

<b>AAC WG-3</b>	<b>Document</b>	Recommendation	x	<b>Status</b>	Draft version nr.	4	<b>Approved</b>	Focal Group	
<b>Rapporteur</b>		Position paper			12 October 2021			WG-3	
B. Feneis		ToR						ExCom	

## Freshwater aquaculture and wildlife

### 1. Abstract

Inland fish farming has existed in Europe for up to 800 years. Carp pond farming takes place in the midst of nature and in harmony with it. Large pond areas are among the most ecologically valuable and species-rich cultural landscapes in our homeland due to the sustainable and nature-friendly management. The development over long periods of time has led to very stable ecosystems without any major specifications being required. Now, mostly with the best of intentions, numerous requirements and regulations for the preservation of these areas are being enacted through EU regulations to protect individual species and simultaneously endangering complex ecosystems with numerous red list plants and animals and supposedly promote biodiversity. Many ponds are subject to the EU Flora-Fauna-Habitat Directive, the EU Bird Protection Directive or are nature reserves. The existing legal situation also includes the protection of some animal species that cause devastating damage to the pond economy and thereby threaten the existence of the economic basis of the farming operations. These are primarily: 1. cormorants, 2. Otter, 3. Heron although only 10% of the existing stocks would be required for a stable stock. When cormorants invade a pond for days, they often eat 80-90% of the harvest. The remaining fish are often badly injured and cannot be sold and finally die in a long agonizing process. Added to this are the fish losses due to the great egret and little egret, great crested grebe, goosander and the North American mink. In recent years the otter has spread rapidly, causing dramatic losses in fish stocks. With all this damage, not only the financial aspect can be considered.

Contrary to the promises made when introducing Natura 2000, the European Cormorant Plan etc. To this day, the protection of cormorants (*P. carbo carbo*/*P. carbo sinensis*) and other predators (herons, otters) has priority. This intensive protection of a single animal species leads to the abandonment of extensive production and thus removes the basis of the entire ecosystem. In individual areas, MS have developed step-by-step plans for the solution, starting with the reimbursement of costs and ending in a fourth stage with the removal of individual animals. The total number of breeding pairs estimated in the Western Palearctic area by the ornithologists in 2012 – 2013 of 406,000 to 421,000, which means, based upon its biological data, that at that time a total number of individuals of 3,000,000 birds each year.

The development of the otter population is characterized by a continuous east-west expansion. Over many years the population has developed at a speed of around 5-10km per year in the direction of Austria and Bavaria. The innate territory behavior causes a territory size of up to 15 km river length in rivers. However, if the food supply is correspondingly large, as in the fish ponds, this changes and there are also several otter families in the smallest of spaces. Contrary to the prey behavior of herons and cormorants who only catch fish they can swallow, the otter is ready and able to catch and kill spawning fish typically weighing up to 4-5kg or even bigger. Since this species of animal has a hunting instinct that is not limited to the prey that is required for daily needs, the otter kills far beyond this need (surplus killing). The amount of damage in ponds depends particularly on the size of the pond. The smaller the ponds, the easier it is to track and kill the fish throughout the pond. Thus, in the countries with pond farming, the areas where there are small-scale structures are particularly affected. The North-East Bavarian ponds landscape is listed as an example. There the average pond size is <1ha. The breeding and spawning ponds are often only a few 100m<sup>2</sup> in size. In these ponds, an otter kills up to 30 animals in one night, often the entire

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population, mostly spawning fish. Using very precise data in Austria, the development and impact on aquaculture is described as an example. Europe's different carp areas have special strains with various EU and national quality labels, highlighting the creating of identity in rural areas that comes together with carp ponds farming.

The fish from these regions in Northern Bavaria were assigned with the EU label "Protected Geographical Indication"(PGI) and since 2021, the Bavarian carp pond farming ("Bayerische Karpfenteichwirtschaft) in Bavaria has the "Intangible Cultural Heritage" seal of UNESCO. As the otter is placed under protection without exception, the abandonment of these biotopes means that the basis of life for amphibians, insects and water birds is also lost. Apart from the fact that the feeding pressure from otters also has a direct effect on the bird populations, because the clutches are also gutted.

The problems of the pond farms in the MS in terms of the predator threat are present almost everywhere. The regional difference is in the order of the threat. In large ponds, such as in the Czech Republic in northern and eastern Germany, fish can escape the otters more easily than in the smaller ponds of about 1ha in Bavaria or Lower Austria. While swarms of cormorants, gray herons and great egrets wreak havoc in the large ponds. In the EU, these problems must be dealt with by the EU. This has been demanded for many years but is being demanded by the EU. On the one hand referred to the direct dialogue between the MS, and no joint responsibility for the solution assumed. On the other hand, however, various regulations are made that lead to an impenetrable set of rules, providing some MS arguments to do nothing, and making every step towards a common practicable solution impossible. In addition, the hurdles for removal are so high that they are only possible in exceptional cases. The pond owners give up beforehand. The common assessment of all interest groups with regard to the development of the population is described and the results of the consensus seeking process. The demands of the pond economy to ensure their survival are formulated just as clearly as the lack of understanding why the protection of a single animal species is placed above the importance of the entire ecosystem.

Fish production in ponds has existed since the early Middle Ages and has shaped the landscape of large areas ever since. This status could be kept only by the continuous input of human work. On the contrary the abandoned ponds were transformed during time into arable lands with a diminished ecological value. Thus, the condition and preservation of the valuable areas is anthropogenic and not the result of untouched nature. During this time, a valuable cultural landscape with a high diversity of flora and fauna has developed through this use. This fact was last taken into account (2020) by the recognition of carp areas as world cultural heritage or registered RAMSAR sites. This condition can only be maintained with continuous, moderate human intervention.

Pond owners need to maintain traditional pond management in the future

- A possibility to protect your stocks effectively. If this is associated with costs, this must be borne by the public purse, since it is also the public who intervene in the private property of the pond owners by protecting the predators.
- A framework of action for sustainable management, i.e. enabling economically, ecologically and socially successful management. This will also have to include stock management, also including killing, if necessary, for some problem species at appropriate regional scales, independent of national borders.
- Appropriate remuneration for the services rendered in the common good such as land support based on parameters of biodiversity would be the ideal option for this.
- Funding for investments in technical improvements and pond construction/pond maintenance is still necessary.

