

BSAC Workshop on seals and cormorants - the Baltic predators: Balancing fisheries and the environment

27th October 2023, 09:00-15:30 CEST

**Hybrid, at the National Marine Fisheries Research Institute, Gdynia, Poland, and
online
Report**

1. Welcome

In opening the meeting, **the BSAC ExCom Chair** welcomed all participants to the first special BSAC workshop on seals and cormorants, in particular the Member State representatives, Commission, and all the experts who had accepted the invitation to make presentations. He was pleased to see such a massive attendance (75 people online and 38 in the room).

He referred to the objective of the workshop is to gain feedback of experts on the legal rules and management measures related to seals and cormorants, on the status of populations, monitoring and interactions of seals and cormorants with fish stocks and fisheries. The workshop will conclude with 4 presentations from the perspective of the BSAC members. The BSAC plans to organise a follow-up workshop in 2024.

The Executive Secretary referred to the background document highlighting the past BSAC work seals and cormorants and presenting the 23 speakers of the workshop¹.

2. Policies and management in place

Presentation: EU policy context: The Birds and Habitats Directives, the MSFD and the Regulation on trade in seal products: Vedran Nikolic (DG ENV D3), Anne Delvaux (DG ENV F3), Alice Belin (DG ENV C2).²

Vedran Nikolic (DG ENV D3) set the scene by reviewing the legislation related to cormorants and seals. Cormorants are protected under the Birds Directive³, Article 5 (not huntable species). The current conservation status is assessed as secure (favourable) with increasing trends. Article 9 of the Birds Directive allows for derogations from the general protection regime to take the necessary actions, including lethal control, to prevent serious damage to fisheries and aquaculture. These derogations are granted by the competent national authorities. However, preventive measures should be implemented first. These derogations are explained in the guidance document⁴ on the application of Article 9. They consist of solutions to be found at the local level where conflicts occur and where they can be discussed

¹ [Past Meetings - Baltic Sea Advisory Council \(bsac.dk\)](#)

² [DG-ENV-BSAC-workshop-cormorants-and-seals.pdf](#)

³ Birds Directive, 2009/147/EC. [EUR-Lex - 32009L0147 - EN - EUR-Lex \(europa.eu\)](#)

⁴ [Great cormorant - Publications Office of the EU \(europa.eu\)](#)

and implemented in cooperation with local stakeholders. The EU Cormorant platform (currently updated) provides further information. EMFAF can be used to support preventive measures and to compensate for losses. Applied measures should first of all aim at ensuring coexistence.

Seals: Vedran Nikolic presented the protection regime for seals (Habitats Directive⁵). Under the provisions of this directive, Member States must designate and manage Natura 2000 sites for seals to contribute to the achievement/maintenance of their favourable conservation status (FCS). The Directive also includes the obligation to set measures to ensure that taking in the wild/exploitation is compatible with maintenance of FCS. They can derogate from Articles 12-15 for the reasons and under the conditions set out in Article 16. Derogations are currently used in Poland, Finland and Sweden to prevent serious damage to fisheries. He went on to present the conservation status of different seals species as reported by Baltic Member States. Only the grey seal is in favourable conservation status in the Baltic region. **Management measures** can be taken by Member States to maintain FCS. This can include regulation of hunting through temporary/local/temporal prohibitions, quotas, licencing, etc. EMFAF can provide funding for preventive measures and for conservation and damage and to compensate for losses.

Ensuring co-existence: The challenges should be addressed in close cooperation between fisheries and environment authorities and stakeholders, in line with the legislation. Member States are encouraged to implement preventive measures to avoid or limit damage caused by cormorants and seals. EU funds are available to support preventive measures and compensation of losses. Member States can make full use of the derogation provisions under the Birds Directive to manage Cormorants. This remains adequate tool to address local conflicts. They can also manage seal populations under the provisions of the Habitats Directive, subject to the obligations in Natura 2000 sites and the aim of achieving or maintaining FCS.

Alice Belin (DG ENV C2) referred to the Marine Strategy Framework Directive. MSFD requires the achievement of clean, healthy and productive seas (good environmental status - GES), according to 11 descriptors of quality. Descriptor 1 requires the application of an ecosystem-based approach where the collective pressure of human activities is kept within levels compatible with the achievement of GES. Four criteria are used to assess GES for marine bird and mammal species: bycatch levels, population abundance, species distributional range, species habitat extent. Threshold values have to be set in regional/subregional processes, consistent with the Favourable Reference Range values of Habitats Directive where relevant. Member States are required to take the necessary measures to achieve/ maintain the levels set by these threshold values. Threshold values for bycatch are not set at zero for certain species. The idea that there should be coexistence of human activities and nature.

Anne Delvaux (DG ENV F3) referred to the Regulation (EC) No 1007/2009 on Trade in Seal Products, as amended by Regulation (EU) 2015/1775, which prohibits the placing of seal products on the EU market, with two exceptions: The “Inuit or other indigenous communities”

⁵ Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora [EUR-Lex - 31992L0043 - EN - EUR-Lex \(europa.eu\)](#)

exception allows the placing, provided several conditions are fulfilled and the seal products are accompanied by an official document attesting their origin. An occasional import of seal products is allowed for the personal use of travellers or their families. Implementing Regulation (EU) 2015/1850 provides for the requirements for importing seal products for the personal use of travellers or their families; the recognition of government bodies to certify compliance with the "Inuit or other indigenous communities" exception and to issue attesting documents; and the designation of competent authorities in the EU Member States.

