FINLAND MEETING REPORT
INTERCAFE @ Hanko Peninsula 13-15 April 2007

"What to do when the cormorant comes"

INTERCAFE meeting report, Hanko, Finland, April 2007

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This full report of the meeting is in six parts:

(1) Introduction
(2) Presentations – local experts
(3) Integrated working session: exploring the local situation with local experts
(4) INTERCAFE @ Hanko Peninsula field trip report
(5) General working sessions: regular Work Group tasks
(6) 2006/07 Short Term Scientific Missions

The agenda for the meeting is given in Appendix 1.

PART (1) Introduction

This, the seventh INTERCAFE meeting, was held at the Tvärminne Zoological Station of the University of Helsinki, on 13-15 April 2007. Tvärminne Zoological Station is situated on the Hanko Peninsula – the most south-westerly tip of Finland. Immediately offshore lie over 85,000 islands – some no more than bare rocks – that form the inner and outer belts of the Gulf of Finland, Finnish Archipelago and Gulf of Bothnia. Within the last decade, some of these islands have become colonised by breeding cormorants and many local people as well as government authorities have considered both the implications and possible mitigation measures resulting from the species' arrival in Finnish waters.

As well as the 'regular' INTERCAFE Work Group activities, the meeting was themed around the issue of "What to do when the cormorant comes". The title is slightly ambiguous, being neither a statement nor a question. This meeting thus did not

produce a list of actions to be undertaken 'when the cormorant comes' and followed almost like a recipe. Neither did the meeting explore all the possible options open for cormorant management. Instead, participants and local experts explored in some depth the situation in this region of Finland and the establishment and development of a national cormorant management plan. The theme was chosen carefully for two main reasons.

First, unlike many countries covered by INTERCAFE, there are relatively low numbers of cormorants breeding in Finland (although numbers are increasing at around 50% per year). By summer 2007 there were an estimated 8,900 pairs in 29 colonies and population growth was strongest in the archipelago sea where numbers had doubled to almost 3,200 pairs (with additional, unknown, numbers of 'floating' birds, non-breeders, and fledged young). Furthermore, cormorants have made a relatively recent appearance as a breeding birds in the country – so unlike many other European countries, they are a relatively new phenomenon. Second, despite the above observations, the Finnish government has already devised a National Cormorant Management Plan – it was published about 18 months prior to our meeting, in October 2005. Given INTERCAFE's interest both in linking science and policy-making and in recording the feelings and thoughts of local people directly affected by cormorants, Hanko was seen as an ideal location to further explore these issues.

A flavour of Hanko and the archipelago: habitat variety and fish communities

We were privileged to work with many local experts during the meeting. These included local land/water owners, fishermen and ornithologists, a representative of the local Fisheries Association, the Finnish Game and Fisheries Institute, and BirdLife

Finland. In addition, a biologist from Tvärminne Zoological Station provided further ecological information, an ornithologist from St. Petersburg University in Russia offered us new data on the development of cormorant populations in the far eastern Gulf of Finland, and we learned about the archipelago's changing economy and rural setting from a social scientist based at the Swedish School of Social Science at Helsinki University. We also heard first-hand from a member of the Working Group set up to develop the Finnish national Cormorant Management Plan. This collaboration allowed us to learn much about the biological and social diversity of the area.

Once again, INTERCAFE participants found themselves exploring issues of scale. Cormorant colonisation of Finland began on a 2ha rocky skerry - set in the outer archipelago, itself emerging from the Baltic Sea. The Baltic covers some 415km^2, has an average depth of no more than 50m, and contains some 22,000km^3 of water. This water - particularly near the seabed may take anywhere between 5-40 years to exchange completely due to the narrow constrictions to the west caused by Denmark and Sweden. Unlike, many traditional 'oceanic' seas, the Baltic is characterised by great differences in salinity (indeed, in some regions the water is essentially 'fresh') and hence, it holds a unique and highly diverse community of fishes. However, the enclosed and shallow Baltic Sea is highly vulnerable to environmental changes – be they caused by changes in the influx of saline water, changes in the quantity and quality (e.g. nutrient status) of freshwater runoff (from more than 200 rivers entering the Sea), and numerous subsequent changes to the ecosystem.

Politically and socially too, the Baltic is a dynamic system. In a region containing some 50 million people development has been largely frozen in many places for 50 years by The Cold War. Today the Baltic is now emerging as one of Europe's most dynamic areas. Here, there are major infrastructure projects, new trading links, and sweeping political change. Indeed, in many countries bordering the Baltic, these changes can, and have, happened very quickly.

It was against this background of (sometimes rapidly changing) cultural diversity - in landscapes surrounding an immense and dynamic ecosystem - that INTERCAFE participants explored the topic of ***what to do when the cormorant comes***.

Further reading

For further information on Finnish environments, see Wahlström, Hallanaro & Manninen (1996) *The Future of the Finnish Environment*, published by Edita (Helsinki) for the Finnish Environment Institute. For further information on the Baltic Region, see "The Baltic Region: north-east Europe's frontier of change" number 94/5 in the Understanding Global issues series published in 1995 by European Schoolbooks Publishing Limited, Cheltenham, UK.

PART (2) Presentations – local experts

2.1 The development of the Cormorant population in the Russian Gulf of Finland

Anna Gaginskaya: Laboratory of Avian Ecology and Bird Protection of Biological Research Institute of the St. Petersburg State University.

The nesting of the Great Cormorant on the Russian islands of the Gulf of Finland was confirmed in 1994 (Ossipov & Gaginskaya 1994). Prior to that, it was considered a rare vagrant in the Leningrad Region. Single individuals were observed during spring, and not so often – during autumn migrations (Noskov *et al*. 1981). When the height, size and number of nests at different localities were compared, the assumption was made that the breeding colonies of Cormorants probably appeared in the area in the early 1980s, first on the Dolgiy Reef Island, and then on four islands of the Bolshoi Fiskar Archipelago (Gaginskaya 1995).

When the islands were surveyed in 2006, breeding colonies of Cormorants were found on the Dolgiy Reef Island (60°25'N; 27°42'E), on 5 islands of the Bolshoi Fiskar Archipelago (60°24'N; 27°57'E), on Severnyi Virgin Island (59°56'N; 26°51'E), on the small Chaikin Island in the Seskar Island shallow-water zone (60°01'N; 28°18'E) and on some islands of the Kurgalskiy Peninsula (59°54'N; 28°02'E). Data on how nest numbers increased over the study period are presented in Table 1.

Place	**1994**	**1995**	**2000**	**2001**	**2005**	**2006**
Dolgiy Rif Island	≈100	144	790	?	?	1588
Zubets Island	?	0	(8)	?	?	0
Bilshoi Fiskar Archipelago	<350> only on two islands	≈1000	?	?	?	1305
Severnyi Virgin Island	0	0	?	?	?	121
Chaikin Island	0	(12)	?	300	800	?
Peninsula Kurgalsky (on the data S.Kouzov, J.Bublicheko)	0	4	20	0	?	≈60

Table 1. Count of Cormorant nests on the islands of the Russian Gulf of Finland in different years

The number of Cormorant nests in the colonies keeps increasing. On the Dolgiy Reef Island, it roughly doubled from 2000 to 2006, and on Seskar – more than doubled from 2001 to 2005. Generally speaking, a tendency has been noted for a longer breeding season, less synchronous egg laying and hatching, and greater number of addled eggs and nestling deaths.

Below are data on the total number of nests in the colonies and the proportion of nests with different clutch sizes. The data indicate that recruitment is mostly due to 3- and 4-egg clutches (Tables 2 & 3).

Place	**Date**	**Total no. nests**	**Number (%) of nests with different clutch size**						**Number (%) of empty nests**
			1	2	3	4	5	6	
Bilshoi Fiskar Archipelago	30.05	1,305	64 (4.9)	181 (13.9)	482 (36.9)	498 (38.2)	77 (5.9)	3 (0.2)	24 (1.8)
Severnyi Virgin Island	31.05	121	2 (1.7)	9 (7.4)	29 (24)	63 (52)	18 (14.9)	-	9 (7.4)
Dolgiy Rif Island	02.06	1,588	31 (1.9)	78 (4.9)	488 (30.7)	853 (53.7)	130 (8.3)	8 (0.5)	31 (1.9)
Total		3,014	97 (3.22)	268 (8.92)	999 (33.1)	1,414 (46.9)	225 (7.5)	11 (0.36)	64 (2.12)

Table 2. The total numbers of nests (and percentage of them) with different clutch sizes in three Cormorant colonies.

Place	**Date**	**Total number of eggs and nestlings in a colony**	**Number of eggs and nestlings in nests with different clutch size**						**Average clutch size**
			1	**2**	**3**	**4**	**5**	**6**	
Bolshoi Fiskar Archipelago	30.05	4,267	64	362	1,446	1,992	385	18	3.2
Severnyi Virgin Island	31.05	449	2	18	87	252	90	-	3.7
Dolgiy Rif Island	02.06	5,761	31	156	1,464	3,412	650	48	3.6
Total		10,477	97	536	2,997	5,656	1125	66	3.5

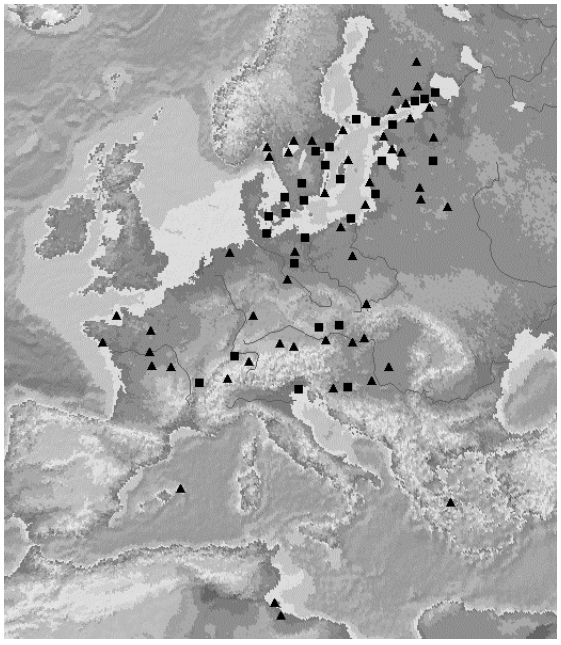
Table 3. The average clutch size (eggs + nestlings) in three Cormorant colonies.

Over 6,000 Cormorant nestlings have been ringed in 3 areas in 1994, 1995 and 2006 (Table 4) and a number of recoveries received. The term "recovery" denotes the receipt of any information about a find of a ringed bird or a ring.

Ringing date	30.06.1994	22.06.1995	18-19.06.2006
Ringing place	2 islands of Bolshoi Fiskar Arch.	Four islands of Bolshoi Fiskar Arch. and Dolgiy Rif Island	5 islands of Bolchoi Arch. And Dolgiy Rif and Severnyi Virgin islands
Number of ringed nestlings	1,000	2,025	3,000
Total number of recoveries	53	107	28 (by 01.04.2007)
Percentage of recoveries	5.3	5.3	
During the 1st yr	42 (80 %)	84 (78.4 %)	
After 2 yrs	7 (13 %)	15 (14 %)	
" 3 yrs	4 (7 %)	2 (1.9 %)	
" 4 yrs	0	2 (1.9 %)	
" 5-10 yrs	0	4 (3.8 %)	

Table 4. Ringing recoveries of Cormorant nestlings from islands in the Russian Gulf of Finland.

The "scattering" of recoveries produced by ringed young birds (Map 1) covers 23 countries in Europe and Northern Africa. The furthest recoveries of ringed birds or rings were Libya, Tunisia, Spain and Greece.



