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Framework for a European Management Plan for the Great Cormorant

EIFAAC EUROPE

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Preparation of this document

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Since 2008, the membership of the European Inland Fisheries and Aquaculture Advisory Commission (EIFAAC) and the European Parliament have requested the preparation of a European management plan for the great cormorant on several occasions.

This document was written by Ian G. Cowx (University of Hull, United Kingdom of Great Britain and Northern Ireland), Niels Jepsen (Danish Technical University, Denmark) and Raymon Van Anrooy (EIFAAC secretary).

The preparation of the document involved hundreds of stakeholders, representing governments, research and management institutions, intergovernmental organizations, non-governmental organizations (NGOs) and civil society organizations (CSOs) active in bird conservation, fish and biodiversity conservation, water management, fisheries and aquaculture. Draft versions of this document were shared by the EIFAAC Secretariat with all key stakeholders in April and May 2025 for comments and suggestions.

Contributions, information and comments were received from government officials from the ministries responsible for the environment and fisheries of nearly all 37 EIFAAC member countries.

The European Commission Directorate General for Maritime Affairs and Fisheries (DG MARE) and European Commission Directorate General for the Environment (DG ENV), and various Members of the European Parliament participated in the stakeholder meetings and contributed to the draft framework management plan, as well as scientists on bird- and fish conservation, fisheries and aquaculture from more than 30 European universities.

Organizations which participated in and contributed to the development of this framework management plan included, among others: Angling Trust (United Kingdom), Alienor, Aquaculture Advisory Council (AAC), Association of Marine Aquaculture Companies of Andalusia (ASEMA, Spain), Association Française des Professionnels de la Pisciculture d'Etangs (France), Asociatia Nationala a Producatorilor din Pescarie (ROMFISH, Romania), Baltic Sea Advisory Council (BSAC), Birdlife Europe, Centro Tecnológico de la Acuicultura (CTAQUA, Spain), Brancheorganisationen Dansk Lystfiskeri (Denmark), Danmarks Sportsfiskerforbund (Denmark), Deutscher Fischerei Verband e. V.(Germany), Deutscher Angelfischerverband e.V. (Germany), Eurogroup for Animals, European Anglers Alliance (EAA), European Federation for Hunting and Conservation (FACE), Federation of European Aquaculture Producers (FEAP), Fédération Française d'Aquaculture (France), Fishprotection contra Cormorant re. association (FPcC, Germany), Lystfisker Danmark (Denmark), Maison Wallonne de la Pêche (Belgium), Natural Resources Institute Finland (LUKE), North Sea Advisory Council (NSAC), Organizacja Producentów Polski Karp (Poland), Polskie Towarzystwo Rybackie (Poland), Polski Związek Wędkarski (Poland), Seas at Risk, Sportvisserij Nederland (Kingdom of the Netherlands),

Svenska Jägareforbündet (Sweden), Wetlands International, and Związek Producentów Ryb (Poland).

The preparatory process included a range of regional workshops, meetings and consultations in 2024 and 2025:

- an EIFAAC workshop on management advice for reducing the impact of cormorant predation on fish and fisheries, Pula/online, Croatia, 8 October 2024 (78 participants from 24 countries);
- a Baltic Sea Advisory Council Workshop on predators in the Baltic (seals, cormorants), second edition, Helsinki/online, Finland, 30 October 2024 (71 participants);
- a North Sea Advisory Council/BSAC Workshop on predators (seals & cormorants), Lulea, Sweden, 20 March 2025 (41 participants);
- an EIFAAC Stakeholder consultation on the draft European Cormorant Management Plan, Rome/online, 25 April 2025 (114 participants from 27 countries); and
- a Polish Presidency to the Council of the EU/EIFAAC Conference on management advice to reduce cormorant predation impacts, Brussels/online, Belgium, 3 June 2025 (230 participants from 31 countries).

The document was further reviewed in September 2025 by staff of DG MARE and DG ENV. The EIFAAC Technical and Scientific Committee and EIFAAC Management Committee reviewed the document in November 2025 and cleared it for submission to the EIFAAC members and the European Parliament.

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Executive summary

Cormorants are protected in the European Union under the Birds Directive (2009/147/EC), which has contributed to a dramatic increase in their populations since the 1980s. However, this conservation success has brought cormorants into conflict with inland and coastal fisheries and aquaculture in Europe. The increasing population size and expanding range of the great cormorant in Europe have contributed to threats to aquatic biodiversity, declining fish stocks, and the loss of aquaculture production in both fresh and coastal waters. This has, in turn, led to economic losses for commercial and recreational fisheries and aquaculture enterprises.

To address the problems caused by an ever-increasing population of European great cormorants, numerous mitigation measures have been undertaken at the national level. However, great cormorant population numbers and their distribution range across Europe continue to increase, and the mitigation measures put in place have been largely unsuccessful. The limited success of ongoing national management interventions has thus highlighted the need for a pan-European management plan, as previously requested by the European Parliament.

This document provides a framework for a European management plan for the great cormorant (the "CMP framework") to manage the adverse impacts of an expanding great cormorant population on inland and coastal fish, fisheries and aquaculture, across the species' European distribution range. The framework provides a balanced, science-based and inclusive roadmap for managing the complex interactions between cormorants, fisheries, aquaculture and fish conservation in Europe. It is designed to compensate, mitigate and, where possible, reconcile cormorant–fish conflicts. What is more, although the framework focuses on maintaining the great cormorant's good conservation status, it also recognizes the social and economic dimensions of the growing population, especially as these relate to fish, fisheries and aquaculture, in addition to the consequences of cormorant–fish–human interactions.

The CMP framework contains: a review of the biology and development of great cormorants in Europe; a section on the impact on fish resources and associated socioeconomic impacts; a section on relevant legislative, policy and management issues; and finally, a structured framework for its implementation and evaluation.

The framework involves a series of steps:

1. assessing the system of cormorant–fish interactions, related economics, and the underpinning policy drivers, objectives and target end-points;
2. formulating management measures;
3. choosing a course of action;
4. implementing management actions, monitoring changes in cormorant, fish, aquaculture and ecosystem characteristics, region-wide cooperation, and compensation for damages to fisheries and aquaculture; and
5. re-evaluating and adjusting the end-points and objectives of the plan with a view to the future.

The CMP framework provides a process for stakeholder engagement and enables structured decision-making and adaptive management through the Evaluate-Adjust-Adapt process. The outcomes of the CMP framework are to achieve: a significant decrease in cormorant-related conflicts in Europe; maintain the favourable conservation status of the great cormorant across

its European distribution range; improve the conservation status of vulnerable fish species; and, in part, address reasons for the failure to achieve good ecological status in rivers, lakes and transitional waters under the EU Water Framework Directive. The framework will also contribute towards sustainable freshwater aquaculture, as well as the development of inland fisheries business and food security in Europe.

Contents

1. The need for a European cormorant management plan

Recovery of the European great cormorant populations (*Phalacrocorax carbo carbo* and *Phalacrocorax carbo sinensis*) tells a highly successful conservation story. Following the very low abundance of the 1950s, as a result of persecution and toxic pollution, the population has since grown and expanded its range across Europe (van Eerden and Gregersen, 1995; Bregnballe, 1996; Bregnballe *et al.*, 2011a; Bregnballe *et al.*, 2014). This change brought the great cormorant into direct conflict with fisheries; and since the 1990s its impact on inland and coastal fisheries in Europe has been the subject of intense debate. This is reflected in the various interventions made by the European Parliament over the past three decades (see Section 2.5.3 and Annex 2), including calls for a European Management Plan and a request for support for various projects to address the conflict. Support has also been provide by the European Commission to projects to attempt to address the problem, such as REDCAFE (Centre for Ecology & Hydrology, 2025a), INTERCAFE (Centre for Ecology & Hydrology, 2025b), CORMAN (Cormorants Research Group, 2025) and FRAP projects (Helmholtz Centre for Environmental Research – UFZ, 2015)). The increasing population size of the great cormorant and its expanding range have contributed to low levels of fish stocks and difficulties improving these, in addition to a loss of aquaculture production in both inland and coastal waters. This has led to economic losses for commercial and recreational fisheries and aquaculture enterprises (Section 2.3).

This perspective is countered by arguments that the current poor status of fish stocks is the result of commercial and recreational overfishing, including considerable bycatch, and general environmental degradation (Klenke *et al.*, 2013). This viewpoint maintains that fish stocks should be helped to recover through the management of fishing pressure, strategically removing the barriers to fish migration, and restoring their habitats. This approach would also meet the European Union's goal to restore 25 000 km of free flowing rivers by 2030. While considerable attention has been paid to these measures through the Common Fisheries Policy (EC, 2013a), notably those introduced in 2023 to improve the sustainability and resilience of the EU fisheries and aquaculture sectors, in addition to the Water Framework Directive (WFD) (EC, 2025a) (including estuarine [transitional] and coastal waters) and the Marine Strategy Framework Directive (MSFD) (EC, 2008), fish populations continue to decline. Indeed, freshwater fish species have some of highest proportions of poor conservation status of any biota (EEA, 2020). Within Europe, 37 percent of the 531 native freshwater fishes assessed for the IUCN European Red List are threatened (Freyhof and Brooks, 2011).

One factor that has persisted since it was first raised in the 1990s – including after the removal of *P. c. sinensis* from Annex 1 of the Birds Directive in 1997 [1]– is predation and damage perpetuated by cormorants. These not only directly affect fish populations, but also inhibit the recovery of threatened species and depleted stocks once environmental conditions have been improved.

To date it has not been possible to alleviate the increased pressure from cormorants on rivers, lakes and coastal waters, or on aquaculture facilities, by using traditional mitigation measures (restoration, barrier removal, stocking, reducing fishing pressure and shifting capture methods); alternative strategies are therefore required. This includes managing the cormorant population size, in proportion to the damage caused, and recognizing that localized

[1] https://ec.europa.eu/commission/presscorner/detail/ro/ip_97_718

actions have failed to resolve ongoing conflicts because the problem is pan-European (Kindermann, 2008; Cowx, 2013).

A precedent for such a multi-country approach has been successfully adopted for other problem bird species such as the barnacle goose (Jensen *et al.*, 2018), the greylag goose (Powolny *et al.*, 2018) and the Svalbard pink-footed goose, where, in the latter case, a management plan has been put in place to control its feeding on field crops (Madsen *et al.*, 2012), which was evaluated in 2017 (Madsen *et al.*, 2017).

While cormorants may constitute a vital component of biodiversity, fisheries managers, fisheries organizations, fish farming organizations and fish farmers, and those engaged in the management and rehabilitation of endangered fish species have raised concerns about critical declines in fish conservation status and fish farming. In the case of fish farming, pond-based aquaculture is becoming economically unviable in various places because of losses resulting from great cormorant predation and damage (FAO, 2024b, 2025a; FDAAPPMA, 2024; Parlier, 2024). Pond farm closures could also have considerable indirect impact on conservation of aquatic biota, as they act as critical habitats for many threatened aquatic species.

Although much attention has to be paid to the impact of fishing on the status of fish stocks, this predominantly refers to marine waters and diadromous species such as salmon, shad, lamprey and eel. Fishing for eel is now heavily regulated to protect the species (as per Council Regulation (EC) No 1100/2007). Inland waters in Europe are rarely impacted by fishing, because it is mostly recreational, catch-and-release fishing (Cowx, 2015). Especially in rivers where stocks are notably in decline, predation by cormorants is often a major contributor to their decline or failure to recover (as per Conrad *et al.*, 2002; Guthörl, 2006; Jepsen *et al.*, 2018; Jepsen and Rasmussen, 2023; Kallö *et al.*, 2020; Kallö *et al.*, 2023; Kennedy & Greer, 1988; Steffens, 2010), but some studies have found no effect of cormorants on fisheries (see Suter, 1995).

Fish populations in many waterbodies are now in poor condition and many stocks are threatened, including fish species of high conservation value (IUCN, 2023, 2025; Pradhl, 1996; Sayer *et al.*, 2025). Freshwater and marine fish have a very high proportion of their species assessments in poor or bad conservation status (around 80%) under the Habitats Directive, which is higher than any other species group (European Environment Agency, 2024b). . Loss of large freshwater fish that are top predators of smaller fish may result in a higher biomass of small fish, a lower biomass of invertebrates, and therefore more algae, which in turn impacts the ecological status of waterbodies.

To address the issues arising from the increasing abundance and range of cormorant populations in Europe, numerous national and European collaborative projects have been undertaken to manage and mitigate the conflict between cormorants and fisheries and aquaculture, including the EU REDCAFE, INTERCAFE, CORMAN and FRAP projects and the development of a cormorant management toolbox (Russell *et al.*, 2013). There has, however, been no discernible reduction in cormorant population numbers across Europe or significant measurable mitigation of the problems encountered by their increasing presence. More projects have been initiated, including the Horizon 2020 ProtectFish project (Protectfish Consortium, 2025), while national management plans have been developed in some countries to address the problem (Gerdaux, 2005; Cowx, 2013). However, these actions do not address one of the fundamental issues: the lack of a coherent regional management plan for this migratory bird species, despite numerous calls for such a plan from the European Parliament,

EIFAAC, fisheries and aquaculture agencies, NGOs and stakeholder associations, such as the European Anglers Alliance and the Aquaculture Advisory Council (see Annex 2). Consequently, fish populations continue to deteriorate, and the survival of many fish stocks and associated businesses is threatened. Further, many aquaculture businesses have become unviable and gone out of business as a result of unsustainable cormorant predation (Musil, 2002; Kortan *et al*., 2008; Donati *et al.*, 1997; Adamek and Kaigrova, 2022; FAO, 2026).

The aim of this document is to:

- outline the nature of the conflict arising from the recovery and expansion of the great cormorant in Europe, the ways these have been addressed, and the effectiveness of the measures adopted;
- review the main economic impacts of the conflict, and attempts to define the major problems preventing resolution;
- review the legislative and policy framework applicable to the cormorant–fish conflict; and
- present a framework for a European management plan to reduce the damage caused by great cormorants to fish biodiversity, fisheries and aquaculture.

2. Cormorant–fish conflict

2.1 Description of the cormorant population

Two subspecies of great cormorant occur across Europe: the smaller *Phalacrocorax carbo sinensis*, which inhabits coastal as well as inland waters; the other subspecies, the larger *Phalacrocorax carbo carbo* is mainly found around the open coast of the British Isles, Iceland, Ireland, and Norway (Nelson, 2005; Bregnballe *et al.*, 2014). The subspecies *P. c. sinensis* has increased strongly, both in terms of numbers and geographical range, and causes numerous conflicts throughout Europe. The subspecies *P. c. carbo* has maintained a stable population and distribution in recent decades (although declining in Norway), and has therefore not caused as many conflicts. Thus, when the term "cormorant" is used in this document, it refers mainly to *P. c. sinensis* in mainland Europe and *P. c. carbo* in northwestern Atlantic coastal countries.

2.1.1 Breeding biology

Cormorants are colonial waterbirds that breed in relatively large colonies. They are flexible with regards to where they establish colonies, and build their nests in trees, shrubs and/or on the ground. They breed directly on the ground on small islands if these are safe against predators (primarily foxes). However, if there are trees and shrubs on the island where they settle, they usually choose to build their nests in them. When cormorants breed by lakes, the nests are often found in trees next to the lakeshore. Colonies can occur in diverse locations, including shipwrecks, electrical transmission towers (decommissioned) and even old lighthouses. The breeding season extends from March to July. The eggs are white to slightly blue. Cormorants start breeding from the age of 2 to 6 years, though their reproductive time most commonly starts from the age of 3 years (Frederiksen and Bregnballe, 2001). They will usually lay 2–5 eggs each year. Nesting success increases with age and experience (Bregnballe, 2006). Cormorants are rather long-lived and can reach ages of 15–20 years (Frederiksen and Bregnballe, 2000; Fransson and Pettersson, 2001). The mean annual survival rate of adult cormorants is estimated at 88 percent. The mortality rate can range between 5 percent and 26 percent, depending on factors like winter severity and population size (Frederiksen and Bregnballe, 2000). The egg incubation period is approximately 30 days. About 7 weeks after hatching, the young are ready to fly. Breeding success depends primarily on food availability and the amount of disturbance during the breeding season. In favourable years, ≈2.5 young can be produced per nest, but in years with little food as few as 0.5 young are produced per nest. Some studies from Germany and Czechia reported the number of young per breeding pair was 2.1–3.8 per nest (Zimmerman and Rutschke, 1991). The young will typically leave the nests between late June and the end of July, depending on latitude.

2.1.2 Foraging and diet

Cormorants live almost exclusively on fish. The cormorant's individual food intake fluctuates throughout the season from 200 to 700 g/day, with a mean of 500 g/day (Grémillet *et al.*, 1996; Keller & Visser, 1999; Ridgway, 2010). The need is greatest in May–June when cormorants have their young. The cormorant is an efficient underwater hunter that forages in virtually all waterbodies, even the smallest fresh waters (running and still), shallow coasts and brackish habitats in depths up to 50 m, but normally only down to 20 m (Bregnballe, 2009). Cormorants usually seek food alone, but also forage in groups of hundreds in fjords, lakes, rivers and in shallow marine areas. During the breeding period, they will normally utilize

waterbodies in a radius of about 30 km from the colonies, but foraging trips of up to 50 km have been reported. Cormorants are good at locating areas with many fish that are relatively easy to catch, such as in ponds and small open lakes (van Eerden *et al.*, 2012). Cormorants also forage in very small waterbodies like garden ponds, small streams of 1–2 m wide and even in underground concrete channels. Cormorants can survive on shrimps, sticklebacks and tiny sand goby if other prey is absent, but they can also eat fish of up to 2 kg (± 50 cm in length) (Klenke *et al.*, 2013; Kallö *et al.*, 2023).

2.1.3 Migration and overwintering

Cormorants have established breeding colonies in most European countries, but most of the breeding takes place in northern Europe, especially around the Baltic Sea (van Eerden *et al.*, 2012). From late summer to autumn, there is a shift in the distribution of cormorants away from the Baltic/Nordic fjords and freshwater areas and out to the more open coasts and remote small islands. Around September–October they begin their autumn migration. Some migrate along the Atlantic coast and others migrate over land, usually along rivers (Figure 1) (Frederiksen, *et al.*, 2018). Important wintering areas include France, southern Germany, northern Italy, the Kingdom of the Netherlands, Spain and Switzerland (Bregnballe and Rasmussen, 2000). Some cormorants choose to stay in northern areas, including the British Isles and the Baltic Sea region in winter, and do well in mild winters. The number of cormorants that overwinter in the north has increased as winters have become milder, linked to increasing air temperatures and less ice cover.

Figure 1. Example of recoveries of ringed cormorants from The Eurasian African Bird Migration Atlas *Source:* Bird migration atlas: great cormorant - https://migrationatlas.org/node/1773#section1)

The population of cormorants in Southern European countries like Croatia, Italy, Portugal and Spain has continued to increase in recent decades (Regione del Veneto, 2024; Opacak *et al.*, 2004; Junta de Andalucia, 2025), as well as in Central and Eastern Europe (Bregnballe *et al.*, 2014). Cormorants in Central and Eastern Europe tend to stay year-round, so they are moving from obligatory migratory birds towards more diverse strategies (including resident birds).

2.1.4 Development in Europe

In Europe, standardized comprehensive cormorant surveys have only been conducted a few times. The last comprehensive survey was in 2013 (van Eerden 2021); the numbers given below are therefore estimates. The European Breeding Birds Atlas shows trends in the distribution and abundance of cormorants and their breeding status up to and including 2017 (Figure 2); and it is widely recognized that the distribution range and abundance have increased further in recent years (T. Bregnballe, unpublished data).