With the amendment to the Regulation of 2015, Member States are still allowed to hunt seals for the sustainable management of their marine resources, but the resulting products cannot be placed on the EU market anymore. The processing of seal products in the EU and re-export of the processed goods outside the EU is not banned under Regulation (EC) 1007/2009, as amended.

A [Commission Report](#) on the implementation of the EU Regulation for the period 2019-2022 and up-to-date information are available on the [Trade in Seal Products webpage on EUROPA](#)⁶.

In May-June 2024, the Commission will launch an evaluation of EU Seal Regime, starting with a public consultation, to which all participants in the workshop are invited to contribute, targeted consultations with the EU Member States (mainly those around the Baltic Sea) and other stakeholders and a call for scientific evidence. Based on the evaluation findings, the Commission will consider whether further measures are needed.

HELCOM work on marine mammals and birds: Florent Nicolas, HELCOM Associate Professional Secretary⁷

Florent Nicolas presented the HELCOM work on marine mammals and birds. He introduced the HELCOM structure and the Baltic Sea Action Plan (BSAP). The aim of the revised BSAP is to achieve its vision by 2030. As there are lot of actions (199) in the BSAP, the presentation focused on the actions directly related to marine mammals and birds, included in the segments related to biodiversity and sea-based activities. Marine mammals are included under both segments. Actions under fisheries management (bycatch) and include for example measures to reduce negative impacts of fishing activities / technical measures, to develop and implement of effective data collection on incidentally bycatch in line with ICES and to maintain, develop and extend regulatory or voluntary schemes to protect key seabird areas, to share information among Contracting Parties, the BALTFISH and BSAC on non-lethal mitigation measures or other ways to manage seals-fisheries interactions and implement those measures by 2025, as appropriate.

HELCOM Recommendations are also a tool under the HELCOM framework. Florent Nicolas highlighted the Recommendations related to birds and marine mammals : the Recommendation 27-28/2 "Conservation of seals in the Baltic Sea Area"⁸, Recommendation 17/2: "Protection of harbour porpoise in the Baltic Sea Area"⁹ as well as the Recommendation

⁶ https://environment.ec.europa.eu/topics/nature-and-biodiversity/trade-seal-products_en

⁷ [Past Meetings - Baltic Sea Advisory Council \(bsac.dk\)](#)

⁸ [HELSINKI COMMISSION \(helcom.fi\)](#)

⁹ [Rec-17-2_revised-2020.pdf \(helcom.fi\)](#)

34E/1 “Safeguarding important bird habitats and migration routes in the Baltic Sea from negative effects of wind and wave energy production at sea”¹⁰. HELCOM bodies (Working Group and Expert Group) follow-up the implementation of the Recommendations. The HELCOM bodies directly working with marine mammals and birds are the HELCOM Working Group on Biodiversity, Protection and Restoration (WG BioDiv), HELCOM Expert Group on Marine Mammals (EG MaMa) and the joint HELCOM-OSPAR-ICES Joint Working Group on Seabirds (JWG Bird): Baltic + North East Atlantic are involved. Their goal is to share scientific knowledge on the development and maintenance of indicators for policy background information and support the implementation of the BSAP and Recommendations. Florent Nicolas referred to the publication of the latest results of the third holistic assessment of the Baltic Sea, HOLAS 3,¹¹ which provides a comprehensive overview of the ecosystems health of the Baltic Sea and covering the assessment period of 2016–2021.

Management system in Poland: Katarzyna Kamińska, Fisheries Department of the Polish Ministry of Agriculture and Rural Development¹²

Katarzyna Kamińska presented the management system with respect to seals in cormorants in Poland. She underlined that all seal species are under full protection in Poland and cannot be killed, captured or scared away. The conservation status is assessed as unfavourable/bad due to the fact that no breeding takes place in the Polish waters and there is high mortality of young seals. A conservation plan has not been implemented.

She referred to the mitigation measures to the seal-fisheries conflict in Poland. A compensation system was implemented in 2016 for cod, salmon and sea trout and 19 applications had been accepted. A new compensation system is planned under EMFAF, with similar rules for granting compensation. The presenter referred to the project on testing seal safe gears, financed from EMFF and conducted by the West Pomeranian University of Technology in Szczecin and Darłowo Group of Fish Producers and vessels owners.

In relation to cormorants, Katarzyna Kamińska stated that the breeding population is stable. The cormorants are expanding to the south. Cormorants are protected in Poland under Article 6.1 of the Regulation on the protection of species of animals, and it is forbidden to kill and capture them. Reduction of their population is only allowed on special permission, in case they cause damages to fish farms. When applying for permission to shoot cormorants it is necessary to apply to the Regional Directorate for Environmental Protection. The exact number of cormorants to be shot must be indicated and it is not allowed to shoot cormorants in a coastal area at sea. The discussion about a potential compensation system for losses caused by cormorants at fish farms is ongoing.

The Inter-ministerial team to deal with losses in fisheries and fisheries economy caused by protected species of marine mammals and birds was established in 2019. Major issues for discussion are cormorants and seals and problems they are causing to fisheries and aquaculture sectors (currently compensation system for cormorants is on the Agenda).