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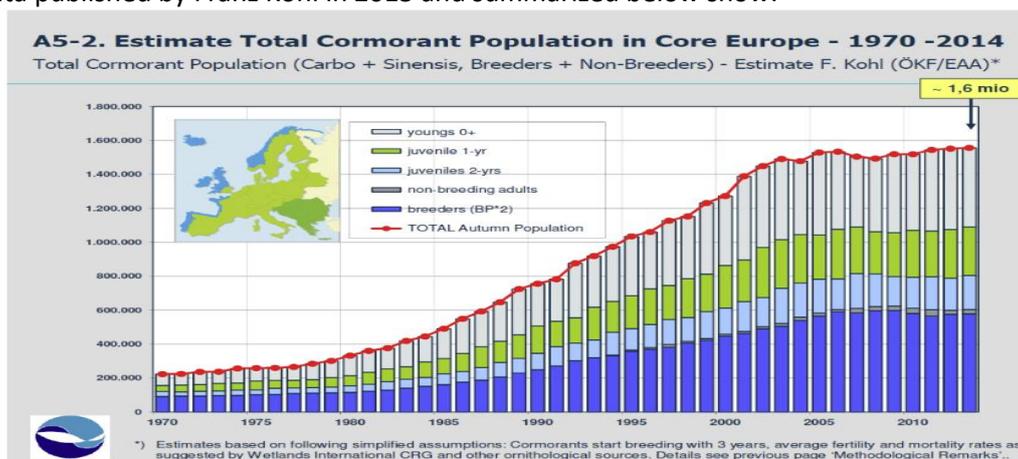
The fish farmers also want to remain virtuous while feeding humans with a product which is sustainable for our planet, giving a share to the Nature, which they are used to do. But if the farming becomes no longer profitable, it can no longer feed neither Humans, nor the protected species!

## 2. Background

Whenever nature could not provide enough freshwater fish and other aquatic organisms to meet the needs of communities, humans developed aquaculture. Traditional aquaculture has always been associated with natural or semi-natural habitats and will therefore always have some degree of interference with wildlife that feed on fish or shellfish.

One of the oldest known conflicts is that between carp farming and fish-eating birds. Already in the middle of the 13th century Albertus Magnus described the cormorant, then called Morfex, in his book *De animalibus*, as “a very voracious bird that causes damage to fish ponds”<sup>1</sup>. Not many years later, on October 12, 1377, the Roman Emperor Charles IV ordered the residents of Breslau (now Wrocław), where one of the oldest carp ponds in Europe (Milicz/Militsch) is located, to “kill and exterminate the water ravens” in the places where they live and where they have their nests”. This had become necessary “because the water ravens ... cause great damage to the fish in the water”<sup>2</sup>. The great biologist Buffon described in the eighth volume of his nine-volume work on birds (1770 - 1783) the influence of the cormorants on the fish ponds<sup>3</sup>: “The cormorant is so skilful at fishing and so ravenous that when he visits a pond, he will wreak more havoc on its own than a whole flock of other fish-eating birds. Fortunately, it is almost always on the coasts of the sea and is rarely found inland”. Even so, in inland Europe, cormorants were present where there were carp ponds and hunting practices have always been used to protect the fish farms without having a major impact on the bird population.

The real impact began in the 19th century when carp farming, after hundreds of years of development across Europe due to the industrial revolution (many ponds were also used as water mills) and due to the reclamation of more land for other forms of agriculture and livestock farming considered more profitable, was abandoned. The intensification of agriculture, the use of pesticides and fertilizers, the conversion of wetlands into agricultural areas and the hunting of wild birds were the arguments with which the Birds Directive was established in 1979. However, the number of cormorants in the 1970s was not as dramatic as the data published by Franz Kohl in 2015 and summarized below show:



<sup>1</sup> Stadler, H. 1916: Albertus Magnus. De animalibus libri XXVI. Nach der Cölnher Urschrift. Erster Band. — Aschendorff, Münster. (In German and Latin)

<sup>2</sup> Beike, M. (2014). Phalacrocorax carbo sinensis in Europe-indigenous or introduced? (S. Ruuskanen, Ed.) *Ornis Fennica*, 91(1), pg. 48-56

<sup>3</sup> Buffon, G. L. L. 1792–1793. Natural history of birds. W. Smellie, translator. 9 volumes. A. Strahan, T. Cadell and J. Murray, London, UK.

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Figure 1. The cormorant population in Central Europe 1970-2014, assumption that cormorants start breeding at 3 years of age, average fertility and death rates (source: European Anglers Alliance)

The protection status for cormorants tripled the population within 15 years between 1979 and 1994. The numbers registered before 1994 prompted the conference of the parties to the Convention for the Conservation of Migratory Wildlife Species (Bonn Convention), at its fourth session (Nairobi, 7 -11 June 1994) to adopt recommendation 4.1 of the Scientific Committee on the Conservation and Management of Cormorants in the African-Eurasian Region. The document acknowledges that "the increase in the populations of *Phalacrocorax carbo carbo* and *Phalacrocorax carbo sinensis* has created conflicts with human interests, particularly in fish farming areas, coastal inland waters and river systems, that "the population trend of the subspecies of the great cormorant, *Phalacrocorax carbo sinensis*, both in the number and in the area of distribution is increasing". Finally, the Convention recommends research on "assessing the damage caused by cormorants to fisheries", "the effectiveness of deterring techniques and the development of other techniques to protect fisheries" and "ensuring that cormorants are only killed under controlled conditions".

Since June 1994, the number of cormorants, especially *P.c.sinensis*, in Europe, excluding Russia, Ukraine, has almost doubled in twenty years. In the meantime, the European Commission decided in 1997 to take off the great cormorant (*Phalacrocorax carbo sinensis*) from Appendix I of the Birds Directive<sup>4</sup>.

In 2008, Heinz Kindermann (MEP) drafted a "report on the adoption of a European cormorant management plan to minimize it the increasing impact of cormorants on fish stocks, fisheries and aquaculture", which was later renamed by the European Parliament as the "European Cormorant Plan", and adopted<sup>5</sup>.