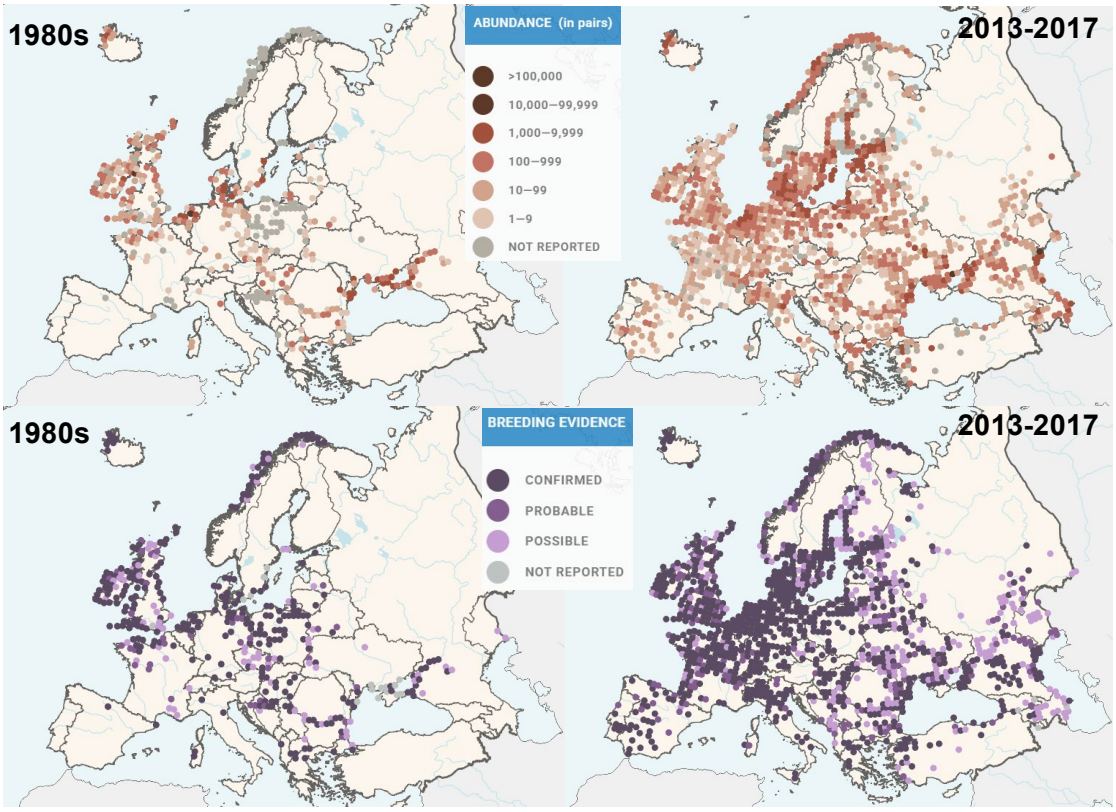


Figure 2. Abundance (upper panels) and distribution of breeding cormorants in the Western Palearctic in 2012 presented in 50 x 50 km grid cells between the 1980s and 2013-2017. *Source*: European Breeding Birds Atlas 2 - *https://ebba2.info/maps/species/Phalacrocorax-carbo/ebba2/abundance/*)

In the first half of the twentieth century, the great cormorant was close to extinction in Europe. In the early 1960s, the northwest European population numbered about 5 000 breeding pairs. In the 1970s, the population began to grow in Denmark, the Kingdom of the Netherlands and Sweden, and numbers increased to ≈ 13 500 pairs in 1981. The increase in numbers reflects that the abundance of cormorants was negatively impacted in the past by human activities or the side-effects of societal development (e.g. persecution and toxic

pollution such as DDT and PCBs) (Dirksen *et al.*, 1995; van Eerden and Gregersen, 1995). Adoption of the EU Birds Directive in 1979 built on national level conservation measures and resulted in markedly increased protection of cormorants – and thus of cormorant population abundance – and their distribution increased greatly (van Eerden and Gregersen, 1995). Yet the implementation of the Birds Directive was not followed by plans for management of the species, and the population of *P. c. sinensis* grew rapidly and spread over Europe (van Eerden and Gregersen, 1995; Lindell *et al.*, 1995; Keller and Muller, 2015; Bregnballe, 1996; Bregnballe *et al.*, 2011; Bregnballe *et al.*, 2014).

Other reasons for the successful expansion of the great cormorant are increased nutrient input into lakes and coastal waters leading to eutrophication, boosting fish populations and therefore providing more abundant food sources for cormorants (de Nie, 1995; van Eerden and Gregersen, 1995; Suter, 1997). The growth of fish farming in various European countries, particularly in areas frequented during cormorant migration, has also provided additional foraging opportunities, especially in fish ponds (Moerbeek *et al.*, 1987).

In 2014, the global population was estimated at ≈ 1.4–2.1 million individuals (Wetlands International, 2015). The European population was estimated at 401 000–512 000 breeding pairs, which equates to 828 000–1.03 million mature individuals (Birdlife International 2015; 2018). The total number of breeding pairs in Europe is estimated to have increased since 2014, though it has not been counted recently. This recent, substantial increase in numbers has coincided with an extension in geographical range, with cormorants moving north, especially along the Baltic coasts of Sweden and Finland, resulting in a build-up of breeding colonies as far north as the Bothnian Bay (Figure 1). However, there have also been marked increases in numbers of (smaller) breeding colonies on the European mainland and the British Isles. Knowledge of the size of the cormorant population in Europe prior to modern times is limited, but it has been concluded, based on archaeological finds and ancient literature dating back a thousand years, that the cormorant was never very abundant in Europe; thus: “the current distribution and abundance of the cormorant cannot be seen as a recovery of the species to historically existing conditions” (Beike *et al.*, 2013).

Even the best counts (2006, 2012/13) carry some uncertainty, both because some colonies may have been overlooked and because some nests inside of some colonies are likely to have been missed (Bregnballe *et al.*, 2013).

The dynamic nature of the cormorant population, as well as variation in the counting effort from country to country, makes robust estimates of total population size in Europe challenging. The conversion from counted nests/pairs to total number of individuals is not trivial and will vary with population age structure. This has given rise to much discussion regarding the ‘true’ size of the population. Overall, it is often assumed that each counted nest equates to 4.5 birds in the autumn (Bregnballe, 2009; Wetlands International, 2025), although another study used a conversion factor as low as 3 birds as a simplified method to estimate the population of waterbirds in general (Meininger *et al.*, 1995). Based on the nest counts and the conversion factor of 4.5, a valid approximation would be that there are currently more than 2 million cormorants spending all or most of their time in European waters. The future development of the cormorant population will primarily be determined by:

a) the food supply;
b) opportunities for cormorants to establish new colonies;
c) regulatory measures, especially culling of juveniles and adults; and

d) expansion of the population of white-tailed sea eagles and other predators like foxes and racoons, and weather conditions (Hermann *et al.*, 2021).

2.2 Impact of cormorants on aquatic resources

Discussions of cormorant predation on wild fish, and thus commercial fishing, recreational fishing, fisheries and fish conservation, have been intense for decades and continue to this day (Kindermann, 2008; Cowx, 2013; Carss, 2022; Saarikoski *et al.*, 2025). Impacts from cormorant predation on wild fish populations are, however, difficult to measure. Consequently, most information is gained from single-site assessments carried out as part of targeted studies (see Kindermann, 2008; Seiche *et al.*, 2012; Cowx, 2013) and the EU Cormorant Platform (EC, 2023b). These are supplemented by information in various national and regional cormorant management plans (e.g. Denmark, Finland, the Veneto region in Italy, and Sweden; see Gerdaux, 2005 and Cowx, 2013 for overviews) and information being compiled as part of the EU funded ProtectFish project. These studies provide clear and compelling evidence for predation impact on fish species and populations in specific areas.

There are many common recurrent results from different places that show the impact of cormorant predation of fish stocks, especially salmon and sea trout [smolts] and grayling in rivers, pike in lakes, and cod and juvenile flatfishes in coastal waters. However, not all results can be readily used or seen as valid for other areas or species. Consequently, the transferability of scientific results is central to providing evidence for the conflict. The impact on farmed fish, on the other hand, is relatively easier to evaluate, as the input (fry/fingerlings, feed), growth and mortality rates, and output (expected harvest without predation) are known. In this section, definitive evidence of impact is described, while it is acknowledged that evidence of no- or low impact can also be found in the scientific literature. A more thorough discussion of this dichotomy can be found in Cowx (2013) and Marzano *et al.* (2013).

Nevertheless, ample evidence shows that predation from cormorants can have substantial adverse impacts on aquaculture and inland and coastal fishing, and on aquatic biodiversity in general. Considering a total population of 2 million cormorants in Europe (as a geographical area, rather than solely the European Union) and the fact that they each must consume a mean of 500 g of fish/day (Grémillet *et al.*, 1996, Keller and Visser, 1999, Ridgway, 2010), equates to ≈ 365 000 tonnes of fish consumed each year, assuming they all forage within European waters the whole year. When compared to commercial fishing landings from the high seas, this number is only a fraction of the total – but if it is compared with total combined annual coastal and freshwater fish harvest around Europe, it is a very high proportion. So, the impact from cormorant predation is very dependent on the foraging habitat. In marine fisheries it generally represents a less direct impact. In coastal areas and fjords the predation impact will only be major when fish stocks are low, but in rivers and lakes with a naturally lower fish biomass, the impact can be very high.

Rivers

In rivers and streams, even rare visits by cormorants have serious consequences for wild river fish populations such as salmon, marble trout, brown trout, grayling, barbel and nase (Harris *et al.*, 2008; Jepsen *et al.*, 2018, 2018b; Kennedy and Greer, 1998; Kohl, 2005; Steffens, 2010; Kainz, 1994; NASCO, 2025). Trout and salmon smolts are particularly vulnerable to cormorant predation, especially stocked, hatchery-reared trout and other commonly stocked species (Boström *et al.*, 2009; Boström *et al.*, 2012; Cech and Vejrik, 2011; Jepsen *et al*., 2019,

Källo *et al.*, 2023; Säterberg *et al.*, 2023). Some studies argue that cormorant predation may pose an extinction risk to some fish populations (Koed *et al.*, 2006; Jepsen *et al.*, 2010; Steffens, 2010). Cyprinid fishes (e.g. roach, bleak and bream), European pike and perch-like fish (pikeperch, perch and gizzard shad) are also at great risk of being adversely affected by cormorants (Evrard, *et al.*, 2005; Ovegård *et al.*, 2021; Delmastro *et al.*, 2015; FDAAPPMA 47, 2024).

Lakes

Depletion of fish stocks in lakes as a result of predation by cormorants has been documented in Denmark, Germany, Sweden and the United Kingdom of Great Britain and Northern Ireland (Britton *et al.*, 2002, 2003; Boel, 2012; Boström *et al.*, 2012; Carpenter *et al.*, 2005; Dirksen, *et al.* 1995; Ovegaard, *et al.*, 2017; Rudstam *et al.*, 2004; Skov *et al.*, 2014; Winfield, *et al.*, 2007; Wright, 2003 – though see Engström [2001], for no impact). These impacts are particularly severe in small shallow lakes (Britton *et al.*, 2002, 2003; Wright, 2003).

Marine

In coastal (and fjord) waters, there is considerable evidence that cormorants can consume a high proportion of the fish stocks (Birt *et al.*, 1987; Bax, 1998; Dehngard, *et al.*, 2021; Dieperink, 1995; Vetemaa *et al.*, 2010); and for some species in the Baltic Sea cormorants eat more fish than are caught by commercial fisheries (Hansson *et al.*, 2017), although the results of this modelling study have been disputed (Heikinheimo *et al.*, 2018). Nevertheless, predation impacts on cod, eel, flounder and perch in the Baltic Sea area are now well documented:

- perch (Vetemaa *et al.*, 2010; Östman *et al.*, 2012, 2013; Gagnon *et al.*, 2015, Veneranta *et al.*,2020; Arlinghaus *et al.*, 2021; Bergström *et al.*, 2022);
- pikeperch (Eschbaum *et al.*, ,2003; Mustamäki *et al.*, 2014; Heikinheimo *et al.*, 2016; Salmi *et al.*, 2015);
- pike (Östman *et al.*, 2013; Hansson *et al.*, 2017; Bergström *et al.*, ,2022);
- flounder (Florin *et al.*, 2013; Östman *et al.*, 2013; Jepsen *et al.*, 2010; Nielsen *et al.*, 2008; Jepsen *et al.*, forthcoming);
- eel (Jepsen *et al.*, 2010; Dauster, 1987);
- cod (Jepsen *et al.*, forthcoming).

However, there are also studies that did not find severe impacts of cormorant predation on marine fish stocks (Lehikoinen *et al.*, 2017; Heikinheimo *et al.*, 2018; Heikinheimo *et al.*, 2022).

Information on cormorant predation of threatened eel populations – once the foundation of historically important fisheries – is scattered (Carpentier *et al.*, 2009). However, research indicates that cormorants can consume 40–44 percent of small eels in a single summer in coastal areas (Jepsen *et al.*, 2010). Estimates suggest that in Denmark cormorants are now the leading cause of eel mortality, exerting a greater impact than the combined threat from fishing and hydropower/water pumping stations (Danish Eel MP, 2008).

Fishing

Inland (freshwater) capture fisheries production in the European area has declined from 192 000 tonnes in 1980 to 110 000 tonnes in 2023, a reduction of 43 percent (FAO, 2025b). The increase in predation by cormorants cannot be solely blamed for this reduction in freshwater fish production, but it has certainly contributed to the decline. Increased predation from cormorants also constrains depleted fish populations from recovering, despite measures

being taken to address other influencing factors, as has been observed in Denmark (Jepsen *et al.*, 2018). The reduced stocks of freshwater fish have caused most EU Member States to introduce catch-and-release practices (Arlinghaus *et al.*, 2002; 2015; Ferter *et al.*, 2013; Arthur, 2025) and resort to intensive stocking of fish in inland waters for recreational fisheries (Cowx, 2025). For comparison, non-EU, eastern European countries that have a lower prevalence of cormorants have exhibited an increase in inland fisheries production over the same period, although production has been relatively stable in recent years (FAO, 2025b). These countries generally have fewer problems with cormorant predation on fish, as the cormorant population is smaller, not protected, actively managed and hunted (FAO, 2026; forthcoming).

Fish farming

Despite considerable emphasis on promoting aquaculture production in the European Union (EC, 2020b, 2021, 2022), freshwater aquaculture production fell in the European area between 1990 and 2023: from 340 000 tonnes to 300 000 tonnes; a reduction of 14 percent (FAO, 2025c). Pond aquaculture in Czechia, France, Germany and Romania saw declines in production where an increase would have been expected, based on improved aquaculture techniques and management (FAO, 2025c). While economic and marketing factors may contribute this decline, the reduction in production is partly attributable to the increase in cormorant numbers and related predation on freshwater fish ponds (Opacak *et al.*, 2004; Seiche *et al.*, 2012; Volponi, 1997; Halasi-Kovács *et al.*, 2023). Most freshwater fish aquaculture production in Europe takes place in ponds, and cormorant predation has caused farm closures and reduced profitability in many countries (FAO, 2026 forthcoming).

General decline in fish and fisheries

Against this backdrop of increasing cormorant population abundance and range, there is also a recognition that fish stocks and fisheries are in decline because of other factors, including fishing pressure, predation pressure from other piscivores, climate change, habitat degradation and environmental change. These other factors do, of course, play a role, but there are many studies where other causes for declining fish stocks can be ruled out, leaving only cormorant predation Koed *et al*. 2006; Jepsen *et al.*, 2010, 2018, 2019; Klenke *et al.*, 2012). Arguments that fisheries themselves are largely responsible are unsubstantiated for most areas, because fishing activities have declined drastically in freshwater and coastal areas, and fish stocks had responded positively until cormorant numbers increased (Anon, 2022; Boel, 2012; Jepsen *et al.*, 2014; Jepsen *et al.*, 2018; Jepsen and Rasmussen, 2023). Fishing, as a single factor, is not accountable for the poor state of many fish stocks in inland and coastal waters (whereas fishing is often responsible for the state of marine fisheries). However, in some southern Member States of the European Union some commercial inland fishing may still have a significant impact on populations... Fishing pressure in coastal waters has reduced tremendously in the last decades (Pascual-Fernandez *et al.*, 2020; Guyader *et al.*, 2013), and yet fisheries are still in decline. As an example, the traditional coastal cod fishing in the western Baltic has almost ceased to exist (Figure 3), while tagging studies show that cormorants are now eating 70 percent of the tagged cod in just one season (Jepsen *et al.* unpublished). With such predation pressure, rebuilding of the stock is unlikely, despite closure of the fisheries.

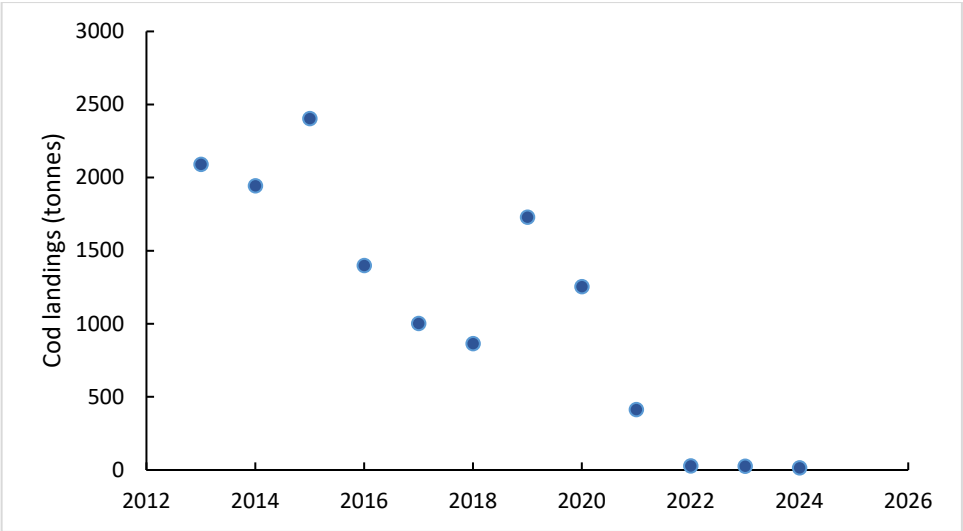


Figure 3. Danish landings of cod in the Western Baltic in ICES subdivision 22 from 2012 to 2024

Source: Statistics Denmark. 2025. Fishery- landings of fish - subdivision 22

In inland waters, catch-and-release fishing is widely practised by recreational fishers (Arthur, 2025; EAA, personal communication) so has little impact on stock status. Moreover, the populations of many freshwater fish species that are not subject to any fisheries exploitation and where habitat quality has improved have still not recovered – including locations benefitting from considerable investment in removing barriers to reconnect rivers (see European Centre for River Restoration[2]), as well as initiatives to improve river habitat and water quality. Tagging studies document the direct impact of cormorants on several freshwater fish populations (Jepsen and Rasmussen, 2023; Skov *et al.*, 2014). Cormorants also appear to be a common denominator in the failure to meet recovery benchmark targets that indicate "Good Ecological Status" or "Potential for fish", as set out in the EU Water Framework Directive (Steffens 2010; Görner, 2019; Jepsen *et al.*, 2014). However, as bird predation is not formally recognized as a pressure, the problem is inadvertently overlooked. The failure to meet good ecological status affects not only fish but apex predators such as otters and other fish-eating birds (e.g. herons, mergansers, ospreys, kingfishers), the prey base of which has become unstable.

While predation remains the primary impact of cormorants on fish populations, there are additional concerns regarding the effects of wounding and disturbance on fish stocks. Studies by Gremillet *et al.* (2003, 2006) have revealed that although cormorants are considered highly efficient predators, they abandon nearly half of their hunting attempts because prey escapes their grasp or because it is too large to swallow. Many of these escaped fish sustain injuries, which can lead to infections and increased mortality rates (Adamek *et al.*, 2007).

In natural fisheries, the proportion of fish injured by cormorants is generally low (less than 5 percent). However, in aquaculture settings such as farm ponds injury rates can be higher—up to 18 percent (Kortan and Adamek, 2011). Furthermore, Kortan *et al.* (2008) have found that as many as 47 percent of 2-year-old mirror carp (*Cyprinus carpio*) measuring 200–300 mm in total length and weighing 200–300 g showed signs of injury. Such additional damage can

[2] https://www.ecrr.org/

result in considerable economic losses in both stillwater and commercial fisheries, rendering fish unmarketable or undesirable for harvest (Callaghan *et al.*, 1998; Engstrom, 1998).