Map 1. Ringed cormorant recoveries from colonies in the Russian Gulf of Finland. Triangles = single recoveries, squares = more than one recovery.

References
Gaginskaya, A.R. 1995. "The Cormorant *Phalacrocorax carbo* as a breeding species of the Leningrad region". *Russian Journal of Ornithology*, 4(3/4):93-96.

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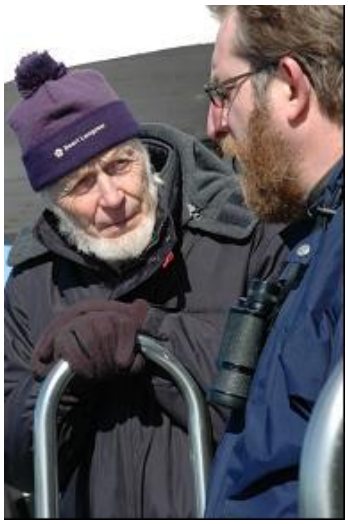
Noskov, G.A., Zimin, V.B., Rymkevich, T.A., Lapshin, N.V. 1981. "Birds at the Lagoda Ornithological Station and in its vicinity", *Ecology of the Birds Lagoda Area*. Leningrad, pp.3-86 (in Russian).

Ossipov, D. and Gaginskaya, A. "The Bolshoy Fiskar archipelago – not yet protected, But should be", *WWF Baltic Bull*., 5:27-28.

2.2 Why we do not want cormorants

Henrik Lundberg: local land/water owner, Busö Island, Ekenäs Archipelago.

Henrik´s family have been living on the same island since 1794. He is retired, and stays out on the island most of the year. He is the Chairman of the local Fisheries Region (which is a fisheries management unit). In 1996, the first breeding cormorant in Finland bred on a small islet belonging to Henrik's family estate. This colony eventually moved to another islet close by. Henrik summarises his talk…….



"Folks on the islands have always lived from nature, always respecting the balance in the ecosystems they live in. Today this seems to be increasingly difficult, due to pressure from the outside, which cannot be controlled from the inside. Part of this is the regulatory network (including EU legislation), which has been implemented without considering the long-term effects. An example is legislation protecting cormorants (and grey seals), the consequences of which the authorities do not know and are unwilling to understand.

For a long time the islanders themselves kept harmful animals at bay, looking after the balance in nature. Today, this is no longer possible due to the authorities. Cormorants are not bad as such; all organisms have their place in the ecosystem. But, when cormorants become too numerous in the wrong place, they become pests, and have to be removed.

I will discuss the growth of the Ekenäs [Tammisaari archipelago] *cormorant population, and the problems arising for the fishermen. I will talk about the effect of cormorants on fish and other impacts on nature. I will argue that cormorants are a threat to biodiversity on a local scale, and that they impair ecosystem services relating to human recreational demands. I will also point out that some of the "facts" given by authorities are misleading, and discuss ways of getting rid of the problem.*

The Cormorant is a smart bird, which makes them very adaptable, and they lack natural enemies. The damage done locally by cormorants must be considered from the perspective of the local people being affected, not from the point of view of the bureaucrat of the central government".

Cormorants first nested on a 2ha skerry in 1996, by 2002 there were 500 birds there. They are not there now because in 2001 they moved to trees on a nearby island (with about 20 nests at first).[1] Cormorants affect fishing people – they tear gill nets and also injure the fish caught in these nets thus making them unmarketable.

We have observed flock foraging for sprat and small herring and the birds tend to use the same foraging sites every year. These areas are also ones that have been used by fishermen for several decades – and fish have now gone from places where fishermen formerly fished (even in the presence of cormorants).

Although cormorant colonies are in the outer archipelago, on fledging the birds tend to move to the inner archipelago. They stay here until the first frosts and then migrate in October/November. In the spring, they arrive again – sometimes in mid-March and are nesting again by 01 April if the water is ice-free. Cormorants are thus in these areas for 7-8 months of the year.

Henrik has long-term fishery records that show that the fish are disrupted by cormorants: some age-classes of fish are over- (or under-) represented, and the proportions of different fish species have also changed. There are also Swedish data that show that cormorants can remove 20% of the local fish population, with consequent affects of the fishery.

Importantly, cormorants eat all species of fish in the sea (even small species when feeding their young), and specimens up to a maximum size of 40cm. From a landowners' point of view, the birds also affect the island vegetation – the normal flora (e.g. low shore plants) disappears on breeding islands. Some 3,000 cormorants might eat 385 tonnes of fish during their stay at the colony. They also contribute to the eutrophication process in the waters around colony islands. Taken together, there is a high effect on local biodiversity. One of the most serious effects if/when cormorants nest in trees is that they eventually kill them (taking pine twigs for nests and producing guano). Furthermore, other species of breeding birds (e.g. Caspian terns *Sterna caspia*, Greylag geese *Anser anser*) move away as a result of cormorant colonisation. A controversial report (by Lars Westin - date and reference details not available at meeting) produced in Sweden has also shown that cormorants can affect the ecosystem by altering the fish community.

[1] Timo Asanti has provided officially recorded figures: Cormorants started breeding in 1996 with 10 pairs. In 2002 there were 1391 pairs, in 2005 4603 pairs, in 2006 5766 pairs and in 2007 8894 pairs. There are a mixture of ground nesting and tree nesting birds.

Local landowners in the area often own many islands and can make a living by renting summer cottages. However throughout the summer, cormorants affect the area - fledged birds congregate in rookeries and produce a large amount of guano in these places, which is highly visible. Visitors do not want to see (and hear and smell) cormorants all the time.

There are suggestions that the Finnish authorities are withholding information form people. For example, authorities only give the numbers if breeding birds so the numbers of 'floating', young, and non-breeding birds are not given. There also claims that published cormorant diet data are misleading.

Locally, the best practices to reduce the cormorant population would be to remove eggs, oil some of the remaining ones, and leave other unharmed in the nest. Hunting in the area is not considered to be much use because of the difficult conditions. There also appears to be confusion around the issue of whether the birds in the archipelago are of the *sinensis* or *carbo* race. Concerns have been raised that the authorities are not listening to local people – at a local scale, once all the fish are gone the birds will move on too – local people are not allowed to do things on their own islands. In 2002 it was decided that they could not be compensated for damage done by cormorants. In 2006, compensation was sanctioned for fish farming – but not for losses of wild fish.

Henrik believes that many of his claims are not held by the authorities – but cormorants certainly consume fish of commercial value! The Finnish authorities have allowed the killing of only 53[2] cormorants, and recently (about 2 weeks ago) within the local area it was decreed that cormorant eggs could not be oiled/removed – as this would disturb the breeding of other species on the islands. There are 45,000 pairs of cormorants in Sweden, will the Finnish authorities wait until that number are recorded in Finland before they do anything?

Note added after meeting: Timo Asanti of the Nature and Land Use Division of the Finnish Environmental Institute (SYKE) agrees that their studies have shown that vegetation does indeed disappear around cormorant nests and that trees can die within 2-3 years from the effects of guano. However, there appear to be no effects on vegetation at distances of 3-5m from nests. Evidence also suggests that, except in the most local of circumstances (but with no supporting data), the contribution of cormorant guano to eutrophication is considered "less than minimal". Water quality in

[2] **Note added after meeting:** There appears to be some confusion over the number of cormorants that the authorities have allowed to be killed. Mr Lundberg reports 53 and elsewhere a figure of 57 is mentioned in the field trip report. Later discussions have attempted to clarify this figure. At the time of the meeting, the Finnish authorities had not given legal permission for any cormorants to be killed. Thus although it was possible to apply for permission to kill cormorants, no request had so far been approved. One possible explanation was that the figure (of 53 or 57 cormorants) actually referred to the number of licences that had been issued to those seeking permission to kill birds. However, it appears that no licences have been issued to kill birds. A second explanation is that the figure refers to the number of requests received for permission to kill cormorants – but it has not been possible to ascertain how many applications there have been. A third explanation is that the 53/57 figure actually originates from a theoretical calculation on the numbers of birds that *could* legally be killed under the current system. Although frustrating that we could not find the true 'meaning' of this figure, this situation highlights one that INTERCAFE participants have encountered during several other meetings: that there is sometimes widespread confusion between different individuals and/or stakeholder groups surrounding often fairly basic information. This situation highlights again the need for clear communication between all those involved in cormorant-fisheries issues.

the whole Baltic Sea area is affected by agricultural fertilisers and waste water coming from municipalities. The authorities do try to keep people informed on the cormorant situation via the media – and at least once a year new details of population size and growth, vegetation effects, diet etc are provided where available. There should really be no confusion over the race of birds: those breeding are certainly the *sinensis* subspecies, although some 3-4,000 *carbo* birds can be seen during the migration period along the Gulf of Bothnia. Officially, cormorants are regarded as belonging to the Finnish fauna and are thus not considered to be an invasive/alien species. Similarly, unlicenced killing/disturbance of cormorants is against both Finnish national law and the EU Birds Directive and is thus considered to be a "nature crime".

2.3 BirdLife Finland and Cormorants – why we should want cormorants

Mika Asikainen: Director-General, BirdLife Finland.

Cormorants are present in Finnish environments and so it is not a question of "do we or do we not want these birds." There is a conflict over this issue, but that is a matter of attitude and attitudes can be changed.

BirdLife International is a global Partnership of conservation organisations that strives to conserve birds, their habitats and global biodiversity, working with people towards sustainability in the use of natural resources. BirdLife Finland is the Finnish BirdLife partner. BirdLife Partners operate in over one hundred countries and territories worldwide. The BirdLife Global Partnership has more than 4,000 bird experts working for conservation and 10 000 000 supporters worldwide.
How BirdLife works?

- First we collect scientific data on birds, bird sites and their habitats.
- Then we publish the data.
- Then we inform decision makers.

BirdLife's aims are to:

- prevent the extinction of any bird species and keep common birds common
- identify and monitor a network of internationally important bird areas
- conserve and where appropriate improve and enlarge sites and habitats important for birds
- help, through birds, to conserve biodiversity and to improve the quality of people's lives

Cormorants from the birdwatchers' viewpoint

Cormorants raise feelings in people. There has been an increase in Cormorant populations in Europe since 1980's. The Cormorant colonies are very conspicuous and they change the landscape locally. One of the factors affecting our attitudes is the fact that Cormorants eat fish, as we do ourselves.

For birdwatchers, Cormorants also raise feelings. It is a great bird to watch and on migration it forms big flocks and migrates in great numbers. The return of the

Cormorant to Finnish nature is spectacular [the subspecies *carbo* was previously resident some 7-9,000 years ago]. It has historically bred in the Baltic Sea and is therefore a natural part of our world. Previously, humans have probably kept the populations of Cormorant very low.

After the return of the Cormorant as a breeding bird in Finland, its population has increased to 5,700 pairs in 2006. It inhabits some 20 islands. However, there are tens of thousands of little islands in the Finnish archipelago so there is plenty of room for Cormorants. Because it is a part of our nature, there is no need to treat it differently from other animals.

In Finland, law protects the Cormorant all year round. The fact that a few people don't ***like*** Cormorants is not enough to deviate from the basic norms of conservation. Contrary to what is often stated, they belong here just as we do and they do not compete with us for food. We should keep analysing the changes in their population, collect data and study the reasons behind the changes. The increase of Cormorants may tell us a much more important message than we realise.

Only if there were to be well-proven evidence of significant disturbance to nature or significant disturbance to our livelihoods, should we act and think of ways we can prevent these disturbances.

2.4 The hopeless state of the ecosystem

Harri Kuosa: Tvärminne Zoological Station, Hanko.