¹⁰ [HELCOM Rec. 34E 1: Safeguarding important bird habitats and migration routes in the Baltic Sea from negative effects of wind and wave energy production at sea](#)

¹¹ [State of the Baltic Sea 2023 – HELCOM](#)

¹² [Management system in Poland seals and cormorants \(bsac.dk\)](#)

Management system for grey seals and cormorants in Estonia, Elo Rasmann, Ministry of Regional Affairs and Agriculture, Estonia¹³

Elo Rasmann presented the management system for grey seals and cormorants in Estonia. The number of grey seals has been growing continuously in the past years, at the rate of 7-8% per year. Hunting for grey seals has been allowed in 2015. The hunting quota amounts to 1% of the population (quota has never been fully utilised) and hunting is allowed from 15th April – 31st December. Since April 2023, hunting from boats with non-working engines is allowed, so far only from land or rowing boats. Mandible or canine tooth (root) – for a biological sample. The price for seal hunting permits was lowered (from 65/100€ to 13€). Hunting of nuisance specimen is allowed from protected areas and outside quota with special permits. According to the law, total hunting pressure should not exceed the average population growth rate in the last seven years. According to Estonian authorities, it is preferable to manage the population size of grey seal and deal with nuisance specimen instead of paying compensations to fishermen.

The speaker referred to the fact that the population of cormorants in Estonia is growing rapidly. Since 2005, the abundance has tripled. There is a protection and management plan in place since 2008. Quota-free hunting is allowed. 600 – 700 cormorants are hunted per year during the hunting season, from 1st August until the end of November. Oiling of eggs (2000 per year) was carried out in 2011-2014. Revision of the protection and management plan has been given high priority. In 2023, measures have been taken to limit population impact to the fish stocks in one feeding area (Pärnu river, Tindisaared). Oiling of eggs was carried out on 8 islets where cormorants have been dominant inhabitants in recent years. On average 1/3 of nests were treated, in total 14 158 eggs were oiled by fishermen. The presenter concluded by saying that pan-Baltic management measures are needed in view of fast growing populations of grey seals and cormorants.

Management system in Sweden with focus on seals, Norbert Häubner, Swedish Agency for Marine and Water Management (SwAM)¹⁴

Norbert Häubner informed that the grey seal management plan has been in place since 2019 and the plan for harbour seal since 2012. The management plan for ringed seals is under preparation. Hunting of all seal species is allowed. National monitoring of seal populations is carried out in cooperation with countries around the Baltic Sea. Assessment of the status is based on population size, distribution, health and bycatch, in accordance with the provisions of Habitats Directive and MSFD. In accordance with the management plans, favourable conservation status of seal populations and impact on human interests must be neutral or positive. The Swedish Environmental Protection Agency (in cooperation with SwAM) is responsible for hunting permits. Hunting permits are based on population assessments and favourable conservation status is prerequisite for permits. Monitoring is necessary so hunting cannot interfere. Hunting is not permitted in national parks. In 2023-2024, the hunting quota for grey seals amounts to 1500 specimen, whereas for harbour seals

¹³ [PowerPoint Presentation \(bsac.dk\)](#)

¹⁴ [Seal management in Sweden \(bsac.dk\)](#)

it is 630 and for ringed seals 350 (protective hunting). Killed seals must be reported the next day. The hunting quota is not fully utilised. Diet, size and age analysis of seals are carried out as a follow up of hunting. With reference to damages of catch and gear, the speaker underlined that despite a decreasing number of fishers and exposed gears, the reported number of damages is quite stable. In accordance with the requirements of MSFD, assessment of seal abundance and distribution will be carried out until 2024.

3. Why focus on cormorants and seals

Cormorants and seals interactions with fisheries, Gildas Glemarec, National Institute of Aquatic Resources (DTU Aqua)¹⁵

Gildas Glemarec presented the interactions between seals and cormorants and fisheries. He underlined that DTU Aqua conducts research in close cooperation with the fishing community. Its focus is on scientific results and policy issues that matter to the fishing industry, taking into account the Technical Measures Regulation. The population of grey seals has been growing and in 2018 amounted to 40-50.000 specimen in the Baltic. There are 200.000 cormorants in the Baltic. Both seals and cormorants are attracted to passive gears. They can damage the catches, by damaging fish or breaking the gear. DTU Aqua runs monitoring programmes for bycatch of protected species since 2010. This information needed to understand how many animals die in gillnets every year. There are also several research programmes, i.e. on the reduction of impact through gear switching or mitigation solutions (seals + cormorants) and on the impact of seals, including studies on grey seal foraging distribution in the Baltic Sea and estimation of seal depredation. Several mitigation solutions such as pots and fykes are being tested, with positive feedback from fishers. Grey seals eat 80,000 tonnes of fish per year, mainly from gillnets. Seals (off Bornholm) predominantly take cod from the nets and can damage or remove up to 100% of the cod catches in the nets. Preliminary in-situ observations with ROVs are carried out to determine the “vanishing” rates of fish. Fisher's declarations of seal damage in the logbooks underestimate the total extent of damage.

Predators-prey interactions, Maria Ovegård, the Swedish University of Agricultural Sciences (SLU)¹⁶

Maria Ovegård presented the predator-prey interactions with the focus on cormorants and seals. She referred to the fact that the number of predators, including all species of seals and cormorants in the Baltic has been increasing. The conflict between fisheries and cormorants and seals intensifies. Fisheries management in the Baltic is moving towards ecosystem based approach and therefore predator-prey interactions must be taken into account. Predator-prey interactions include direct consumption, wounding prey and inducing predator avoidance behaviour by adjusting feeding, mating and breeding behaviour.