Additionally, cormorants can cause fish to seek refuge in inaccessible habitats such as small streams, in reeds, or under complex overhanging structures. This displacement makes the fish unavailable to fisheries (Feltham *et al.*, 1999). In some cases, fish become so densely packed in these refuge areas that they face the risk of oxygen depletion, which can lead to further mortality.

Dietary studies consistently show that cormorants forage on a broad spectrum of fish species. However, Doucette *et al.* (2011) have suggested that cormorants may, in fact, exhibit specific and relatively narrow dietary preferences. These preferences can influence food web dynamics, particularly in ecosystems with low prey diversity. In diverse systems with abundant prey, cormorants are less likely to exert significant pressure. Conversely, in ecosystems with limited prey options, their predation has more pronounced ecological or economic impacts. Therefore, it is important not to assume universally negative effects of cormorants on fisheries, but instead to evaluate impacts in the context of local food web structures, and the niches occupied by both cormorants and ecologically and economically valuable fish species.

Because cormorants are able to feed on a wide range of fish species and are highly mobile, simple predator–prey relationships are unlikely to regulate population grow naturally, which makes concerted action necessary. It seems to have become a classic “predator pit” situation for many fish stocks. A predator pit occurs when two alternative equilibria (Holling 1973; May 1977) exist and prey is held at a low-density equilibrium, unable to pass a critical threshold (‘the pit’) needed to reach the higher-density equilibrium (Messier 1994; Sinclair and Pech 1996).

Habitat effects

An often-overlooked aspect of cormorant ecology is the dramatic transformation of forest ecosystems associated with dense breeding colonies (Goc *et al.*, 2005). The accumulation of guano (faeces) in these areas can lead to canopy loss of up to 90 percent in riparian forests, triggering cascading effects on other organisms, including amphibians. Additionally, the nutrient enrichment of adjacent waterbodies from guano runoff can disrupt ecological processes, resulting in reduced biodiversity and biomass of aquatic invertebrates and plants.

Growing numbers of cormorants – particularly large nesting and overwintering colonies – have further amplified their ecological footprint. For example, in forested areas, cormorants can inflict substantial damage. In extreme cases, such as the Kąty Rybackie colony in Poland, which spans approximately 100 hectares (ha) of pine forest, entire forest stands have been killed, leading to conflicts with forest managers (Goc *et al.*, 2005). In the Swedish archipelago, losses in value of summerhouses have been reported and discussed in the public media owing to the establishment of cormorant colonies on small islands (Svenska Dagbladet, 2021).

Cormorant colonies also alter soil chemistry. Eggshell fragments and pellet contents can neutralize soil acidity, while high concentrations of faecal matter enrich the soil with nitrogen and phosphorus. This process can exceed the soil’s phosphate absorption capacity (Breuning-Madsen *et al.*, 2008), increasing the risk of nutrients leaching into nearby watercourses and potentially triggering eutrophication. Such nutrient loading has implications for water quality and may affect the classification of waterbodies under the Water Framework

Directive. The physical presence of carcasses from dead chicks and adults also attracts scavengers and predators, further altering the local ecological community.

Overall, the establishment of a cormorant colony induces widespread habitat changes, initiates succession processes, and contributes to a substantial transfer of energy and nutrients from aquatic to terrestrial systems. By shortening food chains and accelerating biogeochemical cycles, cormorants can alter both aquatic and terrestrial environments. Indeed, by predating on larger piscivorous fish, cormorants modify the food chain, leaving small pelagic species to proliferate (Olin *et al.*, 2022), and deplete the larger zooplankton that regulate algal growth (Gerke *et al.*, 2021). Ultimately this can accelerate eutrophication processes (Donadi *et al.*, 2017; Eklöf *et al.*, 2020), with algal blooms causing oxygen depletion, and negatively impacting water quality and aquatic biodiversity (Alves Amorim and Do Nascimento Moura, 2021). The consequences of this indirect impact on the ecological status of waterbodies under the EU WFD, as a consequence of cormorant predation on fish, can thus be significant (Ovegård *et al.*, 2021).

2.3 Socioeconomic impact of cormorant predation of fish

The social and economic impact of cormorant predation on recreational fishing and aquaculture facilities is substantial. A study by EIFAAC, the Federation of European Aquaculture Producers (FEAP) and European Angling Alliance (EAA) has estimated that the costs of cormorant predation to aquaculture and fisheries in Europe exceeded EUR 350 million per year in 2023 and 2024 (FAO, 2026 forthcoming). Government research institutions and ministries from 25 countries contributed to the study. More than 250 angling clubs and 160 fish farmers submitted information on cormorant counts, preventive actions taken and damage and losses as a result of predation by cormorants.[3]

There are approximately 7 000 freshwater (pond and raceway) aquaculture farms in the European Union, with a total annual turnover of around EUR 1 billion (EC, 2023a). The total freshwater aquaculture pond area in the European Union is nearly 360 000 hectares. The freshwater fish output from pond production in the European Union has been around 100 000 tonnes per year in recent years, plus some tens of thousands of tonnes of trout that are mainly produced in raceways (FAO, 2026; Cai *et al.*, 2024).

Box 1. Losses to aquaculture farms

A total of 118 aquaculture farmers from 7 EU countries, producing an average of 11 000 tonnes of trout, carp, pikeperch and tench per year, reported a combined loss of more than EUR 10 million for 2023 owing to fish predation by cormorants. Reported losses per farm ranged from EUR 500 to more than one million euros per farm, with a median figure of EUR 30 000 per farm. Losses reported by pond farmers ranged from EUR 100/ha to EUR 662/ha. Annual losses of trout in raceways to cormorant predation were around 2 percent, increasing to 40 percent of the stock in large-sized pond production systems. The average annual fish stock loss because of cormorant predation in carp and tench ponds was 19 percent, ranging from 3 percent to 70 percent of the stock.

[3] Detailed information will be published in FAO, 2026 (forthcoming).

National-level aquaculture studies, strategies and plans of European countries such as France, Germany and Poland frequently refer to the economic losses and impact of cormorant predation on aquaculture farm production and incomes (Ministère de la Transition écologique, 2025; MAPA, 2014; AG NASTAQ, 2020). Annual losses to pond aquaculture farmers throughout Europe from fish predation by cormorants are estimated to exceed EUR 250 million. Recreational fishing clubs reported losses of stocked fish in the order of EUR 100 million annually due to cormorant predation. In comparison, heron predation losses to aquaculture and recreational fisheries were estimated at EUR 48 million annually (FAO, 2026 forthcoming).

Reported income losses in pond aquaculture due to predation by cormorants are often the difference between a profitable and loss-making business (Halasi-Kovács *et al.*, 2023; FAO, 2024a, b; FAO, 2026 forthcoming; Engle *et al.*, 2021). Tens of aquaculture farms have closed as a result of cormorant predation, as farms were no longer economically viable. Moreover, many pond aquaculture farmers, and some cage-culture farmers, indicated that they were disinvesting in aquaculture and shifting towards more extensive production practices, as the risks from predation by great cormorants and other protected species (e.g. herons, pygmy cormorants and otters) had become too great (FAO, 2026 forthcoming).

Disinvestment generally occurred after fish farmers had tried a wide variety of measures to reduce predation on their fish stocks. It is estimated that employment in freshwater aquaculture in Europe has declined by 20 percent in the last 20 years (FAO, 2025a), partly as a result of increasing cormorant predation and a lack of compensation for lost fish. Similarly, new investments in freshwater pond aquaculture have stalled as they are considered not viable (Parlier, 2024; Ministère de la Transition écologique, 2025; FAO, 2026 forthcoming), causing a further reduction in rural employment opportunities. The European Commission's campaign to promote aquaculture across the region through the "Aquaculture in the EU: We work for you with passion",[4] which aims to bring aquaculture closer to citizens across the continent, with a strong focus on sustainability, food security, and regional development, cannot succeed without addressing the cormorant issue.

Recreational fishing organizations are widely acknowledged as providing stewardship to the nature resources under their management (Shephard *et al.*, 2023). Many of these organizations have reported that river restoration to maintain and rehabilitate aquatic biodiversity is failing because of predation of fish by cormorants. To reintroduce endangered species such as Atlantic salmon and North Sea houting, support declining stocks of species such as grayling and sustain angling, many lakes and rivers need restocking, which is a labour-intensive and expensive process. The level of predation by cormorants has reached the point where fishing organizations can no longer bear the costs of river restoration and re-stocking. Reduced catches by recreational fishers lead to less participation and reduced income for angling clubs and rural communities, and consequently less effort and expenditure on the stewardship of inland aquatic resources. Fewer members, a decline in tourism and a reduction in license fee income for recreational and commercial fishing are the negative effects associated with high levels of cormorant predation. Some commercial fisheries are also reporting losses and reduced profitability as a result of conflicts with cormorants: this has been observed in Greece (Katselis *et al.*, 2023) and the Baltic Sea (Svels *et al.*, 2019).

[4] https://eu-aquaculture.campaign.europa.eu/index_en

The costs for aquaculture businesses and angling clubs to reduce predation and mitigate the effects of predation on their fish stocks are high; they include: scaring and hunting/culling cormorants, covering ponds/water with nets, restocking, and hours for guarding the ponds and rivers, leading to millions of euros of additional annual expenditure (FAO, 2026 forthcoming; Ministère de la Transition écologique, 2025). Moreover, stressed fish and fish that are seeking shelter from predation do not eat well, causing suppressed growth rates and reduced income for farmers (FAO, 2024b).

Fish farmers have reported stress, depression and health problems as a result of the need to continuously guard their ponds against cormorants and because they are not allowed to take timely action to reduce cormorant predation on their fish. The lengthy and cumbersome administrative approval processes for shooting cormorants mean that approvals for taking action are often received after the damage has been done.

The loss of fish production as a result of cormorant predation also has an impact on the availability of food that provides high quality protein and micronutrients (EIFAC, 1988; Engle *et al.*, 2021; Golden *et al.*, 2021) in Europe. A part of the estimated 365 000 tonnes of fish consumed annually by the great cormorant population in Europe could have been high quality nutritious food for people (FEAP, 2022; FAO, 2026 forthcoming). Given that the average fish and seafood consumption per capita in Europe is some 22 kg per year, the cormorant population in Europe consumes as much fish as 16 million people. The total value of fish consumed by the cormorant population in Europe is estimated at more than EUR 1 billion per year (FAO, 2026 forthcoming).

The import of fish and seafood continues to increase in the European Union and amounted to around 5.9 million tonnes in 2023 (EC, 2024a). Meanwhile, the EU trade balance on these products is negative (approximately EUR 23 billion/year). Europe's food sovereignty is on the political agenda, and the fisheries and aquaculture sectors have an important role to play to reduce dependence on food imports and improve food systems, as per the European Ocean Pact (EC, 2025). The large cormorant population thus presents a barrier to increasing the production of aquatic food systems (aquaculture and fisheries) in freshwater and coastal environments throughout Europe.

Ecosystem services are negatively affected by the growing cormorant population, as aquatic biodiversity and the natural recruitment of fish are compromised. The services provided by aquatic and wetlands ecosystems (including 360 000 ha of man-made fish pond ecosystems) are of high value. Pond farms contribute greatly to preserving the biodiversity of numerous wetland-related plant and animal species, most of them with importance for the NATURA 2000 network. Operating fish ponds contributes to climate resilience through carbon sequestration and water retention, as well as assisting in a circular approach of water management. The loss of pond aquaculture causes a reduction in natural values and biodiversity and excludes a means to achieving climate goals (FAO, 2024a). The financial damage caused by cormorants to aquatic ecosystems has not been investigated sufficiently to provide an estimate here.

2.4 Measures to prevent and avoid serious harm

Numerous reviews of measures to prevent and avoid serious harm by fish-eating birds to inland fisheries and aquaculture enterprises have been undertaken, most of which have been

synthesized under the EU REDCAFE and INTERCAFE projects, and specifically within the Cormorant Toolbox (Russell *et al.*, 2012).

The main measures can be broken down as follows:

- Non-lethal measures:
  - scaring cormorants away from fishery or aquaculture units;
  - exclusion techniques;
  - habitat modification techniques to reduce the availability of fish to cormorants; and
  - fish stock management techniques to reduce the availability of fish to cormorants.
- Lethal measures:
  - lethal measures to reduce cormorant number directly; and
  - reducing reproductive success through egg destruction.

Various measures are deployed in different European countries to different extents, and with varying degrees of success (Russel *et al.*, 1996, 2003, 2008; Russell and Carss, 2022). The choice of measures depends on the scale of the cormorant–fisheries conflict, the type of waterbody or fishery operation impacted, and the potential economic losses incurred.

2.4.1 Non-lethal control measures

Scaring is a well-established method that is applied across Europe with varying degrees of success. Scaring devices cover a range of visual and auditory tools from shooting, gas cannons, fireworks, green lasers, reflectors, bells and the presence of people during daylight hours. In order to be effective, scaring methods need to be continuous, varied, and require considerable manpower and coordinated effort. Scaring, however, moves the predation problem from one fishery or fish farm to another, increasing the food requirement of birds, so is unlikely to be regionally effective. Novel technologies like automated optical recognition combined with artificial intelligence to detect foraging cormorants, drones to scare or oil eggs, shotguns and rifles with silencers, subsonic ammunition, and thermal aiming devices, are being tested by stakeholders and may contribute to the available toolbox.

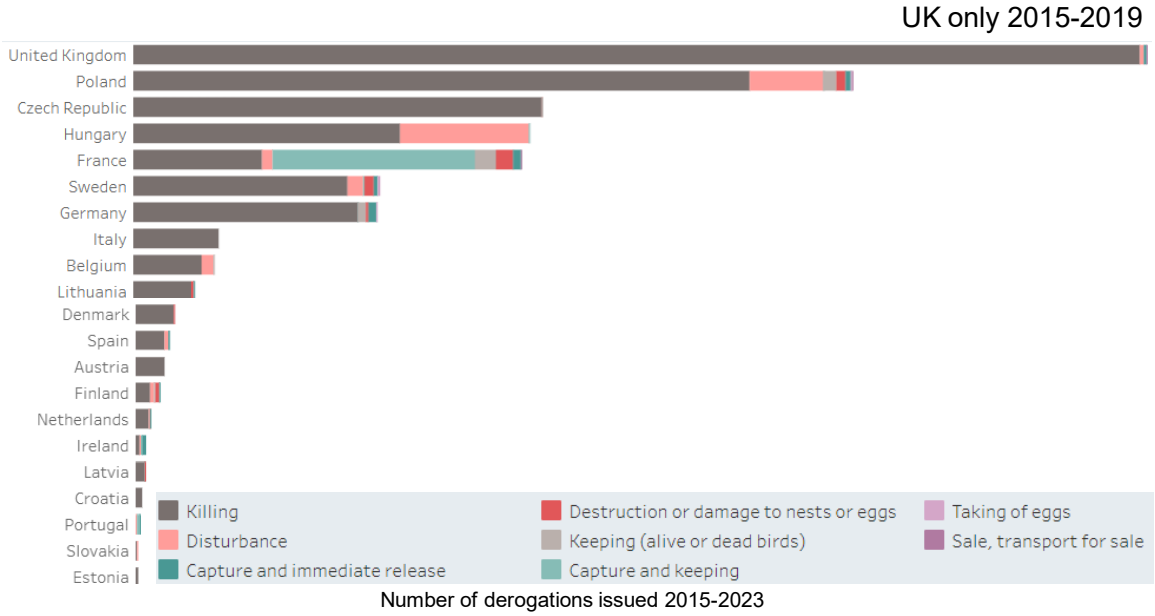
Scaring methods can, and often are, coupled with other exclusion and habitat modification methods that control the access of cormorants to the fish and fisheries. These include wires and netting that prevent cormorants from landing on the water and foraging, or habitat modifications and increasing habitat complexity, which may act as refugia for fish from cormorants. Such measures are only relevant for artificial settings like aquaculture ponds and raceways, stocked ponds, and around fixed fishing gears. While they may be effective at the local level in small waterbodies or small fish farm ponds, they are largely impractical for large waterbodies, especially where they are utilized for angling, navigation or other conservation species, including birds.

These exclusion actions can be supported by modification to the fish stocking protocols, such that larger fish, outside the normal foraging size of cormorants, are stocked at times when cormorant numbers are lowest.

2.4.2 Lethal actions against cormorants in Europe

As with most wild bird species, the deliberate capture and killing, disturbance, destruction of a cormorant's nest or taking its eggs can only be allowed by EU Member States in accordance

with the derogation system of the EU Birds Directive (Article 9). Large-scale shooting of cormorants, under the Article 9 derogation of the Birds Directive, takes place in Denmark, France, Hungary, Poland, Sweden, and parts of Germany, as well as non-EU countries such as Norway and the United Kingdom (Figure 4). The effectiveness of these measures appears to be limited, both locally (as the conflicts continue; FAO, 2024b) and at a pan-European level (the population continues to increase). Similarly, oiling and egg pricking are used in several countries, with a limited impact on controlling cormorant numbers at the European scale. This is in part because some countries, such as the Kingdom of the Netherlands, do not apply the



derogation and lethal control is not permitted. Other countries apply the derogation options but insufficiently to make a difference. As a consequence, these countries potentially act as a source for replenishment of birds in countries where lethal control measures are carried out.

Figure 4. Number of derogations issued under Article 9 of the Birds Directive to control cormorants in Europe: 2015–2023. *Note*: France does not report here.
Source: European Environment Agency (2024a) Overview of derogations and exceptions to species protection across the EU. https://www.eea.europa.eu/en/analysis/maps-and-charts/overview-of-derogations-and-exceptions-dashboards[5]. Cited 20 August 2025.

Eastern European countries outside of the European Union, where cormorants are not protected, and actively managed and hunted, generally experience fewer problems with cormorant predation – and some fish stocks and inland fisheries populations have even improved in recent years (FAO, 2026 forthcoming).

These results suggest that to be effective, lethal control measures need to be applied in a coordinated, well planned manner and include most European countries.

It should be recognized that some management organizations and stakeholders do not endorse culling cormorants under Article 9. BirdLife International and FACE produced a joint

[5] This figure does not include France, as the country did not report on its derogations to the EU. Information on the national system of derogations can be found here: https://www.isere.gouv.fr/Actions-de-l-Etat/Animaux/Faune-sauvage/Les-especes-protegees/Le-Grand-Cormoran

statement in 2008 on the derogation under Article 9, opposing any proposal of listing the cormorant as a huntable species in Annex II of the Birds Directive.[6] The argument is that there is no legal margin for a binding EU-wide framework obliging Member States to reduce cormorant populations under the Birds Directive. BirdLife International and the European Federation for Hunting and Conservation (FACE) stress that it is the right of each EU Member State to decide on the application of derogations of Article 9: they suggest management efforts should focus on following up and promoting the work undertaken by the REDCAFE and INTERCAFE projects. However, as demonstrated, these measures are ineffective at the pan-European scale.

2.4.3 Compensation

Many national authorities take the view that the cost of managing cormorant conflicts should be borne by the stakeholder. Nevertheless, some countries or regions apply or have applied compensation schemes to offset the consequences of cormorant predation for certain stakeholders. These include Czechia, Finland, Lithuania, Romania, Saxony (Germany), Slovakia, and Wallonia (Belgium). Such measures are largely, although not exclusively restricted to fish farms and hatcheries, with losses of fish consumed covered (though not always fully) by compensatory payments. The calculation of compensation payments is seldom rigorous and often simply an approximation based on the farm system and a visualization of cormorant presence. In some countries it is also possible to apply for financial aid for the construction of netting enclosures or scaring programmes. It should also be recognized that compensation payments are not necessarily related to financial losses but often applied to encourage fish farmers to maintain the heritage value of cultural landscapes.

