EUROPE

Review of EIFAAC cormorant damage report

Wetlands International Europe – November 2026

Report available here.

Location	Statement	Comment
P. 1	residual population of great cormorants in Europe has grown to more than **two million birds**	A **residual population** means the population remaining after a decline, loss or removal—essentially a "remaining" or "remnant" population. In the case of the Great Cormorant, this would be the January numbers after most of the fledged juveniles died. The best published broad-scale estimate places the mid-January great cormorant population at slightly over one million birds in 2013 across the European and adjoining wintering range (van Eerden et al., 2022). More recent preliminary EU reporting indicates approximately 517,000–651,000 wintering birds within the EU; an updated continental estimate awaits a new coordinated census. The two million birds is a plausible estimate for a post-fledging population in around August, but this will quickly decline to around 1.2–1.5 million birds.

P. 1	Published scientific evidence from peer-reviewed journals indicates that the current levels of cormorant predation of fish are negatively impacting aquatic biodiversity.	No evidence is quoted.
P. 1	One such protected species that has experienced drastic decline, and where countless unique populations (river specific) have been lost, is the grayling (*Thymallus thymallus*). Overwhelming evidence indicates that the direct and only cause for the decline is predation by cormorants. Studies have also found significant negative impacts on the populations of brown trout (*Salmo trutta*), Atlantic salmon (*Salmo salar*) and eel (*Anguilla anguilla*).	Statement without supporting evidence. Instead of overwhelming evidence, the IUCN Red List includes the following statement for grayling (Least Concern in Europe): "This species' decline has primarily been driven by river regulation and other forms of habitat degradation, which have resulted in widespread loss of the heterogeneous, interconnected fluvial habitats required to complete its life-cycle. [...] Predation pressure from piscivorous birds, particularly Great Cormorant (Phalacrocorax carbo), is **believed** to represent a significant threat at **some sites**." Brown Trout (Least Concern in Europe): predation is not listed as a threat to the species in Europe in the IUCN Red List indicating that there is no strong evidence for this threat. Atlantic Salmon (Vulnerable in Europe): The IUCN Red List also does not mention cormorants or predation as an important threat to this species in Europe. European Eel (Critically Endangered): The IUCN Red List notes: "Predation also represents a threat to A. anguilla and is increasingly being discussed in relation to competition with commercial and recreational fisheries. Cormorants in

		particular have been a focus of recent research, which has found eel consumption by cormorants to be of a similar quantity to that of fishery landings in both the Baltic Sea (Hansson et al. 2018) and some lakes in Sweden (Ovegård 2017). Human factors may exacerbate the threat. Under experimental conditions, acoustic disturbance has been found to reduce anti-predation behaviour in eels, affecting likelihood of survival (Simpson et al. 2015). Unsustainable exploitation is a threat to the species". But the overall level of threat is assessed as unknown.
P. 1	Many of these businesses have had to stop their income-earning activities because regulations prohibit practical methods to reduce cormorant predation	This statement is not supported by any evidence in the document.
P. 1	Cormorant predation also cancels out the positive effects of river restoration	This statement is not supported by any evidence in the document.
P. 1	The migratory aspects of both the cormorants and the river-dwelling fish they prey upon indicate that the cormorant problem cannot be solved at the national level alone.	This statement is not provided by any evidence. Bregnballe et al. (2015) actually show why pan-European management is unrealistic and unnecessary.
P. 6	Breeding birds have an average daily food intake of 0.8 kg/day, according to some studies, while chicks have an intake of more than 0.3 kg/day (Grémillet *et al.*, 2003; Keller and Visser, 1999; Ridgway, 2010; Dehnhard *et al.*, 2021). Therefore, a conservative estimate of the mean daily food intake by cormorants is 500 g/day, which is applied in this inventory.	These statements conflate different biological quantities and study contexts, and therefore do not justify describing 500 g per bird per day as a conservative population-wide estimate. The issue is not whether cormorants can take approximately 0.8 kg of fish in a day, but what that quantity represents and whether it can legitimately be extrapolated to the population and period covered by the inventory. Grémillet (1997), a possible source of the 0.8 kg figure, reported mean daily food intake of approximately 828 g in males and 829 g in females during breeding, with intake

		increasing with brood biomass. These results concern parental food acquisition during chick rearing, including food subsequently delivered to chicks; they should not be presented as the adults' own consumption or as a representative average for all breeding birds. Applying such a figure to adults while separately adding chick consumption would risk double counting the food provided to the brood. The cited references do not resolve this problem. Grémillet et al. (2003) modelled the requirements of wintering Great Cormorants at Loch Leven, rather than measuring food intake by breeding adults or chicks. Comparisons with breeding birds in its discussion do not constitute independent estimates for those categories. Keller and Visser (1999) likewise studied wintering birds, estimating daily food requirements of 539 g for free-ranging individuals; this is not evidence for either an average breeding-adult intake of 800 g or chick intake exceeding 300 g. On the citation chain identified here, Dehnhard et al. (2021) reuses Ridgway's estimate rather than providing independent corroboration. Ridgway (2010) is itself a review covering multiple cormorant species, not a direct measurement of the particular population assessed in this inventory. Consequently, the word "therefore" conceals an unsupported inference: selected estimates from different seasons, reproductive stages and species do not establish a