The speaker referred to studies on quantification of fish removal and presented some data. She stated that top predators have the potential to remove substantial amounts of fish, of the

¹⁵ [JWGBIRD 2022 \(bsac.dk\)](https://www.bsac.dk/jwgbird2022)

¹⁶ [PowerPoint Presentation \(bsac.dk\)](#)

same order of magnitude as the combined commercial and recreational fisheries, in particular in the case of coastal fish. She noted that extrapolations of fish removal generally lack detailed information. It is important to make studies on the variability in diet and prey consumption, as well as variability in abundance and distribution of predators, in order to have proof whether or not predators have impact on fish populations. 4000 titles and abstracts were evaluated and a statistical effect of the impact of predators on fish could be seen (effect sizes) in 22 articles. From studies conducted up to 2020, it can be seen that cormorants generally have negative effects on fish populations and perch and cyprinidae species seems to be the most vulnerable to cormorant predation. There is a general lack of knowledge on predator ecology, including diet and consumption, abundance and distribution, movement patterns as well as food web dynamics and complexity.

4. Cormorant research

The Development of the breeding population of cormorants in the Baltic Sea region, Thomas Bregnballe, Aarhus University, Denmark

Thomas Bregnballe presented the development of the breeding population of cormorants in different countries in the Baltic region. The EU helped funding a pan-European count of the breeding colonies in 2012-2013. Some, but not all, of the states around the Baltic Sea have continued to organise annual counts of colonies. The population abundance has stabilised in Denmark, Germany, Poland, Lithuania, Finland, the Russian part of the Gulf of Finland. Marked increases have been noted in Sweden and Estonia over the last 10 years. In the Baltic, there has been an increase from approximately 162,000 breeding pairs in 2012 to maybe over 220,000 breeding pairs in 2022. The speaker referred to the density dependent mechanisms. Reproductive performance and survival of cormorants depend mainly on access to food resources near the breeding colonies. Also severe winters can affect their survival. Cormorants are also affected by predation and disturbance by white-tailed sea eagles, as well as shooting. Actions are also undertaken to keep cormorants away from breeding sites, consisting of oiling of eggs and disturbance.

Cormorants impacts on fish populations, Niels Jepsen, National Institute of Aquatic Resources (DTU Aqua)¹⁷

Niels Jepsen presented the development of the Danish cormorants population. The number of cormorants in the Danish coastal and freshwater areas had dramatically increased and later stabilised at high level since protection measures in the early 1980s. At the same time, coastal fish stocks have collapsed. Research indicates that cormorants can have a substantial impact on fish populations. According to scientific studies, mean mortality of salmon smolt by cormorants amounted to 47%. Based on tag recovery, cormorants ate approximately 40% of sea trout under 50 cm. Research also indicated a reduction in flounder survival in the vicinity of a cormorant colony. For river fish with low populations, predation by even a few cormorants can be a threat. The speaker presented the western Baltic cod case, based on the rough number of cormorant present, the size distribution of cod eaten by

¹⁷ [til Niels Jepsen \(bsac.dk\)](mailto:til@nielsjepsen.bsac.dk)

cormorants, the information on the time the birds forage in the area, as well as the proportion of cod in cormorant diet (based on 2 studies). Assuming that 20% of food consumed by cormorants is cod, approximately 24 million cod could be eaten annually by cormorants in the Danish part of the Baltic, whereas the total recruitment is estimated by ICES between 4-17 million cod/year. The speaker referred to a pilot PIT-tagging study on cod, eel and flounder. The recovered tags equals a predation by cormorants of 65% of the cod and 58 % of the flounder. It could therefore be concluded that cormorants have an impact on migrating salmonids, flounder, eel and potentially high impact on cod. A new 3-year study is underway to better model the overall impact of cormorants and seals in cooperation with German scientists.

Cormorant-induced mortality in western Baltic Cod (KoMoDo), Tyrell DeWeber, The Potsdam Institute of Inland Fisheries, Germany

Tyrell DeWeber presented an on-going research project on cormorant-induced mortality of western Baltic cod. He underlined that, so far, the results from one location are available. The project is aimed at quantifying cormorant predation in selected sections of the Baltic Sea coast with a particular focus on cod, comparing conventional and novel genetically-based methods for quantifying fish predation from cormorant pellet analyses and estimating the potential impact of cormorant predation on natural mortality and the population dynamics of western Baltic cod. He presented work packages under the project, including literature review, collecting cormorants data and pellets, identifying the relative amount and weights of fish species in diets and the age of cod in cormorant diets, testing genetic and other novel methods to quantify the proportion of fish species in cormorant diets, estimating the proportion of cod and other fish species in the diet of cormorant throughout time and space, Direct estimation of predation is carried out through mark-recover method for cod and other target species. The project also aims at collecting and analysing population data for cod and other fish species and estimating the potential role of cormorant predation on the population dynamics of western Baltic cod. A regional monitoring plan will be developed to collect cormorant predation data as a potential input for ICES assessments. The results of the project will be presented and published. The project is conducted in collaboration with the Thünen Institute and Danish DTU Aqua and will be concluded in 2027.

Cormorant effects on aquaculture and fyke nets: direct effects on gear damages, Mats Westerbom, LUKE, Finland¹⁸

Mats Westerbom presented the project carried out in Finland. The goals of the on-going project are to document and quantify the direct damages caused by cormorants and grey herons on fisheries and aquaculture. The project has been running for over a year. The project is to determine which species cause losses and what are the losses, how many birds visit fyke nets and aquaculture facilities and how much fish do they eat as well as what is the overall behaviour of the birds. Damages in aquaculture and fyke nets are identified on the basis of 24/7 surveillance carried out with remotely controlled cameras. 2000 days of data were collected. The results obtained so far from one-sixth of collected data are preliminary. With reference to fisheries, early findings indicate that fyke net type has a large impact on

¹⁸ [PowerPoint-esitys \(bsac.dk\)](#)

damage size and frequency. For open fyke nets, predation pressure from cormorants correlates positively with the size of the adjacent colony, but there are large temporal differences in pressure size among different locations.