The European Parliament funded a study on the cormorant-aquaculture conflicts in 2013<sup>6</sup>. The European Commission also funded a number of studies on the effects of predators on fish farming, particularly cormorants, through various mechanisms and programs, such as "Framework for biodiversity Reconciliation Action Plans<sup>7</sup> (FRAP, 2006)", "*Reducing the Conflicts between Cormorants and Fisheries on a pan-European scale*<sup>8</sup>, (REDCAFE, 2002)", "*An interdisciplinary approach to European Cormorant-fishes conflicts*<sup>9</sup> (INTERCAFE, 2008)" and "*Sustainable Management of Cormorant Populations*<sup>10</sup> (CorMan, 2013)". Some Member States funded research on the effects other predators on fish farming, such as the otter, such as "Effects of land use changes on population dynamics and the distribution of the otter (*Lutra lutra*) in Saxony and Germany (2013)<sup>11</sup>", "Human-wildlife conflicts at pond fisheries in eastern Poland: perceptions and management of wildlife damage<sup>12</sup>", "Pilot Study 4: Environmental Data on Aquaculture – Austria (2020)<sup>13</sup>".

The 2011, 2013, 2015, 2017 and 2019 international carp conferences in their final resolutions called for the European Commission to provide more support and a coherent action plan for the relationship

<sup>4</sup> [https://ec.europa.eu/commission/presscorner/detail/en/IP\\_97\\_718](https://ec.europa.eu/commission/presscorner/detail/en/IP_97_718)

<sup>5</sup> Management plan to minimize the increasing effects of cormorants on fish stocks, fisheries and aquaculture (2008/2177 (INI)

<sup>6</sup> Cowx, I.G. – BETWEEN FISHERIES AND BIRD CONSERVATION: THE CORMORANT CONFLICT, Report for European Parliament's Committee on Fisheries (PECHE), IP/B/PECH/IC/2012-046 [2013];

<sup>7</sup> <https://www.ufz.de/index.php?en=43183>

<sup>8</sup> [http://cormorants.freehostia.com/cormo\\_news/Redcafe\\_final\\_report.htm](http://cormorants.freehostia.com/cormo_news/Redcafe_final_report.htm)

<sup>9</sup> <http://www.intercafeproject.net/COST.html>

<sup>10</sup> <https://ec.europa.eu/environment/nature/cormorants/management.htm>

<sup>11</sup> <https://www.ufz.de/index.php?en=37969>

<sup>12</sup> Kloskowski, Janusz. (2011). Human-wildlife conflicts at pond fisheries in eastern Poland: Perceptions and management of wildlife damage. European Journal of Wildlife Research. 57. 295-304. 10.1007/s10344-010-0426-5.

<sup>13</sup> <https://www.umweltbundesamt.at/fileadmin/site/publikationen/rep0715.pdf>

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between predators and fish farming. European farmers' associations such as FEAP, COPA-COGECA have also repeatedly asked for a solution to ensure that fish farming is not given up due to the losses that carp farmers in particular suffer every year. This is becoming more and more important as the carp pond economy provides habitat conditions for a large number of protected birds and meets the requirements to be declared as Natura2000 areas. The cessation of fish farming in these areas leads not only to the loss of economic activity but also the associated biodiversity.

### 3. Conflicts

#### 3.1. Existing situation

**In Romania**, deterring, shooting to scare or shooting to kill was forbidden, as the great cormorant was kept under a strict protection status in the national legislation of the time. In 2019, the legislation was changed and the cormorant could be controlled by lethal methods within the fish farm limits, but no quota has been assigned yet. There are no compensation rules for the losses and no objective calculation formula for these. Management plans for the NATURA2000 sites do not include any form of compensation whatsoever for the restrictions which are established against a traditional technological fish farming management. Non-lethal equipment bought by the farmers through EFF 2007 – 2013 were very shortly banned by the environmental authorities. The consultative stage of the N2000 management plan elaboration seldom includes fish farmers and when it does almost none of their arguments are considered. The distribution map of the *P.c. sinensis* in Romania is always focusing on the Danube and Danube Delta albeit since the middle of '90s hundreds of individuals are present all over the country in the fish farms from North to South and from East to West.

**In Germany** there are different regulations in the federal states due to the federal structure.

The cormorant is found everywhere in Bavaria – as shown in the figure below. The winter and spring migrations of the cormorants are particularly problematic for pond management. Usually there are large flocks from September and until December. In spring from the beginning of March to the beginning of May. The winter population in Bavaria is around 8,000 birds.

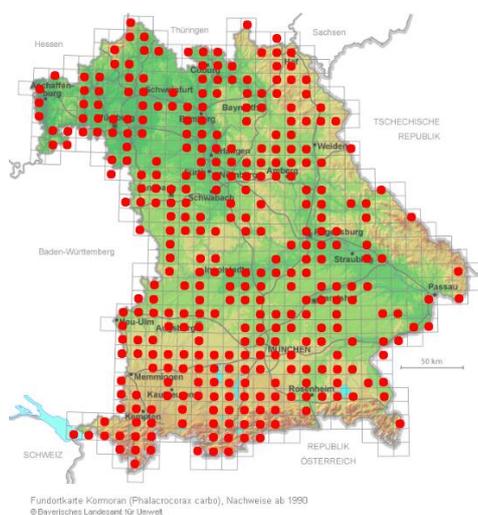


Figure 2. The distribution of cormorant population in Bavaria

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As regarding the economic losses mitigation due to fish eating birds the following rules apply in Bavaria:

(1) In order to avert considerable damage caused by the fishing industry and to protect the native fauna, the killing of cormorants (*Phalacrocorax carbo sinensis*) is carried out in accordance with Paragraphs 2 to 6, in deviation from Section 44 Paragraph 1 Nos. 1 and 2 of the Federal Nature Conservation Act (BNatSchG) Shooting allowed within a radius of 200 m around water.

(2) Are excluded from the permit

1. pacified districts according to Art. 6 Para. 1 and 2 of the Bavarian Hunting Act,

2. Nature conservation areas according to Section 23 BNatSchG and national parks according to Section 24 Paragraphs 1 to 3 BNatSchG in conjunction with Article 13 of the Bavarian Nature Conservation Act (BayNatSchG),

3. European bird sanctuaries according to the Bavarian Natura 2000 regulation:

- The shooting is only permitted in the period from August 16 to March 14.
- In sanctuaries according to Art. 70 of the Bavarian Fisheries Act (BayFiG) and in closed waters according to Art. 2 BayFiG, shooting is permitted from August 16 to March 31, subject to special protective regulations.
- It is not permitted to shoot from one and a half hours after sunset to one and a half hours before sunrise.
- Section 11 of the Ordinance on the Implementation of the Bavarian Hunting Act (AVBayJG) applies accordingly.