		population-wide mean, nor do they demonstrate that choosing 500 g/day will underestimate consumption. A value around 500 g/day has been used as a broad working approximation in the INTERCAFE guidance, but that guidance explicitly recognises substantial variation with season and behaviour. The 500 g/day is necessarily wrong, but its claimed conservatism has not been demonstrated. It only demonstrates the lack of scientific rigour in this review.
P. 6	This study applied an average fish price of EUR 4/kg, unless detailed national average fish prices by species were available. The price of fish per kilogram varies considerably by species, stage in the life cycle and country. Off-farm prices from aquaculture farms and landing site prices from fisheries are the most suitable for assessing the value of fish per kilogram in Europe. FAO annually collects off-farm fish prices (see Chapter 6, section 6.1) and has price data from various landing sites. In general, there are price linkages between capture fisheries and aquaculture for species supplied by both sectors. Asche, Roll and Tveterås (2025) have demonstrated evidence of market integration and substitution. Aquaculture expansion increases the supply and places downward pressure on the prices of capture fisheries, thus confirming direct competition for the same species. However, the degree of competition varies by market structure, product form (for example, live carp fetches a higher price in Eastern European countries) and quality differentiation. Farmed and wild products are	The use of farm-gate and landing-site prices is appropriate for valuing commercial output, but does not substantiate the default EUR 4/kg assumption. The passage should document the derivation, reference year, coverage and weighting of that value. Its concluding inference also confuses market integration with price equivalence: linked markets can retain substantial price differences. Most importantly, prices should be applied to attributable losses of commercial production, not automatically to all biomass consumed by cormorants. Recreational losses require a separate valuation framework. Unless these distinctions are addressed, the resulting figures should be presented as assumption-dependent valuations of consumed biomass rather than demonstrated economic damage. These weaknesses **substantially undermine the study's headline economic estimates as measures of attributable fisheries damage**. The concern is not simply uncertainty over the EUR 4/kg assumption, but the failure to

	increasingly part of a single, interconnected market system, and thus have similar market prices.	establish a consistent relationship between fish consumed and commercial or recreational benefits lost. Unless that relationship is demonstrated elsewhere in the analysis, the affected totals should be treated as assumption-dependent consumption-value proxies, not validated estimates of economic damage. Independently substantiated losses should be assessed separately.
P. 7	Predation risk from birds, such as cormorants and herons, and mammals, such as otters, induces strong anti-predator responses in fish, including inactivity, refuge use, and reduced foraging. These responses can suppress feeding, thereby reducing growth and biomass production, although such effects are rarely quantified directly. Various scientific studies have shown significant effects of predators on fish stress, feeding behaviour, fish biomass growth and fish health (Kortan *et al.*, 2010; Kortan and Adamek, 2011; Kortan, Adámek and Flajšhans, 2008; Klenke *et al.*, 2013; Ovegård *et al.*, 2021; Petersson and Järvi, 2006). Experimental studies show that predation risk can reduce feeding rates in fish by approximately 20–60 percent, with typical values around 30–40 percent (Lima and Dill, 1990; Sunardi, Manatunge and Fujino, 2007). Nevertheless, there is still little scientific evidence tying cormorant presence to fish biomass through non-consumptive stress pathways because such studies are largely lacking. It is clear, however, that predator-induced stress produces measurable physiological and behavioural changes in fish,	The cited literature supports behavioural responses, injuries and some changes in fish condition associated with predator exposure, but **does not establish a general quantitative relationship between cormorant consumption and additional stress-mediated harvest losses**. The refuge studies primarily demonstrate reduced predation, not an isolated effect of stress on growth. The empirical derivation and denominator of the Czech 25% coefficient, published only in a ministry document and not in a peer-reviewed scientific journal, must therefore be documented before its validity can be assessed. Its Europe-wide application, justified by the absence of alternatives and respondent agreement, should be treated as an **unvalidated scenario assumption rather than an evidence-based correction to economic damage**.

	including reduced feeding, growth and increased energetic costs, but these responses are context-dependent and cannot be easily generalized into fixed, quantitative growth effects (Sopinka *et al.*, 2017; Iwama, Afonso and Vijayan, 2006; Lima and Dill, 1990). Fish farmers often reported side effects of fish predation by cormorants, such as hiding behaviour, injured fish, reduced feed intake and slower fish growth. Experiments to reduce the predation impact in aquaculture pond systems and angling club waters with artificial refuges have shown positive results in reducing fish stress (Lemmens *et al.*, 2016; Russell *et al.*, 2008), also demonstrating that stress impacts fish behaviour and biomass. To account for predation-related fish stress and its consequences for fish growth, a corrective (stress) factor has been applied in addition to the average price of fish. A stress factor (stressor) in fish is any environmental or internal factor that disrupts normal physiological and behavioural processes. This requires the organism to expend energy to maintain balance, often resulting in reduced feeding, growth and health (Barton, 1991; Schreck, Contreras-Sánchez and Fitzpatrick, 2001; Schreck, 2010; Kortan *et al.*, 2010). Based on research conducted in Czechia, a stress factor of 25 percent was applied to better reflect the effects of cormorant predation on the fish harvest and, consequently, the damage caused by predation to the output of aquaculture and inland capture fisheries (Ministry of Agriculture of the Czech Republic,	

	2023). Given the absence of other examples and in view of the general agreement for this approach by survey respondents, the stress factor was applied European-wide.	
P. 7	In this inventory, damage is defined from an economic perspective as the quantifiable monetary loss of assets, production and income resulting from cormorant predation. Economic damage comprises both direct and indirect components. Direct damage refers to the immediate and measurable loss of fish biomass through consumption or injury of fish, corresponding to the loss of physical production assets. Indirect damage (or losses) refers to subsequent reductions in economic performance resulting from predation pressure, such as reduced growth, lower production yields, lost revenues, increased production costs, and impacts on the economic viability of fisheries and aquaculture operations. This distinction aligns with established economic frameworks, where direct losses represent the value of destroyed assets or production, and indirect losses reflect declines in output or income arising from these initial impacts (see also UNDRR, 2017).	The distinction broadly resembles UNDRR's separation of physical asset damage from subsequent economic losses, but **its application here is insufficiently specified**. Consumed or injured biomass is not automatically equivalent to lost commercial production, particularly in capture fisheries where fish populations can compensate reduced density with increased growth (that is why fisheries apply thinning harvest to stimulate growth to more marketable size). Reduced growth, lower yield, lost revenue and reduced profitability may represent **overlapping consequences of the same predation event and cannot be added without reconciliation**. The inventory should identify its accounting measure, demonstrate losses against an explicit counterfactual and explain how double counting is prevented. Citing UNDRR supports the general classification, not the validity of the inventory's valuation method. undrr +2
P. 8	D = C × P × S (1 + α) D = daily predation damage per bird (EUR/day) C = daily fish consumption per bird (kg/day) P = average price of fish (EUR/kg) S = stress factor α = proportional stress-related loss (e.g. 0.25 = 25 percent)	This formula is mathematically incorrect. The correct formula would be D=CP(1+α) as S = (1+a). The formula assumes that stress-related monetary losses **are always proportional to the priced biomass consumed**. That is a strong assumption: it implies the same