Questions

A small scale fisheries representative from Poland referred to substantial damages to fish and fishing gears by growing populations of seals and cormorants. He asked if any concrete next steps are planned by the BSAC after the workshop, in order to make pressure on the decision-makers to mitigate the impact of predators.

The BSAC ExCom Chair underlined that it is up to the BSAC members to decide whether another BSAC workshop should take place in 2024, to give the stakeholders more time for discussions and subsequently to draft a BSAC recommendation.

A fisheries representative from Denmark asked how damages to the catch need to be documented to get a compensation for a loss of a specific number of fish.

A representative of Polish administration replied that a fisheries inspector is requested document the losses in the catch as well as any evidence that the fish were eaten by seals or cormorants.

A representative of anglers referred to the removal of the cormorant from Annex I of the Directive¹⁹ on the conservation of wild birds in 1997. He asked what was the size of the breeding population of cormorants at that time.

A Danish scientist replied that the cormorant population numbers in Europe were considerably lower in 1997 than now. Replying to a question on 40% mortality of eel caused by cormorants, **a Danish scientist** confirmed a great impact of cormorant predation on the European eel population.

A representative of the OIG asked whether egg oiling is an effective management measure for cormorant populations, and whether it could be an alternative to hunting.

A Danish scientist answered that oiling can effectively reduce reproduction of cormorants and thus their predation on a limited, regional scale. However, in the long term, cormorants may recruit from other colonies.

A representative of the OIG asked about the threshold values for good environmental status (GES) for the Baltic seal populations.

A Swedish scientist replied that the current abundance of grey seals is above the threshold of Limit Reference Level (LRL) of 10,000 seals²⁰. The current ecosystem carrying capacity levels are not known.

In reply to a question by **a fisheries representative from Poland** on how much cod is consumed by cormorants, **a Danish scientists** stated cormorants eat small cod. Given the assumption that cod constitutes 20% of cormorant's diet, cormorants in the Baltic could eat the entire annual recruitment of cod.

5. Seal research: predation and parasites

¹⁹ Annex I to Birds Directive 79/409/EEC

²⁰ [Grey seal abundance - HELCOM indicators](#)

Parasites transmitted by seals and their impact on condition of cod in the southern Baltic Sea, Magdalena Podolska, National Marine Fisheries Research Institute, Poland²¹

Magdalena Podolska presented the impact of parasites on the condition of cod in the southern Baltic. She presented the major drivers of cod stock dynamics: salinity, oxygen, water temperature, food availability, seals, diseases and parasites, and fisheries. Cod livers are infected by nematodes belonging to the Anisakidae family. Grey seal is a final host of liver worm *Contracaecum osculatum*. In the 1980s and 90s, infection of cod with *C. osculatum* in the Baltic Sea was at a low level (2 - 3%). The prevalence of infection increased markedly in 2011 and rapid increasing trend was reported in subsequent years. Infection dispersed to the entire area of the southern Baltic, reaching a level of 90% of infected individuals of cod. There are favourable environmental conditions for dispersal of parasites as liver worm prefers the low salinity found in the Baltic Sea. Parasites affect health condition of cod. Recently, the biomass of cod of commercial size (> 35 cm) has been at the lowest level reported since the 1950s. Magdalena Podolska presented the hypothesis that the presence of nematodes may be one of the factors leading to a reduction in liver energy reserves. This was investigated by different methods. A low body condition of fish infected with nematodes may be explained on physiological grounds. Cod is a lean fish - its protein reserves are stored in the trunk muscles, whereas the main energy reserves are stored in the form of lipids in the liver. Damage of liver tissue caused by nematodes may negatively affect the physiology of this organ and its capacity to store the necessary level of energy reserves. A severe reduction in the lipid content of the liver may reduce the chance of cod surviving periods of food limitation. In conclusion, Magdalena Podolska stated that high infection density could potentially affect reproductive success and lead to an increase in cod mortality. If the infection level of cod continues to increase, there is a risk that the condition factors of more fish will decline below poor or lethal levels, which may lead to a further increase in natural mortality. Such an increase in natural mortality could undermine a recovery of the stock even when catches are severely restricted.

Impact of grey seals on the cod population (predation and parasitism), Kurt Buchmann, University of Copenhagen, Denmark²²

Kurt Buchman presented the impact of grey seals on the cod population. The grey seal population 120 – 140 years ago was considerable and had a major impact on local fisheries. Culling efforts reduced the seal population, which was then kept at a level until protective legislation allowed the population to increase. The lowering seal population was associated with maximised fishing yield between 1970 and 1990. Since the 1990-2000, the seal population has started to increase. The Baltic cod population has begun to decrease. The grey seal is now extremely prevalent in the main spawning ground east of the island Bornholm. The seal occurrence in this specific region is higher than during the last seal population peak in 1880s. The grey seal is an intelligent animal and effective hunter with huge appetite. One sign of the increasing seal population was the increased predation on

²¹ [Slajd 1 \(bsac.dk\)](#)

²² [Microsoft PowerPoint - Impact of seals on Baltic cod Oct 27, 2023.pptx \(bsac.dk\)](#)

fish in fishing gears since the year 2000. As much as 70% salmon are eaten by seals. Since 2000, cod is heavily infected by seal worms *Pseudoterranova decipiens*, as well as *Contracaecum osculatum*. Cod become infected by these worms by eating infected intermediate hosts (e.g. sprat, invertebrates e.g. crustaceans). These are infected by larvae hatching from parasite eggs delivered by adult worms in the seal stomach and passed with seal faeces to the sea. In 1982-1983, one had to examine 5 cod (35-45 cm body length) in order to find one single *C. osculatum* larva. Now all cod are infected with up to several hundred larvae. One seal may ingest varying amounts of cod - but even a few kg cod a day per seal will result in a predation of thousands of tonnes per year. Worst case scenario may reach a harvest around 90,000 tonnes, provided the seal population is around 40-50,000 individuals. The speaker concluded that in short-term, recovery of cod population will require measures regulating seal populations.