4. Persons authorized to hunt are entitled to shoot.

5. The higher nature conservation authority can withdraw the authority if paragraphs 1 to 3 are violated.

6. Reporting obligations:

- The location of the shooting, such as the hunting ground, body of water or stretch of water, as well as the type of water and the date of shooting, the number of cormorants shot and, in the case of ringed birds, the ring number are to be given to the responsible hunting authority by April 10th each year on an insert sheet for the list of hunting routes (§ 16 AVBayJG) to communicate.
- The hunting authority shall send the insert to the responsible higher nature conservation authority by May 1st of each year.

Currently, the population of the Eurasian otter (*Lutra lutra*) is almost widespread throughout **Austria**, with high densities especially in the two main pond-farming regions in the north of Lower Austria and in the east of Styria, where the otters cause substantial losses affecting the entire stock of pond farming. Currently, Lower Austria has derogations for wildlife species with high densities regarding pond management (heron, cormorant, beaver and otter), while the second area of pond farming in Styria does not have any derogation, which distorts competition from the point of view of pond farmers. According to an Austrian data collection study funded by the European Maritime and Fisheries Fund (Environment Agency Austria 2020), the annual loss rate in fish production is on average 30 percent (survey among fish producers of all sectors) caused by protected wildlife, especially by otters, but also by cormorants and herons.

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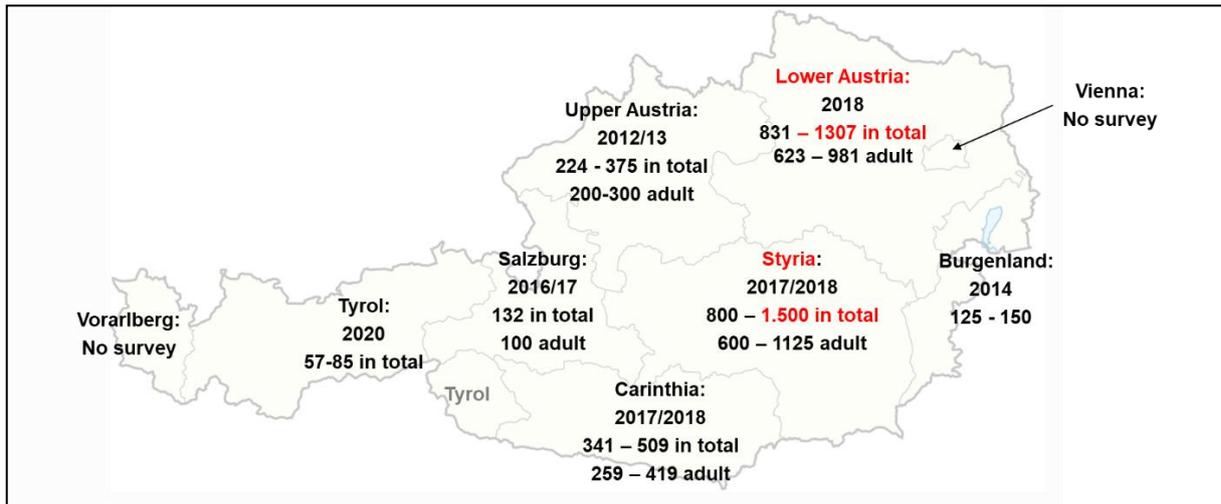


Figure 3. Otter population surveys of the nine Austrian Federal States (no uniform method for counting). High otter densities in carp pond regions (in Red). (© Leo Kirchmaier/LK NÖ)

Since 1984 it has been documented that otters cause severe economic damage to pond farms in Lower Austria. The present otter population survey in Lower Austria<sup>14</sup> showed a favourable conservation status for otters with a total population of around 1,300 individuals and 980 adult otters. The study states, "The otter population is currently artificially supported by fishponds, as these ponds represent an additional unnaturally high, continuous food supply." This means that pond regions indicate a disproportionate density of otters. The otter population growth and increasing predation pressure fuels a human-wildlife conflict (for example, due to "surplus killing" – a common behaviour exhibited by predators, in which they kill more prey than they can immediately eat<sup>15</sup>).

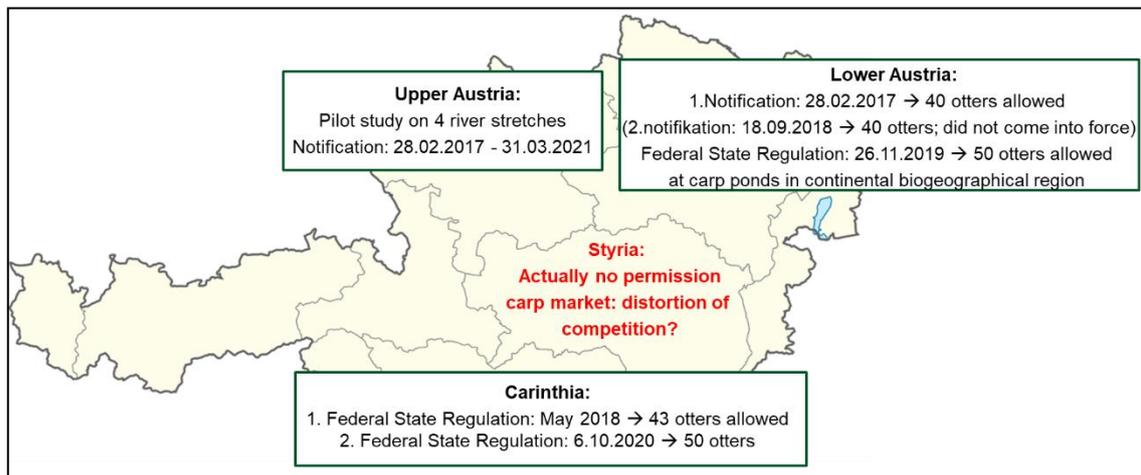


Figure 4. Local permissions and notifications regarding otters. Besides Lower Austria, Upper Austria and Carinthia have derogations regarding otters.

<sup>14</sup> Kofler H., Lampa S., Ludwig T. (2018): Fischotterverbreitung und Populationsgrößen in Niederösterreich 2018. Endbericht. ZT KOFLER Umweltmanagement im Auftrag des Amtes der Niederösterreichischen Landesregierung, 117 S ([https://www.noel.gv.at/noel/Naturschutz/Fischotter\\_NOe\\_2018\\_fin.pdf](https://www.noel.gv.at/noel/Naturschutz/Fischotter_NOe_2018_fin.pdf))

<sup>15</sup> Kruuk H. (2006): Otters, Ecology, Behaviour and Conservation. Oxford University Press, Oxford, 1-265.