	Applying the values presented above, this would result for cormorants in: D = 0.5 × 4 × 1.25 = 2.5 EUR/day per bird Direct damage is represented by C × P Indirect damage (stress effects) = S = 1 + α	relationship regardless of fish species, stocking density, habitat, refuge availability or frequency of disturbance. For example, Great Cormorants consume the invasive round goby (*Neogobius melanostomus*) in the Baltic Sea, where 72% of the EU population breeds, sometimes as a substantial component of their local diet. Total fish consumption therefore cannot automatically be interpreted as loss of native fish or commercially targeted stocks.
P. 8	T = N × O × D N = number of individuals (i.e. cormorants) O = number of days per year with occurrence (days/year) D = daily damage per individual (EUR/day) (from the first formula above) T = total annual predation damage (EUR/year) Example: If there are, on average, 1 000 cormorants in a country for some 200 days per year (on average), the estimated total annual predation damage would be EUR 500 000. T = 1 000 × 200 × 2.5 = 500 000 EUR/year	The equations correctly calculate the numerical output from the stated assumptions, but **do not establish attributable economic damage**. The problems with the D factor are already demonstrated above. The N x O works only with the correct definition of abundance. Bird days should be correctly calculated as $$B = \sum_{t=1}^{x} N_t$$ where N_t is the number present on day t and x is the number of days cormorants are present. The shortcut $B = NO$ is equivalent only when the mean and duration are defined consistently. A peak count, breeding-population estimate, number of different birds visiting during a year or annual mean cannot be substituted indiscriminately for N. It makes the report's estimates

		particularly problematic that it does not accurately account for the annual population dynamics of the species. Unless these conditions are demonstrated, EUR 500,000 should be reported as an assumption-dependent model output rather than a measured annual economic loss.
P. 9	Wintering populations are more widely distributed, with major concentrations in western and southern Europe. **Sweden reports the highest number of cormorants (149 534; 18 percent)**	EU Member States reported the following numbers to the European Commission in their Article 12 reports in 2024: **Sweden: 18,000–30,000 individuals**. This raises serious questions about the validity of population estimates used in this report.
P. 10	Economic damage is highly concentrated. Denmark reported the highest annual damage (EUR 91.8 million; 13.7 percent of total), followed by Sweden (EUR 80.7 million; 12.0 percent), Norway (EUR 46.4 million; 6.9 percent), Romania (EUR 44.7 million; 6.7 percent) and Estonia (EUR 44.2 million; 6.6 percent). These five countries account for approximately 46 percent of the total estimated damage of EUR 671.9 million caused by cormorant predation on fish in the 26 countries that provided data. Overall, the results indicate a strong geographical concentration of both populations and impacts. Northern Europe hosts the largest breeding colonies, while wintering aggregations and associated economic impacts extend across the western, southern and eastern regions of Europe.	The claim that "economic impacts extend across the western, southern and eastern regions of Europe " is contradicted by the claim in the previous paragraph that 46% of the economic damage is concentrated in just five, mostly Northern European countries. Another example of unsubstantiated, bombastic claims that have no place in a (supposedly) scientific report.

P. 17	Overview of damage types	None of the statements is supported by any evidence.
P. 17	The inventory survey, additional information collected and the Framework for a European Management Plan for the great cormorant (FAO, 2026) indicate that cormorant predation affects a wide range of freshwater and coastal fish species, with impacts varying by habitat and life stage. The surveys conducted for this inventory revealed that the most affected species in inland waters include salmonids (Atlantic salmon and brown trout, particularly smolts), grayling, cyprinids such as barbel, breams, roach and bleak, percid species such as perch and pike-perch, as well as sturgeon species such as sterlet. In lakes and rivers, juvenile and stocked fish are especially vulnerable. In coastal and transitional waters, significant impacts are reported for eel, perch, pike, flounder and cod, with evidence that cormorants can consume a substantial proportion of local stocks.	Reference is provided to **FAO.** 2026. *Framework for a European Management Plan for the great cormorant*. EIFAAC Occasional Paper, No. 61. Rome. However, the results of the survey were never made available for scrutiny. The review of the FAO (2026) document has revealed serious problems with the damage estimations, including misquoting the results of studies, and it cannot be called solid evidence.
P. 17	Predation pressure is particularly critical for threatened and endangered species (e.g. *Zingel* spp., *Gymnocephalus* spp., *Romanogobio* spp.) and restocked species (e.g. *Acipenser* spp.), where losses can hinder stock recovery or reintroduction efforts. Overall, the species most affected by cormorant predation in Europe are typically those of high ecological or economic value, especially where populations are already depleted or concentrated in accessible habitats, increasing their vulnerability to predation.	