Questions:

A representative of the OIG asked whether the impact of seal worms will decrease if the number of seals decreases.

A Polish scientist replied that parasites are already in the marine environment and will stay there for years. Even if all seals disappear, the parasites will still be there.

A Danish scientist stated that in the 1970s the seal population had been smaller and there were less parasites in cod. Replying to a question on whether the immune system of cod is compromised in any way by changing environmental conditions in the Baltic, he stated that there are numerous studies on the immune system of fish. He added that since seals do not have a top predator in the Baltic, their population will not decrease by itself. Replying to a question on parasites infections in cod in 1990s, when the cod was in a much better condition, he stated that the parasite infections had increased along with the increasing grey seal population. Measures aimed at regulating the grey seal abundance are needed in order to decrease the high infection load in Baltic cod.

A Polish scientist stated that in the case of such high level of infections, response from cod immune system is too weak to fight the parasites.

6. Seal Research: interactions and management

**State of the seal populations, Karin Hårding, University of Gothenburg, SE;
Markus Ahola, Swedish Museum of Natural History, Sweden²³**

Karin Hårding presented an overview of the three Baltic seal species. Ringed, grey and harbour seals are very different – they have different body sizes, different diet, are affected by different environmental stressors and have different hunting regimes.

Historical population sizes were much larger than today. They declined due to bounty hunting. A population increase had occurred in 1970s when hunting was abandoned. All three seal species started to recover. **Markus Ahola** presented the latest updates on population, based on aerial surveys. Ringed seals are at risk of decline since they depend on strong ice to reproduce. In 2023 the population of the Baltic grey seal was estimated at

²³ [Karin-Harding-Markus-Ahola-Presentation-27-oktober-2023_v4x.pdf \(bsac.dk\)](#)

approx. 45 000 individuals, and the population is increasing at the rate of 5% per year. The highest increase rate is in the southern part of the Baltic, where the sub-population originates from migration and not reproduction. Migrations are often due to increased hunting pressure in some regions. The increase in the number of harbour seals has slowed down in the Baltic. Karin Hårding referred to the seal diet. Grey seals eat many species of fish and their diet varies over season. Seals prefer small fish, but also eat a lot of stickleback and crustaceans. The impact of seals on the ecosystem is not well understood, but in some cases they can help to stabilise and promote healthy ecosystem when they prey on fish such as sticklebacks that compete with commercial fish. Seals also damage the catches and the fishing gears.

In conclusion, Karin Hårding stated that several signs of resource limitation should be noted. The ringed seal population may collapse in 50 years if the warming continues. The ringed seal abundance is decreasing. Grey seals increase in numbers, but suffer from health issues. Important prey fish like cod and herring are overfished. Managers should bear in mind that hunting can lead to population collapse, if the populations are already stressed.

Challenges of compensation schemes for human-seal conflict mitigation in the Baltic Sea, Katarzyna Nadolna - Ałtyn, National Marine Fisheries Research Institute, Poland²⁴

Katarzyna Nadolna - Ałtyn presented the challenges for compensation schemes for human-seal conflict mitigation in the Baltic. A compensation scheme in human-wildlife conflicts is a formalised system designed to provide financial or in-kind reimbursement to individuals or communities who have suffered losses due to interactions with wildlife. Compensation schemes aim at alleviating the economic burdens of these conflicts, reducing retaliatory measures against wildlife, promoting positive perceptions and tolerance towards the wildlife species involved. There are 288 publications referencing wildlife compensation and 138 unique compensation programmes. She presented different compensation schemes, among others ex-post compensation schema where stakeholders are compensated after damages have occurred and in-advance compensation schema where stakeholders receive compensation or incentives before any damages occur, often to adopt preventive measures. She presented the Baltic experiences in compensation schemes for seal induced damages in fisheries. There are various approaches in the Member States, but one guiding principle - compensations are a temporary measure. No system can guarantee that all fishermen will be satisfied. Creating an optimal system to support coexistence between small-scale fishery and seals requires a deep understanding of the local context, including socio-economic complexity, as well as cultural and psychological factors.

She presented the Polish case (but characteristic of many coastal fleets in the European Union), where fishermen complain about a decline in fish stocks in the Baltic, absence of alternative fishing techniques proved effective under local conditions (fleet and hydrological characteristic), lack of reasons to invest in new fishing methods. The general attitude is that there is no future for small-scale fishing and the question is whether a compensation system can really help in such case. Katarzyna Nadolna – Ałtyn presented the inspiring thesis, among others that compensation systems should consider not only economic damages but

²⁴ [Slajd 1 \(bsac.dk\)](#)

also support human dimension and that including the social aspects of how marine mammals interact with fisheries could help us make more practical conservation decisions. There are some golden rules for the application of a compensation system, among others transparent and fast claim process, regular monitoring and knowledge sharing.