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In February 2017, the Lower Austrian federal state government issued the 1<sup>st</sup> notification as a legal basis for the reduction of the otter population by a maximum of 20 otters with regard to pond farming (another 20 individuals regarding rivers). However, the notice-based approach has not proven effective in practice.

Taking into account the increasing challenges in the field of fish production, the government of the federal state of Lower Austria issued a regulation regarding otters on 26<sup>th</sup> of November 2019. The regulation allows exceptions of the Europe-wide strict protection of the otter in Lower Austria at those pond sites where fencing is impossible. The regulation applies at pond sites (within a radius of 50 m) in the continental biogeographical region outside of nature reserves. 50 otters may be taken per calendar year with otter contingents for each administrative district based on the number of ponds in the district. An online register indicates whether a further removal of an otter is permitted or if the quota has already been depleted. Trained and certified hunters conduct removals and report them to the conservation department within 24 hours. The federal state government undertake veterinary inspections of these otters to gain knowledge about their ecology. An accompanying monitoring of the otter population maintain the favourable conservation status according to the FFH-directive. The regulation causes a decrease of fish damage in hot spot regions outside of conservation areas.

A recently performed analysis about the wildlife of fishponds **in Hungary** and its consequences<sup>16</sup> highlighted that besides contributing to the sustainability of aquatic and wetland habitats, fishponds ensures the maintenance of numerous natural values with European importance. Their most significant impact is the support of waterfowls connected to wetland habitats; they provide nesting, resting and feeding habitats for these bird species. At Hortobágy fishponds, which is the largest pond system in Hungary with ca. 5,500 ha pond surface more than 300 bird species were observed. 220 species is detected in the Rétszilas Fishponds, about 200 in the Biharugra fishpond system, and 274 in the Lake Fehér at Szeged<sup>17</sup>. One third of the species observed in the ponds of the Hortobágy Fish Farm are nesting. These numbers indicate the importance of fishponds for both nesting and migratory bird species<sup>18</sup>.

Birds are the most abundant and thus the most influential group in fishponds (Figure 2). The level of economic significance of bird species is not constant, it is determined by their number, the duration of their stay in the ponds, the amount of fish and feed they consume, and the species and size of the fish they eat. Based on the literature, there are 62 proved fish-eating bird species in Hungary<sup>19</sup>. Taking into account the feeding habits and number of individuals of these species, eight can be considered as fish consumers with relevant economic impact. These are the Great Cormorant (*Phalacrocorax carbo*), the Pygmy Cormorant (*Micropterus pygmaeus*), the Grey Heron (*Ardea cinerea*), the Great White egret (*Egretta alba*), the Black-crowned Night Heron (*Nycticorax nycticorax*), the Great Crested Grebe (*Podiceps cristatus*), Black-headed Gull (*Larus ridibundus*) and the Caspian Gull (*Larus cachinnans*). The economic influence caused by fish consumers is multiple. The first is the direct effect of fish consumption, while the second is the loss of yield resulting from fish consumption. Among birds that potentially consume fish feed (Mallard, Eurasian Teal, Gadwall, Eurasian Wigeon, Northern Pintail, Northern Shoveler, Garganey, Common Pochard, Ferruginous Duck, Common Coot), considering their quantitative conditions, Mallard (*Anas platyrhynchos*), Common Pochard (*Aythya ferina*) and Common Coot (*Fulica atra*) can be considered with significant influence. The number of individuals of other species lags far behind them. Species – include bird species – that do not directly cause a loss of revenues or increase of costs are indirect influencers. This category includes all species that during their nesting and migration period, inhibit the

<sup>16</sup> HAKI 2020. Role of freshwater pond aquaculture in the maintenance of natural values of wetland habitats in Hungary. Manuscript. Pp. 21

<sup>17</sup> AQUASPACE (2016) Policy-Management issues of freshwater aquaculture. D2.1. Ed by É. Kerepeczki. Pp. 1-26

<sup>18</sup> Halasi-Kovács, B. (2005) The nature conservational importance of the fishponds of Hortobágy Fishfarm Co. and their natural values. Manuscript. Pp. 1-19. (in Hungarian)

<sup>19</sup> Halasi-Kovács, B. (1998) Report on the ornitological status of the fishponds of Hortobágy Fishfarms Co. Manuscript. (in Hungarian)

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normal operation for a certain period of time due to their needs – water level adjustment, reed production – and thus reduce the predictability of farming. For these species, the number of individuals is not determinative in the damage. The indifferent category includes species that do not affect production due to their consumption or small number.



Figure 5. Some fish-eating predatory bird species in fishponds (©László Csiszár)

### 3.2. Damage assessment

In Romania, the number of autumn cormorants is around 170,000 individuals and they are not only present in the Danube Delta or along the Danube, but also in places where they have never been seen before, such as in the northern part of the country. The losses caused by the predators and given by fish farmers in a conservative calculation are estimated to around EUR 35,000,000 per year.

Some of the situations a Romanian fish farmer is dealing on a regular basis are shown below.

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Figure 6. Impact of fish-eating birds on carp fish farming (©ROMFISH)

About 8000 autumn and spring cormorants in Bavaria. Damage results from the food requirement of approx. 700 g/bird/day.

In Hungary the damage assessment<sup>20</sup> resulted from the studies performed during the last decade revealed not only the direct losses because of the wildlife interactions with the carp farms, but also the indirect losses. Among the species, which have direct economic influence, the Great Cormorant and Pygmy Cormorant is eminent. The size of the domestic nesting population of the Great Cormorant can be estimated at 3000-4000 pairs, while the number of immature roaming individuals is approximately the same amount (3000-6000). The migratory population shows a lower spring and a higher autumn peak, with all of these the Great Cormorants registered in Hungary reaching 29,000 individuals. The average daily food requirement of the species is 0.5 kg of fish. It can effectively capture its food up to a weight of 500 grams, so the first two age groups produced in fishponds are most at risk. The feeding of the Great Cormorant is characterized by Common carp preference<sup>21</sup>. Their damage can only be limited by the currently most widely used gas cannon scarer. Based on the above written, a significant and long-term reduction cannot be achieved by shooting of the domestic population. Currently no coordinated strategy for their reduction of the populations in the EU countries and – despite the existing demand – this does not seem to be expected in the near future. Therefore, would be necessary an appropriate coordination at least the national level derogation measures of the Central and Eastern European countries. According