The Baltic Sea is not single unified water mass, nor can it be assessed as one unit in any sense: ecosystem structure, biodiversity or human-induced problems. However, whenever we find problematic or unexpected developments in the Baltic Sea, we can almost without exception pinpoint human action behind it. It has taken us a long time to realize that the unique characteristics of the Baltic Sea make it, at the same time, both vulnerable and hard to turn back in time when disturbed.

The official goal in relation to the state of the Baltic Sea is to reach the good ecological level of 1950's. One of the specific goals is to increase water transparency. The productivity of the Baltic Sea has increased at least two-fold in the last 100 years. This is seen as murkier water, but it has had drastic effects on other parts of the ecosystem, too. However, it has been very difficult to differentiate what are natural phenomena in the Baltic Sea and what are man-made. We know for example that large cyanobacteria blooms are a natural phenomenon, but their present intensity most certainly is not.

It has been a major realisation to the human populations around the Baltic Sea that the whole sea can be affected by their actions. It has also been a major shock to realize that the sea has a long memory. Both features are based on the unique morphometry

of the Baltic Sea basin. We would probably have much less/fewer problems if either ocean water could penetrate to the Baltic Sea more effectively, or if the Baltic Sea was a freshwater lake. At present, the water renewal time in the Baltic of over 20 years (natural phenomenon) combined with decades of nutrient input (man-made) has changed the Baltic Sea considerably.

The productivity of the Baltic Sea is based on available nutrients. Their concentrations have increased considerably. In most other water ecosystems we can talk about the limitation of a single nutrient, either nitrogen (in oceans) or phosphorus (in estuaries and lakes). However, the Baltic Sea is mostly limited by both nutrients. This would not be possible without the ability of cyanobacteria to grow in brackish water. Most of the production is limited by nitrogen, but our cyanobacteria may fix molecular nitrogen, and use the available phosphorus for growth. Thus, both nutrients are limiting productivity, and the addition of either nutrient will increase it.

Regulating the input of even two nutrients simultaneously would be difficult and expensive, but we are also faced with the fact that phosphorus is not permanently buried to sediment in present conditions. Thus the old sins are haunting us, and the phosphorus status of the Baltic Sea remains very high. The only possibility to increase phosphorus burial would be to decrease the amount of settling organic material, and, consequently, enhance oxygen conditions on sea bottom. In the Baltic Sea settling material mainly consists of spring production, which is nitrogen limited. We are in danger of facing a vicious circle, in which nitrogen-based spring bloom increases phosphorus input from sediment, which in turn intensifies the growth of nitrogen-fixing cyanobacteria, which in turn increase the nitrogen status of the water mass, which in turn increase spring production, and so on, and so on.

Regardless of the reasons for increasing productivity in the Baltic Sea, we are unable to control how this extra production is transferred in the food web. We do not have proper estimates of the total biomass of the top predators, fish, birds and seals, about 100 years ago. However, the Baltic Sea is able to sustain at least that amount of animal productivity. A good guess is that it is able to produce even more, and that unused primary production may detrimentally affect the ecosystem. The timing and species composition of algae is also affected such that less of the increased production is consumed by the parts of the food web that we consider ‘useful’ or ‘healthy’. It will take decades to turn this development back, and there are very few shortcuts or ‘manipulative actions’ or ‘active management’, which could make matters easier.

Q Sandra: Is there communication between scientists and landowners over these issues affecting the Baltic?
A Harri: No.

Q Chris: Are cormorants shot in Russia?
A Anna: No, there is no control of cormorants.

Q Mariella: What are the implications of this eutrophication of the Baltic?

A Harri: There are three main issues. First, increased organic matter in the water reduces the oxygen on the seabed. Second, this promotes blooms of toxic algae. Third,

the water becomes more turbid (less clear), benthic (bottom-dwelling) organisms get less light, there is less seaweed, reduced fish populations (e.g. fish that prey by sight start to disappear etc).

Q Ilona: If I understood, financial compensation was stopped in 2002?

A Timo: It was not stopped then for fish farmers or for damage to fishermens' gear. But it is an open question – it's a dynamic system, if pressure increases then there will be political pressure on the authorities to do something.

Comment: Michael Andersen – There is a problem for fishermen – even with relatively small numbers of – a few thousand – cormorants. To a fisherman, there's even a problem if there are only 20 birds visiting his nets.

2.5 Fish community changes in the eutrophicated Baltic

Meri Härmä: Finnish Game and Fisheries Research Institute

Nutrient loads to the Baltic Sea have increased since the early 20th century. Total nitrogen load has increased by a factor of 4' and phosphorus load by a factor of 8. The internal loading of phosphorus is an especially serious problem and will continue to be so in the future, even though there has been some decrease in the nutrient loads in the 1990s. Increased nutrients cause such things as intensified algae blooms, decreased water transparency, and deterioration of oxygen conditions in the deeper areas. These changes, among others, have direct and indirect effects on the fish. Total fish catches of the Baltic Sea have increased tenfold since the early 20th century. There are two reasons for this, (1) open sea fishing has intensified, and (2) fish production has increased. Fish production correlates with eutrophication.

The pelagic (i.e. open water) fish community in the Baltic Sea is dominated by four species: Baltic herring (*Clupea harengus membras*), sprat (*Sprattus sprattus*), cod (*Gadus Morhua*) and (anadromous) salmon (*Salmo salar*). There was a regime shift from a herring- and cod-dominated community to the dominance of sprat during the 1990s. There are several reasons for this: cod stocks have collapsed due to over-fishing and deteriorating oxygen conditions in the reproduction areas, and changes in salinity conditions have affected the food supply of herring and sprat.

Coastal fish community and species composition depends on such things as salinity and exposure. Freshwater fish species dominate in the northern Baltic Sea. Roach (*Rutilus rutilus*) is nowadays the most abundant species in the northern coast of the Gulf of Finland and in the Archipelago Sea and here roach has spread out even to the outer archipelago during the 1990s. Abundance of other cyprinids, like bream (*Abramis brama*) and silver bream (*Blicca bjoerkna*) have also increased. Improved reproduction conditions in the innermost archipelago, due to wide-scale environmental changes like eutrophication and climate change, are the reason for the recent increase in abundance of cyprinids. Also some other species like pike-perch (*Sander lucioperca*) have benefited from the recent changes in the coastal environment. We can speculate about the future effects of climate change. It is expected that in the next 100 years climate change will probably affect the salinity of the Baltic Sea (e.g. increased rainfall in winter leading to increased run-off and decreasing salinity), and the decreasing salinity in Spring would most likely benefit the reproduction of roach.

Stocks of the internationally managed pelagic fish species are well assessed (including annual biomass estimates). However, the state and changes in coastal fish stocks are poorly documented and understood. No biomass estimates are available even for species important for fisheries and hardly any data are available on small (and less-valuable) fish species, although their importance for food-webs might be considerable. Therefore it is very difficult to assess the effects of changes in coastal fish populations on the recent expansion of cormorants in the northern Baltic Sea, or the effects of cormorant predation on coastal fish stocks. One can speculate that roach have increased on the coast and because this is a commonly eaten prey of cormorants, their numbers have increased too. This is only an association and we do not know the strengths of the association, or whether it is 'cause and effect' or of other factors are at play.

Several of these issues are further explored in Meri's Q&A session with Work Group 1 reported in section 3.1 of this report.

2.6 The future of small-scale fisheries on the Finnish coast

Chris Karppinen: Uusimaa Fisheries Association

The small-scale Finnish coastal fishery does not stand or fall with the presence of the cormorant but it is a very important issue that affects people's lives in so many ways.

Characteristic of the professional fisheries in Finland is a small-scale fishery with small vessels in the shallow waters of the archipelago. There is some 150 km of coastline in the Uusimaa Region. Trawls, gillnets, trap nets and fykenets are the most common fishing gears used by professional fishermen. The main target species for the

fishery is herring (*Clupea harengus membras*), sprat (*Sprattus sprattus*), pikeperch (*Sander lucioperca*), perch (*Perca fluviatilis*), pike (*Esox lucius*), salmon (*Salmo salar*), and whitefish (*Coregonus* sp.). Other fish species of economic importance is burbot (*Lota lota*), flounder (*Platichthys flesus*) and smelt (*Osmerus eperlanus*). Herring and sprat are the most important species for trawling, while pikeperch, perch and pike are mostly caught by gillnets.

Most of the professional fishermen are part-time fishermen and they get most of their income from many different sources. In the Uusimaa region there are 117 fishermen who get more than 30 % of their income from fisheries and 132 who get less than 30 % of their income from fisheries. Most of the fishermen live on the coast or in the archipelago - and their other sources of income are agriculture, forestry, aquaculture and tourism (e.g. guided fishing, sight seeing tours, or cabin renting).

The Finnish coastal fishery mostly takes place in the same areas where cormorants are abundant and the cormorant has been listed by the fishermen as one threat to their fisheries in the future. Already today the cormorant is causing economic losses to fisheries by damaging fishing gear, destroying fish catches, and reducing fishing efficiency by their presence. In fish farms, cormorants have also been recorded causing damage by injuring and stressing the farmed fish but the quantity of damage is currently unknown. Other inconveniences that have been presented that the Other reported problems caused by are (i) lowering the results of fish stocking and (ii) influencing the fish communities.

Fisheries point of view – focus on recent knowledge

- Compensation for damages to fisheries
- Prevention of damages in the most problematic areas
- Reduction of the cormorant population
- Protection of fishfarms, fishing gear and stocked fish
- Consider the cormorant as a game species

Management plan

- Working group: Ministry of agriculture and forestry, hunters and fishingwater owners were excluded.
- Outcome: Better documentation is needed!
- Consumption of fish, impact on fish communities and stocking, quantity of damages to fishing gear, fish catch and fishfarming.

For the land- and water-owners, the cormorant may cause economic losses to forestry by damaging the vegetation and soil. In the future, reduced recreational values for forests and reduced property prices many also occur – due to changes in the landscape and the discomfort arising through disturbance (by smell and noise) caused by cormorants.

From the local fisheries point of view there is some concern that local people from the archipelago were not included in the Working Group that devised the national management Plan and there is an urgent need for both immediate actions to prevent damage caused to fishing in the most problematic areas, and to start up a compensation system for the economic losses suffered. Permissions to restrict the Cormorant population are needed and hunting the birds in order to protect fishfarms, fishing gear and stocked fish could be a good option. The cormorant should also be considered as a game species and its sustainable use/harvest within safe limits for the population should be allowed[3].

2.7 The changed economy and the rural setting in the archipelago

Kjell Andersson: Senior Lecturer in Sociology, the Swedish School of Social Science at the University of Helsinki.

During the 1950s and 1960s the Finnish archipelago experienced a population decrease exceeding 25% each decade. During the late half of the 1970s the situation stabilised and, since then, there has been a fairly steady state in the larger communities while the outer reaches of the archipelago has been more or less depopulated.

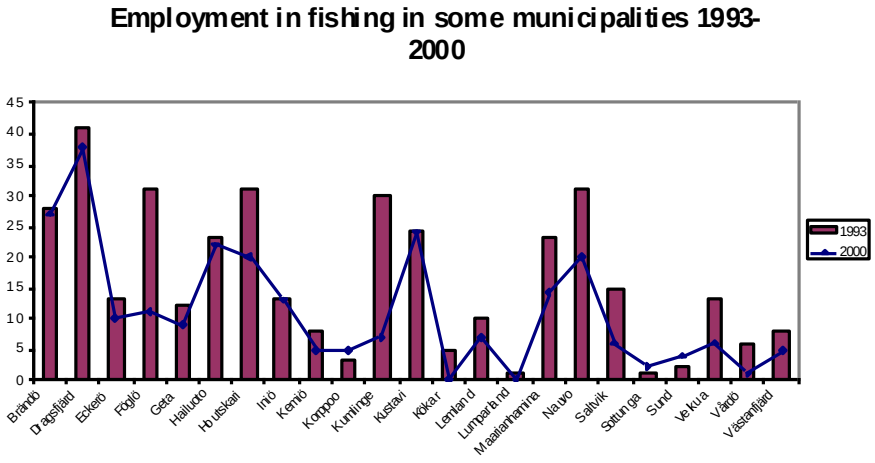
A dramatic drop in the number of people employed in the traditional primary industries of farming and fishing, accompanied the population losses during 1950-1975. By 1975, the number of people employed in these industries was only about 25% of what it had been in 1950.