P. 18	Across Europe, **additional stocking of fish has become a widespread mitigation response to compensate for losses caused by cormorant predation** and to sustain fisheries production. The data collected for this inventory indicate that recreational fisheries organizations and aquaculture operators increasingly rely on repeated stocking to maintain fish populations and angling yields, particularly for salmonids, cyprinids and other high-value species.	The statement conflates long-established fish-stocking practices with additional stocking specifically undertaken to compensate for cormorant predation. Unfortunately, EIFAAC or other fisheries organisations do not routinely collect stocking data to confirm or debunk this claim. Cowx (2025) states that "Information on quantities and value of fish stocked into inland waters is sparse and rarely held in central databases". Nevertheless, EIFAC's 1981 questionnaire, published in 1982, found that stocking streams, rivers, reservoirs and lakes was "a common practice" in all 13 responding countries. Brown trout was stocked in 11 countries, rainbow trout and pike in eight, and eel and common carp in seven (EIFAC, 1982, Appendix III). A subsequent EIFAC survey identified numerous stocking objectives, including compensation for human disruption of the life cycle, maintenance under environmental or fishing pressures, enhancement above naturally sustained production, put-and-take angling, repopulation and conservation (EIFAC, 1994, Annex 6, Appendix 1). FAO's synthesis likewise identified environmental damage, recruitment overfishing, production enhancement and conservation as major reasons for stocking (Welcomme and Bartley, 1998, section 2.2.1). These publications demonstrate that widespread stocking (and the stocking of salmonids, carp and other

		valued species) cannot itself be treated as evidence of a response to cormorant predation. Any assertion that fisheries "increasingly rely" on additional stocking because of cormorants requires separate, time-referenced evidence distinguishing such releases from routine production, harvest replacement and other stocking objectives, and the fisheries industry is currently unable to provide any of these. Hence, this is just another propagandistic statement without any supporting evidence. On the other hand, Welcome & Bartley (1998) clearly stated in Section 2.2.1: "As more conventional approaches to management by **control of the fishery have proved incapable of limiting effort**, compensation for shortfalls in recruitment caused by overfishing and environmental damage has been sought through the addition of young fish to the system." There are very few national time series of stocking statistics available publicly. Where comparable time-series evidence is available, it shows **declines** in several stocking programmes—not a consistent increase. The clearest examples located are Danish brown trout and Czech catfish and eel. However, these series mostly end in 2017–2018 Cowx, I. G. (2025). *Fish stocking in inland waters in Europe and Central Asia: Issues and solutions* (EIFAAC Occasional

		Paper No. 54). Food and Agriculture Organization of the United Nations. https://doi.org/10.4060/cd4844en European Inland Fisheries Advisory Commission. 1982. *Report of the Symposium on Stock Enhancement in the Management of Freshwater Fisheries. Held in Budapest, Hungary, 31 May–2 June 1982 in conjunction with the Twelfth Session of EIFAC.* EIFAC Technical Paper No. 42. Rome, FAO. 43 pp. Relevant location: Appendix III, "Summary of responses to the questionnaire on stocking fish in Europe" European Inland Fisheries Advisory Commission. 1994. *Report of the Third Session of the Working Party on Stocking, Thonon, France, 15–19 November 1993.* EIFAC Occasional Paper No. 28. Rome, FAO. 47 pp. Welcomme, R.L. & Bartley, D.M. 1998. "An evaluation of present techniques for the enhancement of fisheries." In T. Petr, ed. *Inland fishery enhancements*, pp. 1–35. FAO Fisheries Technical Paper No. 374. Rome, FAO.
P. 18	The Framework for a European Management Plan for the great cormorant (FAO, 2026) confirms that intensive stocking has become a key, but costly, compensatory measure, with many rivers and lakes requiring continuous restocking to sustain fisheries and biodiversity objectives.	That document has not established anything supported by any evidence, only shared unsubstantiated opinion.
P. 18	Reported costs vary widely but are substantial: angling organizations in several countries collectively spend	This statement lacks any supporting evidence.

	millions of euros annually on stocking programmes, often financed through licence revenues and volunteer contributions, while aquaculture operators incur additional costs to replace lost biomass and maintain production levels. In some cases, individual organizations report additional annual stocking expenditures exceeding EUR 100 000, particularly in systems supporting salmon, trout and carp fisheries.	
P. 19	Egg oiling is considered less disruptive than nest destruction because it reduces the likelihood of re-laying and repeated breeding attempts.	The claim that egg oiling is 'less disruptive' than nest destruction is not well supported as written; the cited advantage is its greater effectiveness, since incubating adults commonly do not re-lay in the same season (CorMAN).
P. 19	An analysis of the country summaries indicates that predation can result in production losses of 10–50 percent at the farm level, with juvenile fish and extensively managed ponds being particularly vulnerable. Hectare-based estimates from several countries suggest losses of around EUR 500–600/ha are common, which, when extrapolated to national pond areas, align with reported country-level damages.	CHECK IF THIS IS SUPPORTED BY DATA IN THE ANNEX
P. 20	At the European level, off-farm freshwater aquaculture production is valued at approximately EUR 2.08 billion annually, with an estimated 469 000 ha of ponds and millions of cubic metres of raceways, recirculation and cage culture systems. However, the 16 countries that have reported on aquaculture damages and included in Table 3 represent only a portion of this total area, and major	The extrapolation from EUR 138 million to EUR 250 million is not shown and **rests on an unsupported assumption of "similar pressure levels".** It treats the reported damage as a representative sample, although Table 3 combines modelled and survey-based figures from different years (Romania 2014–19, Greece 2011–20). In addition, the statement contradicts the earlier statement on P. 9: “Türkiye