The RESOCO project: How to mitigate and manage a social conflict between seal, conservation and fisheries in the Baltic Sea, Sven-Gunnar Lunneryd and Sara Königson, SLU, Sweden²⁵

Sven-Gunnar Lunneryd referred to the Seals and Fisheries Programme, which started in 1994, and includes a council of authorities and fishermen as stakeholders. The main goal of the programme is to develop mitigation methods to minimise the seal and fisheries conflict. Despite the implementation of the programme, the conflict continued to increase. The grey seal population also continued to grow. Seal impact on cod fishery includes high gear damage, damaged catch, hidden damage, scaring effect, competition for the resource, the impact of seal worms. Despite the fact that number of Swedish gillnet vessels in the Baltic proper had decreased from 329 in 2001 to 137 in 2022, the seal damages have increased. A net is a dining table. Development of alternative gear is necessary.

He presented the RESOCO project dealing with approaches and measures for mitigating seal-fisheries conflict in the Baltic Sea²⁶. He referred to the article synthesising the main problems with seals²⁷.

Large static gears is one of the options to mitigate seal-fisheries conflict. A hovering pontoon trap was developed and tested. This gear has a robust design to resist waves and currents and is seal-safe. It allows to get the highest quality catch and avoid bycatch of harbour porpoise and birds.

He referred to the management of seal population. A special seal trap attached to a floating pontoon has been approved in Sweden. This gear could be used to capture seals and decrease damages by seals in coastal fishery. A few small trials of protective hunting at seal traps were carried out with dubious result²⁸.

The speaker referred to the Habitats Directive²⁹ and underlined that while the main aim of this Directive is to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements, the maintenance of such biodiversity may in certain cases require the maintenance, or indeed the encouragement, of human activities.

According to the HELCOM Seal Recommendation of 2006 (27-28/2)³⁰, the grey seal population should reach the carrying capacity regardless of economic and ecological consequences and has a long-term objective to allow seal populations to recover towards

²⁵ [Pres-mall-en-4x3-2019-10-29 Read this before creating your presentation \(bsac.dk\)](#)

²⁶ RESOCO Report - *Approaches and measures for mitigating seal-fisheries conflict in the Baltic Sea*.
[DOI:10.6027/temanord2022-569](#)

²⁷ [Reassessing the management criteria of growing seal populations: The case of Baltic grey seal and coastal fishery - ScienceDirect <https://doi.org/10.1016/j.marpol.2023.105684>](#)

²⁸ On protective hunting of grey seals [Har skyddsjakt av gråsäl vid laxfällor någon effekt? \(slu.se\)](#)

²⁹ Council Directive 92/43/EEC on the conservation of natural habitats [eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31992L0043](#)

³⁰ [HELSINKI COMMISSION \(helcom.fi\)](#)

carrying capacity levels. Reaching carrying capacity for a top predator implies a high impact on the ecosystem, especially if this ecosystem is disturbed. In his view, the HELCOM Recommendation should be revised. He underlined that fishing is no longer the main mortality factor for Baltic cod. He quoted one of the conclusions of RESOCO: "There is an urgent need to find an optimal balance between the sustainable size of grey seal population and the viability of the coastal fishing sector"³¹.

Economic aspects of the seal-fisheries interactions in Sweden, Staffan Waldo, SLU and Lund University, Sweden³²

Staffan Waldo presented the economic aspects of the seal-fisheries interactions in Sweden. From economic perspective, there are both benefits and costs of having seals in the Baltic. The benefits include existence value, seal watching and hunting. The existence value is difficult to measure in economic terms and hunting has low economic value. There are 50 companies offering seal watching tourism in Sweden. He turned to the costs that include competition for the fish resource, eating from fishing gears (and breaking them), spreading parasite infections. Seals have an impact on the revenues of the fishing companies, as their predation results, among others, in smaller landings and lower quality of landed fish (fish infected by parasites), as well as damaged gear. A survey on costs was addressed to all Swedish fishers in 2013 and 2014. Almost all costs were reported by small-scale fisheries (passive gear). He concluded by saying that seals generate both values and costs. Swedish Baltic Sea small-scale fishers leave the fishery due to seal interactions. The current seal population is larger than the optimal and should be closer to the Limit Reference Level of 10,000 seals.

Questions:

A fisheries representative from Germany referred to the statement made by one of the scientists that fishing is no longer the main mortality factor for Baltic cod. In his opinion, scientists should clarify the causes of mortality of Baltic cod. He asked whether seals feed on harbour porpoise and birds.

Swedish scientists explained that seals could eat harbour porpoise bycaught in the fishing nets. However, only sporadic cases of such predation had been noted in the Baltic.

7. Views of stakeholders

Small-Scale Fishers' perspective, Marc Eskelund, FSKPO, Denmark³³

Marc Eskelund presented the perspective of small scale fishers in the conflict between fisheries and the predators. He presented a pyramid illustrating the challenges and conflict of marine predators and (commercial) fisheries, with damaged catches at the top, followed

³¹ [Reassessing the management criteria of growing seal populations: The case of Baltic grey seal and coastal fishery - ScienceDirect](#)

³² [Bild 1 \(bsac.dk\)](#)

³³ [Microsoft PowerPoint - BSAC-Marine-predators-FSKPO_printable.pptx](#)

by catches removed from the gears, and potential catches scared away from the gear by the presence and hunting behaviour of the marine predators.

