops, livestock, forests, fisheries and water*". Article 2 states that: "*Member States shall take the requisite measures to maintain the population of the species in article 1 at a level which corresponds in particular to ecological, scientific and cultural requirements, while taking account of economic and recreational requirements, or to adapt the populations of these species to that level*".

Whilst Natural England has produced a population level figure that they regard as meeting conservation status requirements based on the average population size over the period 1996 – 2001, DEFRA have confirmed that this figure is arbitrary and has little or no scientific basis. Indeed, there are arguments that the legal requirement is for maintenance of the population level of cormorants that was present at the time the Directive was introduced in 1979.

The main threat to UK fish is during the autumn and winter from migrating birds that have bred in Baltic countries moving south to avoid typical Baltic winter temperatures. The numbers arriving in England vary significantly year on year depending on winter temperatures in mainland Europe and is impossible to predict in advance.

Under the present system cormorant population numbers are based on the annual WeBs counts, these take place on large water bodies and, therefore, do not reflect cormorant numbers on smaller water bodies. These numbers are then modelled by APHA to try and produce numbers for England. However, APHA advise caution, stating these numbers are only reliable to show annual population trends as opposed to absolute numbers. It is these figures that are used by NE to calculate the numbers of cormorants that can be shot to ensure the conservation status is not in threat and as such is regarded as an adaptive management system.

The problem with this system is that it favours the status of cormorants over fish. This is because it is reactive to cormorant numbers and not proactive in protecting fish. The cormorant numbers are only produced a considerable time after the winter period (we have not seen the figures for a few years) and therefore with regards to fish the damage will have been done. We need a more proactive system to allow us to protect fish when cormorants are present on our waters.

Context

Our freshwater ecosystems are heavily threatened and have suffered from centuries of anthropogenically-driven degradation. Under EU Water Framework Directive (WFD) standards, only 14 per cent of England's rivers currently meet Good Ecological Status⁵, many that do fail are due to poor fish populations. European eels (*Anguilla anguilla*) are critically endangered, while stocks of Atlantic salmon (*Salmo salar*) are at an all-time low in England, and both species represent popular prey for cormorants.

The cormorant is a highly evolved predator, unmatched in nature. With each bird consuming an average of 500g (in excess of 1lb) of fish daily⁶. Now, with an increasing breeding population here in the UK, it is worth noting that when raising chicks this can rise to between 1.1kg and 1.9kg per day. According to a study in the Netherlands a chick needs an average of 386g of fish per day in its first 30 days, with a peak food requirement of 632g per day in the period of fastest growth^{6a}. Their effectiveness as predators of salmonids, trout and other native fish species brings them in obvious conflict with recreational fisheries and conservation issues through the unsustainable impact on our designated fish species. This conflict is long-standing and across the European Union the majority of member states see it necessary to control cormorant numbers in order to protect fish populations of recreational, economic or conservation significance, with France making extensive use of the derogation

to protect Fauna and Flora. This includes protection for heavily threatened fish species such as European eel and Atlantic salmon.

Freshwater angling in England is a past-time in which well over one million people take part every year, with each of them purchasing a fishing licence from the Environment Agency and therefore contributing financially to the conservation of freshwater ecosystems and fisheries. The latest EA report on freshwater fisheries⁷ demonstrated that freshwater angling supports around 27,000 full-time equivalent jobs and contributes approximately £1.2 billion annually to the English economy. Furthermore, each year anglers collectively contribute hundreds of thousands of hours of volunteer time to improving habitat, engaging young people with the countryside, removing litter and deterring illegal fishing. Much of this is initiated, coordinated and supported through the Angling Trust's Voluntary Bailiff Service, representing a force of over 500 anglers who dedicate their time to assisting the Environment Agency and Police in tackling fisheries enforcement challenges.