From 1975 on there has been a diversification of the economy in the archipelago. Agriculture and fishing have continued to lose strength while the service sector, to a large extent coupled to the welfare state, have been growing, especially before the 1990s and the advent of neoliberalism and the outbreak of the economic recession in Finland. However there is still a balance with a comparably large primary sector, as well as significant other sectors (such as transport) in the archipelago, compared to many parts of inner Finland where services nowadays are dominant. In addition, "new rural goods and

[3] As we learned in Slovenia (see paragraphs 9 and 11 of section 3.2 [pp26-27] of the final agreed INTERCAFE@ Bohinj Meeting Report, listing the cormorant as a 'huntable' game species would legally be extremely difficult under the Birds Directive and there are certainly no plans for this to happen.

services" coupled with summer tourism and the numerous second homes in the archipelago seem to be an important factor behind the comparatively healthy economy in the region. However, these new rural goods and services (RGS) are difficult to quantify because of the economic statistics that follow the "Fordist" logic while the new archipelago economy clearly is "post-Fordist", based on pluriactivity as it was before modernisation in the 1950s and 1960s.

The old primary industries were based on natural resources. The new RGS are based on a broader spectrum of resources - what some researchers have called the "countryside capital". This capital consists of the traditional natural resources, but also of the built environment, local cultures and traditions, social resources and such intangible new assets as good publicity in the media. Thus, conflicts around wind power, or seals, or other species that some people despise directly threaten the countryside capital. When the countryside capital is threatened, the same is the case with RGS - which are based directly upon it.



Some researchers argue that the "constant capital rule" of ecological economies should apply also to countryside capital. That is, that the capital stock passed to the next generation should not be smaller in size, or lower in quality, than the one inherited from the previous generation. This is really a challenge to all stakeholders in the archipelago: local inhabitants, the authorities, environmentalists, tourists and second home dweller.

2.8 Cormorants in Finland – insights after the management plan or another perspective?

Mikael Kilpi: Sydväst Polytechnic and Åbo Akademi University & Aleksi Lehikoinen: Helsinki University.

The Finnish Cormorant Management Plan was published in October 2005. The plan was initiated by the Ministry of the Environment, and negotiated with representatives from the Finnish Game and Fisheries Research Institute, the Finnish Environment Institute and organizations representing fisheries and agro/forestry producers and landowners. The chairperson and the appointed secretary represented research interests.

The Plan followed broadly a recent "consensus" format developed for management plans for problematic species (e.g. seals, wolf, lynx and brown bear), stating that:

1. The population of (X = cormorants) should be remain viable,
2. The harm caused by (X) should be minimized,
3. People should get to know more about (X),
4. The population of (X) should remain shy to humans.

The Group firstly identified a set of arguments for potential harm done by increasing cormorants, broadly fitting into four categories: (1) cormorants will harm fisheries, (2) they will harm fish farming, (3) they will affect land use and harm woodland, and (4) they will harm other species.

This list was scrutinized with the best available data at hand, leading to, broadly speaking, a rejection of most identified potential harmful effects, due to insufficient documentation of the magnitude of the harm caused; such that point 1 (above) for example was broken down as follows;

Commercial (and other) fisheries will suffer due to cormorants, because:

(a) Cormorants eat commercially valuable fish - **True (NQ = not quantifiable)**
(b) Fish populations will crash - **No data**
(c) They will affect the structure of the food webs in the Baltic - **No data**
(d) They will injure fish and cause monetary loss due to low quality of the catch - **True (NQ)**
(e) They will harm fishing gear - **True (NQ)**
(f) They eat stocked fingerlings - **True (NQ)**
(g) They disturb fish spawning - **may be True (NQ)**
(h) They try to catch fish that are too large to swallow - **True (NQ)**

The Plan suggests, that the following actions should be taken

(1) A clear set of criteria for assessing serious damage at all spatial scales should be formulated,
(2) A way for compensating the losses due to serious damage should be found,
(3) Pro-active measures should be developed to minimize losses for fisheries (including gear etc.)
(4) Legislation should be changed, so that measures to reduce the cormorant population can be taken if (documented) need arises (move to Bird Directive Annex II)

The management Plan also clearly stated that more information was needed, to firmly root the (tentative) actions against cormorants to quantitative data.

The Working Group did not agree upon all issues – the "fisheries" and "landowners" stakeholders urged for measures to begin immediately.

In retrospect,

(1) We did achieve a plan, which got a fair amount of publicity, giving the impression that something was actually done,
(2) We did succeeded in performing a stakeholder discussion furthering management decisions,
(3) We probably - in the end - agreed on more issues than we disagreed on, making it at least clear that more ecological data were needed to tackle management in a sustainable way,
(4) We saw eye-to-eye in identifying that the readiness to react should be done on a case-by-case basis (i.e. at a colony level),
(5) We did not manage to convince the "conservationist" stakeholders to start seriously lobbying for funds to address the research needs identified,
(6) We did not make the "pro-culling" stakeholders happy either, mainly because we did not agree that culling should start at once,
(7) We only touched upon the very complex question of just how much ecological data/knowledge is enough to get a good management strategy, which would tackle the conflict in a way that would make everybody happy.

It was also noted that at present cormorant colonies were present on only 29 of the 76,000 islands of the Finnish archipelago.

NOTE: Exactly one day after the INTERCAFE @ Hanko Peninsula meeting, a political decision to include cormorants in the programme of the new Finnish government was taken. Now, the government, including the Ministry of the Environment, urged for immediate action to stop the cormorant population increase. No new quantitative data - on any of the potential harmful effects of the birds - had emerged to back up this decision.

Q Simon: What type of fish farming occurs here?
A Chris: We have both floating cages in still waters and land-based hatcheries.

Q Bruno: In relation to the management Plan, Chris said that some groups were excluded and Mikael said the people were included – how come there's confusion?
A Timo: The Plan contains a list of all involved - maybe there were no local archipelago fishermen but it is the official Finnish Government Management Plan.

Q Sandra: If it is the official plan, how is it being implemented?
A Timo: The Ministry has sent out a letter to people explaining how they can apply for permits to oil eggs and so on. So far, there have been three application cases and all have been rejected.

Q Mariella: Can I ask about fishing rights? Do they relate merely to waters adjacent to an owner's land?
A Chris: It is very complicated!

Comment – Mariella: Perhaps we can try to map it out during the fieldtrip?

Q Zeev – When Mikael showed us the example of breaking down the argument that "Commercial (and other) fisheries will suffer due to cormorants, because….." , most of the subsequent points raised had no data (NQ). So in effect the management plan was based on very little scientific data?
A Mikael: Yes but the management Plan urges the authorities to collect the required data!

Q Scott: The management plan has two elements – the product and the process. Is the management plan flexible for the future?
A Mikael: I would like to think so. If we were to do it again now, we could do it better. However, we are understaffed and so it would be hard to do another iteration of the Plan now.

Q Bruno: Can I ask about recreational angling? Do you need a licence to go angling in Finland, how many Finnish anglers are there, and what is the economic value of angling?
A Chris: People between the ages of 18-65 pay for an angling licence. There are around 300,000 [rod] *anglers in Finland. The economic value of angling was not known by those at the meeting.*

Comment – Kjell – It was thought that the Finnish leisure fishery could certainly be developed much more than the present situation.

Q Simon: In relation to Meri's talk, are cormorants affecting the fish populations here, or are they actually just tracking them.
A Meri: As I said, there is an association but certainly not demonstrable cause and effect. At a guess, it is likely that cormorants are tracking the fish rather than affecting them.

Q Miha: Is there any evidence of Newcastle disease in Finnish cormorants?
A Timo: It does not appear to be an EU problem (although it is with Double-crested cormorants in N America).

Q Trude: In relation to the tourism industry here in the archipelago, do cormorant affect the numbers of visitors coming? Is there a decline in real estate prices as a result?
A Henrik: In relation to his summer cottages, they do now have fewer visitors.

Part (3) Integrated working session: exploring the local situation with local experts

3.1 Work Group 1: Ecological databases and analyses

Local stakeholders: Anna Gaginskaya (St. Petersburg State University), Meri Härmä (Finnish Game and Fisheries Institute). Mennobart van Eerden, Stef van Rijn, Stefano Volponi, Karlis Millers, Mikael Kilpi, Ivailo Nikolov, Catarina Vinagre, Vilju Lilleleht, Marijan Govedic, Zeev Arad, Botond Kiss, Jean-Yves Paquet, Manfred Enstipp, Szymon Bzoma, Reinhard Haundschmid, Mindaugas Dagys, Daliborka Barjaktarov, Svein-Håkon Lorentsen.

Discussions were led by Mennobart van Eerden who introduced the session: WG1's task here was to zoom in on the situation and, with the help of the local experts, get a overview of this NE Baltic (i.e. Gulf of Finland) situation – from perspectives of both the birds and the fish/wider aquatic environment. Anna had told us that Cormorants in this part of the Baltic system had expanded from the Russian (eastern) side. What about Sweden or Estonia as potential sources for these birds? The general opinion (but with very little data) is that birds colonising Finland have done so from the west. Discussions focussed on Anna's information.

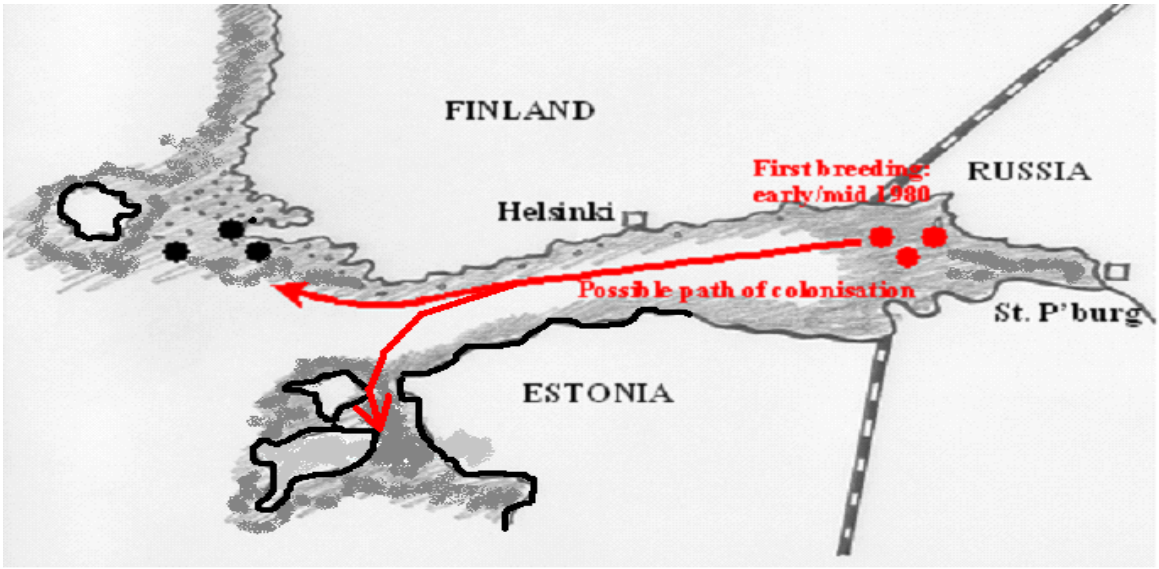
The first **breeding** in this part of Russia was recorded in 1994 – but, based on the field evidence of old nests and dead trees, it is likely that breeding actually started here in the early/mid-1980s (i.e. prior to any colonization of Sweden). Thus, this region could be the nucleus for the Gulf of Finland/Baltic expansion. Three environmental issues suggested this would be a 'good' place for Cormorants to colonise (see Map 1). First, the area is eutrophic (high nutrient levels) being close to St Petersburg, a city of over 5 million people, and the mouth of the River Neva. Second, much of the water in this eastern part of the Gulf of Finland is very shallow. Third, the area was formerly a military zone with no public access and so offered a 'protected' place for the birds.