	producers such as Ireland, Italy, Portugal, Türkiye, the United Kingdom and several Eastern European countries are only partially or not covered at all. Given that reported damages in covered countries already exceed EUR 138 million annually, and assuming similar pressure levels across the broader pond aquaculture area, total predation-related losses for European aquaculture are likely around EUR 250 million per year.	reported that the overall impact on fish stocks and fish farming is 'relatively low' because hunting of the species is permitted". Table 3 also lacks damage values for Austria, Denmark, Norway and the UK, so the "16 countries" cannot be matched to the table. The EUR 138 million total (EUR 122.9 million pond plus EUR 15.1 million other) mixes pond and non-pond systems that the text itself says have very different loss rates (1–2% for trout raceways, 10–30% for ponds). The text also cites EUR 200–300 million as the "range" without any uncertainty analysis.
P. 20	The analysis is biased towards pond aquaculture impacts, which underrepresents higher-value aquaculture segments. Raceway and cage farms, particularly for rainbow trout and other salmonids, experience lower percentage losses (often 0.1–2 percent) but much higher unit values, with off-farm prices exceeding EUR 6/kg in 2024, compared to around EUR 3–4/kg for carp species. Even small proportional losses in these systems, therefore, translate into significant economic impacts. For example, Danish trout farms report combined predation and mitigation costs approaching EUR 0.7 million annually, for a relatively small production base. When such higher-value systems are scaled across Europe – including underreported or non-reporting countries, such as Bosnia and Herzegovina, Italy, Portugal, Spain, Türkiye	The claim that the pond-weighted analysis is biased, and that the EUR 250 million "central estimate" is therefore realistic, is not supported by the report's own evidence. Table 3 reports EUR 122.9 million for pond farming and only EUR 15.1 million for other aquaculture, from just a handful of countries, so the stated bias is a gap in coverage that the authors never turn into a calculation. Raceway and cage losses of 0.1–2% on fish worth about EUR 6/kg give a lower value loss per tonne than the 10–30% pond losses on carp at EUR 3–4/kg, so the premise that small proportional losses "therefore" mean significant impacts does not follow. The Danish example also undercuts the argument. Denmark's EUR 689,000 is damage alone, not the "combined predation and mitigation costs" stated, and it shows a small impact on

	and the United Kingdom – and combined with pond-based losses, as well as additional data on brackish- and marine water aquaculture losses, a central estimate of approximately EUR 250 million per year represents a realistic and balanced midpoint within a broader EUR 200–300 million range.	a small production base. The scale-up names countries that are already in Table 3 with low or zero values (Spain at EUR 2.7 million, the UK salmon sector at zero), and it adds no quantified contribution from Italy, Portugal, Bosnia and Herzegovina, or brackish and marine systems. It also counts Türkiye, which told the secretariat that the overall impact there is relatively low because hunting is permitted. A range of EUR 200–300 million that merely brackets the chosen figure is not a method, so the EUR 250 million should be presented as an unvalidated expert judgement, and not as a "realistic and balanced midpoint.
P. 20	The total annual loss of aquaculture production attributable to cormorant predation in Europe is estimated at 50 000–75 000 tonnes, with a central estimate of approximately 62 500 tonnes per year. Given incomplete country coverage and underreporting in several major European aquaculture-producing countries, this estimate should be considered conservative, with actual losses potentially higher, particularly in high-value aquaculture systems and countries with limited data availability.	The claim that cormorants cause 50,000–75,000 tonnes of aquaculture losses a year, with a central estimate of 62,500 tonnes, is described as "conservative" but is neither derived nor independently supported. No calculation is presented, and the figures match the euro estimate divided by the report's default price of EUR 4/kg (EUR 200–300 million gives 50,000–75,000 tonnes, and EUR 250 million gives 62,500 tonnes). The tonnage is therefore a restatement of an unvalidated EUR 250 million extrapolation, which is itself built on EUR 138 million of heterogeneous reported damage and carries no uncertainty analysis. The conversion is also internally inconsistent. The EUR 4/kg default is below the report's own 2024 average off-farm price of EUR 5.68/kg, which would overstate tonnes. The damage values also include a 25% stress uplift that represents reduced growth, not fish removed from ponds, which further inflates the weight. Calling the figure conservative because of

		incomplete coverage ignores these upward biases, so the number should be presented as an order-of-magnitude judgement and not as an estimate with a central value.
P. 21	More than 130 aquaculture farmers from several European Union countries reported individual farm losses owing to cormorant predation (over one or more years), confirming and extending earlier estimates. Across countries, losses per farm range from around EUR 500 to more than EUR 1 million annually, with typical values around EUR 30 000–100 000 per farm. Pond-based systems are most affected, with losses generally ranging from EUR 100/ha to over EUR 600/ha, and even higher in heavily impacted areas. Reported stock losses vary widely, with average annual losses of 10–20 percent in carp, tench and mixed-species ponds, but reaching 30–70 percent in extreme cases. In contrast, trout raceway systems typically experience 1–2 percent annual losses, increasing to 40 percent of the trout stock in large-sized pond production systems. Some farmers using cage culture systems in marine waters, such as in Cyprus, Greece and Spain, reported damage caused by cormorants; however, these losses were minor compared to the damage caused to freshwater pond farming.	The report assembles more than 130 farm-level reports, yet it presents only pooled ranges and "typical" values, so the obvious question is why this sample was not analysed properly. The report gives no breakdown of farms by country, region, production system (carp ponds, trout ponds, raceways, cages), species or pond size. It does not report the number of farms per stratum, the means and medians with dispersion, or the years covered. A range of EUR 500 to over EUR 1 million per farm and 10–70% stock loss spans more than three orders of magnitude and says little without that stratification. The authors acknowledge that the data quality is uneven, from detailed pond-level records to "guesstimates" (Preparation of this document), but they did not weight, flag or separate the two kinds, nor test how much that heterogeneity drives the results. Obvious analyses were skipped. Loss per hectare or per tonne could have been modelled against region, system, predator pressure (cormorant days) and mitigation effort, with a mixed model and country as a random effect to handle the clustering of farms within countries. Farm records could also have been used to derive loss rates with confidence intervals that would feed the national and European extrapolations. Instead the report uses one assumed EUR 4/kg price and a flat 25% stress factor, and it offers no uncertainty on the EUR 250 million total. A sample of this