2.4.4 Management plans

Management plans to address the cormorant–fisheries conflict exist in a number of European countries within the European Union (including, Austria, Denmark, France, Ireland, Italy, Slovakia and Sweden), and Norway, Switzerland and parts of the United Kingdom outside the European Union (Gerdeaux, 2005; Cowx, 2015) – yet these are not coordinated between countries. The plans are generally related to the control of bird depredation on open waterbodies, while in Austria and Switzerland the management plans target the control of birds exploiting river fisheries (mostly scaring, with culling as a last resort). This lack of coordinated planning coupled with inconsistency over culling populations between countries has implications for managing the cormorant–fisheries conflict. Although transnational cormorant management plans are generally lacking in Europe, the feasibility of such an approach to address the conflict is possible, as can be seen from the implementation of cormorant management in North America on lakes Huron and Ontario (U.S. Fish and Wildlife Service, 2003; Fielder, 2008, 2010). The latter shows that multifaceted, large-scale plans have proven successful to reduce the predation pressure from cormorants. Such plans are often structured with alternatives, which are introduced progressively and only implemented if the previous stage has not been successful: 1) no intervention; 2) scaring birds (without shooting); 3) limiting local damage at commercial fish ponds; 4) strictly monitored reduction of

[6] Joint Statement of BirdLife International and FACE on Cormorants *June 2008:* https://circabc.europa.eu/ui/group/3f466d71-92a7-49eb-9c63-6cb0fadf29dc/library/df4389c7-8e4b-44cf-87e9-dba40a27e1ec?p=1&n=10&sort=modified_DESC

resources; 5) reduction of regional populations; and 6) opening up lethal control as a last alternative.

2.4.5 Predation risk management success

Responses from a questionnaire circulated to EIFAAC member countries indicate that various European countries have applied the range of measures outlined in Section 2.4.1-2.4.4 to different levels, and have experienced varying but often limited success (FAO, 2024b).

Some fish farms have installed UV-resistant netting over hatchery/nursery tanks, raceways and small ponds i and angling clubs have covered small stretches of rivers with netting. Other farms have installed fishing lines across ponds, where these are too large to cover with nets, but all with limited success. Many angling clubs have increased their pond depth, introduced more water plants (to reduce sighting and accessibility of fish by cormorants), floating covers, or "fish forests", which provide shelter against predation. Others have introduced fenced areas in their waters, also covered by nets, with mesh sizes that are too small for cormorants, but large enough for small fish. These provide refuge for some fish stocks but do not address the underlying problem.

Bird-scaring devices with predator decoys, sudden noises, kites, balloons, aluminium strips, moving objects and laser lights are also used by fish farmers and angling clubs, but these have proven to be short-term solutions, as birds seem to get used to them. Watch-keeping and chasing cormorants away from ponds and angling areas and stocking are now common practices but require lots of time from fish farmers and volunteers.

Preventive measures have been extensively applied under Article 9 (derogations) of the EU Birds Directive, include culling (shooting), destruction of nests, oiling of eggs and disturbance of nests during breeding season (See section 2.4.2). However, the application and review processes is often complex and approvals for such measures often come too late, when damage has already been done. There is apparently a high degree of variation in the way each Member State reads Article 9, from strict "no implementation" to easy and fast provision of permissions to regulate.

Other frequently applied risk mitigation strategies include an increase in the stocking of fry and fingerlings, stocking with larger fish, stocking in spring instead of autumn, or just stop stocking and maintain a fish density that is very low, making a water area less attractive for cormorants. These can be expensive and can make the water body less attractive to angling.

Aquaculture crop insurance, including cover of damage caused by predators, is available in most European countries. Many marine cage-culture operations are also insured. However, the insurance premiums are often too high for freshwater pond farmers (van Anrooy *et al.*, 2022). Aquaculture crop insurance premium subsidies are not provided by European governments.

Financial compensation for damage caused by cormorants to fish stocks in aquaculture exists in a few European countries, such as Belgium, Czechia, some regions in Germany, Latvia, and Slovakia. However, the compensation paid is partial, and certain countries that paid compensation in the past no longer do so. There is no financial compensation for lost fish as a result of predation by cormorants for angling clubs. Limited compensation was paid in the past to commercial (inland) fisheries in a few countries, but this appears to have stopped. A few angling clubs involved in the protection of aquatic biodiversity have received financial

support for preventive measures, such as netting and the construction of fish forests/shelters. The existing financial compensation and prevention systems for the predation of fish by cormorants are few, inadequate in scope and insufficient in terms of funds available.

2.4.6 Conclusions

The main conclusion is that no single management intervention is effective at mitigating the problems created by great cormorants. Shooting (on a large scale) does not appear to be a viable option unless the numbers are reduced across the entire European distribution range. Continuous dispersal and turnover of birds is a result of incoherent action from countries that do not adopt intervention measures. Controlling local bird population density by destroying nesting areas and oiling eggs is, again, only likely to have a limited and short-term impact, if not carried out in a coordinated at a regional scale, notably by targeting the main breeding colonies in northern Europe. Similarly, scaring methods (human disturbance, laser guns, and sound and taste aversion) do not appear to be effective because they must be carried out on a continuous basis. Moreover, birds become accustomed to the methods employed, and the problem is potentially passed on to other fisheries. Exclusion devices are only viable on some aquaculture facilities and are not feasible in open fisheries because they restrict or prohibit fishing activities. Some success has been achieved with fish refuge devices (McKay *et al.,* 1999; Russell *et al.,* 2003, 2008; Orpwood *et al.,* 2010), but again only at a local scale. These features have included artificial reefs or underwater, fenced zones that constrain access to fish-eating birds, but they are not suitable for rivers where they can cause localized flooding problems.

The solution to the problem of bird depredation is therefore complex and multifaceted. It is unlikely that legislation to protect birds will be changed in the short term, and scientific evidence/advice seems unable to provide easy solutions. Furthermore, irrespective of the physical measures required to reduce the problems, the conflicts that now exist are deep-rooted, societal issues and will not be resolved unless all stakeholders are involved in the debate and solution.

2.5 Policies and legislation relevant for management

A range of international and regional instruments, EU directives, EU policies and national legislation affect the management and conservation of the great cormorant. The most important of these are discussed below.

2.5.1 International instruments

The **Convention on the Conservation of Migratory Species of Wild Animals (CMS)** of 1979 entered into force in 1983. The CMS (also called the Bonn Convention) contains appendices for endangered migratory species (Appendix 1) and migratory species conserved through Agreements (Appendix 2). The great cormorant does not appear in these appendixes.

Nevertheless, the Fourth Conference of the Parties (1994) issued Recommendation 4.1 on "Conservation and management of cormorants in the African Eurasian region", which recognized the strong increase in the great cormorant population and requested to maintain a favourable conservation status for this species. The same recommendation requested that members carry out research on the assessment of damage caused by cormorants to fishers' interests, and on the effectiveness of scaring techniques and the development of other techniques to protect fisheries. However, implementation was limited to some projects. At the Twelfth Conference of the Parties (2017) it was proposed to develop an action plan for the great cormorant in the African-Eurasian Region, but the parties did not agree to this proposal.

The 1995 **Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA**) entered into force in 1999. Most European countries have ratified this agreement. The great cormorant (*P. c. carbo*) is included in the list of waterbird species to which the agreement applies. In the development of action and/or management plans under AEWA, priority species are listed in Appendix I of the CMS, as threatened species according to the IUCN Red List, and with populations of less than 10 000 individuals. The large population sizes of great cormorant would not justify an AEWA action plan, as plans are made for population recovery purposes.

Under the AEWA the great cormorant (*P. c. carbo* and *P. c. sinensis*) has three populations listed with distribution in Europe. Currently all three have the status: Populations numbering more than around 100 000 individuals, which could benefit from international cooperation. The AEWA has provisions to address the management of overabundant and conflict-raising species. This has been applied with the implementation of International Single Species Management Plans for the Svalbard pink-footed goose, greylag goose, and barnacle goose. The first two are huntable under the EU Birds Directive, while the last one is not. The AEWA has not been given mandate by the parties to the agreement to work on the great cormorant. Nevertheless, this cormorant management plan framework largely complies with the AEWA international single and multispecies management plans format and guidelines (AEWA, 2021).

2.5.2 European and European Union legal and policy instruments

The **Convention on the Conservation of European Wildlife and Natural Habitats** (Bern Convention, 1979), of the Council of Europe, entered into force in 1982 (CoE, 2025). All members of the Council of Europe have ratified the Bern Convention, which governs the conservation of fauna in Europe, including the great cormorant. Article 2 of the Convention text states:

> The Contracting Parties shall take requisite to maintain the population of wild flora and fauna at, or adapt it to, a level which corresponds in particular to ecological, scientific and cultural requirements, while taking account of economic and recreational requirements and the needs of sub-species, varieties or forms at risk locally.

Phalacrocorax carbo carbo and *P. c. sinensis* are not included in Appendix II of the Bern Convention concerning special protection of the wild fauna species specified. The species is covered under the Convention's Appendix III protection regime, which stipulates that:

> Article 7.1. Each Contracting Party shall take appropriate and necessary legislative and administrative measures to ensure the protection of the wild fauna species specified in Appendix III.
>
> Article 7.2. Any exploitation of wild fauna specified in Appendix III shall be regulated in order to keep the populations out of danger, taking into account the requirements of Article 2.

The EU Directive on the Conservation of Wild Birds (Birds Directive, 2009) relates to the conservation of all species of naturally occurring birds in the wild state in the European territory of EU Member States. It covers the protection, management and control of these species, and lays down rules for their exploitation. The Directive covers birds, their eggs, nests and habitats. The current Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds, is an amendment of the 1979 Directive 79/409/EEC (EC, 2009).

Like the Bern Convention, the Birds Directive requires EU Member States to take measures to maintain the population of the species at a level commensurate to ecological, scientific and cultural requirements, while taking economic and recreational requirements into account, or alternatively to adapt the population of these species to that level (Article 2).

Species listed in Annex I of the Birds Directive are subject to special conservation measures concerning their habitat to ensure their survival and reproduction in their area of distribution (Birds Directive, Article 4). *Phalacrocorax carbo carbo* and *P. c. sinensis* have not been listed in Annex I to the Birds Directive since 1997 (EC, 1997a,b). This means the obligation to take special conservation measures such as designation of special protection areas does not apply to these species; however, they do fall under the general protection regime provided by the Birds Directive.

This general protection regime can be found in Article 5 (without prejudice to Article 7 and Article 9) setting out the required measures to be taken by the Member States:

> **Article 5**: Without prejudice to Articles 7 and 9, Member States shall take the requisite measures to establish a general system of protection for all species of birds referred to in Article 1, prohibiting in particular:
>
> a) deliberate killing or capture by any method;
> b) deliberate destruction of, or damage to, their nests and eggs or removal of their nests;
> c) taking their eggs in the wild and keeping these eggs even if empty;
> d) deliberate disturbance of these birds particularly during the period of breeding and rearing, in so far as disturbance would be significant having regard to the objectives of this Directive; [and]
> e) keeping birds of species for which the hunting and capture of which is prohibited.

Article 7 applies to species listed under Annex II to the Directive (species that may be hunted under national legislation). Paragraphs 2 and 3 under Article 7 state that

> The species referred to in Annex II, Part A may be hunted in the geographical sea and land area where this Directive applies [and] […] The species referred to in Annex II, Part B may be hunted only in the Member States in respect of which they are indicated.

Neither of the two parts under Annex II currently list *P. c. carbo* and *P. c. sinensis* and therefore this annex does not apply for this species.

Article 9 allows Member States to derogate (in other words, *to suspend under certain circumstances*) from the basic prohibitions in Articles 5–8 as follows:

> 1. Member States **may derogate** from the provisions of Articles 5 to 8, where there is **no other satisfactory solution**, for the following reasons:
>   a) in the interests of public health and safety, — in the interests of air safety — **to prevent serious damage to crops, livestock, forests, fisheries and water** — for the protection of flora and fauna;
>   b) for the purposes of research and teaching, of re-population, of re-introduction and for the breeding necessary for these purposes;
>   c) to permit, under strictly supervised conditions and on a selective basis, the capture, keeping or other judicious use of certain birds in small numbers.
> 2. The derogations referred to in paragraph 1 **must specify:**
>   a) the species which are subject to the derogations;
>   b) the means, arrangements or methods authorized for capture or killing;

c) the conditions of risk and the circumstances of time and place under which such derogations may be granted;
d) the authority empowered to declare that the required conditions obtain and to decide what means, arrangements or methods may be used, within what limits and by whom;
e) the controls which will be carried out.

3. Each year the Member States shall send a **report to the Commission** on the implementation of paragraphs 1 and 2.
4. On the basis of the information available to it, and in particular the information communicated to it pursuant to paragraph 3, the Commission shall at all times ensure that the consequences of the derogations referred to in paragraph 1 are not incompatible with this Directive. It shall take appropriate steps to this end.

Over the 2015–2023 period, the great cormorant was the species with the second-highest number of derogations under Article 9, after the house sparrow (*Passer domesticus*). In terms of the type of derogations, *P. carbo* (both subspecies included) is the species for which most derogations for deliberate killing were sought: 86 percent of the total number of derogations related to the great cormorant (Figure 4). Moreover, 22 EU Member States (23 including the United Kingdom) sought derogations for killing cormorants, largely with the purpose of preventing serious damage. The nearly 10 000 derogations sought for great cormorants over the 2015–2023 period (Figure 4) indicate the considerable problems caused by the species.

The European Commission has repeatedly stated that the tools made available by the current interpretation of Article 9, as laid out in a guidance report from 2013 (EC, 2013b), are sufficient to manage the cormorant population and mitigate local conflicts. Nevertheless, many of the requests by fisheries and aquaculture sector stakeholders for permission to kill, oil eggs or destroy the nests of great cormorants do not obtain approval from national environment agencies as their internal policies aim to limit derogations, and approvals are only given after large-scale damage has been done. The varied ways in which Article 9 is used in different countries causes additional conflicts, and cases about permission to regulate cormorants often end in national courtrooms.

The **EU Directive on the conservation of natural habitats and of wild fauna and flora (Habitats Directive, 1992)** aims to contribute to ensuring biodiversity through the conservation of the natural habitats and of wild fauna and flora in the European territory of the Member States (Council Directive 92/43/EEC) (EC, 1992) . Article 12 [Protection of species] of this directive is similar to Article 5 of the Birds Directive.

Article 16 of the Habitats Directive offers the possibility of derogation if

> [T]here is no satisfactory alternative, and the derogation is not detrimental to the maintenance of the populations of the species concerned at a favourable conservation status in their natural range:
>
> a) in the interest of protecting wild fauna and flora and conserving natural habitats;
> b) to prevent serious damage, in particular to crops, livestock, forests, fisheries and water and other types of property;
> c) in the interests of public health and public safety, or for other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences[.]

Great cormorants are not mentioned in the Habitats Directive. Derogations under Article 9 of the Birds Directive should be used when cormorant predation is impacting "natural habitat areas" (Annex I), "species requiring special areas of conservation" (Annex II) and "Strictly protected species" (Annex IV). There are 65 fish species listed under the annexes of the Habitats Directive. A number of these, such as Atlantic salmon, Danube salmon, houting, marble trout, grayling, barbel and nase, are negatively impacted by predation from cormorants (see Section 2.2).

The **EU framework for community action in the field of water policy (Water Framework Directive)** (EC, 2000) (Directive 2000/60/EC) is also a relevant piece of legislation in relation to the problems caused by great cormorants. The Water Framework Directive requires EU Member States to protect and, where necessary, restore waterbodies to good status, and to prevent deterioration. Good status means both good chemical and good ecological status. Native fish are foundational to aquatic food web stability. Predation by cormorants can significantly impact fish fauna, species composition and fish population abundance, and changes the age structure in fish communities, as well as the reproductive capacities of protected fish species throughout Europe. Impacts like predation by cormorants must be – but are not presently – considered when assessing the WFD-waterbody status based on the biological quality element "fish fauna".

The cormorant's conflicts with fish, fisheries and aquaculture also have an impact on the implementation and outcomes of a range of other elements of EU policy and legal frameworks, such as:

- The **European Green Deal** (EC, 2019), which states that "European farmers and fishermen are key to managing the transition", and that it "is essential to preserve and restore biodiversity in lakes, rivers, wetlands and estuaries, and to prevent and limit damage from floods." Fishers and fish farmers therefore have a key role to play.
- **EU Biodiversity Strategy for 2030: Bringing nature back into our lives** (EC, 2020a), regarding restoring the good environmental status of marine ecosystems and restoration of freshwater ecosystems.
- **EU Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system** (EC, 2020b) aims, among other things, to "ensure food security in the face of climate change and biodiversity loss"; it emphasizes the creation of economic returns and an accelerated shift to sustainable fish and seafood production.
- **Strategic guidelines for a more sustainable and competitive EU aquaculture for the period 2021 to 2030** (EC, 2021), which recognizes that: "For freshwater aquaculture in particular, predators and drought pose also a challenge in terms of profitability." The strategy also states that "the environmental performance of the EU aquaculture sector can be further improved by the management of predators."
- **Common Fisheries Policy** (EC, 2013a) which aims to "ensure that fishing and aquaculture activities are environmentally sustainable in the long-term and are managed in a way that is consistent with the objectives of achieving economic, social and employment benefits, and of contributing to the availability of food supplies".
- The Communication of the Commission on **Safeguarding food security and reinforcing the resilience of food systems** (EC, 2022) recognizes the importance of the long-term availability of affordable food (including fish) for the European population, sustainable management of fish stocks and reducing the dependence on imports.

- **Nature Restoration Regulation** (EC, 2024b), which aims to contribute to "(a) the long-term and sustained recovery of biodiverse and resilient ecosystems across the Member States' land and sea areas through the restoration of degraded ecosystems; (b) achieving the Union's overarching objectives concerning climate change mitigation, climate change adaptation and land degradation neutrality; (c) enhancing food security; and (d) meeting the Union's international commitments.

2.5.3 European Parliament and international resolutions

The **European Parliament resolution** of 4 December 2008 on the adoption of a **European Cormorant Management Plan** [aimed] to minimize the increasing impact of cormorants on fish stocks, fishing and aquaculture (2008/2177(INI)). In this resolution the European Parliament called on the European Commission (among others) to submit a cormorant population management plan in several stages. Coordinated at the European level, it should seek to integrate cormorant populations into the environment as developed and cultivated by man in the long term, without jeopardizing the objectives of the EU Birds Directive or Natura 2000 with regards to fish species and marine and freshwater ecosystems (paragraph 7).

The **European Parliament resolution** of 12 June 2018 **towards a sustainable and competitive European aquaculture sector: current status and future challenges** (2017/2118(INI)), reiterated

> the views it has already expressed in its resolution on the adoption of a European Cormorant Management Plan, and points out that reducing the harm caused by cormorants and other birds of prey to aquaculture farms is a major factor in production costs, and thus for their survival and competitiveness; calls on the Member States to apply the current exceptions in the case of herons and cormorants and to the Commission to review the state of conservation of the otter. (paragraph 90)

The **European Parliament resolution** of 4 October 2022 on **striving for a sustainable and competitive EU aquaculture: the way forward** (2021/2189(INI)) acknowledged that the population of cormorants has seen a massive increase, and that this increase is causing serious damage to many marine sectors, including aquaculture. The resolution calls on the Commission

> to prepare a proposal for an EU great cormorant management plan that could properly and definitively address the problem the aquaculture sector has been facing for many years, based on the best available scientific advice and experiences and practices already tested in Member States; urges that the plan be designed for the effective mitigation and control of their effect on aquaculture farms, with a view to reducing their economic, environmental and social impact on production and biodiversity; highlights that the plan should include a list of eligible measures on preventive coexistence solutions and adequate compensation for losses and measures, financed with EU or national funds; insists that financial support for tailor-made research aimed at finding and testing preventive measures is key, but also for allowing proper monitoring, including recording and analysing the effects of the measures undertaken; calls on the Member States to implement those measures on a local case-by-case basis and report to the Commission every year on the implementation of the plan, including the effectiveness of the measures chosen; calls on the Commission to evaluate the EU great cormorant management plan every five years and report to Parliament; urges the Commission to prepare, as an immediate action, a guidance document on how to apply derogations provided for in Article 9 of the Birds Directive, and to assess the need to modify the current legislation

where preventive measures have proven insufficient and the financial and social impact does not allow for coexistence solutions, according to the best scientific advice (paragraph 56).