Vilju said that the first Cormorant nest was recorded in the Estonian side of the Gulf of Finland in 1983 and there was only a single nest for at least 2 years. The first colony in this region was not formed until 1994. Thus these dates (1984 and 1994) are very similar to the Russian situation. [NB. For the whole of Estonia cormorants established their first colony in Matsulu Natyre Reserve in 1984 on the islets of Sipelgarahu and Valgerahu moving in 1986 to the nearby islet of Tondirahu]

Thus, available evidence that Cormorants **colonised this area** of the Baltic in the south and east and then moved west. Interestingly, all Anna's ringing recoveries showed birds moving in southerly or westerly directions – this is contrary to the general picture of **European flyways** which run north/south up and down western, central, and eastern Europe. Given this, we might expect these eastern Gulf of Finland birds to migrate north to south (i.e. Belarus, Ukraine, Black Sea). Daliborka reported

that most Serbian ringed birds recovered were from Estonia and Lithuania. One compounding factor to the suggestion that eastern Gulf of Finland birds were not migrating along an expected route however was the general lack of ringed bird recoveries from such eastern parts of Europe.

Perhaps there were just too few recoveries from far eastern Europe to demonstrate the migratory pathway? It was agreed by WG1 that a relatively small colour-ringing project involving breeding birds from the far eastern waters of the Gulf of Finland would be very important in determining the migration routes of this particularly interesting 'group' of European Cormorants.



Map 1. Diagram of first breeding sites in Russian Gulf of Finland and Estonia and possible path of colonisation to Finnish archipelago.

Other migration aspects were discussed. Karlis said that in Latvia large flocks (often hundreds of birds) were seen migrating to the north at the end of the summer (thousands of birds in August). However, these birds may move back south again in mid-September. Anna also said that Cormorants in her area move north first before moving south later in the year. Mennobart said the situation was also similar in the Netherlands where Dutch birds moved to Denmark in late summer before moving back south in the autumn.

Over-wintering issues were then discussed. Cormorants of the *Phalacrocorax carbo carbo* race were thought to breed in the Barents Sea and then winter in the Baltic and the Gulf of Finland whilst it is the *P.c. sinensis* race that appears to be the one that breeds in the Gulf of Finland. Is there permanent over-wintering in Finnish waters, or do all birds migrate out of the region in winter? Timo said that most of the birds leave in September/October/November but there are a few birds in winter but it is not know whether they are *carbo* or *sinensis* birds nor where they come from. Anna said that

they really did not know anything about over-wintering in the Russian territory of the Gulf of Finland.

Breeding success was also discussed. Anna's data from the Russian portion of the Gulf of Finland showed that **clutch sizes** there were very high (Figure 1). Furthermore, these colonies are apparently still increasing in size and so (based on NW European experience) we may expect the **production** to be 2.5-3.0 fledged young/nest. Furthermore, the breeding season appears to be protracted in the Russian territory.

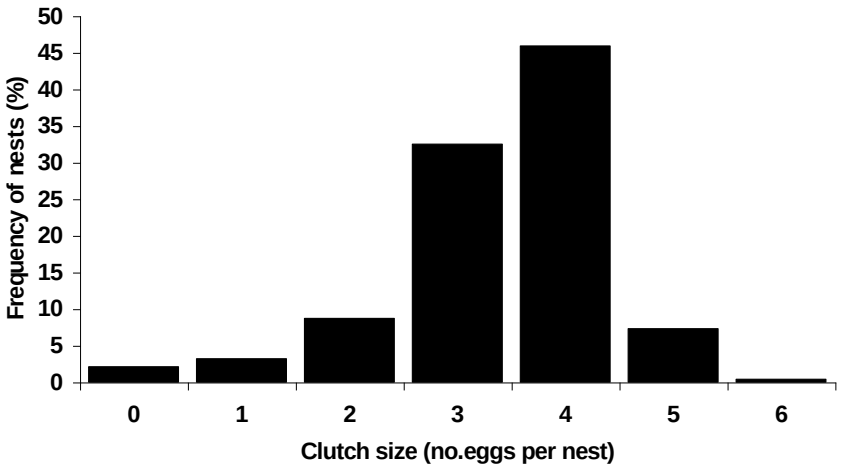


Figure 1. Clutch size (number of eggs counted per nest), including empty nests. Data from 3 island colonies in Russian territory of Gulf of Finland (Anna Gaginskya).

So, these Russian colonies are probably producing many eggs and many young. There is a need for more data but WG1's first guess is that the Cormorant colonies in this Russian region are very productive.

Additional information from Finland was provided. Here, bigger colonies tend to have higher fledging success and:

(i) average clutch size is 3.5-3.7 eggs/nest (very close to the Russian situation)

(ii) average production is 1.5-2.0 fledged young/nest (the same order or slightly lower than Russia).

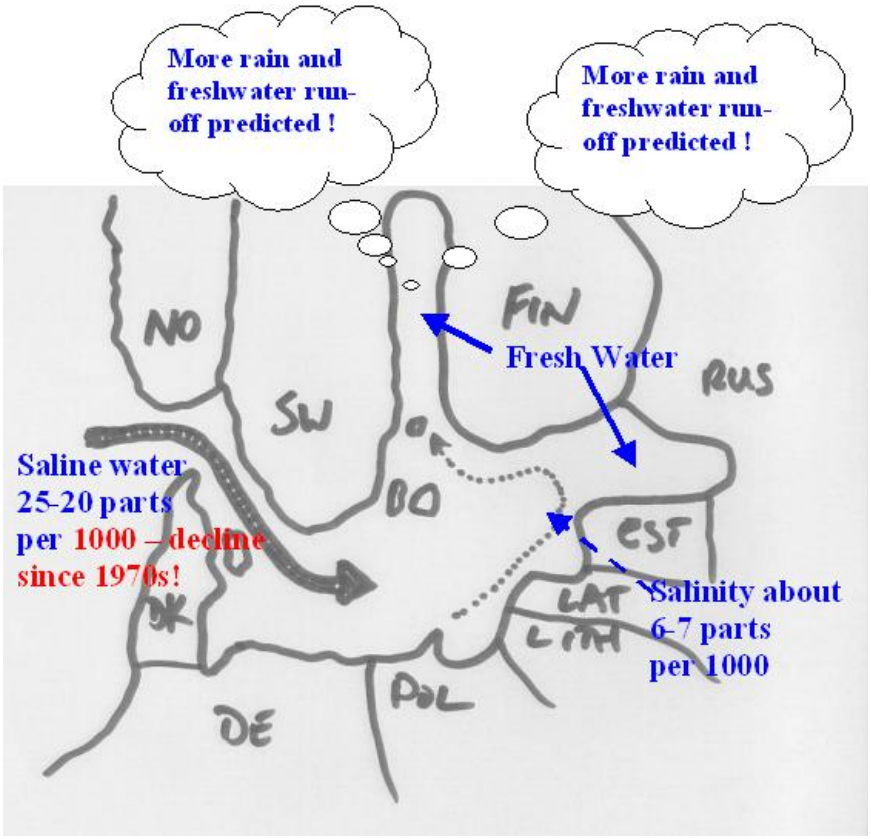
Natural Cormorant 'control' was also discussed. There are reports from Finland that White-tailed sea eagles (*Haliaeetus albicilla*, WTSE) are now attacking both breeding Cormorants and fledglings. One Cormorant colony of ca. 100 pairs in Sweden produced no young at all – losses were due to WTSE predation (some 20 adults and juveniles). It was the same situation in Norway, and also included WTSE predation on Gannet (*Sula bassana*) colonies in the Lofoten Islands, and Cormorants, gulls (*Larus* spp.) and Kittiwakes (*Rissa tridactyla*) elsewhere. Even in the Netherlands – where the first breeding of WTSE has recently been recorded – the birds were observed visiting a Cormorant colony and researchers there are certainly interested in the development of WTSE-Cormorant relationships.

Environmental issues were discussed with Meri Härmä (see Map 2) and these led to further discussions of **fish and fisheries** in the region. Three main environmental issues were affecting the Baltic system:

(1) Eutrophication (nutrient enrichment) – see also presentations by Harri Kuosa and Meri Härmä (sections 2.4 and 2.5, respectively). This is certainly causing significant shifts in the ecosystem. Considering that while concentration of P and N is increasing, oxygen is decreasing, visibility is less because of algae blooming in the Baltic Sea. These changes caused shifting of dominant fish species in the open water. Lack of oxygen in fish breeding area, also conduce changes in fish species.

(2) Since the 1970s there have been very few major intrusions of saline water into the Baltic. Furthermore, the system is predicted to become even less saline as a result of increased run-off. Changes in saline have impact on dominant fish species feeding (e.g. herring) and reproduction (e.g. cod).

(3) Climate change (including wind, temperature, rainfall, North Atlantic Oscillation). It is predicted that winter rains in the north of the region will increase and so freshwater run-off into the Baltic will also increase.



Map 2. Diagram of salinity levels in the Baltic system. Saline influx from the west has reduced since the 1970s, inner regions (Gulfs of Bothnia and Finland) are freshwater, increased rainfall (and freshwater run-off) are predicted for the north as a result of Climate Change.

All three environmental issues (alone and in combination) will affect the **fish communities** of the Baltic Sea – but by how much, is unknown. There is also a serious need to include non-commercial fish species in the general considerations (and modelling) of possible environmental effects on the system. It was thought that there are around ten of these non-commercial fish species in the system. Meri gave a general picture for several species:

Commercial fishes, Cod (*Gadus morhua*) and Baltic Herring (*Clupea harengus membras*) are both declining species and both are suffering from over-fishing. Conversely, the Sprat (*Sprattus sprattus*) as smaller relative of the Baltic Herring is increasing. Herring (*Clupea harengus*) can be divided into several different stocks and races. The most important races in the East Atlantic are the winter-spawning Norwegian and Icelandic herrings, the autumn spawning Icelandic and North Sea herrings and the Baltic herrings. Baltic herring is found in the eastern part of the Baltic Sea east of the line passing from the southern extremity of Oland Island to the Bay of Danzig, as well as the Gulfs of Finland and Bothnia and may sometimes be encountered in purely fresh water. The Flounder (*Platichthys flesus*) is also a species of commercial interest in the region.

It was considered very difficult to quantify the **by-catch of the commercial fishery**, partly at least, because the data provided by fishermen were incomplete.

Non-commercial fishes such as the Eelpout (Viviparous Blenny *Zoarces viviparous*) are relatively hard to catch and quantify – but they are known to be an important component of Cormorant diet in the Tammisaari region of Finland (see REDCAFE National Overviews, Carss & Marzano [eds] pp105-107, and references, p109). Other non-commercial fishes include Three-spined Stickleback (*Gasterosteus aculeatus*), Sand Goby (*Pomatoschistus minutus*), Black Goby (*Gobius niger*), and the Common Goby (*Pomatoschistus microps*).