		size should have supported an empirical estimate with confidence intervals. As presented, it serves only as illustrative anecdotal figures. It is missed opportunity to better target damage prevention measures and it only serves the predefined purpose of advocating for Pan-European management of cormorants.
P. 22	Reported income losses in pond aquaculture attributed to cormorant predation are often the difference between a profitable and a loss-making business (Halasi-Kovács, Gyalog and Békefi, 2023; FAO, 2024a, 2024b; Engle *et al.*, 2021). However, economic viability is also influenced by administrative and regulatory constraints, including limited flexibility in applying timely control measures, permitting procedures for derogations, and compliance with environmental legislation, which can delay or restrict effective responses to predation (FAO, 2024b). Together, these factors have contributed to reduced profitability for pond farming in several countries. The number of pond aquaculture farms that have ceased operations in Europe is unknown. In the survey conducted for this inventory, many pond aquaculture farmers and some cage-culture operators indicated they are disinvesting or shifting towards more extensive, lower-risk production systems, as the combined pressures from predation by great cormorants and other protected species, such as herons (with estimated annual losses of around EUR 48 million across	The passage's central claim, that cormorant losses are often the difference between a profitable and a loss-making pond farm, is stated far more strongly than its references allow. The Hungarian manuscript is unpublished and cannot be validated at this moment. The FAO documents represent only workshop participants' opinions but are not independently validated. The Engle paper is a US study of double-crested cormorants on catfish farms, so it is a different species and farming system, and it supports only the direction of the claim, but not its relevance in the European context. The text then admits that the number of farms that have closed is unknown, so "contributed to reduced profitability" rests only on respondents' perceptions. The heron loss of EUR 48 million has no method or source, and the passage names pygmy cormorants and otters without any evidence.

	Europe), pygmy cormorants and otters, have increased production risks.	
P. 22-23	Cormorant predation represents a substantial and quantifiable economic pressure on inland fisheries (recreational/angling and commercial) across the EIFAAC membership area, although reported estimates remain uneven and often incomplete. Based on the overview in Table 4, countries that provide explicit monetary estimates for inland fisheries report combined damages of approximately EUR 90–100 million annually, including major contributions from France (EUR 27.6 million), Germany (EUR 27 million), Poland (EUR 23 million), Slovakia (EUR 6.25 million), Czechia (EUR 3.65 million) and the Kingdom of the Netherlands (EUR 3.0–3.5 million) (Table 4). These figures are derived using different methodologies, including bioenergetic consumption models (bird numbers × feeding days × value of fish consumed), structured surveys of angling organizations and expert-based valuation of stock losses. In the largest reporting countries, estimation approaches are relatively robust. In France and Germany, damage assessments are primarily based on fish consumption by cormorants, converted into economic values using species-specific price data and supported by national fisheries statistics and angling data. In Poland, estimates reflect aggregated reports from angling clubs and fish farms, capturing both direct predation losses and reduced catch opportunities. In Czechia, estimates combine population	The argument in whole section has several internal and logical problems. The central problem is that **the headline figure depends on an arbitrary assumption**. The 10–20% allocation of the EUR 600+ million stock-level damages to inland fisheries has no stated empirical basis. Those estimates come mainly from Denmark, Sweden, Estonia, Romania and Finland, where coastal and marine foraging is often dominant, so the inland share could be well outside that range. The **arithmetic also does not reconcile**. EUR 90–100 million plus EUR 60–120 million gives EUR 150–220 million, but the central value of EUR 180 million is not derived from anything. The text calls this a "conservative" extrapolation, yet it adds a speculative component to the reported total and then reports the result as an estimate. The **method for the damage figures is also weak**, and the text treats it as strong. The bioenergetic model (bird numbers × feeding days × value of fish consumed) measures fish consumed, not economic damage. It ignores compensatory mortality, since many prey fish would have died anyway. It also ignores that cormorants eat non-commercial species, and that consumed fish are not equivalent to lost angler or landing value. Fish are valued at

	data with daily consumption values (EUR per bird per day) and are cross-validated with angling association data, which report additional damages of EUR 3–4 million annually to recreational fisheries alone. These examples demonstrate that, where data are available, damages to inland fisheries are both economically substantial and methodologically grounded. However, many countries reported only aggregate estimated damage to fish stocks (often including inland and coastal waters and aquaculture) without separating inland fisheries impacts. These estimates, primarily based on the bioenergetic consumption model explained above (see Chapter 2, section 2.2, and Chapter 3), are substantial, exceeding EUR 600 million annually across reporting countries, and include major contributions from Denmark (EUR 91.7 million), Sweden (EUR 80.7 million), Estonia (EUR 44–46 million), Romania (EUR 44.7 million) and Finland (EUR 40–43 million). Given that inland fisheries represent an important component of these fish resources, a proportion of these losses can reasonably be attributed to inland fisheries impacts. The total annual (landing site) value of European inland capture fisheries is estimated at EUR 716– 739 million. Comparing this with reported and inferred losses suggests that cormorant predation constitutes a significant share of the sector's economic value. A conservative extrapolation can be made by combining: (i) the EUR 90–100 million in explicitly reported inland fisheries damages; and (ii) a	price, but the value to the fishery depends on whether the lost fish would have been caught. The paragraph then calls the French and German approaches "relatively robust" and "methodologically grounded", although the stated methods are based on consumption and prices. Poland's figures come from aggregated club and farm reports, which are subjective and may overstate losses. Mixing aquaculture, which is a different sector, with inland capture fisheries risks double counting and inflates the total. There are further problems with comparability and the final ratios. The country figures use different methods, such as consumption models, surveys and expert valuation, and they should not be summed as if they were commensurable. The Czech cross-validation is circular if the angling association data and the model share the same assumptions. The text also adds "indirect effects (stock depletion and behavioural changes)" to the range without quantifying them, which risks counting the same losses twice. The 21–31% ratio is the weakest claim. It **compares "apples with oranges"**: damages with the landing-site value of EUR 716–739 million. That value covers commercial landings and may not include recreational fisheries, so the numerator (which includes angling losses) and the denominator do not cover the same thing.