The ongoing success of recreational angling depends on healthy stocks of fish, many of which have suffered significantly as a direct result of increased predation by cormorants. We need only to look at anglers' favorite coarse fish species, the roach (*Rutilus rutilus*), and the dramatic decline in one of the UK's most iconic rivers, the Hampshire Avon. Highlighted in the Environment Agency's fish stock survey of 2005⁹ the roach were shown to have declined to such a perilously low number it was considered that the remaining population density was below critical mass and unable to recover unassisted. As stated in the ARP challenge document, this directly coincided with the highest recorded European cormorant population density... Coincidence? – We at the Angling Trust don't think so. The hard work of conservation projects such as the Avon Roach Project¹⁰ have arrested the decline in the Avon and the project has been mirrored on other rivers up and down the country also suffering declining fish populations and all cite the cormorant as a significant factor in the decline.

The Impact of Cormorants on Fish Stocks – A Literature Review

It is widely acknowledged that the great cormorant is a highly efficient predator of fish and able to deal with relatively large prey^{11,12,13,14}. Recent studies have demonstrated that predation by cormorants can be the primary cause of collapses in fish abundance at a local level, possibly threatening the survival of isolated populations. For example, a tagging study¹⁵ of brown trout (*Salmo trutta*) and grayling (*Thymallus thymallus*) populations in several river systems in Denmark showed that an estimated 30 per cent of tagged trout and greater than 70 per cent of grayling were consumed by cormorants, causing population collapses.

Impacts of cormorants on still waters

Cormorant impacts are, of course, not restricted to riverine fish populations. Still water fisheries – both those that are artificially stocked by angling clubs and those that are naturally colonised – can also be decimated by cormorant predation.

Loch Leven is a natural lake in south east Scotland that supports a world-renowned recreational fishery for both brown and rainbow trout (*Oncorhynchus mykiss*). It is now also home to a large number of overwintering cormorants. It was the subject of a study by Stewart *et al.*¹⁶ looking into the level of predation by cormorants and the impact on the

fishery. Using diet analysis and subsequent modelling, it was estimated that over a seven month period, cormorants consumed in excess of 80,000 brown and 5,000 rainbow trout. This compared with an average annual angler catch of 5,828 brown and 12,815 rainbow trout, indicating a very large degree of competition between cormorants and anglers and a huge economic loss of stocked trout to cormorants.

There have previously been suggestions that the hunting efficiency and therefore the impact of cormorants is reduced in turbid water conditions. However, research from lakes in Macedonia suggests that this is not the case and that birds maintain high foraging effectiveness even in very coloured water¹⁷.



Fig 1: Fish injuries inflicted by cormorants

The impact of cormorants on fish stocks is not limited to the fish that are consumed. While cormorants can take fish up to 4lbs they are known to actively hunt prey much larger than can actually be eaten, 'slashing' at larger fish with their sharp beaks and often afflicting deep

wounds (Fig 1). These damaged fish become stressed, stop feeding and are much more vulnerable to disease. They also shoal up unnaturally often in very shallow water thus making them prone to attack by other predators.

Impacts of cormorants on migratory fish species

Perhaps the greatest justification for a major change in the UK's cormorant management regime is the need to conserve fish species that are in a perilous state, such as European eel, Atlantic salmon, lamprey and bullhead. Much of the research exploring the impacts of cormorants on migratory salmonids during their vulnerable smolt stage has been based in Scandinavia^{18,19,20,21,22,23}. In Denmark, cormorant population dynamics have mirrored those in the UK, increasing rapidly throughout the 1980s and 90s, resulting in severe impacts on fish populations¹⁵. Jepsen *et al.*²⁴ undertook a literature review to establish the true scale of cormorant predation impacts on migrating smolts, which revealed a staggering mean mortality rate of 47 per cent, and consistently over 20 per cent.

It is reasonable to assume the same impact occurs here in the UK. With this in mind, we must consider this exacerbating impact of predation of salmon by cormorants in England against a background of declining stocks due to shifting oceanographic conditions, climate change, man-made barriers to migration, habitat degradation, over-abstraction and pollution²⁵. In this context, the aforementioned level of predation by cormorants could easily threaten the survival of remaining (and genetically distinct) salmon stocks in certain rivers.