Note: this paragraph added after the meeting via group discussion. At least three further species of fish are **stocked artificially** in the system, the Whitefish (*Coregonus lavaretus*) a 'whitefish' and on a very small scale the Pikeperch (*Sander lucioperca*). Pikeperch was considered to be increasing in the Baltic as a result of increased turbidity (reduced water clarity). Both species are naturally reproducing so stocking may just be a compensatory measure. Both these species are of considerable commercial value. Most commonly stocked is the Brown Trout (*Salmo trutta m. trutta*) which is one of the most sought after species and most of the catch comes from stocked fish as the natural spawning rivers no longer support self-sustaining populations.

Overall, WG1 concluded that it was vitally important in the Baltic to look at the **whole system**. For example pelagic (open water) issues such as salinity and over-fishing maybe related to the peripheral (shallow) aquatic areas of the Baltic where Cormorants are foraging and related with re-distribution of fish species.

Discussion then moved to **inland freshwater lakes**. Intuitively, it is easy to see the Finnish situation with Cormorants as being similar to that in nearby Sweden – but not at such an advanced stage. Currently breeding Cormorants in Finland are confined to the outer archipelago regions – it is these same coastal habitats that were first

colonised by breeding Cormorants in Sweden – but within the last 10 years lots of colonies have been established on freshwater lakes in the Swedish interior. WG1 considered whether the same pattern would probably be repeated in Finland.

Current understanding was that there was no tremendous difference in the trophic status of Swedish and Finnish lakes. Finland has a more 'continental' climate than Sweden and remains colder for longer in winter. This may prevent inland colonisation. However, the climate in the northern Gulf of Bothnia (where Swedish Cormorants breed inland) is about the same as that in the southern lake area of Finland – so it might be predicted that Finland will show the same colonisation pattern (i.e. a move inland) as Sweden. Indeed there are already some observations of cormorants in bigger inland lakes in Finland. Finally, **other fish-eating birds** were discussed. The Goosander (*Mergus merganser*) breeds over the whole of Finland (some 30 -35,000 pairs) there are also smaller populations (some 30,000 pairs) of the related Red-breasted Merganser (*Mergus serrator*). This suggests that both fish and ice-free conditions may be available to Cormorants across Finland, again suggesting that a move inland is possible.

In the Plenary Feedback session, one of the most important ecological issues to emerge from a cormorant perspective is the extended breeding period of cormorants across Europe. For instance, breeding begins in January/February in NL, in March in DK, in April in SWE/FIN, and in May in the most northerly regions. This 5-month breeding commencement period shows that cormorants have considerable flexibility in relation to breeding period and subsequent fledge dates across the geographic area of interest to INTERCAFE.

Note added after the meeting: (1) It is clear that both changes in salinity and eutrophication are affecting different parts of the Baltic. In turn, these might well be affecting the community structure of fishes there. However, these relationships (environmental effects – changes in fish communities – increased cormorant numbers) are not clear-cut. Information on salinity in different parts of the Baltic can be found at:

http://www.helcom.fi/environment/indicators2002/oxygen/en_GB/figure2/?u4.highlight=salinity

In some parts of the Baltic cormorant numbers have increased where salinity has increased. In other areas, changes to the fish community (e.g. roach, pikeperch) are thought to be due to eutrophication and reduced water clarity, respectively. Clearly further research would be needed to clarify these relationships and the likely interactions between them.

Note added after the meeting: (2) Human fisheries are also an important influence within the Baltic. From the fisheries perspective, there appears to be a general lack of discussion in Finland about the role of commercial fisheries regarding environmental changes in the Baltic Sea. At the Finnish coast, fish stocks are hard to regard as 'over-fished'. However, commercial fishers do suffer from changes in water quality, heavy metals in the food chain, as well as seal predation. Moreover, the amount of nutrients taken from the Baltic by fisheries is substantial.

3.2 Work Group 2: Conflict management and resolution

Participants (all or part of sessions): Arildp; Espelien (Norwegian invited expert), Nils Røv, Ger Rogan, Bruno Broughton, Redik Eschbaum, Tamir Strod, Henrik Lykke Sorrenson, Ferenc Levai, Robert Gwiazda, Mikael Kilpi, Petr Musil, Thomas Keller, Kareen Seiche, Michal Adamec, Ion Navodaru, Timo Asanti, Local invited expert: Chris Karppinen (Finland).

I. Q & A Interview with Chris Karppinen (Uusimaa Fisheries Association**)**

Q1: What single tool would you like in the management toolbox?

A: *Hunting. This may not reduce cormorant numbers but would scare birds away from key fishing areas. It would accord with other aspects of wildlife management.*

Q2: When would this be necessary?

A: *General hunting in the autumn, with special measures at sensitive sites. It would be similar to what happens in Sweden & would show the locals that someone cares about them and their problems.*

Comment: Nils said that there couldn't be a general open season but cormorants could be added to the list of game birds (this has a long tradition in other countries). Henrik felt that it was not realistic to move cormorants onto another list. Ferenc noted that in Hungary cormorants were not considered a game bird and were not protected either – anyone can ask for a hunting permit. Nils thought that the military was also involved in controlling them.

Thomas thought that moving cormorants into the EU 'huntable' list would not happen, but a permit system was worth adopting – this is done in parts of Germany. Robert pointed out that in Poland permission is given to shoot in certain areas (e.g. around fish farms). The protection is only partial, and year-round shooting can take place at fish farms.

Q3: Is there so much damage that shooting is an answer? There are only 26 cormorant colonies, spread over 76,000 islands! Would it not be better to have local solutions to local problems, including tree damage?

A: *I agree. This will probably happen, but cormorants around the coast are one matter; the situation will become far more serious if the population expands and the birds move inland.*

Q4: Where would the cormorant be shot?

A: *In and around fish farms only, based on ownership.* (Nils – this is similar to the policy adopted in Israel). *My solution would cope with resident and immigrating birds.*

Q5: If cormorant numbers keep growing in Finland, this method will become less effective. Would a national tally for cormorants be a good idea?

Comment: Bruno noted that a tally system wouldn't work because when birds were removed or reduced at the best cormorant sites, these gaps would be filled from the remaining cormorant population and the conflict would remain.

A: *Henrik added that in Denmark, there are large numbers of cormorants and the policy is to now grant permits to prevent the establishment of new colonies on private islands and land. But no-one is monitoring what happens to the fish!*

Q6: Can you protect fish farms with physical barriers and, in any event, as the problem is still small could the birds be moved away using non-lethal methods (e.g. pyrotechnics) as in Israel?

A: *In cage-rearing systems, barriers can be employed, but the ponds used for fish rearing are too large to protect in this way.*

Q7: Although it was not a national problem, there could be local problems with cormorant guano killing trees. Are there islands or areas where trees need to be protected? (Henrik reported that this happens in Denmark).

A: *I'm not sure.*

Q8: Do cormorant re-use old nests? If so, this method may not work.

A: *Maybe. It certainly happens in South Africa.*

Q9: How useful is the management plan?

A: *Not very good. It's more of a summary and background document.*

Q10: What about compensation – does the Government pay this?

A: *Yes, for fish farms only; there is no compensation policy for commercial fishermen although it is possible to insure the fishing gear and claim for damage.*

Q11: Is the damage to gear or catches actually monitored?

A: *No. We are used to for seal damage but cannot really differentiate between this and cormorant damage.*

Q12: Can you quantify damage to commercial fisheries or fish farms?

A: *No, this is very difficult.*

Q13: Is the situation stable or changing?
A: *The value of the commercial catch is stable but with fewer fishermen.*

Q14: Do fishermen still want to hunt cormorants?
A: *Yes, they will because they feel that it helps, even though the damage is so hard to monitor.*

Q15: How might the cormorant population develop? Is it likely to remain stable or will it expand?
A: *I don't know. It has already expanded, but noone can predict what will happen next.*

Q16: Do you think that the birds will breed on inland lakes?
A: *Maybe, especially as the winter freeze on inland waters is now much shorter than it used to be.*

In the Plenary Feedback session, some of the most important issues to emerge from a 'management' perspective included the differentiation between 'hunting' cormorants and 'shooting' them. We all know that it is going to be very difficult, if not impossible, to get cormorants onto the list of huntable species (see "The cormorant in the context of the Birds Directive" by Micheal O'Briain, DG Environment, section 3.2 of the INTERCAFE @ Bohinj Meeting Report). In the Finnish archipelago, local shooting and scaring of cormorants might be feasible but there were concerns that this merely moved the problem to other areas. Whilst cormorants were considered an issue for forestry, this was more a local problem with the 'landscape' of the islands rather than being an 'industrial one (i.e. affecting wood production at an industrial level). It was thought that some islands should be fully protected from cormorant colonisation – but there appeared to be no provision for this in the current management Plan. Based on experience elsewhere it was felt that it would be almost impossible to agree on a particular population level for Finnish cormorants. There were also local concerns that fish farmers were offered compensation for damage to their stocks but that this was not an option for those concerned with 'wild' fisheries. It was also unclear how any compensation payments were to be quantified. One very strong message in relation to 'cormorant management tools' was the importance that local people placed on feeling that the authorities cared about them and their concerns – and took them seriously.

3.3 Work Group 3: Linking science with policy and best practice

Exploring what is happening in the Finnish archipelago

Stakeholders: Mika Asikainen (Birdlife Finland), Henrik Lundberg (local landowner)
WG3: Michael Andersen, Sandra Bell, Jaroslav Bohac, Trude Borch, Ilona Cheyne, Susana Franca, Miha Janc, Scott Jones, Nikolay Kissiov, Renata Martincova, Mariella Marzano, Simon Nemtzov, Rosemarie Parz-Gollner, Faustas Stepukonis, Pekka Salmi.

Facilitator: Scott Jones, **Rappateurs:** Mariella Marzano/Sandra Bell

The session began with everyone introducing themselves, and then asking Mika and Henrik questions.

Rosemarie: How many recreational anglers are there? I am interested in the balance between fishing, recreational angling and tourism.

Henrik: The number of licenses for leisure fishing is 350,000. The amount of fish taken by angling is more than the catch of commercial fisheries but it also depends on the species. Commercial fisheries take more herring and sprat.[4]

Miha: Is it compulsory to take records?

Mika: No

Henrik: It is difficult. There are no rules that say you have to report catches. [So] *we guess what is caught.*

Note added after meeting: The lack of catch reporting here refers to recreational fisheries. National and Regional information about recreational fishing (including 'household fishing') is collected by the Finnish Game and Fisheries Research Institute from large-scale surveys. Compared to many other countries, there is thus exceptionally good knowledge about recreational fishing in Finland. However, these statistics can not be applied at the local level.

Faustas: Who catches more cod - commercial or recreational fisheries?

Erik: There is non left, so no-one is catching it.

Michael: There is plenty of cod in the Baltic Sea further south.

Simon: Listening to the presentations it seems less of a fisheries problem – landowners are more affected. The impact on fisheries is not documented or well understood. There is no real cause and effect. People see birds in trees and have a perception from the noise that they are more prevalent. It is perception rather than actual problem.

Henrik: No the impact on fisheries is just as big as on landowners. In the outer area of the archipelago there are almost no fish left. Studies on pikeperch have shown they are damaged (30%) by cormorants. The affect of cormorants on fisheries is bigger than for landowner issues.

Trude: It is important to remember that landowners have fishing rights too.

Mariella: Are cormorants coming here like they are in Sweden?

[4] Pekka Salmi suggests that the real number of recreational fishers will be much higher as public fishing rights do not require the payment of any license fee. See also http://www.rktl.fi/www/uploads/pdf/taskutilasto2006_verkko.pdf for estimates of the value of recreational fishing.

Mika: They keep increasing but nobody knows the limit. An example is the Barnacle Goose breeding in the late 80s. The population exploded but they are now showing signs of levelling off. They are not fish-eating species. The limiting factor is the amount of meadows available in the autumn - there is less food. Nature has its own way to limit things.