The **IUCN/Wetlands International Cormorant Research Group** responded in an Open letter to the Members of European Parliament about the initiative report (2021/2189(INI)), and in particular its paragraph 56 on cormorant management (IUCN Wetlands International Cormorants Research Group, 2022). IUCN/Wetlands International asked to promote the implementation of existing solutions and to ensure conflicts were solved by following up scientific research. The **European Inland Fisheries and Aquaculture Advisory Commission** (EIFAAC) welcomed the European Parliament resolution of 4 October 2022 in an advisory note on striving for a sustainable and competitive EU aquaculture: the way forward (2021/2189(INI)) (EIFAAC, 2022). It offered its expertise to coordinate the development of a European-wide great cormorant management plan to harmonize measures and regulations aiming to reduce the population of cormorants in Europe to a sustainable and manageable level.

In 2022, EIFAAC also issued a Resolution on measures to support the protection of vulnerable and endangered fish species from unsustainable predation from cormorants (EIFAAC/31/2022/3) which called, *inter alia*, for the preparation of a European-wide cormorant management plan to harmonize measures and regulations aiming to reduce the damage to fish stocks in Europe.

In addition to the above-mentioned international and regional instruments, various European countries have adopted national-level measures to reduce the impact of cormorant predation on fish, fisheries and aquaculture (including the establishment of damage reporting and compensation schemes). These national measures have not been as successful as hoped given the migratory nature of the cormorants, where a superabundance of the predators results in a "sink situation", with new birds entering an area as it becomes "vacant" as a result of local restrictive regulations controlling great cormorants in adjacent areas.

2.6 Management issues

Interactions between birds and fish/fisheries have long been prevalent within both marine and freshwater ecosystems (see Annex 2). In recent years, however, there has been increasing concern and lack of accountability with regard to the impact of expanding populations of fish-eating birds on wild fish populations and aquaculture enterprises. This has led to growing concerns about, on the one hand, the conservation of birds, and on the other the sustainability of fisheries resources for both commercial and recreational exploitation and aquaculture development, alongside the protection of native aquatic biodiversity.

Conflicts involving cormorants have been studied in detail in Europe through the EU REDCAFE/INTERCAFE COST Action projects and FRAP (Behrens *et al.,* 2008), but also at a national level, where multiple scientific projects have sought to resolve or mitigate the conflicts (see Section 2.2 and Section 2.4). Conflicts primarily arise from competition for the same resources, but the conservation of fish populations has become increasingly important, especially as many fish stocks have declined and, critically, non-fished species have become vulnerable. The effects of predation are amplified in areas where fish stocks are already under pressure from deteriorating habitats. Summaries of these conflicts and actions are highlighted below.

Coastal and lake fisheries: Cormorants are catching fish directly from nets, removing valuable catch, while also damaging other (large) fish and nets. Solutions have been to use cover nets in pound net fisheries and regulating/killing cormorants in proximity of the nets. Cover nets have been of limited effectiveness, however, given that cormorants learn to swim under the nets (the same way as fish enter). The nets are also expensive and laborious to use.

Aquaculture: Modern recirculation aquaculture systems (RAS) and raceway systems can be protected by nets, strings or by moving indoors. However, traditional pond aquaculture remains open to cormorants and the problem cannot be solved by covering ponds with nets as cormorants learn to walk in under the nets. The same is true for the many put-and-take lakes/ponds, where cormorants can cause great damage to the stocked fish by eating smaller fish and injuring large fish. Aquaculture producers that use cages in coastal areas, lakes and reservoirs, have often covered their cages with nets against fish escapes and predation by cormorants. However, at maintenance and harvest times many cage fish farmers encounter predation by groups of cormorants.

Recreational fishing: When cormorants forage in rivers, the main target fish species are often eaten in very high numbers, leaving rivers with very little fish to catch. Grayling and salmonid (trout and salmon) populations can therefore be depleted by a relatively small number of birds. In many rivers, the total biomass of fish has dropped from 150–500 kg/ha to 10–15 kg/ha (Jepsen *et al.*, 2018; Görlach and Müller, 2005; Görner, 2006; Steffens, 2010). This means that fishing in rivers with such low stocks is no longer attractive and feels ethically wrong. Management measures include stocking more and larger fish, and to organize "hunting/scaring patrols" along rivers. In larger lakes, the situation is less pronounced, but cormorants have been shown to remove a high proportion of large perch, mid-sized pike, trout and pikeperch in lakes in Denmark, France, the Kingdom of the Netherlands and Sweden, all of which makes recreational fishing less attractive.

Conservation: Some fish species that used to be very abundant, like the grayling, salmon and eel now have a very bad conservation status, with generally negative trends, and some populations locally extinct. When investigating the causes, cormorant predation remains a key contributing factor that precludes the capacity for some fish populations to recover when other stressors are addressed. Thus, species of freshwater fish protected under the Habitats Directive and listed as vulnerable or threatened in the IUCN Red List are under increasing pressure from cormorant predation and, to date, management responses have been very limited. Furthermore, many species are now vulnerable and contribute towards many waterbodies not achieving good ecological status or potential under the EU Water Framework Directive. It is clear that many local or generic factors other than predation can cause fish populations to decline. Most of these factors are described by the IUCN/SSC specialist freshwater fish group (https://freshwaterfish.org/), but with little documentation about the size of impact, and cormorant predation is largely overlooked.

Although the most frequently reported problems with cormorants are related to fisheries, guano (faeces) produced by birds at breeding and roosting sites is known to eventually kill trees — which, when alive, may have commercial or amenity value. Guano production can also alter the local fauna and flora communities, which can have conservation consequences for some rare or localized plant and animal species, especially amphibians and other bird species that depend on fish for their food. In some places the presence of relatively large aggregations of cormorants in colonies or roosts, and the associated noise and smell, are degrading the local land/waterscapes.

The conflicts involving fish protection and cormorants have been intense in most EU Member States and across the rest of Europe for decades, and they remain that way despite many protective and responsive measures, including culling (in line with the EU Birds Directive's Article 9 on derogation). There are only a few well-documented examples of successful attempts to reduce avian predation pressure (such as Lake Neuchâtel in Switzerland [Vogel *et al.*, 2010]; and Lake Ontario, USA; [Johnson *et al.*, 2001]). Since completion of the European-Union-funded REDCAFE and INTERCAFE COST-Action projects (2008), conflicts have escalated further and numerous new reports of damage to wild fish populations have been published (see Section 2.2 and Section 2.3). This has changed the nature of the conflicts, at least in part, from commercial and recreational fisheries perspectives to species conservation, balancing the needs of how to meet conservation requirements for species regarded as being in conflict. Yet the existing tools to mitigate conflicts (i.e. INTERCAFE TOOLBOX [Russell *et al.*, 2012]) have not proved effective, in their current application, to reduce the ongoing levels of conflicts.

A recent EIFAAC survey (FAO, 2024b), including responses from 26 European countries, revealed a continued high level of conflict between cormorants and biodiversity conservation, recreational fisheries, commercial fisheries and aquaculture. The number of conflicts between cormorants and recreational fisheries and biodiversity conservation have also increased rapidly. The survey showed that 70 percent of respondents agreed that a European-wide cormorant management plan is needed to control the increasing cormorant population.

3. Plan principles, overall goal and specific objectives

3.1 Nature of the conflict

In the past 30 years the number of breeding and overwintering great cormorants has increased dramatically across Europe, creating conflict between bird conservation and fisheries and aquaculture. In many European countries, great cormorant populations negatively impact fish stocks and reduce catches, putting pressure on fisheries and aquaculture activities and generating socioeconomic conflicts. Although the great cormorant is protected under Directive 2009/147/EC (Birds Directive), there is an urgent need to resolve the cormorant–fish conflict in a manner that is proportionate to the damage caused, recognizing that localized action has failed to resolve what is a pan-European issue.

3.2 Overall goal

The overall goal of the Framework for a *European Management Plan for the Great Cormorant (framework CMP)* is:

> **To achieve a fair balance between pan-European conservation of the great cormorant, with the sustainable use and protection of aquatic biodiversity, fish populations, fisheries and aquaculture interests, including the socioeconomic well-being of communities dependent on fisheries and aquaculture**.

3.3 Guiding principles

The framework CMP is guided by the following principles.

Sustainability	Ensure the long-term coexistence of cormorants, fish populations, and human livelihoods by maintaining both an ecological balance and the economic viability of fisheries and aquaculture.
Evidence-based management	Where possible, decisions will be based on robust scientific data, including population dynamics, migration patterns, ecological and socioeconomic data and information.
Recognizing alternative issues	Due consideration is given for all environmental, social and economic pressures constraining fish and fisheries recovery.
Adaptive management	Use flexible and dynamic approaches to address evolving challenges, incorporating regular monitoring and stakeholder feedback.
Collaboration and coordination	Promote cooperation and continuous dialogue between European countries, as well as bird, fisheries, conservation and animal welfare organizations and other stakeholders.
Compliance with policies and legal frameworks	Align management actions with EU directives (e.g. Birds Directive, Habitats Directive, Water Framework Directive), international treaties (e.g. Bern Convention) and the national legislation and policies of European countries.
Minimization of conflicts	Balance the needs of fisheries, aquaculture, biodiversity conservation (including fish and birds), and societal interests to reduce conflicts between stakeholders.
Ethical considerations	Apply management measures with the lowest adverse impacts on animal welfare.

Precautionary approach	Address potential risks proactively, ensuring that management measures do not cause unintended ecological or economic harm.
Environmental stewardship	Conduct management interventions in a responsible manner with care for the environment and in accordance with key stakeholder interests.

3.4 Objectives

This Framework for a European management plan for the great cormorant (framework CMP) aims to mitigate, compensate and, where possible, reconcile cormorant–fish conflicts. It focuses on the biological dimension of maintaining the great cormorant's conservation status,[7] while recognizing the social and economic consequences of cormorant–fish interactions. The plan is also expected to contribute to the long-term viability of inland and coastal recreational and commercial fisheries and aquaculture enterprises in Europe, in addition to the implementation of European and national food security and rural development policies and strategies.

The objectives of the framework CMP, based on consultation with national authorities and key stakeholders in 2024 and 2025, are to:

1. Maintain up-to-date status and trend data on the distribution and abundance of great cormorants (breeding and overwintering), and inland and coastal fish populations and aquaculture, and understand the reasons for changes in the population abundance of both cormorants and fish stocks.
2. Improve the understanding, documentation and quantification of the ecological, economic and social impacts of cormorants on inland and coastal waters and their associated aquatic biodiversity, fisheries and aquaculture.
3. Provide a plan of action to protect vulnerable fish species against predation by great cormorants, contributing to achieving the EU Water Framework Directive, Habitats Directive, and the European biodiversity targets.
4. Adapt, update and provide a framework to implement preventative measures to reduce and mitigate the impact of cormorant predation on fisheries and aquaculture, and harmonize compensation schemes.
5. Provide a framework to facilitate the use of derogations to authorize the controlled culling of great cormorants, while maintaining the species' good population status across its distribution range in Europe.
6. Promote cross-border collaboration and the harmonization of monitoring, management and policy frameworks.
7. Provide a central, open-access, fully moderated platform for engagement with all key stakeholders.

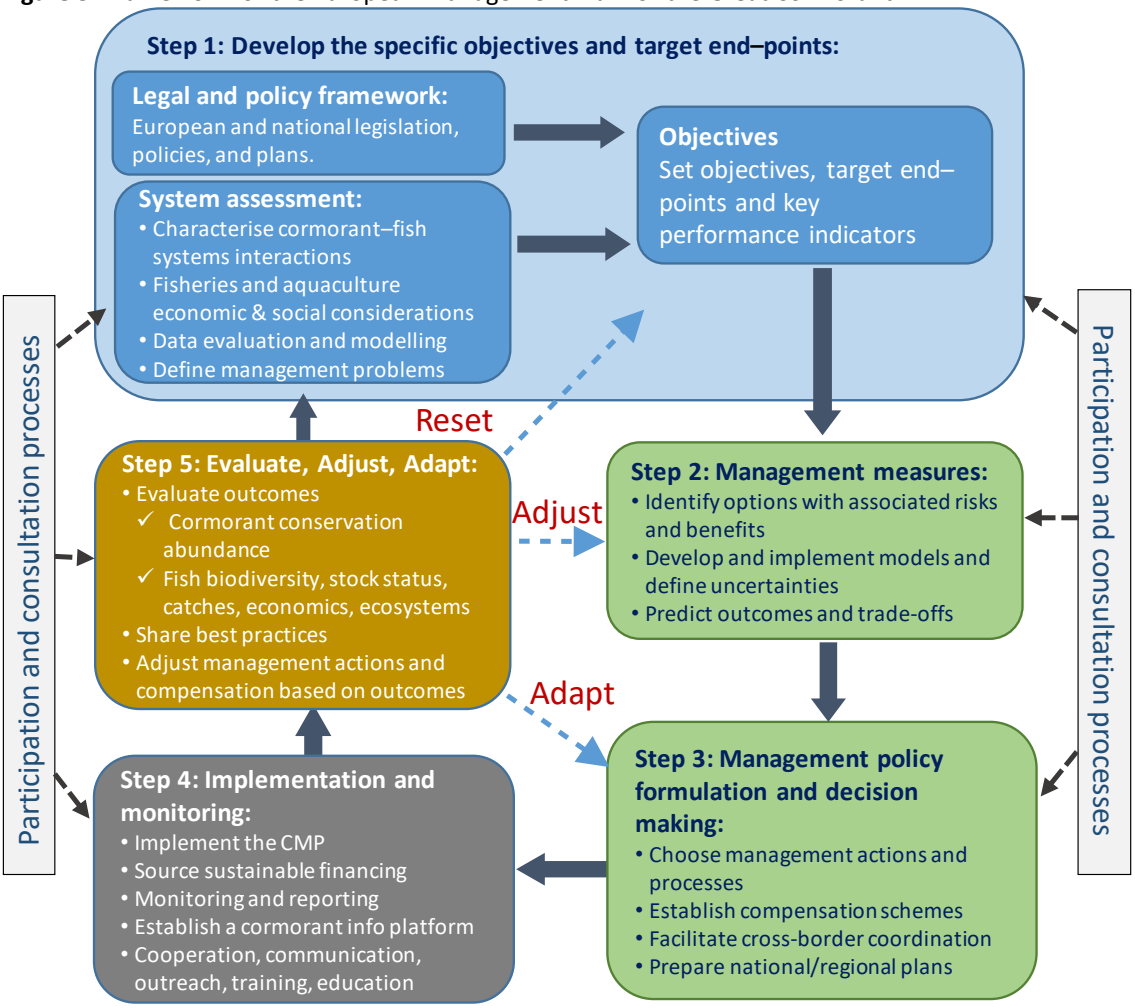
[7] AEWA and the EU Habitats Directive apply the term "Favourable Conservation Status", while the EU Birds Directive uses "Good Population Status". Article 7 of the Bern Convention refers to restoring "satisfactory population levels".

4. European management planning framework for the great cormorant

4.1 Management planning framework

The Framework for a European management plan for the great cormorant (framework CMP) adopts an adaptive approach and involves a series of steps: 1) assessment of the status of cormorant–fish interactions, related economics, and the underpinning policy drivers, objectives and target end points; 2) formulating management measures; 3) choosing a course of action; 4) implementing management actions, monitoring changes in cormorant, fish, aquaculture and ecosystem characteristics, region-wide cooperation, and compensation for damages to fisheries and aquaculture; and 5) evaluation and adjustment of the plan's end-points and goals for the future (Figure 5). Explicit specifications and documentation are required at each step, supported by stakeholder participation and consultation.

Figure 5. Framework for the European Management Plan for the Great Cormorant



The framework CMP provides a process to quantify the problems, stakeholder motives and desires, goals and objectives, and enables structured decision-making and adaptive management through the Evaluate-Adjust-Adapt-processes.

4.2 Step 1: Develop the specific objectives and target end-points of the management plan

4.2.1 Characterize cormorant, fisheries and aquaculture systems

The first step is to formally characterize the interactions of cormorant–fish systems, and define the management problems and conflicts. Sufficient information exists to define and quantify these problems (see Section 2), and develop an appropriate action plan, but the information should be updated continuously and used to revise any proposed actions. Data collection methods, data evaluation and modelling processes, should be agreed by key stakeholders and, where necessary, approved by the proposed Cormorant Management Advisory Group (see Section 4.5.2 and Annex 4).

The following actions are needed to reinforce the information and account for changing conditions as the framework CMP is enacted.

- Establish and operate an open-access, **pan-European system for monitoring** and updating cormorant population trends in distribution and abundance, breeding sites, and migration routes, and factors contributing to their range expansion.
- **Build on and standardize data collection and monitoring protocols** for cormorants, fish and fisheries across European countries and agencies, for consistency and comparability. (This action would build on the ongoing ProtectFish project.)
- **Review the status and trends in fish populations across Europe** related to achieving WFD and HD objectives in the face of cormorant predation. (This action would expand the ProtectFish project work to more European countries.)
- **Establish scientifically informed, favourable reference values and ranges to define 'good' population status of great cormorant across its European range, in addition to thresholds** that trigger the implementation of non-lethal deterrents and lethal control measures (in compliance with the Birds Directive and national legal protections).
- Continue data collection and **monitoring of the ecological, economic and social impact**s of cormorant predation, as well as other pressures on fish stocks in inland and coastal waters and fish farms; offer an evaluation against other threats to fish biodiversity and population status.
- **Establish a central database** of cormorant abundance, breeding colonies, population dynamics, migratory patterns and predation impacts. These inputs should engage with existing databases that hold appropriate data such as the European Breeding Birds Atlas. The cormorant data will be complemented by national fish monitoring data collated under the WFD and HD, or other non-EU national monitoring requirements.

4.2.2 Setting objectives

The objectives for the plan, as defined in Section 3.4, should be aligned to quantitative targeted end-points for the size of the European great cormorant population. There is a need to **establish scientifically derived reference and end-points for the abundance and distribution of the European cormorant population**. These should maintain good population status for the species, but also align with attaining a favourable conservation status of fish species across Europe where cormorant predation is a known pressure, thus improving the status of fish populations and viable fish farming enterprises (see Section 4.3). These end-points will be developed and agreed upon by the Cormorant Management Advisory

Group (see Annex 4) in collaboration with key stakeholders, and reviewed and endorsed by competent authorities in European countries and at the regional level (as needed).

4.2.3 Legal and policy framework

The distribution and abundance of great cormorants in Europe are largely regulated by the EU Birds Directive and national wildlife protection legislation (see Section 2.5). Where conflicts arise, people can request to control population size through lethal measures, generally targeting the adult birds or eggs (oiling). These requests are evaluated, approved or denied, by environment ministries or competent authorities. In EU Member States, environment ministries, as the competent authorities, submit annual reports to the European Commission on derogations granted under Article 9 of the Birds Directive. This will continue, but it is recommended that the actual numbers of birds culled, not just the numbers of derogations approved, should be reported.

Local control measures have so far proved inadequate to reduce the impact of cormorant depredation at a European level. There is a clear need to assess the population status of cormorants in each European country, aligning national and regional policies and management measures within Europe to ensure consistency and effectiveness of control measures. Such an assessment should be a priority during implementation of the CMP. Where countries abstain for control, due consideration should be given to the contribution of these countries to the§ replenishment of the overall European great cormorant population abundance.

Management options for consideration are:

- Clarify the requirements and procedure to apply for derogations under Article 9 and introduce a standardized, fast-track, stream-lined protocol to apply for derogation for common use by stakeholders and competent authorities in all countries.
- Consider a change in the protection status of the great cormorant under the Birds Directive, by moving the great cormorant to its Annex II part B (huntable species), as has been requested by many EU Member States at the EU AgriFish Ministerial Council meeting in September 2025 (CEU, 2025).
- Consider a reduction in the protection status of the great cormorant under the Bern Convention from a non-named species in Appendix III to a species listed as an exception (similar to the house sparrow, jackdaw, rook and great black-backed gull), which will give more options to Member States for national level cormorant population management. Consider developing legislation that establishes spatial (zonal) management plans with zones where great cormorant abundance is actively managed to protect fish populations (e.g. around aquaculture farms and fish populations in both coastal and inland waters), i.e. where lethal measures are granted and documented, and matched with “exclusive protection zones” for cormorants.
- Depending on the mid-term evaluation, and progress made towards resolving the cormorant–fish conflict, consider preparing a definitive great cormorant International Single Species Action Plan under the Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA), applicable to countries in its European distribution range.