<sup>20</sup> HAKI 2020. Role of freshwater pond aquaculture in the maintenance of natural values of wetland habitats in Hungary. Manuscript. Pp. 21

<sup>21</sup> Dudás, M., Halasi-Kovács, B. (2000) Investigation of the growth and feeding of the Great Cormorant (*Pahalacrocorax carbo*) population in the protected fishponds of the area of Hortobágy National Park. Manuscript. Pp. 1-12. (in Hungarian)

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to the calculations<sup>22</sup>, the total fish consumption of the Hungarian Great Cormorant population is 2,427,700 kg per year. From population data, it can be assumed that at least 50% of the consumption affects fishponds. According to nutritional data, 85% of the fish consumed here are Common Carp<sup>23</sup>. The Pygmy Cormorant was basically a migratory species in Hungary until the early 1990's. The first nesting specimens were registered in 1991 in Hortobágy. Both its nesting and migratory populations are rising sharply. Its nesting population is currently 750–900 pairs, while its migratory population is close to 5,000 specimens<sup>24</sup>. Its diet consists of smaller fish and it can effectively catch them up to a size of about 150 grams, depending on their body shape, so fingerling production is primarily exposed to them. According to domestic estimates, their daily fish consumption is 300 g/day. The species is highly protected in Hungary, so neither bird alert nor shooting is allowed. Based on the domestic distribution of the species the entire population is strongly attached to the fishponds. As calculated from the population data, the amount of a Pygmy Cormorant-day is 1,439,000. The damage caused by the otter is also becoming more significant. This is confirmed by the fact that during the increasingly frequent extreme low-water periods due to the climate change, the majority of the otter population is located at fishponds in Hungary. Unfortunately, there is no generally accepted method for estimating the population size, but for example the estimated population size approached 250 individuals in the area of Hortobágy Fishfarm based on a previous survey. From the calculations made in Hungary based on a conservative approach of the losses which took into account only two bird species and the otter it resulted that the loss per pond hectare is 177 kg of common carp, which at a price of 2.4 EUR/kg at farm gate makes it 425 EUR/pond ha. This loss is actually higher if you take into account the indirect losses caused by regular management practices such as filling and drainage of the ponds, reeds and pondweeds management, rules for scaring and shooting predators and so on.

### 3.3. Mitigation

#### 3.3.1. Method inventory and effectiveness

All the methods used in Romania have not been effective as the cormorant learns very quickly. The only method that is reported by the farmers to have some success is shooting to scare away combined with extraction of some individuals in order to associated the noise with a real danger, which keeps the cormorants off the farm for several days, a method which is mentioned also by BirdLife "Shooting cormorants as an aid to scaring can work, but its effectiveness varies".

The great learning ability of the cormorant can also be observed not only in Bavaria. It is reported by the fish farmers, which are dealing daily with cormorant attacks, among other fish-eating birds occurrence, that only the shot is effective. Protective cages, claps of thunder or similar measures only help briefly.

In Hungary scaring and shooting is only allowed with the permission issued by the Environmental Authority the operation must always be coordinated with the National Park for a limited number of specimens that can be shot in a year. Using gas cannon is prohibited within 500 meters ranges of nesting colonies (other than Great Cormorant). Shooting is only allowed after 15th of July on ponds where a nesting colony is located (other than Great Cormorant).

<sup>22</sup> Faragó, S. (2012) A kárókatona európai és magyarországi helyzete, a fajjal kapcsolatos konfliktusok. Előadás. A magyarországi kárókatona (*Phalacrocorax carbo*) állományhoz kapcsolódó problémák kezelésére létrehozott szakértői munkacsoport első ülése. 2012. március 13. Földművelésügyi Minisztérium.

<sup>23</sup> idem

<sup>24</sup> Oláh, J. (2014) A Kis kárókatona és természetvédelmi kezelésének javaslatai. [www.termeszetvedemikezeles.hu](http://www.termeszetvedemikezeles.hu)

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The guidance document on hunting under Council Directive 79/409/EEC on the conservation of wild birds<sup>25</sup> published by EC notes that: “It is generally accepted that some huntable bird species can jeopardise the interests referred to in Article 9(1)(a) outside of the hunting season allowed under Article 7. It is also generally accepted that, in order to safeguard these interests, there may sometimes be no satisfactory solution other than destruction of birds. In this context, it would seem reasonable that the use of hunting is a legitimate means of safeguarding the interests mentioned in Article 9(1)(a). Of course, in this instance, hunting serves a non-recreational objective (i.e. damage prevention). The species for which Article 9(1)(a) are invoked are sometimes referred to as ‘pest species’. The justifications for their control include ‘to prevent serious damage to crops, livestock, forests, fisheries and water’ as well as ‘for the protection of flora and fauna”.

### 3.3.2. *Farmers’ approach*

The often spatially extensive open carp ponds, integrated with local water systems, are landscape components of great environmental importance. Unless the fish production is too intensified, carp pond-complexes can function as wetlands supporting rich animal biodiversity. However, wildlife attracted to farm ponds by abundant food supplies and specific habitats may generate conflicts between animal conservation and economic interests by causing stock losses and physical destruction at aquaculture facilities. Increases in some wildlife populations and their spread into human-dominated landscapes are a growing concern not only in CEE. Wildlife-related conflicts may have serious consequences both for the profitability of aquaculture enterprises, due to lost production and costs of implementing damage prevention method, and for wildlife populations due to the loss of fish farmers’ interest in supporting by themselves the maintenance of production operations and their increasing proclivity for abandoning the fish farming and move towards other forms of agriculture with various forms of direct payments in place.

Over the past few years, experience in Lower Austria has shown that valid otter management requires three measures that complement each other:

1. Fencing of small ponds (0.65 ha) to protect fish stock. However, there is not a hundred percent protection and many special cases make fencing impossible even at small ponds (e.g. uneven terrain, location next to road).
2. Financial compensation (subsidies) of fish damage where fencing is not applicable. An independent authority verifies the damage (compensation only for carps not for e.g. pike-perch and other secondary fish produced in pond farming). However, it is only a partial compensation; the rest is "paid" by the pond farmers.
3. Measures regarding otter-population - local permission to reduce population at hot spot regions to minimise fish losses as claims continue to increase but compensation is insufficient. The objectives are to reduce the damage caused by otters in terms of production costs (main cost factor), prevent the ponds from being abandoned and turned into arable land, preserving the ponds and their multiple ecosystem services as wetland structures and to improve the low self-sufficiency of domestic fish.