Michael: What about your involvement in the management plan?

Mika: We were not part of the management plan.

Henrik: The Barnacle Goose is closer to Helsinki. The cormorants are in the archipelago. If they were nearer [to Helsinki] *there would be screaming in the media.*

Miha: What is the possibility of cormorants moving inland to the lakes and what are the consequences?

Mika: I don't know. If they have moved inland in Sweden then they might in Finland but there are some differences. In Sweden the ice melts a month earlier. Cormorants are a large bird and it takes a long time for the young to grow up. In the north the lakes are frozen until early May.

Simon: Species get limited - they can't increase forever. If there is no fish, the limiting factor is food. What about diseases, nesting sites etc.? Something will have to come in. I think fish will be the limiting factor. Is there no fish?

Michael: Fishermen are competing with cormorants. They are eating commercially important species. If there are 5,000 breeding pairs- there is a conspiracy to count nests not birds - that means 15-20,000 birds. Each bird eats 400-800 grams which is half a kilo per bird per day. It is obvious that there is an impact on fish stocks. Fishermen are governed by quotas - they see cormorants as competitors.

Simon: According to your maths that's 5 tonnes a day. The breeding season is 3 months, 100 days which equals 500 tonnes. According to the graphs, 500 tonnes is nothing.

Michael: It does have an impact on fish stocks locally. An example is eelpout in Denmark. The cormorants came and the fish are now gone.

Simon: That's correlation, not cause and effect

Michael: That's what you guys always say.

Scott: The issues to come out [of this discussion] is scale. The impact over a short time in a small area is about time and spatial scale. It's about causation not correlation. When the cormorants come, the fish go down. Is this what is being said?

Simon: Give me the data

Michael: The scientists always want documentation. Bird defenders say "you can't prove it". It is those who say there is no cause and effect that need to document it. The conflict is there even if you can't document it scientifically.

Note added after meeting: 20,000 birds eating 0.5kg of fish per day over a 100 day period would actually amount to 1,000 tonnes of fish consumed by cormorants (not 500 tonnes as stated above). The corrected figure is thus more substantial when compared to commercial catches of commercial fish species. However, regardless of the 'true' consumption value – and such calculations are notoriously inaccurate – the important recurring theme here (as in previous INTERCAFE meetings/discussions) is perhaps the issue of whether cormorant predation is the *cause* of fish catch declines or merely an *associated* symptom of other environmental issues affecting the fishery.

Trude: I have several thoughts. If there are signs of environmental destruction and there are cormorants coming in, they are not necessarily the cause. You need to work on water quality as well as birds and fish. You need to work on several levels at the same time. There is the cod example in Norway.

Mika: There is the social point of view. If I was a fisherman I would be worried about my future. What I think is partly happening – fish stocks have been decreasing in the Baltic for a long time and there are many reasons. It is difficult for individuals to have an effect (e.g. pollution run-off from farming). Now, in the form of cormorants, something concrete is appearing. I don't disagree with Michael but something concrete is appearing and people are scared. It is normal that they get blamed but it is too much blame considering what they do. We have 20-30,000 goosanders, six times the number of cormorants but they have never been an issue, even though it is in the north. They eat more fish than cormorants

Henrik: Seals have increased as well. Seals destroy nets. They stop to feed on fish in the outer archipelago, scaring the fish towards the mainland where they eat them as they move towards the mainland.

Michael: Food is a limiting factor for the growth of cormorant colonies. It is not constructive to discuss whether it has an impact. It does have an impact even if it does not have an impact on population levels. It is obvious when cormorants are driven away from pound nets in Denmark, they find other ways of setting up colonies. Pound/fyke nets are buffets for cormorants. It is the best place to feed. There is competition, even with one another

Henrik: Cormorants came at the same time as fish populations started to decrease and they started to decrease around the cormorant colonies. It might not only be cormorants but the timing fits.

Pekka: You challenged the idea that cormorants mostly eat less valuable fish - can you tell us more about this?

Henrik: The official view on cormorant feeding is based on breeding pairs. They have not recorded what cormorants were eating before the breeding season in March-October/November. In early spring you can see them eating flounder, which is not accepted by the authorities. Also, in winter they eat herring and sprat which is not

recorded, just in the breeding season. They are here longer and have other feeding habitats outside breeding areas.

Mika: Goosanders are a bigger problem on lakes.

Henrik: Cormorants are a bigger problem than goosanders.

Michael: It is not just the quantity that destroys the fishery but cormorants change the behaviour of fish. For example, in pound nets, fish try to escape when they see cormorant. Eelpout stay at the bottom to hide from cormorants so this damages catches. Not that we don't want cormorants to have their share of fish.

Scott: So it's important to know what the catch is but it is also important to know the impacts on the fishery itself (i.e. not just catches).

Mika: In relation to the catch of cormorants, it is true that the census is based on the breeding season because it is fairly easy to study them. It is too difficult to study what they catch outside the breeding season. The ministry responsible only has a certain amount of resources available and use it in the best way they can. There are competing needs and they have to assess whether cormorant numbers are high enough on the agenda to get research money. That's why there are only breeding studies because it is easy and cost-effective. I agree with you but it is up to whether there are resources.

Simon: There are tremendous knowledge gaps that contribute to conflicts. People bring lots of feelings and emotions and not data. The sides need to decide what data needs to be collected to reduce the conflict. What is the actual impact on fish stocks and populations? Other species such as goosanders leave a huge question mark in the entire equation.

Scott: There are facts, opinions and rumours. Simon asks if there is way that people can agree. What are the knowledge gaps and what is the way forward?

Mika: The knowledge gaps were identified in the management plan.

Simon: The plan is not the end, it is a step.

Henrik: To come back to the data problem. Why do they extrapolate breeding season data for the whole period? Why don't they say it is for the breeding season and say they don't know for the rest of the time? That is what causes what is fact and what is opinion. They use facts in the wrong way and it becomes opinion. The cormorant gives a certain type of fish to their young. Adults don't give steaks to small children.

Trude: It is interesting talking about non-available data. Can scientists say 'we know it all'? Can we start before we have complete datasets. It is not only indicators that they consume fish. Is it enough to act upon?

Henrik: You have to come to a certain point. You need data.

Simon: You act on best knowledge but you also check, monitor, update plans, identify gaps.

Scott: Is this something to build consensus on where are the gaps as you move from iteration to iteration towards a management plan?

Mariella: What about the wider context? The fishers feel upset with the government. What does Henrik want done by policy makers to make them feel listened too? Also, the same with Birdlife.

Henrik: Policy makers should think about what should be done to prevent cormorant populations increasing. They should think about ways to prevent growth.

Mika: We think the government should be prepared to compensate for possible losses. This worked with other species such as the Golden Eagle and reindeer…you get double compensation if there are nests and triple compensation if the nest have young. The main thing Birdlife is not happy with in relation to the management plan is the stipulation to get prepared to control the population if needed. It is important to keep in mind the scale of the problem. What will the solution mean for the general population? Previously tens of thousands of waterfowl were hunted in spring. Only two years ago it was stopped through the Court of Justice, yet Finland are yelling at Malta about its spring hunting. If we hunt cormorants in the breeding season, it will raise ethical problems.

Jaroslav: What number of members do you have in Birdlife Finland? Do you cooperate with the Ministry of Environment and fishermen?

Mika: There are 10,000 members. We work with hunters and farmers, Ministry of Environment and Ministry of Agriculture. We have not worked with fishermen. That is yet to come.

Henrik: It is unfair to have a parallel between the Golden Eagle and cormorants. Golden eagles have territories whilst cormorants have colonies. In the 19th century there was a new weapon available in the archipelago and we could start to control species of threat. We need to control nature to have a balance but that balance has been taken away.

Scott: Mika was not making a comparison but making a point about compensation.

Sandra: Can you (Mika and Henrik) say one positive thing to each other about what we should do next.

Henrik: No

Mika: We need to push for more research. We need to push the politicians to pay for research.

Scott: Would Mika and Henrik like to ask any questions?

Mika: Cormorants have increased in Finland quite a lot - and in the Baltic. What are perceptions in your own countries? Is it the newcomer – cormorants - that is the problem? Is this newcomer conceived as a problem? The goosander population although increased in size has always been here.

Michael: The growth of cormorants started in Holland and Denmark. Goosanders only flock at certain times of year. One pound net fishery did disappear and this coincided with the increase in cormorants. It was not only the cormorants fault but it was perceived by the fisheries as the cormorants fault.

Rosemarie: There is a difference between countries who eat marine fish and those who don't eat marine fish. Goosanders eat freshwater fish and Finnish don't eat inland freshwater fish.[5] *The Swiss eat inland fish so it is a problem there. If human interests are not touched by birds, nobody cares. We need to fight the problems and not the symptoms.*

Michael: The difference between cormorants and other fish-eating birds is they appear in huge groups.

Simon: So do Pelicans.

Scott: Ornithologists always use breeding pairs. Others think this is a trick to make numbers seem smaller. The management plan board might benefit from greater participation. The government may be well placed to help both sides to work together.

In the Plenary Feedback session, some of the most important issues to emerge from a 'society, policy and best practice' perspective included the issue that the Government needed to put more resources into collaboration, compensation, and research. There should be agreement on both the gaps in knowledge and the next steps – "the way forward". For example both 'sides' felt better discussions and transparency on the issue of compensation payments would be helpful. The idea that data collection should involve all interested parties was also supported. The Finnish management Plan appeared to be a good first step but it certainly needed reiteration and needed to be more inclusive. Specifically, it should include input from those that are most affected by cormorant issues on the ground.

[5] **Note added after meeting:** INTERCAFE Finnish participants state that Finnish people do indeed eat inland freshwater fish – but not necessarily in the region we were discussing.

(4) INTERCAFE @ Hanko Peninsula field trip report

4.1 Introduction

This field report documents key outcomes from discussions and observations from our visits to Hanko Bird Station HALIAS (team leader Aleksi Lehikoinen) and a boat trip on the converted trawler "Anna" to a cormorant colony and grey seal areas on Saturday 14th April.

We travelled with three local fisherman, one full-time and two part-time, and with other local stakeholders.

Hanko Peninsula/ Archipelago

4.2 Landscape

- sandy beaches attracts a lot of tourists in summer (an important income for inhabitants)
- bird station is one of the most important bird stations in Finland, here is a migration route of singing birds, raptors, owls, cranes…..
- its situated in a protected landscape
- about 50 volunteers are working in the bird station yearly, they make observations and ring birds

Different habitat types:

1. forest with bushes
2. salty water, partly shallow water
3. plenty of islands (app. 76,000 islands on the Finnish coast)
4. very small islands without any vegetation, only rocks
5. bigger islands with rocks and forest

- Cormorants roost and breed on small islands in front of the coastline
- About 8 km from ringing station is a cormorant colony on an island
- In the open sea we saw another cormorant colony with ~350 birds breeding on the ground - there seemed to be no predators of cormorants (except gulls predating eggs and young)
- Grey seals are reported as another problem species in the region for fisheries but we were not able to see any on this trip

4.3 People and Issues

What to do when cormorants come? (or more correctly, what to do when there are "too many of them")

Relevant Ministries

Agriculture & Forestry (FGFRI + Public land management) - Governs fisheries, hunting and reindeer husbandry

Environment (Finnish Env. Institute) – Carries out research on a few fish species

Stakeholders

- Agriculture and forestry (MPWG)
- Commercial fisheries (MPWG)
- Recreational fisheries
- Fish farming
- Water owner fishermen – **note added after meeting:** non-fishing water owners are also stakeholders. The management unit for water owners is the 'stakeholders association' at the local level, At the regional level, Fisheries Regions manage fisheries at a level between the water owners and the national authorities (i.e. the Ministry of Agriculture & Forestry).
- Non-fishing water owners
- Birdlife Finland
- WWF
- Anglers organisations (mainly freshwater anglers)
- Game districts (regional level)
- Summer cottage owners (local level?)