	partial allocation (approximately 10–20 percent) of the broader fish stock damage estimates to inland fisheries. Applying this proportion to the EUR 600+ million stock-level damages yields an additional EUR 60–120 million attributable to inland fisheries. On this basis, the total economic damage caused by cormorants to inland fisheries in Europe is estimated at approximately EUR 150–220 million annually, with a central estimate of around EUR 180 million. This range reflects both direct losses (consumption and reduced catches) and indirect effects (stock depletion and behavioural changes), while acknowledging uncertainties due to incomplete reporting and methodological differences. Overall, cormorant predation represents a major structural constraint on the productivity and economic performance of inland fisheries across the EIFAAC region. The overall damage caused by cormorants to inland fisheries in Europe ranges between 21 percent and 31 percent of the landing site value. These percentages do not include the lost added value that would have been generated along the value chain, nor the value that could have been generated by recreational fisheries stakeholders.	The **conclusion that cormorants are a "major structural constraint" is a causal claim that the evidence cannot support.** Fish stocks are also shaped by habitat, water quality, barriers, fishing pressure, invasive species and climate. The argument shows that cormorants eat fish and assigns a price to that, but it does not show that they cause measurable population-level or economic loss.
P. 25	Cormorant predation has increasingly important implications for fish availability, food supply and food security in Europe, particularly in inland and freshwater systems. The European cormorant population of approximately 2 million birds is estimated to consume approximately 365 000 tonnes of fish annually (i.e. 1 000	**The statement is arithmetically sound but conceptually overreaching**. The calculations check out: 365 000 t is about 1 000 t per day, and dividing by 22 kg per person gives roughly 16.6 million people. **The problem is what the numbers are made to mean.**

	tonnes per day). This is equivalent to the annual fish consumption of around 16 million people, based on an average per capita intake of 22 kg/year (the EU average in 2023). The total economic value of fish consumed by cormorants in Europe exceeds EUR 1 billion annually, representing a substantial impact on the production of aquatic food systems for human use.	The 365 000 t is a modelled gross consumption figure (about 0.5 kg per bird per day across the whole population), not a measured quantity, and it carries substantial uncertainty arising from assumptions about daily intake, bird-days of presence, and the age structure of the population. The figure of "approximately 2 million birds" also needs a stated scope. It mixes breeding and wintering birds. As we pointed out earlier, this calculation is deeply flawed. It is based on the invalid premise of multiplying the number of breeding pairs by 4.5, a value not supported by any evidence. Even if the numbers can reach such a level for a short period immediately after fledging, a large proportion of fledged juveniles die before the mid-winter census. The mid-winter census has never produced an estimate substantially exceeding 1 million birds. Hence, this estimate is about twice as high as it would follow from the actual population size and **should not be taken as a valid estimate of fish consumption**. **The larger flaw is the implied equivalence between fish eaten by cormorants and fish lost to human food supply.** Much of the prey is small, low-value or non-commercial (roach, perch, ruffe, gobies), and a large share is taken in marine, coastal and brackish waters rather than in inland fisheries, despite the claim about "inland and freshwater systems". Much of the prey would also have died from other causes (compensatory mortality), and the fish would never have been caught or eaten by people.

		The "16 million people" comparison is therefore a rhetorical scale, not a food-security impact. Food security is also a question of access, price and supply chains, and European inland capture fisheries and aquaculture supply only a small fraction of consumption, which is dominated by imports and marine fish. The European Environment Agency estimates that just the EU fisheries sector (not including Norway, Turkey, Russia, Ukraine) discards 360,000 tonnes annually, which is alone the same magnitude as the cormorant consumption for the whole of Europe. **The "EUR 1 billion" value is a gross replacement value of fish consumed at market prices. It is not an economic loss**, because it is not net of compensatory mortality and does not reflect the value of species that are actually harvested. It also conflicts with the document's own more modest damage estimates (EUR 150–220 million for inland fisheries), which shows the two figures answer different questions. "Increasingly important implications" is also unsupported, since the continental population has been stable or declining in many regions since the 2000s. A defensible version would give consumption as a modelled range, separate inland from marine, state the scope of the population, drop the food-security equivalence, and present

		the monetary value as gross consumption value rather than economic damage.
P. 26	This predation occurs in a context where European production is already constrained. Freshwater aquaculture production amounts to approximately 493 000 tonnes annually, while inland capture fisheries contribute about 155 000 tonnes to total fish and fisheries production in Europe. Comparing these production figures with the annual fish consumption by cormorants shows that the consumption of fish by these birds equals about 74 percent of freshwater aquaculture production and is more than double the annual inland capture fisheries landings across Europe.	**This is another, bombastic but meaningless comparison.** The **numerator** is a modelled gross consumption figure for the whole cormorant population. It includes marine, coastal and brackish waters (the Baltic and North Sea coasts hold a 72% of the EU breeding population, which is about 50% of the European one), includes non-commercial and small-bodied species, and fish of sizes and species that would never be harvested. The **denominators** are harvest statistics for a specific sector: freshwater aquaculture output and inland capture landings. Dividing one by the other implies that the fish eaten could have been landed or sold, which is false. Wild fish consumed are not a standing stock that fishing would otherwise have harvested, because much of that mortality is compensatory (fish that would have died anyway from other causes), and landings reflect only the fraction of production that fishers target and can legally take. Aquaculture is a different case again: its losses occur in ponds and are highly local, and they are much better documented through mitigation measures than through national totals. The text also mixes geographic scopes, since the cormorant population figure likely refers to the EU or a wider Europe,