Impacts of cormorant predation on a wider scale

Conflict between the great cormorant and recreational freshwater fisheries is not limited to Europe. In Japan, fishery managers are forced to mitigate the impacts of cormorant predation on ayu (sweetfish), a popular migratory species among recreational anglers whose migration coincides with the cormorant breeding season²⁶.

Existing Mechanisms for Control

At present, fishery managers can exercise limited lethal control for cormorants that are causing serious damage to their fish stocks under two types of licence: an individual licence or an area-based licence. However, this is managed under an overly bureaucratic, inflexible and restrictive, broadly ineffective regime that has completely failed to enable adequate protection of vulnerable fish populations, including salmon smolts here in the UK.

Individual licence applications will only be considered by the licensing authority – Natural England – if non-lethal mechanisms have first been exhausted, can be demonstrated and are deemed to be no longer effective, or are generally impractical on site. Non-lethal approaches are often counter-productive as they simply move the birds onto neighbouring fisheries, which then must go through the same procedures.

There are other, much more fundamental problems with the existing individual licensing policy. Natural England claims that the outcome of a cormorant licence should be determined within 30 working days (i.e. six weeks), by which time a fishery could already be severely impacted. Furthermore, we are aware of many instances of licence determinations taking much longer than 30 working days – in some cases up to several months. A request for

information submitted by the Angling Trust to Natural England under the Environmental Information Regulations (EIR) in June 2019 revealed that decisions for nine of the sixty applications for cormorant licences (i.e. 15 per cent of all applications) in the 2018/2019 season (1st September 2018 – 15th April 2019) were still outstanding in August – in excess of four months overdue. This is simply unacceptable when fishery livelihoods and threatened fish stocks are at risk and has meant that at least nine fisheries were unable to protect their stocks during last winter.

The extent of non-lethal methods that must be attempted before a licence will be granted is not clear and requirements vary between individual Natural England advisors. For example, some advisors are currently requesting that targeted 'shoot to scare' logs are produced illustrating that live ammunition is being targeted above, below and to the side of the bird. The time period over which this should be collated is not specified.

The introduction of area-based licensing has improved the management of cormorants in some catchments where it has been successfully implemented. However, it is widely considered that the number of birds that are granted even on these licences are wholly inadequate.

References and examples are included in the ARP challenge document.

Justification for Change

We argue for the greater right to control cormorant numbers in the UK on the basis of two fundamental reasons:

- Conservation of threatened fish species;
- Protection of recreational angling and those livelihoods and businesses that depend upon it.

It is an indisputable fact that predation by cormorants is often the main factor in the decline of many fisheries. The Angling Trust has campaigned over a number of years to give fishery managers greater flexibility to protect their fish stocks and – therefore – their livelihoods. Some progress has been made with the appointment by the Angling Trust of two full-time Fishery Management Advisors, with part of their work advising fisheries and the introduction by Natural England of the Area-Based Licensing system, but many of the same fundamental issues still remain.

We believe that the current review of the General Licensing system presents a unique and indispensable opportunity for regulators to enable well-overdue protection for threatened fish stocks and give fishery managers the ability to adequately protect their livelihoods. Specifically, we are seeking for cormorants to be added to the new General Licences subject to annual population review to ensure that their favourable conservation status is not threatened. We will work with all our members with strong guidance to ensure that this is done in a responsible manner within the boundaries of a revised conservation status.

We believe the fish populations in this country deserve the right of protection (some under existing policy) and fishery interests deserve the right to protect their livelihoods. Placing the

cormorant on the General Licence here in the UK will assist this and, as stated in the ARP document, is unlikely to impact on the vast, and growing, European population of 1.2 million directly responsible for the growing and unsustainable level of conflict here in the UK. It will, however, go some way in arresting the burgeoning pressure on our inland fish populations by enabling the legal right to protect them.

The Angling Trust
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