In the Baltic, it is no longer the marine predators that are under threat. Important commercial fish stocks (herring, cod, eel, flounders, etc.) are critically low, whereas grey seals and cormorants are very abundant. FSKPO works on improving the condition of small scale fishers. He underlined that whatever mitigation measures are used to minimise the conflict, they should have positive effect on fish stocks. The management of seals and cormorants in Denmark is under the competence of the Ministry of Environment.

FSKPO actively participates in relevant working groups on seals and cormorants and provides suggestions to revise management plans, tests new ways of recoding damaged catches and closely cooperates with scientists in the research and trials to document the impact of the marine predators. Dialogue with the NGOs is also carried out to ensure mutual understanding of the fishers – predator conflict. He presented the view of the FSKPO on how to improve the management of marine predators. The poor conditions of the fish stocks has to be given high priority. The population sizes of marine predators need to be addressed in the light of the current state of fish stocks. Management of predators should be conducted on a pan-Baltic scale. He quoted the Convention on Biological Diversity: There has been a tendency in the past to manage components of biological diversity either as protected or non-protected. There is a need for a shift to more flexible situations, where conservation and use are seen in context and the full range of measures is applied in a continuum from strictly protected to human-made ecosystems.

Recreational fishers perspective, Jan Kappel, European Anglers Alliance³⁴

Jan Kappel presented the view of recreational fishers³⁵ on management of cormorants³⁶. He underlined that cormorants cannot be managed locally. Cross-border cooperation, ideally an adaptive pan-European management plan, is required. All areas/countries in Europe should take responsibility for the whole lifecycle of “their” cormorant populations. The cormorant’s impact on threatened or protected fish species as well as fisheries is a serious problem in many places. Tagging studies provide scientific evidence of the rapid and alarming negative impact of cormorant predation on fish stocks. He underlined the fact that the cormorant had reached favourable status in the 1990s and was removed from the Birds Directive Annex I in 1997. The breeding population was much smaller than today’s population. The recreational fishers in the BSAC call for an adaptive population model for the great cormorant at European Union level, in order to achieve and maintain robust fish stocks and biodiversity by reducing bird predation pressure, ensure conservation of healthy aquatic ecosystems throughout Europe, maintain the favourable conservation status for cormorants. He underlined that cormorants are a truly European problem due to their life cycle and exceptional mobility, which needs to be managed accordingly.

³⁴ [PowerPoint-presentation \(bsac.dk\)](#)

³⁵ EAA, DAFV, Danish Recreational Fishers

³⁶ EAA’s cormorant page www.eaa-europe.org/topics/cormorants

Polish fishers perspective. Representative of the Wolin Fishermen's Association, Poland

Dariusz Kruła, member of the Board of the Wolin Fishermen's Association spoke on behalf of Jacek Kowalczyk, the chair of the Association. He referred to the fact that growing populations of seals and cormorants heavily affect fishers in the Pomeranian Bay. The profitability of fishery decreased and in some periods is close to zero. Seals treat the fishing nets as a dining table. They are smart animals and use the opportunity to eat the fish from the nets. Damages to the catch caused by cormorants have also dramatically increased in recent years. Some fishers decided to leave the profession due to very weak perspectives.

A small scale representative from Poland underlined that the impact of seals and cormorants on coastal fishery is visible along the Polish coast. This impact has been confirmed by the information presented at the workshop. There is an obvious need to manage seal and cormorant populations in the Baltic. He called for further discussions aimed at finding agreeable measures to mitigate the conflict between the predators and fisheries and put more pressure on politicians to take the right decisions with regard to seal and cormorant management.

NGO perspective, Justyna Zajchowska, WWF³⁷, Nils Höglund, CCB

Justyna Zajchowska underlined that the conflict between grey seals and fisheries cannot be resolved without stakeholder engagement and cooperation. WWF Poland works closely with one of the Polish fisheries organisations through a series of workshops, with a mediator, aimed at creating safe space for exchange of information and views. She referred to the WF report on human – wildlife conflicts. The management of such conflicts requires an integrated approach including actions to prevent the conflict such as mitigation of the impact of events after they occur, response to events when they are reported, research the drivers and nuances of conflicts in the area to gain an understanding of the specific conflict context, monitoring occurrences over time and supporting policy and regulations that strengthen conflict management locally. Joint next steps aimed at minimising grey seals – fishers conflict include activities at HELCOM level, proposals for various types of additional research on the topic, to be conducted by scientific institutions, work on improving the Polish compensation system for damages caused by seals, work on improving the reporting system. WWF Poland is planning to organise a seminar on grey seals – fisheries interactions in 2024.

Nils Höglund, CCB, speaking on behalf of the OIG in BSAC referred to the discussions on seals undertaken by the BSAC at several occasions. Many points had been addressed already and the BSAC had not reached agreement on several issues related to the management of seals. More clarity is needed on the understanding of good environmental status (GES) and the carrying capacity level of the of seal population. The effects of culling are not known. Experts from Canada should be invited to the next workshop to share their experiences in managing the seals. He strongly called for a follow up meeting, also to discuss non-lethal solutions.

³⁷ WWF report "The need for human-wildlife coexistence":
[a future for all the need for human wildlife coexistence.pdf \(panda.org\)](#) page 46

Closing remarks, the BSAC ExCom Chair

The BSAC ExCom Chair thanked the speakers for their presentations and the participants for taking part. He stated that the workshop was the first step in understanding the interactions between the Baltic predators and fisheries. He informed that the BSAC will continue to discuss this very important issue in a second workshop, planned in the first quarter of 2024. In order to involve all stakeholders in the discussions, the Secretariat will share a questionnaire on the formula of the next workshop. He thanked the Secretariat for preparing the workshop.