So, the Austrian Study case is reaching some wider valid conclusions:

- Many preventive measures were tested. Hardly anything works to reduce damage, except above-mentioned measures (1-3);
- Narrow regulatory framework, as no participation in population reduction is allowed for pond farmers in special protected areas, e.g. Natura 2000 protected areas (otters are individual subjects of protection in this areas);

<sup>25</sup> [https://ec.europa.eu/environment/nature/conservation/wildbirds/hunting/docs/hunting\\_guide\\_en.pdf](https://ec.europa.eu/environment/nature/conservation/wildbirds/hunting/docs/hunting_guide_en.pdf)

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- Otter population reduction is not an easy task. Building expertise (trapping of otters vs direct shooting) in cooperation with hunters at the local level is essential;
- One of the biggest challenges carp pond farmers faces is fish losses caused by otters and other predators. They are under massive financial pressure due to predation damage and massively afraid of negative press/media because media coverage is highly emotional, when it comes to otters;
- Still more road-kill of otters than population reduction due to Federal State Regulation;
- Predators are one of the main obstacles to expand carp production, which is evidenced by the stagnation of Austrian carp production since years<sup>26</sup>;
- The Austrian case study strengthens the theory that otter populations are not density regulated by prey in carp pond regions anymore, as food is always present.

In the case of Polish study mentioned above it was noticed that pond owners' observations of wildlife do not always accurately reflect the actual risk to economic yield and are likely to be biased by personal economic interest and conspicuousness of the damage. Nevertheless, their perceptions of damage inflicted by wild animals may be critical for the choice of means for minimizing wildlife related losses - to control the population size of species considered pests or to accept non-lethal methods of loss mitigation. Ratings of damage caused by wildlife may also influence involvement of public funds as pond owners may demand population culling or wildlife related subsidies such as compensation schemes. Also, fish farmers working close to wildlife are a potential source of information about wild populations. Finally, fish farmers experiencing significant losses to the principal problem species were more likely to employ lethal control of these species than farmers with losses that could be accommodated.

There is the fundamental question among the carp farmers of whether the traditional, area-bound carp pond management should be preserved. Increasingly, the impression arises that this is no longer the goal taking into account the very long period since they have publicly exposed the menace and the lack of public interest on reasonable measures response.

If carp pond management is to be maintained, however, a significant reduction in the number of predators (including otter number) is necessary according the Birds or Habitat Directives. Financial compensation can help in the short term, but this would not be a prospect in the long term. Ponds will then be abandoned and local aquaculture activities, regional food, regional identity, an intangible cultural heritage and ecologically highly significant landscapes with outstanding biodiversity will disappear.

There are also differences among MS in addressing the predation problem in fish farms which is makes some farmers more resilient than others. The Guidance on Aquaculture and Natura 2000 should be revised and address properly the predation problem in a unitarily manner.

According to the European Environmental Agency<sup>27</sup> the total area of wetlands of EU is 73,000,000ha. On the other hand, the pond aquaculture area used in EU is around 400,000ha, which means 0.55% of the total wetland area. From this point of view, we do consider that the restrictions imposed to freshwater fish farming in term of predators control are intensively disproportionate, especially if we are taking into account that pond fish farming is contributing to a high conservation status for hundreds of species (plants, animals) not just a few, besides from the main contribution of producing fish for the human consumption.

<sup>26</sup> [http://www.statistik.at/web\\_en/statistics/Economy/agriculture\\_and\\_forestry/livestock\\_animal\\_production/aquaculture/index.html](http://www.statistik.at/web_en/statistics/Economy/agriculture_and_forestry/livestock_animal_production/aquaculture/index.html)

<sup>27</sup> <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/EDN-20180201-1>

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### 3.3.3. *Welfarists' and Conservationists' approaches*

Animal welfarists are supportive of extensive pond fish culture which has the potential to be positive for both the environment and for fish welfare. They share concerns about the impact of predation on fish welfare and on the viability of systems of fish production which can be friendly to the environment and animals.

They favour non-lethal methods of reducing predation and suitable support for farmers and environmental managers in using these methods for the benefit of prey, predators and the ecosystem. Similarly, they support subsidy for the maintenance of these freshwater food-producing ecosystems since they provide a clear public good, both in terms of the environment and animal welfare. Also support the funding of research into new alternative non-lethal methods of reducing levels of fish predation is endorsed by animal welfare supporters. Where alternative methods are not effective, they also support the provision of suitable compensation.

Among the animal welfare specialists there is a strong consensus in not supporting at all the use of lethal methods based on the concerns that lethal control of animals often results in those animals killed being replaced by others in neighbouring territories and they firmly oppose any policy designed generally to reduce population levels through lethal means.

In terms of the solutions considered by animal welfare organisations they highlight that a range of non-lethal methods for controlling cormorants are discussed, in addition to lethal ones, in the *Cormorant Management Toolbox*<sup>28</sup> and *Protecting your fishery from cormorants*<sup>29</sup>.

Methods which are likely to be practically effective in reducing fish mortality in pond-based systems without causing undue environmental damage include methods of scaring the birds. This includes various forms of human disturbance including “shooting to scare” (as opposed to shooting to kill) as well as other forms of mild harassment; auditory scares such as gas cannons and pyrotechnics; bioacoustics (e.g. playing killer whale calls in the water has proved effective with cormorants); automated scarecrows; balloons, kites and radio-controlled drones made to look like falcons etc. New higher tech methods include use of lasers. Methods need to be unpredictable to counter the birds’ considerable ability to learn when a threat isn’t real. Netting or enclosing ponds may be effective where they are appropriate and affordable.