4.3 Step 2: Determine management measures

An array of management tools has already been developed to address the cormorant–fish conflict. These are described in detail in the INTERCAFE Toolbox (Russell *et al.*, 2012). They cover both non-lethal and lethal control measures (see Section 2.4). The main non-lethal measures include the use of visual and acoustic deterrents, barriers, and habitat modification; promoting fish refuges (e.g. submerged structures) to shelter vulnerable species; and support for stocking programmes for at-risk fish populations, where ecologically appropriate.

In high-conflict areas, lethal control of the cormorant population is carried out following a licensing/permit system according to Article 9 derogation criteria, underpinned by strict ecological justification and in line with local management plans. As such, lethal control tends to be a localized or national measure and there has been a lack of coordinated control to manage the population of cormorant at a European scale.

To meet the desired objectives to reduce cormorant depredation to sustainable levels across its European range, this step identifies innovative and sustainable methods that are proportionate to the scale of the impact. It takes into account the associated risks and benefits for managing the long-term sustainability of the great cormorant population while minimizing the negative impacts of cormorants on fish stocks, aquaculture, aquatic biodiversity and ecosystem health.

The following options, which are not mutually exclusive, should be considered:

- **Status quo/do nothing:** This option will lead to continued impacts on the viability of fisheries and aquaculture throughout Europe, as seen by a continued history of conflict since the protection of great cormorant (Annex 2). It will further jeopardize the conservation of fish. If the cormorant population continues to expand the likelihood is that it will eventually struggle for food, as is already the case in some areas where numbers are in decline (e.g. Denmark). There is, however, a greater risk that the great cormorant population in Europe will continue to grow and further expand its distribution range, which will increase pressure on fish stocks, fisheries and aquaculture.
- Develop **national and/or region-specific strategies** that recognize varying levels of cormorant population density, habitat type, and human interventions across Europe and implement adaptive interventions that allow for adjustments based on new data, research findings, and evolving cormorant and fish population status and dynamics.
- Develop, test and promote **non-lethal deterrent methods** to prevent or reduce predation rates. This should build on the **INTERCAFE Toolbox**, as part of which existing and novel measures (and combinations thereof) are tested and updated, and advice is made available to all stakeholders**.** Nevertheless, it should be recognized that many of the non-lethal methods have inherent problems with application (see Annex 3), and do not address the underlying problem of reducing predation pressure across the European landscape. Support for **stocking programmes** for at-risk fish populations should also be considered where ecologically appropriate (Cowx *et al.*, 2025).
- Implement targeted **lethal control** to manage the cormorant population size – in a manner proportionate to damage caused – when justified under Article 9 of the Birds Directive and without compromising the favourable conservation status of the great cormorant. The justification will be to protect and conserve threatened and endangered fish populations and improve the population status of impacted fish populations. This will require coordinated culling and egg oiling across the great cormorant European distribution range, especially in primary breeding areas, and will require engagement

with countries that currently do not control cormorant numbers and are acting as reservoirs for replenishing cormorant numbers. The culling and rate of intervention needed will level off as the population reaches a manageable level, and thus make spatial management a more viable and effective option.

- **Establish spatial management** to reduce the impact of cormorant predation on fish, by assigning zones where cormorant abundance is actively managed to protect fish populations and aquaculture and "no-regulation protection-zones" for cormorants. As such, there will be a need to develop **zonal management plans** where lethal control is tied to a documented impact of predation on fish populations, especially in high-conflict areas.

Throughout the formulation of management options, attention is paid to ensure compliance with the EU Directives and national laws and regulations.

4.4 Step 3: Management policy formulation and decision-making

4.4.1 Choose management actions and processes, including monitoring and evaluation plans

The following actions are recommended to achieve a balance between pan-European conservation of cormorants, and the sustainable use and protection of fish populations, fisheries and aquaculture interests.

- Review information on cormorant–fish system interactions and define the management problems and conflicts. This should include identifying issues that constrain reaching consensus on the status of both great cormorant and fish populations.
- Develop and use models to predict outcomes and trade-offs, and define uncertainties, with proposed actions.
- Carry out regular assessments of the conservation status of aquatic biodiversity, including fish populations, and of habitat quality affected by the presence of cormorants and their management.
- Develop models on the target population size of breeding pairs of cormorants within the European distribution range, based on information collected in Step 1 and modelling carried out as part of the management decision-making process. This will build on a reference value for favourable conservation status for cormorants, established in Step 1, and the scale of impact determined in Step 2.
- Propose an appropriate mix of short- and long-term management measures to reach the defined goal:
  - Immediate and continuous: support non-lethal measures, including deterrents, barriers, habitat modifications and fish stocking, where a measurable impact is achieved.
  - Short-term: coordinated culling where the impact of cormorant predation is established and until regionally agreed targets of breeding pairs are reached, based on triennial monitoring and adaptive management procedures (see Step 5). This will build on the existing, country-specific actions but coordinate them across regions and the great cormorant European distribution range so as to enable the cross-border management of cormorant depredation.

- Long-term: oiling of eggs in a defined percentage of nests annually, based on triennial monitoring and adaptive management procedures (see Step 5). The practice of egg oiling has been used for cormorants for many years and is widely applied for managing seagull colonies.

The outcome should be the recovery to good ecological status or potential of those inland and coastal fish populations and aquatic biodiversity proven to be impacted by cormorant depredation (e.g. grayling, trout, salmon, chub, nase, eel), as well as a reduction in losses at aquaculture ponds. If this is not achieved, the regional target should be adjusted following a review of cormorant abundance and status of fish populations and impacts on aquaculture and fisheries, after an initial interim period of 3 years, and every 3 years thereafter.

The measures will be applied in accordance with the legal requirements of Article 9, where and when damage is predicted or preventive measures have been implemented and proven ineffective. The application for derogations needs to be standardized, including appropriate justification for each case, and coordinated across the European distribution range, enabling actions to be taken immediately to avoid further damage.

Linked to this is the need to establish an effective system for damage reporting, assessment and applying for compensation for fisheries and aquaculture facilities affected by great cormorant predation. The procedure for determining compensation payments, including damage reporting, criteria for payment and payment for damages, needs to be equitable and standardized across all European countries.

Each European country needs to prepare and submit a 6-year national plan of management measures and monitoring to the CMAG (see Annex 4), which will enable the preparation of a regional overview, which will be used to formulate actions for the next implementation period.

4.4.2 Facilitate cross-border coordination and decision-making

One of the barriers to effective management of the migratory and expanding cormorant population is the limited cross-border coordination of management interventions. Each country operates its own management activities. Some countries, however, choose not to use Article 9 derogations to reduce the cormorant population size, compromising measures by other countries to address depredation from this transboundary, highly migratory, shared population of birds effectively. Consequently, it appears that much of the effort by individual countries or regions is ineffective at the pan-European level, as it is not addressing the underlying cause: the ever-expanding cormorant population.

To overcome this lack of coordination between countries and authorities the following mechanisms are proposed:

- **Review and adoption of the European management plan for the great cormorant** by the competent authorities and relevant stakeholders within its European distribution range, the European Inland Fisheries and Aquaculture Advisory Commission (EIFAAC) and possibly by AEWA. It is important to ensure coordination and joint implementation of the CMP with non-EU countries in Europe.
- Review and **endorsement of the European management plan for the great cormorant** by the European Parliament, through a dedicated resolution.

- **Preparation and adoption of one or more regional plans,** e.g. one each for the Baltic Sea and North Sea areas, Eastern Europe and Southern Europe.
- **Facilitate coordination between countries** to share responsibility for data collection, monitoring, management, control and evaluation. This will require a structure in which the CMAG and a secretariat have major roles to play (see also Section 4.5.5 and Annex 4).

4.5 Step 4: Implementation and monitoring

4.5.1 Implementation of the framework for the European Management Plan for the great cormorant

The proposed framework CMP should act as a catalyst for implementation and requires a roadmap of interventions. A tentative timeline for implementation is as follows:

Year	***Key milestones***
November 2025	Formal submission of the framework CMP to the European Parliament, and EIFAAC.
Year 1	Formal review and potential adoption of the framework CMP by EIFAAC and the European Parliament. National governments to review the framework CMP.
Year 1	Framework CMP forerunners: Regional working groups established by some countries.
Year 2	Establish the Cormorant Management Advisory Group (CMAG) with representatives from the European countries and key stakeholders, including scientists and bird, fisheries, aquaculture, fish conservation and animal welfare NGOs.
Year 2	Determine and agree European cormorant population abundance thresholds and management targets through multistakeholder fora.
Year 2	Prepare and submit a single species management plan, based on the framework CMP, for review and adoption by AEWA.
Year 2	European Inland Fisheries and Aquaculture Advisory Commission (EIFAAC) adopts the CMP, increasing its application to non-EU countries in Europe.
Year 2-3	Set up a secretariat and a compliance committee composed of country representatives, with clear terms of reference (using Annex 4 as basis).
Year 3	Implementation of the CMP, and development of regional and national level management plans (as required).
Year 3–8	Annual reporting by countries to the Secretariat and CMAG.
Year 8	Mid-term review, evaluation and adaptation of CMP

Following start-up, the outcomes of new research findings and ecological shifts (e.g. effects of climate change on fish migration and bird distribution) will be evaluated and the actions adapted every 3 years.

4.5.2 *Management structure of the European management plan for the great cormorant*

The implementation of a European management plan for the great cormorant (CMP) will require an organizational structure. The following structure, which is broadly similar to that used by most regional fisheries management organizations (RFMOs), is proposed:

a) Cormorant Management Advisory Group – supporting assessment/research and data collection.
b) Compliance Committee – monitoring compliance with the implementation of the plan.
c) Secretariat – coordinating, facilitating and reporting on the implementation of activities in support of the plan.

Further details on the management structure are provided in Annex 4, including draft terms of reference for each entity.

As part of the organization, each European country should report activities and outcomes to the Secretariat annually. The Secretariat will compile the reports and provide a regional overview for the countries, European Parliament, European Commission and EIFAAC, as well as other appropriate stakeholders, following review by the Compliance Committee.

The proposed structure for CMP implementation, monitoring and reporting is presented in Figure 6.

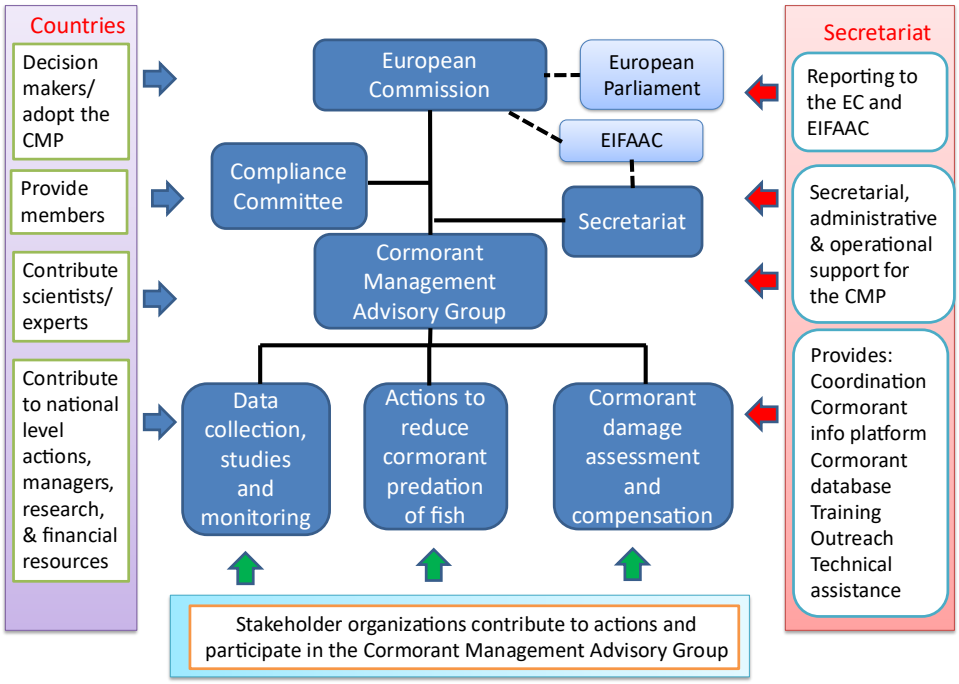


Figure 6. Framework for CMP implementation

4.5.3 *Financing the implementation of the European Management Plan for the great cormorant*

Sustainable financing is fundamental to successful endorsement and implementation of the management plan. Without funding from national budgets, the European Maritime, Fisheries and Aquaculture Fund (EMFAF), and possibly the EU LIFE Programme or Horizon Europe, to support key elements such as data collection and collation, model development, and initial stakeholder collaboration, the plan will be difficult to implement.

The funds will be required to:

- Develop, promote and implement conflict prevention and mitigation measures, including **non-lethal deterrents**, **predation thresholds** and **fish stock resilience**.
- Establish and operationalize damage/loss reporting systems, damage assessment and **compensation schemes** for affected fisheries and aquaculture entrepreneurs.
- Establish and operate **joint data collection and monitoring initiatives**, reporting and dissemination.
- Establish and maintain a Secretariat that will support a **Cormorant Management Platform** including a data hub, coordinate actions between countries, support awareness-raising and capacity building, and reporting to the competent national, international and regional bodies.
- Facilitate meetings of the **Cormorant Management Advisory Group** (CMAG) and the **Compliance Committee** (CC).
- Provide technical support to European countries to develop national plans, capacity building, awareness-raising, and legislation review and amendment (as required).
- Support scientific studies that document whether an impact has been made or not, where a consensus has not been reached.

Co-financing from individual European countries is required to implement local measures for mitigating and compensating the damage caused by great cormorants along with central financing from the EMFAF and LIFE Programmes.

The running costs for the secretariat (salaries and overheads) CMAG meetings and CC will need to be covered from EU and national resources. The more substantial costs for the field measures (shooting and oiling), population monitoring (cormorants and fish) and compensation payments for damages caused by cormorants should be largely covered nationally, but include EMFAF and LIFE programme assistance.

Shooting of adult cormorants already takes place in most countries and is mainly carried out by volunteers, so the extra costs will be on monitoring and egg oiling. However, consideration should be given to reimbursing costs for non-lethal and lethal control measures from national and EMFAF sources, where needed. For instance, the ammunition costs could be claimed and reimbursed, as is the case in some countries for pest-control measures (e.g. for rodents). Fish monitoring in rivers and lakes is conducted under the Water Framework and Habitats Directives, usually on a 6-year cycle, although routine monitoring of fish populations occurs in most countries on a more regular basis. Efforts must be made to adjust monitoring needs to help CMP reporting, including by establishing **index rivers** and assigning more intensive annual (indicator) monitoring to vulnerable fish populations. This would mean operationalizing changes to monitoring programmes – but if infrastructure and expertise are present and available, this should not result in significantly higher costs. The oiling of eggs will be quite labour-intensive for short periods every spring; with the effort likely to be greater in countries around the Baltic, with most nests to oil. Nevertheless, these countries are also the ones likely to benefit most from a reduction in cormorant predation.

4.5.4 Monitoring and data hub

An open-access, pan-European system for the storage of cormorant population monitoring data and the evaluation of trends, breeding sites, and migration routes is required to support the implementation of the CMP. This needs to be coupled with fisheries and aquaculture data.

This data storage and associated platform will need to be maintained by the proposed Secretariat, but should fully engage with the European Bird Census Council and other bird and fish conservation NGOs to benefit from going actions. This information can be used to develop scientifically informed population thresholds to prevent overpopulation, mitigate negative impacts and implement effective population control methods, such as habitat modification, non-lethal deterrents, or regulated culling. Such a data hub will also allow transparency of information and the establishment of management targets. Although there is a recognition that data sharing is a complex undertaking by virtue of issues of ownership and intellectual property rights, the hub will provide links to all open-access data to support this action.

Each year national reports will be submitted to the CMAG to prepare a European overview of numbers of birds culled and eggs oiled against the status of fisheries and aquaculture, and the impacts of cormorant predation.

4.5.5 Cooperation and participation

It is recognized that the great cormorant is a highly mobile species; its management therefore requires collaboration between European countries to address the migratory nature of cormorants and their shared impacts. A participatory stakeholder approach similar to the ecosystem approach to fisheries management will therefore be applied. Actions to redress the balance of cormorant and fish population needs must involve all countries and key stakeholders working in harmony to attain the same desired end-points. To achieve this demands the establishment of a Cormorant Management Advisory Committee (CMAG). The CMAG will include representatives of competent authorities, natural resource managers, scientists, and other key stakeholders (representatives of bird conservation, aquaculture, recreational fisheries, commercial fisheries, biodiversity conservation and other organizations). The involvement of these stakeholder organizations and institutions in the data collection and monitoring, management actions, and damage assessments is critical to the success of the CMP.

To oversee compliance with the plan and implementation of the agreed actions, a compliance committee (CC) will be required, comprising representatives of the European countries and key stakeholders. The committee's structure and terms of reference are described in Annex 4. The CC will work in close collaboration with the European Commission concerning the Birds Directive and possibly with the AEWA Secretariat.

Embedded within this international cooperation is the need to develop mechanisms for sharing successful strategies and lessons learned among European countries. This can be achieved by establishing a **Cormorant Information Platform** (including cormorant information similar to that presented by the IUCN Wetlands International Cormorant Research Group platform (Cormorants Research Group, 2025) but with data and information on fish, fisheries and aquaculture), which will be actively maintained and updated by the secretariat. The platform will be used to share up-to-date information on cormorant distribution and abundance, fish population monitoring results, discussions and decisions on policies/legislation, and appropriate training materials.

4.5.6 Public awareness, communication and education

Informing the public about the interactions between fisheries and cormorant ecology, preventive measures and the need to foster coexistence, as well as the respective roles of cormorants and fish in the ecosystem and the delivery of ecosystem services, is essential. Local

community involvement in decision-making processes to foster ownership and compliance with the plan is key. A communication strategy will be developed, and **public information campaigns will be carried out on a regular basis** to improve awareness of the complexity of the conflict.

Legitimate and inclusive stakeholder engagement is fundamental to the plan and must consider the motives and drivers of the main stakeholder groups. While conservation of biodiversity, in line with European biodiversity targets, is central, due consideration must also be given to wider environmental and biodiversity protection, economic development, food security and livelihood objectives.

Stakeholders will become literate in all aspects of the cormorant–fish conflicts, issues and potential solutions in the CMP through training and communication. Information will be balanced and clear to ensure consensus and avoid misrepresentation and misinterpretation.

4.6 Step 5: Evaluate, Adjust, Adapt

Evaluation of the CMP will be facilitated by continuous monitoring and data collection on the status and distribution of the great cormorant population and its impacts, as well as by keeping track of management actions and results. Equally essential to the evaluation and adaptation of the CMP is information on fish biodiversity, fish stock status, catches, economics, ecosystems and fish farming enterprises. Environmental changes and non-target effects must be tracked, and information should include feedback from stakeholders and field operators.

Information collated during the first 6-year period will be analysed against a reference year established at the start of the implementation period, when the threshold levels for good conservation status are established and agreed to:

- evaluate whether the management actions are achieving desired outcomes;
- assess outcomes of different management actions;
- integrate new scientific research, technologies and or policy updates;
- identify unintended consequences, including ecosystem changes and the proliferation of pest species; and
- redefine management objectives and targets based on the updated information.

Where necessary, management actions will be adjusted in the following ways:

- ***Modify control techniques:*** if a method (scaring, exclusion, culling and egg oiling) is ineffective or causing unintended harm, switch to alternative methods.
- ***Optimize resource allocation***: redirect efforts to the most affected areas or most effective actions.
- ***Increase or decrease intervention intensity:*** if the cormorant population abundance falls below the threshold that threatens their conservation status, any actions should be suspended until the numbers have recovered; conversely, where cormorant numbers are increasing and found to have adverse impacts, efforts should be intensified.
- ***Introduce new technologies***: use innovations, such as drones, to increase the capacity to count birds and nests, to oil eggs in remote nests and in tree-based colonies, or to use drones to scare birds. Where such methods are implemented on Natura 2000 sites, permissions should be obtained from the competent authorities.