		while the production figures cover Europe as defined by FAO, so the ratios are not like for like. The framing that European production is "already constrained" is stated as context but not evidenced, and it ignores other drivers such as habitat loss, water quality, barriers and other predators.
P. 25	The implications for food security are amplified by Europe's structural dependence on imports of fish and fisheries products. The European Union imported approximately 5.9 million tonnes of fish and seafood in 2023, resulting in a negative trade balance of about EUR 23 billion annually and highlighting a significant reliance on external supply (European Commission, 2024). Total apparent consumption in the European Union is around 10.5 million tonnes annually, with a substantial share met through imports. In this context, losses caused by cormorants reduce the capacity of European fisheries and aquaculture to contribute to the domestic food supply.	**This is another incorrect, propagandistic statement not worthy of an advisory body.** The text moves from a general fact (the EU imports most of its seafood) to a specific causal claim (cormorants reduce domestic supply) without any step that links them. Imports are driven mainly by consumer preferences for marine species such as salmon, cod, tuna, shrimp and Alaska pollock, which freshwater systems cannot replace. Inland capture and freshwater aquaculture together contribute only a very small share of the roughly 10.5 million tonnes of apparent consumption. Even taking the earlier modelled 365 000 t of cormorant consumption at face value, that is about 3.5% of EU apparent consumption. It is also an overestimate of lost supply, for the reasons already noted: it covers all habitats, includes non-commercial species, and ignores compensatory mortality. The trade deficit also reflects value, not volume, and is shaped by price, processing and re-export, so it says little

		about food security. The statement mixes scales as well. "Europe" and "the European Union" are used interchangeably, although the cormorant and production figures elsewhere use a wider European scope. The sentence "losses caused by cormorants reduce the capacity" is therefore an assertion presented as an inference. A more defensible framing would say that cormorant impacts are locally significant for particular fisheries and pond farms, and **would acknowledge that they are marginal for EU-level food security**. It would also state any share of supply affected as a quantified, scoped range.
P. 26	Although this inventory study primarily covers the reference years 2023–2024, while using cormorant counts available from the 2012–2015 period, the consistency of reported impacts across countries allows for a cautious estimation of cumulative losses over the past decade. Based on the aggregated annual damage of approximately EUR 670 million reported for 26 countries and considering uncertainties in coverage and valuation, a conservative low-high range of EUR 600–750 million per year can be applied. On this basis, the cumulative economic impact of cormorant predation on inland fisheries and aquaculture in Europe over the period 2016–2025 can be estimated at approximately EUR 6–7.5 billion. This range reflects both direct losses (fish consumed or damaged) and indirect	The section is internally tidy but rests on assumptions that do not hold, so I would not use it as it stands. The **central problem is the baseline**. The EUR 670 million figure is a sum of heterogeneous national estimates, mostly modelled gross consumption values, not measured losses. It also **mixes inland, coastal and aquaculture damage**, which is why the heading's "inland fisheries and aquaculture" does not match the earlier text. The claim that "consistency of reported impacts" justifies extrapolation is therefore weak, because the consistency comes from shared modelling assumptions, not independent validation.

	impacts (reduced growth, lower production and additional costs), as defined in the methodology. Given the current absence of a coordinated European management approach, the continued growth and expansion of the cormorant population is expected to further intensify predation pressure on fisheries and aquaculture systems. The Framework for a European Management Plan for the great cormorant indicates that cormorant populations have increased substantially over recent decades and continue to expand in both abundance and geographical range, with current mitigation measures proving insufficient to halt this trend (FAO, 2026). Assuming a continuation of current trends (“business as usual”), and taking into account both population growth and increasing spatial overlap with vulnerable fish stocks and aquaculture facilities, annual economic losses may rise progressively from the current estimated EUR 600–750 million to EUR 800 million–1 billion per year over the next decade. This would result in cumulative losses in the order of EUR 8–10 billion between 2026 and 2035. Such losses would likely be accompanied by further reductions in inland fisheries production, continued decline in pond aquaculture viability and additional farm closures, with associated impacts on employment, rural economies, food security and increasing European dependency on import of fish products. These projections underscore the economic risks of inaction and highlight the potential benefits of implementing the coordinated, adaptive	Applying a 2023–2024 value to every year from 2016 to 2025 assumes a constant effect, yet the section itself uses counts from 2012–2015. It treats the result as cumulative damage without correcting for prices, inflation or discounting. It also adds a "low-high" range of EUR 600–750 million that is simply ±10% around the central estimate and does not reflect the real uncertainty, which is much wider (compensatory mortality alone could cut a gross consumption value by a large factor). The projection is weaker still. The claim of "continued growth and expansion" needs checking against the population data. Citing a framework document (FAO, 2026) for the trend is not evidence of the trend itself. That document’s projection is not based on any population ecology studies. It simply reflects its authors opinion and contradicts other sources of evidence. Next, the arithmetic is inconsistent: if losses "rise progressively" from EUR 600–750 million to EUR 800 million–1 billion, the ten-year sum would be roughly EUR 7–8.75 billion, not EUR 8–10 billion, which is obtained only by applying the end-point value for every year. The step from population growth to a proportional rise in damage is also unsupported, since predation depends on local overlap,

	Framework for a European Management Plan for the great cormorant.	prey density and compensatory dynamics, not on bird numbers alone. Finally, the closing paragraph states farm closures, employment loss, import dependency and food-security effects as likely outcomes of a counterfactual, with no evidence that cormorants (rather than costs, disease, drought, regulation or markets) drive pond-aquaculture decline. The argument for a management plan is also circular: the economic risk of "inaction" is derived from the same untested damage estimate and then used to justify action. A defensible version would present damage as a scenario range with stated assumptions, use population trends from the monitoring data, separate gross consumption from net economic loss, keep inland, coastal and aquaculture components distinct, and drop the cumulative multi-billion totals or label them clearly as illustrative.