On the other hand, the birds’ protectionists are acknowledging<sup>30</sup> that “Cormorant impact is likely to be most significant in artificial situations, such as where fish are farmed or stocked at high densities in shallow ponds. Relatively large losses of fish to Cormorants at individual fisheries have been demonstrated in a number of countries, mainly at fish-farms and around fishing gear in lakes and coastal bays” and that “cormorant predation is best managed at a local level”. They are considering that there is no evidence to support Europe-wide action and, instead, alternatives to scaring and shooting should also be considered, such as incentives for preventive measures, compensation for affected farmers and industry-wide cost-sharing. Shooting should be carried out only where serious damage can be proven (the burden of proof being with the fishery interest) and other methods have been tested and shown to fail. The basic principle is that shooting should be limited to site-specific scaring and should not be used to cull populations. Shooting cormorants as an aid to scaring can work, but its effectiveness varies. At some sites, shooting, to kill or to scare, appears to make little difference to the number of cormorants present. At others, birds leave for a short while, but return after several weeks. Removing cormorants without reducing the

<sup>28</sup> [https://ec.europa.eu/environment/nature/cormorants/files/Page\\_12-31\\_from\\_Cormorant\\_Toolbox\\_web\\_version.pdf](https://ec.europa.eu/environment/nature/cormorants/files/Page_12-31_from_Cormorant_Toolbox_web_version.pdf)

<sup>29</sup> <http://www.bruno-broughton.co.uk/pdf/Protecting%20Your%20Fishery.pdf>

<sup>30</sup> [https://www.birdlife.org/sites/default/files/bhdtf\\_position\\_2004\\_cormorants.pdf](https://www.birdlife.org/sites/default/files/bhdtf_position_2004_cormorants.pdf)

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attractiveness of a water body to the birds is a never-ending task. Anyway, the birds' conservationists do admit that "as a last resort, where non-lethal measures are not effective alone, shooting a small number of Cormorants as an aid to scaring may be appropriate. This should be under a licence administered by the relevant authorities, following an assessment to demonstrate that serious damage to the fishery is occurring as a result of predation by Cormorants". Also, in their opinion guidelines or criteria should be applied to decide whether serious damage to fisheries has occurred or is likely to occur. They also observe that several European countries (or regions within Member States) permit the shooting of an unlimited number of Cormorants and/or the destruction/discouragement of new breeding colonies. For example, fishermen in Denmark are permitted to shoot Cormorants within 1 km of coastal fishing gear and there is a policy to prevent the establishment of new colonies. In Bavaria, a state regulation permits shooting of all cormorants within 100 metres of any waterbody (with certain restrictions in nature reserves, national parks etc), whereas in Saxony fish-pond owners can claim compensation from the Länder government for damage caused by Cormorants. In France, where Cormorants have been protected since 1972, licences have been issued for shooting at fish farms since 1992 and, more recently, large-scale shooting has been permitted in many departments.

#### 3.3.4. *Compromise attempt*

Although it is obvious and consistent proofs have been provided during the focus group meetings that the activity of some predators is affecting not only the life of farmed fish species, but also the fish welfare by daily stress, wounds and subsequent pathological episodes, the accomplished compromise with welfare oriented NGOs was partially agreed as follows:

- C1. Farmers are entitled to a regular compensation for their losses;
- C2. Farmers are entitled to defend their business of predators, as any other agricultural activity, and ensure a higher degree of fish welfare during the production cycle using any effective combination of methods, including lethal and non-lethal ones, for a certain percentage of fish eating predators. Welfare NGOs do not support lethal methods at all;
- C3. Intensifying and financing the research of welfare NGOs to determine effective non-lethal methods in predators management around pond fish farms;
- C4. For such an accurate and objective assessment on the efficiency of wildlife impact mitigation measures and the development of new mitigation measures a coordination centre on European level could be necessary.

## 4. Common solutions to the effects of wildlife on aquaculture

The accomplished compromise was agreed as follows:

- A. man-made ponds are essential not only for supplying an important source of high-quality food but also for providing ecosystem services to the society, out of which biodiversity protection is essential;
- B. the important role of pond fish farming as net provider of biodiversity and climate change adaptation support should be properly and publicly recognised at the decision-making levels and be consistently underpinned by aqua-environmental direct payments;
- C. there is a need for having accurate and objective data on the impact of predation at the farm level as previous data collection is sufficiently documenting damages;

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- D. there is a need of an accurate and objective assessment on the efficiency of wildlife impact mitigation measures on fish farms in order to accommodate the social and economic functionality of an enterprise with its environmental role;
- E. there is a need to follow the Birds Directive aim which is the maintaining or adapting the birds' population to a "level which corresponds in particular to ecological, scientific and cultural requirements, taking into account economic and leisure-related requirements";
- F. Farmers are entitled to a regular and total compensation for their losses including also higher fish prices as for carp spawners or other species like pike-perch, pike or tench;
- G. Intensifying and financing the research of welfare NGOs to determine effective non-lethal methods in predators' management around pond fish farms;
- H. For such an accurate and objective assessment on the efficiency of wildlife impact mitigation measures and the development of new mitigation measures as e.g. population regulations or other management actions, a coordination centre on European level, including also the expertise and knowledge of fish farmers, could be necessary;
- I. Farmers are entitled to defend their business of predators, as any other agricultural activity, and ensure a higher degree of fish welfare during the production cycle using any effective combination of methods.

Although it is obvious and consistent proofs have been provided during the focus group meetings that the activity of some predators is seriously affecting not only the life of farmed fish species, but also the fish welfare by daily stress, wounds and subsequent pathological episodes and that for fish-eating predators a mixture of lethal, for small numbers of individuals, and non-lethal methods will provide some results and welfare NGOs do not support lethal methods at all without offering a viable solution other than described above.

## 5. AAC recommendations

For the reasons analysed above the AAC is strongly recommends the European Commission, mainly DG MARE and DG ENVI, the EU Member States and the European Parliament the following:

- To Introduce of a regular, highly paid compensation system to keep the freshwater fish farms in good economic and ecological functionality;
- To improve the communication of practices in tackling the predators' management in the freshwater farms within EU Member States by e.g. faster evaluation of, and if needed, changing of the conservation status of predatory species;
- To support the development of research programmes for farmers & conservationists partnerships on the above-mentioned issues;
- To relax the restrictions in the Natura 2000 areas within the freshwater farms limits for some predators which are affecting the pond ecosystem viability by simplifying the derogation procedures;
- To provide a report of the application of the provisions of paragraph 4 of art. 7 "Member States shall send the Commission all relevant information on the practical application of their hunting regulations" regarding *P.c. carbo* and *P.c. sinensis* and other relevant species above-mentioned;
- To consider a European Coordination Center protecting Europe's carp pond farming in order to objectively propose effective measures, optimum population levels and other management solutions for predatory species and so on in order to meet the economical, social and environmental criteria which would benefit equally the fish famers and the society.