- ***Compensation:*** Adjust compensation levels based on CMP outcomes, the preventive measures taken, and the social and economic performance of the affected aquaculture and fisheries enterprises and angling clubs. Reallocate left over compensation funds to support the CMP implementation.

The adjustment of actions may require an update of the objectives and key performance indicators (KPIs), including:

- revising goals if needed – for example, by shifting from long-term suppression to targeted control to maintain an equitable balance of bird and fish populations;
- define new success metrics based on updated knowledge; and
- adjust timelines and expectations based on outcomes.

It is also necessary to communicate new findings to policymakers, managers, and the public. There may also be a need to adapt engagement strategies to increase compliance and participation.

There is also a need to incorporate lessons learned and plan for future adaptation by documenting successes, failures and best practices, and develop contingency plans for unforeseen challenges (e.g. climate change impacts, other piscivorous species). Maintaining decision-making flexibility in order to adapt quickly to emerging threats is fundamental to this requirement.

5. Logical framework approach

The European great cormorant management plan needs clear priority actions and a timeframe for implementation of these actions. Table 1 gives an overview of actions that should be targeted in the short-to-medium term to manage the adverse impacts of an expanding great cormorant population on inland and coastal fish, fisheries and aquaculture across its European distribution range. It should be noted that Table 1 is not a definitive logical project framework because the current document is a framework for a management plan, and quantifiable goals have not been determined, thus indicators cannot be defined. It does, however, follow the structure of an AEWA single-species action plan and can easily be adapted for a comprehensive cormorant management plan.

Implementation of the actions will largely depend on the availability of funding.

The CMP guides coordinated action throughout Europe. It is designed to enable change in policy, legislation and cormorant management approaches to achieve joint objectives. The outcomes of actions will be reviewed every 6 years and adaptation of the CMP and its associated management measures are expected.

The budget required for implementation of the CMP will be prepared at a later stage in the drafting process, based on an agreed structure and actions. Key elements to ensure successful implementation of the CMP will be:

- An allocation of adequate financial resources from the European Union, country environmental budgets and other internal and external sources.
- The availability and motivation of personnel, including support from bird, environmental, fisheries and aquaculture agencies, NGOs and CSOs.
- The necessary logistical resources and equipment available to apply management measures and fund appropriate compensation.

Table 1. Implementation activities, priorities and timeframe for delivery of the cormorant management plan

Goal / Action	Objectives addressed	Timeframe	Outputs	Indicators	Responsibility
Step 1: Develop the specific objectives and target end-points of the management plan					
Characterize cormorant, fisheries and aquaculture systems					
1) Establish and operate a standardized pan-European **system for monitoring cormorant population trends** and breeding sites.	1, 2, 4	Triennial	• Triennial monitoring of breeding and overwintering cormorant population abundance and distribution in European countries. • Monitoring of cormorant breeding success at nesting sites in protected areas. • Regular assessment of conservation status of aquatic biodiversity, including fish populations, and habitat quality affected by cormorant presence and management. • Protocol for stomach analysis of culled cormorants applied. • Access and update European Fisheries Data Framework information. • Empirical information on economic impacts of cormorants on fisheries and other ecosystems services in freshwater and coastal waterbodies, while also taking into account other pressures on fish and fisheries. • Updated studies on the impact of cormorants on the economic viability of fish farms.	• Regular updates of status and trends in cormorant population distribution and abundance, including breeding and overwintering population sizes. • Open-access European monitoring information system updated on a biennial basis. • Review of the cormorant population distribution and abundance in Europe. • Regular updates of conservation status of aquatic biodiversity, including fish populations, and habitat quality affected by cormorant presence and management. • Updated information on economic impacts of cormorants on fisheries, aquaculture and other ecosystems services in freshwater and coastal waterbodies.	• National bird monitoring organizations, CSOs, NGOs and volunteers • EIFAAC • National and regional fisheries and environment agencies and fisheries and aquaculture organizations in each country.
2) **Establish standardized data collection and monitoring protocols** for assessing status of fish populations cross European countries in line with HD and WFD needs.	1, 2, 6	Triennial. Minimum compliance with HD and WFD reporting			
3) Conduct, in a coordinated and standardized manner, studies and report on **ecological and economic impacts of cormorant predation** on fish populations, freshwater and coastal ecosystems, and fish farms, while accounting for other pressures on fish and fisheries.	1, 2, 6	Initially to establish reference state and periodically to assess impact of measures			

Goal / Action	Objectives addressed	Timeframe	Outputs	Indicators	Responsibility
Setting objectives					
4) Agree on the **objectives for the Cormorant Management Plan**.	3, 4, 5	Year 1-2	• Objectives prepared and disseminated. • Predictive modelling tools developed, maintained and results communicated. • Evaluation of actions on cormorant distribution and population size through coordinated monitoring and modelling. • Established regional population abundance thresholds to maintain cormorant conservation status across its distribution range.	• Objectives and KPIs of the CMP agreed. • Local, national and regional cormorant population thresholds established and agreed by key stakeholders.	• National and regional competent authorities • CMAG, Compliance Committee
5) Develop a scientifically informed favourable reference value for good cormorant population status and thresholds that trigger implementation of non-lethal, deterrents such as scaring, exclusion devices or habitat modification, or targeted humane population control methods.	1, 2, 3, 4, 5, 6	Year 2			
6) Establish **key performance indicators (KPIs)** to measure the success of management actions, such as changes in cormorant populations and fish stock recovery.	3, 4, 5, 6	Year 1-2			
Legal and policy framework					
7) **Introduce standardized, streamlined procedures to apply for derogations under Article 9, including universal or regional justifications,** for common use by stakeholders and competent authorities in all countries	4, 5	Years 1-2	• Standardized, fast-track systems developed and applied by most European countries. • Report of legal review published.	• Annual country reports indicate the average time between application and approval. • An increase in the number of Article 9 derogations, commensurate with the scale of cormorant impact.	• National and regional competent authorities • CMAG • Stakeholder organizations

Goal / Action	Objectives addressed	Timeframe	Outputs	Indicators	Responsibility
8) **Legal review** of the options for re-evaluating the status of the great cormorant under the Bern Convention.	3, 5, 6	Year 1-2		• Legal advice shared online.	• Bern Convention Secretariat • AEWA • EIFAAC
Step 2: Determine management measures					
9) **Mitigation measures**: Explore innovative and sustainable methods for managing cormorant populations and mitigating their impacts.	3, 4, 5	Years 1-5	• Updated studies on the ecological damage to wild fish stocks, including virtual population analysis and fish population modelling, and assessments of the well-being of fish species of conservation importance. • Empirical information on the economic impacts of cormorants on fisheries and other ecosystems services in freshwater and coastal waterbodies. • Updated studies on the economic and livelihoods impact of predation by cormorants at aquaculture enterprises. • Update and promote the INTERCAFE Toolbox for non-lethal deterrents to reduce depredation by cormorants on wild fish stocks and at aquaculture facilities, with indicators of likely success and options, including the use of multiple deterrents, to improve likelihood of success.	• Scientific monitoring programme in place to determine and agree on acceptable levels of cormorant depredation. • Ecological and impact data updated and made available online. • Population monitoring data published, and data incorporated into predictive models. • Updated INTERCAFE cormorant mitigation and population management toolbox published online. • Zonal management plans available online.	• Relevant monitoring and research organizations • CMAG and Compliance Committee • EIFAAC • Relevant national and regional competent authorities • Stakeholder organizations
10) **Non-lethal deterrents to protect fish and fisheries**: Determine non-lethal deterrent methods, such as nets, acoustic devices and visual deterrents, to safeguard fish stocks and keep cormorants away from sensitive areas.	3, 4,5, 6	Year 1-2			
11) **Non-lethal deterrents to protect aquaculture**: Determine non-lethal deterrent methods, such as nets and acoustic devices, to reduce economic losses in fish farms.	3,4, 5, 6	Year 1-2			
12) **Systematic lethal control measures:** Establish clear, regionally agreed criteria to justify for when and where lethal	2, 3, 4, 5, 6	Years 1-5			

Goal / Action	Objectives addressed	Timeframe	Outputs	Indicators	Responsibility
control (such as culling) can be used.			• Thresholds of cormorant population abundance at local and regional scales established, where lethal control becomes a justifiable option to manage population abundance where serious damage has been established. • High-conflict areas selected where zonal management could be applied. • Zonal management plans developed.		
13) **Spatial management**: Establish spatial management, including zonal management plans where appropriate, to increase effectiveness of management actions in high-conflict areas.	3, 4, 5, 6	Years 3-5			
Step 3: Management policy formulation and decision-making					
14) European management plan for the great cormorant: Finalize and agree on the actions and KPIs of the plan.	all	Year 1-2	• Pan-European adaptive management plan for cormorants agreed along with its goal, objectives and key actions and KPIs. • National plans developed and 'Best practice' guidelines established for the organization of coordinated control of cormorant numbers at regional and national levels. • Clear criteria established for when and where lethal control (such as culling) can be employed, under what conditions permits can be granted, and how this aligns with EU and national legislation. • Guidelines to facilitate Article 9 derogations under the Birds Directive	• Management Plan agreed by all parties and published. • Thresholds for lethal control established and agreed. • Population target confirmed and communicated to relevant national authorities. • Number of derogations submitted. • National / regional management plans published and shared. • National/local management plans produced including development of activities benefitting local communities. • Funds made available for research and monitoring	• Relevant monitoring and research organizations • National environment agencies • CMAG and Compliance Committee • Relevant national and regional competent authorities, CSOs, NGOs in dealing with
15) **National plans:** Develop national or region-specific plans that recognize varying levels of cormorant population density, habitat type, and human interventions across Europe.	3, 4, 5, 6, 7	Years 1-2			
16) Evaluate efficacy of non-lethal (e.g. scaring, habitat modification netting) and lethal **control measures** such as oiling eggs or regulated culling (in compliance with legal protections).	3, 4, 5	Years 1-5			

Goal / Action	Objectives addressed	Timeframe	Outputs	Indicators	Responsibility
17) **Derogations:** Use the derogations system under the Birds Directive to report on controlled culling in areas where cormorants cause serious damage, in order to aid decision-making on appropriate measures.	4, 5, 6	Continuous	available and linked to requirements to control cormorant depredation pressures. • Damage assessment method developed and agreed. • Damage compensation system established based on best practices and lessons learnt from other bird damage compensation systems used for agriculture. • Relevant authorities (national or regional) responsible for implementation and enforcement engaged. • Existing structures/capacity or new structures in place. • Appropriate funding secured and dispersed to appropriate research and monitoring programmes. • Platform for communication and feedback established and operational under guidance of CMAG and the Secretariat.	programmes and for damage compensation. • Compensation system for cormorant damage to aquaculture and fisheries enterprises established in most countries. • Communication and data platform established.	wildlife and cormorant issues. • EIFAAC • Secretariat
18) **Compensation system:** Establish an effective system for damage reporting, assessment and compensation for predation by cormorants.	3,4, 5 6	Years 1-2			
19) **Assign responsibilities** to authorities and organizations at national level for implementation of management plan and support targeted activities.	5, 6, 7	Years 1-2			
20) **Funding:** Ensure financial resources available to implement CMP, including funding from national, EMFAF and LIFE programme sources.	all	Continuous			
21) **Promote dialogue:** Create platforms for dialogue among fishers, aquaculture farmers, conservationists, and policymakers to build trust and consensus.	5, 6, 7	Years 1-3 Continuous			

Goal / Action	Objectives addressed	Timeframe	Outputs	Indicators	Responsibility
Step 4: Implementation and monitoring					
22) **Protect fish and fisheries using non-lethal deterrents**: Implement non-lethal deterrent methods such as nets, acoustic devices and visual deterrents, to safeguard fish stocks and aquaculture facilities, and keep cormorants away from sensitive areas.	3, 4, 5, 6		• Cormorant depredation rates reduced to socially, ecologically, economically and environmentally acceptable levels by regulated intervention mechanisms. • Population monitoring to ensure population size remains within established threshold for several consecutive years, and the CMAG agrees to take necessary action where appropriate. • Coordination to ensure cormorant management does not compromise protection of key biodiversity areas and protects conservation species, including fish. • Countries support and actively facilitate rehabilitation of key habitats for fish. • Dispersion of damage compensation funds to offset economic losses to fisheries and aquaculture enterprises, and possibly angling organizations.	• Population monitoring data published, and data incorporated in predictive models. • Annual reporting and publication of data. • Review the status of the great cormorant under the Birds Directive and Bern Convention. • Countries support and actively facilitate the rehabilitation of fish habitats. • Annual report on damages and dispersal of compensation funds.	• Monitoring and research organizations • CMAG and Compliance Committee • EIFAAC • Secretariat • Relevant national and regional competent authorities.
23) **Habitat modification**: Implement habitat modifications where necessary to reduce conflicts with fisheries and aquaculture.	3, 4, 5, 6	Years 3-10			
24) **Restore habitats:** Rehabilitate ecosystems affected by cormorant colonies, such as areas of deforestation or degraded soils.	3, 4, 5, 6	Years 3-10			
25) **Control measures:** Implement targeted population control methods where necessary, such as oiling eggs or culling.	3, 4, 5, 6	Continuous			
26) **Compensation mechanisms:** Implement equitable damage compensation schemes for	3, 4, 5, 6	Years 1-3			

Goal / Action	Objectives addressed	Timeframe	Outputs	Indicators	Responsibility
fisheries and aquaculture enterprises affected by cormorant predation across countries.					
Cooperation and participation					
27) **Cross-border coordination:** Facilitate collaboration between European countries to address the migratory nature of cormorants and their shared impacts.	4, 5, 6, 7	Years 2-5	• A Cormorant Management Advisory Group (CMAG) and Compliance Committee (CC) established, along with a review and feedback system at the regional level. • European countries and stakeholder representatives participate actively in research and monitoring activities. • Authorities (national or regional) responsible for CMP implementation and enforcement within each country share data and information at regional level with the CMAG, CC and secretariat. • Reporting of annual culling and egg-oiling statistics by countries to the Secretariat. • Wise use and 'best practices' for the control of cormorants at national and local levels promoted.	• European Cormorant Management Advisory Group and Compliance Committee formally established. • Annual meeting reports of the CMAG and CC. • Monitoring data published and reported to relevant authorities and organizations. • Publication of Article 9 derogation statistics, with the number of culled cormorants. • Best practices shared and dialogue between stakeholders active.	• CMAG and Compliance Committee • Monitoring and research organizations • Relevant national and regional competent authorities, CSOs, and NGOs • EIFAAC • Secretariat
28) **Cormorant Information Platform:** Establish a centralized database to share cormorant population data, fishery impact reports, and best management practices between European countries, agencies and other stakeholders.	4, 5, 6, 7	Years 2, continuous			
29) **Share best practices**: Develop mechanisms for sharing successful strategies and lessons learned among European countries.	3, 4, 5, 6, 7	Years 3-6, continuous			
Public awareness, communication and education					
30) **Awareness campaigns:** Conduct awareness campaigns to inform	4, 5, 6, 7	Years 2-6, continuous	• A communication strategy on the CMP developed and implemented.	• CMP communication strategy available online.	• CMAG • EIFAAC

Goal / Action	Objectives addressed	Timeframe	Outputs	Indicators	Responsibility
the public about cormorant conservation, cormorant impact on biodiversity, and the costs to fisheries and aquaculture.			• Awareness-raising campaigns and knowledge systems implemented and freely available. • Stakeholders and communities actively engaged in CMP development, implementation and evaluation. • Educational programmes designed and presented periodically in European countries and online.	• Statistics on stakeholder engagement in the CMP development and implementation compiled by the CMAG. • Publication of guidelines, training programmes and local codes of conduct. • Education programmes available nationally and online in various languages.	• Secretariat • Monitoring and research organizations • Relevant national and regional competent authorities, CSOs, and NGOs.
31) **Stakeholder involvement:** Engage stakeholders, including fisheries and aquaculture organizations, conservation organizations, managers and policymakers in the development and implementation of management measures.	4, 5, 6, 7	Continuous			
32) **Educational programmes:** Enhance understanding and education about cormorants, fish and their role in the environment, economy and food security to gain broader public support for management actions.	6, 7	Years 2-6, Continuous			
Step 5: Evaluate, Adjust, Adapt					
33) **Evaluate & Adjust:** review outcomes of measures and adjust CMP actions based on new data, research findings, and evolving cormorant–fish population dynamics.	all	Year 6-8	• European countries and key stakeholders participate in the CMP evaluation. • CMP evaluated along with its goal, objectives, key actions and KPIs. • CMP adaptations or adjustments proposed based on the evaluation recommendations, new data,	• Reports of the compliance committee. • Annual reports compiled by Secretariat. • CMP evaluation report published. • Proposals for adjustment and adaptation of the CMP submitted	• CMAG and Compliance Committee • Relevant national and regional competent authorities
34) **Evaluate breeding sites:** Key cormorant breeding colonies in	1, 2, 3, 5	Year 6-8			

Goal / Action	Objectives addressed	Timeframe	Outputs	Indicators	Responsibility
Nature 200 sites are protected and control measures managed in other main breeding colonies to maintain population status.			research findings, and evolving cormorant and fish population dynamics. • Status of cormorant breeding sites, aquatic biodiversity and fish habitat outcomes evaluated. • CMP adapted to changes in the European policy and legislative framework. • European countries evaluate the outcomes of the CMP at national level and adjust their national plans and management actions.	to relevant national and regional competent authorities. • CMP amendments take in consideration relevant changes in the European policy and legislative environment. • Reports of national-level evaluations of national and regional cormorant management plans and damage compensation schemes.	• Secretariat
35) **Evaluate biodiversity and habitat outcomes**: Ensure cormorant management measures have positive biodiversity and habitat outcomes.	1, 2, 5	Year 6-8			
36) **Adapt to changes in the management environment**: Coordinate with EU Natura 2000 sites, WFD and HD programmes and other relevant policies and programmes to ensure that cormorant management contributes to the protection of biodiversity.	all	Year 6-8			
37) **Harmonize policies and legislation:** Align the CMP with other regional policies and legislative changes within Europe (such as the Bern Convention, AEWA, Birds Directive, HD, and WFD) and national policies to ensure consistent and effective management measures.	4, 6, 7	Year 6-8			

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Annex 1: Acronyms and abbreviations

AEWA	Agreement on the Conservation of African-Eurasian Migratory Waterbirds
CC	Compliance Committee
CMP	Cormorant Management Plan
CMS	Convention on the Conservation of Migratory Species of Wild Animals
CMAG	Cormorant Management Advisory Group
CORMAN	EU Project: Sustainable Management of Cormorant Populations
CSO	civil society organization
EAA	European Angling Alliance
EBBA	European Breeding Birds Atlas
EC	European Commission
EIFAAC	European Inland Fisheries and Aquaculture Advisory Commission
EMFAF	European Maritime, Fisheries and Aquaculture Fund
EP	European Parliament
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FEAP	Federation of European Aquaculture Producers
FRAP	Development of a procedural framework for action plans to reconcile the conflict between large vertebrate conservation and the use of biological resources: fisheries and fish-eating vertebrates as a model case
HD	Habitats Directive (Council Directive 92/43 EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora)
INTERCAFE	EU COST Action Project: Interdisciplinary Initiative to Reduce pan-European Cormorant–fisheries Conflicts
IUCN	International Union for Nature Conservation
MS	Member State
NGO	non-government organization
REDCAFE	EU FP5 Concerted Action Project: Reducing the conflict between cormorants and fisheries on a pan-European scale
WFD	EU Water Framework Directive (Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy)

Annex 2: Timeline of interventions on the cormorant–fish conflict

Year	Event	Responsible / Reference
1979	Birds Directive	European Commission
1994	Development of an Action Plan for the Great Cormorant in the African-Eurasian Region. Recommendation 04.01. ADOPTED	UNEP/CMS https://www.cms.int/en/meeting/fourth-meeting-conference-parties-cms
1994/95	EU Directives on the protection of cormorants and herons ;MEP question & COM answer,	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:C:1995:024:FULL
1996	Cormorants And Human Interests Workshop towards an International Conservation and Management Plan for the Great Cormorant (*Phalacrocorax carbo*)	van Dam C. and Asbirk S. (Eds.). 1997 - National Reference Centre for Nature Management, Wageningen, The Netherlands. 152 pp.
1996	Demonstration in Strasbourg 5–10 000 people. Le Monde « Les pêcheurs déclarent la guerre aux cormorans sur les bords du Rhin »	Fishing and aquaculture interests
1997	Development of an Action Plan for the Great Cormorant in the African-Eurasian Region. Denmark and the Netherlands declared they were willing to take the initiative for the preparation of an action plan for the great cormorant	UNEP/CMS https://www.cms.int/en/document/development-action-plan-great-cormorant-african-eurasian-region
1997	Opinion of the Committee of the Regions on 'The immediate measures which need to be taken to counter the damage caused by cormorants in the European regions'	Committee of the Regions https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:51997IR0028&from=FR
1997	Removal of cormorant from Annex I	EU-Commission https://ec.europa.eu/commission/presscorner/detail/ro/ip_97_718
2001	REDCAFE: EU FP5 Concerted Action Project: Reducing the conflict between cormorants and fisheries on a pan-European scale.	DG Environment https://www.ceh.ac.uk/our-science/projects/intercafe-information#:~:text=REDCAFE,European%20Union's%20Framework%20Five%20Programme
2001	International Symposium on Interaction between fish and birds: implications for management. (3 - 6 April 2001)	Organized by the Hull International Fisheries Institute, University of Hull, in collaboration with EIFAC. Cowx I.G. (2003) *Interactions between Birds and Fish: Implications for Management*. Oxford: Fishing News Books Blackwell Science, 374 pp.
2002	GRAND CORMORAN conference (12–13 March 2002)	France
2002	Cormorant event/meeting	Hunting Intergroup EU-Parliament
2003	A statement on cormorants	EU Council of Ministers (fisheries),

2003	INTERCAFE -project EU COST Action Project: Interdisciplinary Initiative to Reduce pan-European Cormorant–fisheries Conflicts. INTERCAFE - Interdisciplinary Initiative to Reduce pan-European Cormorant–fishery Conflicts, (2004-2008, 60 partners, 2012). European Science Foundation/EU RTD Framework Programme, COST Action (635).	https://www.ceh.ac.uk/our-science/projects/intercafe#:~:text=The%20main%20objective%20of%20INTERCAFE,Europe%20and%20to%20deliver%20a http://cormorants.freehostia.com/
2003	FRAP project: Development of a Procedural Framework for Action Plans to Reconcile Conflicts between Large Vertebrate Conservation and the Use of Biological Resources: Fisheries and Fish-eating Vertebrates as a Model Case	DG-Research https://www.ufz.de/index.php?en=36309
2004	"Review of international policy and practice for the management of native species conflicts"	DG-Environment
2007	Cormorant event (23 May 2007)	Hunting Intergroup EU-Parliament
2007	EIFAC Workshop on a European Cormorant Management Plan. Bonn, Germany, (20-21 November, 2007	EIFAC Occasional Paper No. 41. https://www.fao.org/4/i0210e/i0210e00.htm
2008	European Parliament resolution of 4 December 2008 on the adoption of a European Cormorant Management Plan to minimize the increasing impact of cormorants on fish stocks, fishing and aquaculture (2008/2177(INI))	EU-Parliament: EUR-Lex - 52008IP0583 - EN - EUR-Lex
2008	Resolution on a Pan-European management plan for the control of cormorants – 2 July	Advisory Committee on Fisheries and Aquaculture (ACFA) https://maritime-forum.ec.europa.eu/document/download/f64d062c-1ed1-4f57-ab48-7ce8b2444f49_en?filename=Answ%20DG%20ENV%20187956.pdf
2008	Kindermann report adopted 4 December	Report on the adoption of a European Cormorant Management Plan to minimise increasing impact of cormorants on fish stocks, fishing and aquaculture (2008/2177(INI)) Committee on Fisheries, European Parliament (A6-0434/2008
2009	17–18 January Cormorant count	Wetlands Cormorant Research Group
2009	Follow-up to the European Parliament resolution on the adoption of a European Cormorant Management Plan to minimise the increasing impact of cormorants on fish stocks, fishing and aquaculture	EU-Commission
2009	Cormorant seminar – Commission and stakeholders, 31 March	EU-Commission

2009	Speech by Commissioner Joe Borg at the Fisheries Council, Luxembourg, 23 June	Commissioner Joe Borg
2009	EU-guide for use of §9-derogation (final version in 2010)	EU-Commission
2010	CORMAN: EU project "Sustainable Management of Cormorant Populations" (2011–2014)	Consortium Partnership Aarhus University – DCE Danish Centre for Environment and Energy with the UK Centre for Ecology & Hydrology. https://tinyurl.com/y7vpcy6p
2011	France presented a note demanding that the Commission establish a management plan for cormorant populations	France http://register.consilium.europa.eu/pdf/en/11/st11/st11532.en11.pdf
2013	Between Fisheries and Bird Conservation: The Cormorant Conflict Report to European Parliament Directorate General for Internal Policies Policy Department B: Structural and Cohesion Policies, Fisheries	Cowx I.G. 2013 https://www.europarl.europa.eu/RegData/etudes/note/join/2013/495845/IPOL-PECH_NT(2013)495845_EN.pdf
2013	EU guide for applying great cormorant derogations under article 9 of the birds directive 2009/147/EC.	European Commission: Directorate-General for Environment and N2K Group EEIG, *Great cormorant – Applying derogations under article 9 of the birds directive 2009/147/EC*, Publications Office,2013, https://data.europa.eu/doi/10.2779/56719
2016	Answer on cormorant plan given by Mr Vella on behalf of the Commission:	EU-Commission https://www.europarl.europa.eu/doceo/document/E-8-2016-004736-ASW_EN.html
2018	European Parliament resolution of 12 June 2018 on towards a sustainable and competitive European aquaculture sector: current status and future challenges (2017/2118(INI))	EU-Parliament: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=oj:JOC_2020_028_R_0004
2021	Aquaculture Advisory Council: Recommendation on Freshwater Aquaculture and Wildlife	https://aac-europe.org/wp-content/uploads/2021/06/AAC_Recommendation_-_Ecosystem_Services_2021_08_revised2.pdf
2021	Commissioner Sinkevičius' answer on the European great cormorant population	EU-Commission https://www.europarl.europa.eu/doceo/document/E-9-2021-001534-ASW_EN.html
2022	European Parliament resolution of 4 October 2022 on striving for a sustainable and competitive EU aquaculture: the way forward (2021/2189(INI))	EU-Parliament: https://www.europarl.europa.eu/doceo/document/TA-9-2022-0334_EN.html
2022	**EU Council** approved Conclusions on aquaculture strategic guidelines state in Point 10 that "*cormorants…have become a considerable challenge*" and urge "*the Commission to timely identify effective*	https://data.consilium.europa.eu/doc/document/ST-11496-2022-INIT/en/pdf

	and efficient EU-wide management measures to prevent or reduce the damage caused by predators".	
2022	EIFAAC Resolution EIFAAC/31/2022/3 "On the protection of vulnerable and endangered fish species from unsustainable predation from cormorants" including the need for a CMP	FAO/EIFAAC https://openknowledge.fao.org/handle/20.500.14283/cd2886en
2022	Aquaculture Advisory Council: Recommendation on predation by birds in relation with shellfish farming.	https://aac-europe.org/wp-content/uploads/2022/03/10.AAC_Recommendation_-_Freshwater_aquaculture_and_wildlife_2022_10.pdf
2024	FAO-European Commission Trust Fund project on 'Developing Europe-wide management advice to protect vulnerable and endangered fish species from unsustainable predation by cormorants" (GCP/RER/069/EC).	DG Mare/EIFAAC European Maritime, Fisheries and Aquaculture Fund (EMFAF) financed within its work programme for 2024–2025. Projects - Ongoing projects | EIFAAC | FAO
2024	ProtectFish EU Horizon Project: Researching management solutions for fish, birds and people.	DG Research https://protectfish.eu/
2024	EIFAAC Workshop on management advice for reducing the impact of cormorant predation on fish and fisheries. Pula, Croatia, 8 October 2024	EIFAAC: https://www.fao.org/fishery/en/meeting/41469. Report available at: https://openknowledge.fao.org/items/9a7bd657-f7a4-4c86-a372-bfdf55f726ba
2024	BSAC Workshop on predators in the Baltic (seals, cormorants) second edition, Helsinki, Finland, 30 October 2024	BSAC: https://www.bsac.dk/wp-content/uploads/2024/06/BSACworkshoponpredators_Helsinki_30102024_final-report.pdf
2025	NSAC/BSAC Workshop on predators (seals & cormorants) – Lulea, Sweden, 20 March 2025	NSAC/BSAC: https://www.nsrac.org/projects/nsac-bsac-workshop-on-predators-seals-cormorants-20-march-2025-lulea-sweden/
2025	Stakeholder consultation on the draft European cormorant management plan, Rome, virtual, 25 April 2025	EIFAAC https://www.fao.org/fishery/en/meeting/41503
2025	Conference on management advice to reduce cormorant predation impacts, Brussels/virtual, 3 June 2025	Polish Presidency to the European Council & EIFAAC https://www.fao.org/fishery/en/meeting/41505
2025	Letter to the European Commission by Members of the European Parliament: Call for an EU-wide management strategy for the Great Cormorant while maintaining its favourable conservation status – a long overdue necessity. 3 July 2025	The letter is available at the EAA website: https://www.eaa-europe.org/news/18452/10-meps-call-in-open-letter-to-eu-commission-for-a-coordinated-eu-strategy-on-cormorant-predation-management.html
2025	Council of the European Union. Agriculture and Fisheries Council, 22-23 September 2025. PECHE 266. Need for measures to allow ecosystem-based	The note from Sweden and supporters is available here: https://data.consilium.europa.eu/doc/document/ST-12831-2025-INIT/en/pdf

	hunting of cormorants, and to coordinate among Member States to take actions to protect sensitive fish stocks and strengthen biodiversity Information from Sweden supported by the Czech Republic, Estonia, Finland, Latvia, Romania and Slovakia	
2025	The EIFAAC Management Committee and Technical and Scientific Committee meeting, Budapest, 18-19 November 2025, reviews and clears the framework CMP for formal submission to the EIFAAC members and the European Parliament	Information about this EIFAAC meeting is available here: https://www.fao.org/fishery/en/meeting/41547

Annex 3: Overview of measures to reduce impact of cormorants on fisheries and aquaculture

Measure and objective	Efficacy and acceptability
Lethal measures to reduce cormorant numbers directly	
• Active removal of adult breeding birds or overwintering birds from the population. • Shooting at site-specific or local levels under Article 9 derogation. • Coordinated culling for population control at a national level at a national level.	• Response to localized culling short-lived and bird numbers recover to pre-treatment levels over a period of a few weeks. • Shooting adults also helps reduce cormorant predation pressure through harassment of remaining birds. • To be effective in the longer term, culling needs to be repeated at frequent intervals and coordinated across European distribution range. • Culling birds at roosts near aquaculture ponds or on the ponds is likely to create only short-term respite and push birds into other areas where they might become a problem. • Local reductions on the non-breeding grounds have marginal impact at a continental scale, and the problem will recur in the next season when new wintering birds appear.
Reducing reproductive success	
• Egg destruction, for example by oiling [*spraying eggs with inert mineral or vegetable oil*] and egg pricking.	• The benefits of egg oiling over destroying eggs are that cormorants continue to incubate the eggs and are less likely to attempt to re-nest. • Reduces the number of hatchlings. • Takes a minimum of two years before a noticeable reduction in population numbers. • Expensive and time-consuming to carry out and difficult to access many roosts, especially in trees. Drones can improve effectiveness.
• Destruction of nests and breeding habitat.	• Nests or trees used for nesting can be removed or physically broken up with the hope that adult birds will either leave the area or fail to rebuild or re-nest successfully that season. • Nest destruction is labour-intensive, although can be practical on smaller colony sites. • Requires more than one visit per colony as birds are known to re-nest and lay additional eggs if nests and eggs are destroyed (time-consuming). • Constrained by factors such as adverse environmental or amenity impacts and influenced by the availability of alternative roosting sites.

Scaring cormorants away from fisheries or aquaculture units	
• Auditory deterrents: automatic exploders, pop-up scarecrows with exploders, pyrotechnics, alarm or distress calls. • Visual deterrents: laser guns, reflecting tapes, eyespot balloons, scarecrows, lights, water spray devices. • Aerial harassment with ultralight aircraft, radio-controlled model airplanes; ground harassment with vehicle patrols. • Chemical [conditioned taste aversion] deterrents.	• Can discourage cormorants from using specific sites. • For harassment to be effective, a variety of techniques should be used in combination, and the location and combination of devices should be changed frequently for best results. • Roost dispersal may move predating birds from the target area but pass on the problem to other fisheries and aquaculture units. • Measures only have an effective range of up to 200 m so of little use on river systems or larger sites. • Cormorants learn quickly and these methods often do not deter the birds for extended periods of time. • Use of scaring devices may be constrained where there are risks of disturbing other wildlife or human habituation.
Exclusion techniques	
• Netting enclosures using nets, wires, floating plastic balls. • Facility design and construction.	• Nets provide a physical barrier and are effective if the edges of the nets extend to the ground surrounding the pond. • Difficult to implement over large pond areas and rivers. • Costs may be prohibitive for large ponds. • Overhead wire systems function by making it difficult for cormorants to land on – and take off from – ponds. Although these systems are effective at preventing large flocks from landing, individual birds often learn to fly between the lines, or land on levies and walk into the pond despite the wires. • Success of both wire systems and floating ropes depends on the availability of alternative foraging areas nearby. • Construction of pond margins and bottom profile, location of fingerling ponds, and feeding techniques may lessen damage marginally.
Habitat modification techniques to reduce availability of fish to cormorants	
• Elimination of resting or roosting places. • Elimination of nests. • Improving habitat quality for fish.	• Fish refuges can reduce fish losses, foraging efficiency of cormorants and incidence of damage to fish. • Practical constraints regarding the use of refuge structures in rivers and larger still-waters

• Construction of artificial fish refuges.	(especially those that are also used for water sports). • Causes obstructions and snagging to anglers but also increases flooding risk in large rivers.
Fish stock management techniques to reduce availability of fish to cormorants	
• Increase the size of individuals stocked, regulation of stocking density. • Alter stocking strategy [timing of stocking, frequency and location of stocking]. • Use of buffer species to divert cormorants from predating on valuable species.	• Reduces depredation on small-sized individuals but can increase scarring and wounding of larger individuals. • Not always feasible because of availability of stock. • Increases cost of stocking.
No control	
• Allows species abundance and interrelationships to become regulated based on predator prey interactions.	• Cormorant population will continue to expand and exacerbate conflict. • Outcry from stakeholders and businesses affected by cormorant predation. • May not be acceptable where survival of endangered fish and other aquatic species are at risk, especially from cormorant damage.

Source: Adapted from Cowx, 2013. Between Fisheries and Bird Conservation: The Cormorant Conflict Report to European Parliament Directorate General for Internal Policies Policy Department B: Structural and Cohesion Policies, Fisheries. (https://www.europarl.europa.eu/RegData/etudes/note/join/2013/495845/IPOL--PECH_NT(2013)495845_EN.pdf)

Annex 4: Cormorant management framework structure

Cormorant Management Advisory Group (CMAG)

1. The Cormorant Management Advisory group (CMAG) will be responsible for providing scientific, ecological, social and economic advice relating to the management of cormorants in Europe. It will also support the implementation of the adaptive (multiannual) European Management Plan for the Great Cormorant.

2. The CMAG Terms of Reference are to:

a) Develop standardized methods and guidelines to assist European countries in their data collection and reporting in relation to the implementation of the CMP.
b) Collect and assess information provided by European countries, relevant organizations, institutions or programmes on cormorant management efforts, and other data relevant to measuring the impact of the cormorants on aquatic biodiversity, fisheries and aquaculture.
c) Collate and assess information on the status and trends of the great cormorant population, ecosystems and fisheries-related human components, using the appropriate indicators and in relation to agreed management, biological, and/or conservation reference points.
d) Provide independent advice on a technical and scientific basis to facilitate the adoption and implementation of measures concerning the sustainable management of great cormorants and the assessment of biological, ecological, social and economic implications under different management scenarios.
e) Report annually, through the secretariat, to the European Commission and EIFAAC on recommendations concerning conservation, management and research on cormorants, including consensus, majority and minority views.

3. Composition of the CMAG

The CMAG will be composed of scientists officially nominated by the European countries, and observers from international and European stakeholder organizations.

Each European country shall have the right to appoint a representative and an alternate, if needed, both with suitable scientific qualifications, who may be accompanied by experts and advisers.

Members and the Secretariat may invite experts, in their individual capacity, to enhance and broaden the expertise of the CMAG.

The European countries and observers shall finance the participation of their representatives, alternates, experts and advisers to the CMAG meetings.

Compliance Committee

1. The Compliance Committee (CC) will be responsible for reviewing the individual compliance by European countries with the European Management Plan for the Great Cormorant, and its agreed management measures.

2. The Compliance Committee Terms of Reference are:

a) assess, based on all available information, compliance by European countries, and relevant institutions with the measures of the CMP;
b) request clarifications and express concern to European countries and relevant institutions in cases of non-compliance with the agreed measures in the CMP;
c) submit cases in which countries and relevant institutions are not compliant with the agreed measures of the plan, and cases in which activities undermine the effectiveness of the CMP to the attention of the European Commission, through the Secretariat;
d) provide additional information, as it considers appropriate or as may be requested by the European Commission and EIFAAC, relating to the implementation and compliance with measures in the CMP;
e) monitor and evaluate the CMP, and formally propose adaptations to the CMP for consideration by the European Commission and EIFAAC; and
f) provide independent institutional and legal advice and submit biannual reports to the Commission to facilitate the adoption of adaptations to the CMP.

3. Composition of the Compliance Committee

The Compliance Committee shall be composed of one representative and one alternate of each European country. Experts and stakeholder organizations can be invited as observers.

The European countries shall finance the participation of their representatives and/or alternates to the Compliance Committee meetings.

Secretariat

1. The Secretariat will be responsible for official communications related to the implementation, review, evaluation and adaptation of the European Management Plan for the Great Cormorant, coordination with countries, international and regional stakeholders, and reporting to the European Parliament, European Commission and EIFAAC.

2. The Secretariat Terms of Reference are:
a) receive and transmit the official communications regarding the CMP;
b) maintain contacts with government officials, international and regional organizations concerned with the conservation and management of cormorants and fish and other aquatic species that are impacted by cormorant predations, to facilitate consultation and cooperation on all matters pertaining to the objectives of the CMP,
c) facilitate the preparation and implementation of the CMP, prepare budgets and ensure timely reporting to the European Commission, EP and EIFAAC;
d) participate in the formulation of proposals regarding the budget, the CMP and related activities;
e) stimulate interest among European countries and potential donors in the implementation of the CMP and in possible financing or in implementing cooperative projects and complementary activities;
f) promote, facilitate, and monitor the development and maintain the Cormorant Information Platform and regional databases on ecological, social

and economic information related to the population of cormorants and impacts on fish, fisheries and aquaculture;

g) coordinate and technically support the research, awareness-raising and capacity-building programmes in support of implementation of the CMP, when required;
h) organize meetings of the CMAG and Compliance Committee and other related ad hoc meetings;
i) prepare, or arrange for the preparation of, background documents and papers and report annually on the implementation of the CMP to the European Commission, EP and EIFAAC, and arrange for the subsequent publication of the annual reports; and
j) perform any other function, as may be required by the European Commission, EP and/or EIFAAC.

3. The Secretariat shall be composed of:

1. An Executive Secretary – responsible for implementation of policies and activities related to the CMP and reporting to the European Commission, EP and EIFAAC.
2. A Research and capacity-building Officer – responsible for database maintenance and management and facilitation of research, awareness-raising and capacity building on the CMP.
3. An Administrative Assistant – responsible for administrative and operational support related to implementation of the CMP.