Tourism

- 9-10,000 inhabitants in Hanko Peninsula, this goes up to 30,000 during the summer tourist season

- Tourism little developed – competes with the lake areas and with Lapland (in discussions with Finnair)
- Accommodation - bed & breakfast
- Activities: boat trips fishing, seal safari, bird safari?, power boating
- Tourist fishing – mainly Russians fishing for pike, want luxury accommodation (some plans for this), fishing boats have to be re-built for tourist fishing
- 300,000 people purchase a fishing licence
- Recreational catches exceed commercial catches
- Recreational fishing regulations – free hand fishing from 1997 (+ a fishing licence of 27 Euro). This refers to the province-wide lure fishing fee system but, although relevant for many tourist fishers, this is only one part of the licence system. After the meeting, Pekka Salmi provided an overview of the fisheries governance system in Finland and this is provided in this report in the following section (4.4).

Small-scale fisheries

- Gillnets, fykenets, drift-nets and small trawls
- Herring, pike perch, sprat, salmon, pike
- 117 fishermen have more than 30 % of their income from fishing
- Deliver catches to Helsinki
- Local/regional market (+ fresh salmon to Russia)

Fish Stocks

- Decline in stocks of herring and cod due to eutrofication and a cyanobacterical bloom
- Sprat, pike perch and roach have benefitted from the environmental changes
- The state of coastal fish stocks is little researched because these are of less economic importance
- Recordings of landings are made from commercial fisheries but not for recreational and subsistence fisheries

Seals

- Eat fish from fishermen's nets (salmon preferred species) + damage fish
- Damage nets – compensation from government insurance company
- Allowed to shot 5 seals in the area (3 for research) – fishermen don't even bother
- Occasionally - dynamite with bait to kill seals
- Possible to buy seal meat on the black market

Cormorants

- Arrive in mid March and leave Oct./Nov.

Russian Gulf of Finland

- 1980s – some cormorants observed (at end of 1960s/beginning of 1970s in Finland)
- Mid 1990s – cormorants become an issue
- Russian scientists could not visit the area before the beginning of the 1990s
- 1994 – first visit, discovered cormorants (positive discovery because new species added to the list)

Damage from cormornats

- Eat fish (commercial, recreational & farmed fish)
- Damage fish
- Disturb the fishing
- Damage to fish stocking programs (whitefish & salmon)
- Scare off other birds (terns)
- Reduce local biodiversity (forest, flora)
- Smell and noise (reduced recreational value)
- Droppings (guano) create local eutrification
- Spread diseases?
- Birdlife Finland: "If there is biological evidence of cormorants causing significant disturbance to livelihoods we should react but we do not have the data to prove this yet".

Compensation

- Fish farming
- Damage to fishing gear (nets?)

Killing cormorants and damaging their eggs

- The government has allowed the killing of 57 cormorants (**NOTE:** this statement was later found to be untrue – see Footnote 2.
- Legally, people are not allowed to do anything about the eggs either (because this would cause disturbance to the other fauna and the flora on the islands)
- Occasionally fishermen (ilegally) put holes in eggs

4.4 The formal fisheries governance system in Finland – provided by Pekka Salmi

The formal fisheries governance system in Finland is a combination of local decision making by the water owners and a top-down management system by the state. Most of the coastal and inland waters are under private ownership in conjunction with possession of land. The decision maker is commonly a collective, a *shareholders association*, which jointly controls the interests of individual owners in fishery matters. In addition to the fishery associations, there are also a large number of waters managed solely by individual owners (persons or towns, companies etc.). The water owners are responsible for managing their water areas: *granting fishing licenses*, stocking fish etc. Commercial fishermen commonly dwell near the shoreline and thus they are often also water owners through the possession of land. In many cases they, however, need permissions for fishing also in other water areas than their own, because they have to use rather wide water areas.

The owner-based fisheries management system at the coast and inland areas is about one hundred years old (in legislation) and is similar in Sweden (due to our common historical roots). Lately many additions, exceptions etc. to this 'rule' have been made in Finland:

Wider management organisations than the shareholders' (fishery) associations, *Fisheries Regions*, were founded in the 1980s and they offer a forum for decision making among water owners and other groups of fishermen within a larger scale of operation than in the case of the shareholders' associations. The tasks of the Fisheries Regions are partly administrative, although they do not form an official branch of the Government. The fishery central and district authorities in the Ministry of Agriculture and Forestry have also been increased in number during the last 30 years and hold the highest national power, now following the Common Fisheries Policy by the EU.

The upper layers (above the local owner-based management) were founded in order to enhance the 'rationality' of the management system with an emphasis on the fishing opportunities of the modern groups of recreational and commercial fishers. In addition, several use rights of non-owners have been protected by law: e.g. ice fishing with a rod and angling with a rod and natural bait are allowed irrespective of the ownership of the water (so-called *every man's rights*, you don't have to pay any fees or licences). The latest change enhancing the fishing opportunities of non-owners was the adoption of a *provincial lure fishing fee* in 1997, after a lively debate in Parliament and the media. The water owners opposed this new legislation and interpreted it as interference to private ownership and local decision making.

4.5 Interview with Magnus Eriksson (local professional fisherman)

There is some history of commercial fishing in the family – grandfather was a fisherman (and died by drowning), and father helps with the fishing. Magnus is now the only full-time, commercial fisherman in Hanko; others are part-time. This is successful, and he earns a good living because:

- There is now little competition
- He owns a fishmonger's shop in Helsinki
- Demand for fish is increasing, by 4-6%/annum
- The price of fish is increasing, after years when Finnish fish was among the cheapest in Europe.

Earnings

From wet fish landed and sold, earnings are approximately 50-100Euro/annum. In addition to the sale of his own-caught fish, his shop sells imported fish, mainly from Denmark & Norway (salmon). He could sell all the fish he lands to people in Hanko, but he does not do so because he can sell it in the shop in Helsinki at twice this price. However, he does process fish (e.g. smoking) for sale to restaurants in Hanko. Much of his business is with the Russian military, and he runs pike-fishing trips for senior officers mainly as good public relations.

Methods

Main method is rising (from seabed upwards) gill nets, mostly 5m high and 1–2,000m long. Most are set around the inner archipelago, within 1km of the shore, in water less than 10m deep. In summer, fish are more dispersed and nets may be set in offshore and deeper areas. Catches centre on herring, perch, perch-pike, whitefish, pike and others. Trout are rarely caught nowadays, and numbers of flounder have declined dramatically in recent years.

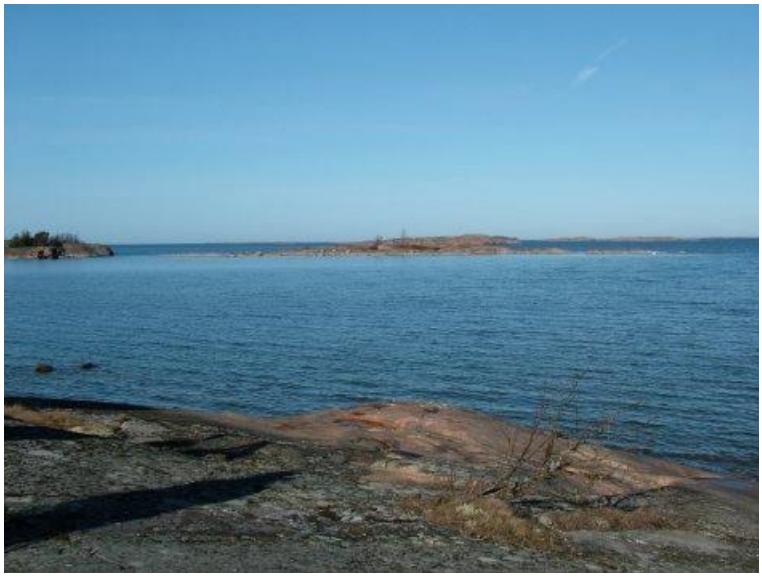
Damage

The main damage is done by seals. They find and eat the fish caught in nets, leaving only the heads. A seal is very occasionally caught in the gillnets and makes repeated, serious attacks on the captured fish (can eat 90% of catch). Seals also damage the nets, so there is a need to set greater lengths of nets to achieve the same catch (i.e. more effort). He moves the locations of the nets every two days or so because otherwise, the seals know where the nets are and they find the fish caught in the them. Estimated loses to seals at sale value is 1-4,000 Euro/month, which can be 25-30% of the catch. Magnus replaces nets to the value of 15,000 Euro/year. He has seen seal-proof fyke nets but:

- Even with subsidies, they are expensive
- Seals learn to stay just outside nets, intercepting fish entering them
- He prefers to move his gear around

Cormorants
Cormorants do attack captured fish but it is impossible to quantify the impact at present (although not a huge problem at present). Magnus fears that with increasing numbers of cormorants, the problem of decreasing fish stocks could become serious. He has seen a flock of about 200 cormorants empty a bay of fish in 15 minutes, and he has caught several birds in gillnets set in 20-30m of water.

Action?
Magnus believes that scaring will not really work for cormorants as he 'works' a long length of shore and knows where the fish are. Shooting may be of temporary benefit. He is a member of a local fishermen's organisation, but he feels that the organization is weak politically and the politicians pay it lip service. Unlike farmers, there is no automatic compensation for seals & cormorants (i.e. pests) or adverse conditions (e.g. gales), which stop him fishing. He would like to see lifting of restrictions now and a system of compensation brought in. He was not aware of national Cormorant management plan.



4.6 Interview with Chris Karppinen who works full time for the Uusimaa Regional Fisheries Association (by Sandra Bell).

NB The material on water ownership and licenses appears to refer to recreational fisheries. However the basic water ownership/local management system is the same for recreation and commercial fisheries. The recreational fishing license system is more complicated because of the new use rights (everyman's rights – free access to fishing and the province-wide lure fishing fee, see 4.4) for recreational rod fishers. Local owner-based management is still valid for recreational fishers as well.

Within 10 nautical miles of the coast waters are *owned*. The system is very complicated. Ownership is attached to property on the land. Someone who owns a house and land adjacent to the waters also owns a portion of the waters. The exact size varies and depends on historical reasons. Sometimes people pool their fishing areas, which can consist of up to a hundred divisions, but also of many fewer portions. In the case of the joint areas all those involved have access to the entirety. Historically the areas attached to certain properties have become smaller as land has been sold creating more patchwork patterns of ownership. The state also owns water areas.

In the 1980s the state introduced Fisheries Regions and there is also a Federation of Fishing Associations. In Sandra Bell's experience in eastern Finland there was a

problem finding people to participate in the regional associations[6] but Chris says that this is not a problem in the coastal region.

People who own fishing areas - be they joint or single forms of ownership – form fishing associations. These sell fishing licenses to people from elsewhere. They also have responsibility for the management of their fishing areas, including stocking, spawning areas, regulating the fishery according to rules imposed externally. There is generally good participation of members in the fishing associations but some water owners, including summer cottage owners don't care and some do not even realize that they are water owners[7].

Each area is allocated a certain number of units varying according to size. Specific fishing gear represents a certain number of units. For example a gill net is usually worth a low number of units while a light trawl is usually worth a high number. Instead of paying a license fee to the Fishing Associations a fee can be paid to the state. The whole of Finland is divided into five sections. A fishermen can pay an annual fee of 27 euros to the state for rights to fish anywhere in one of these five areas. Then the state pays this back to the fishing associations. The allocation of collected funds between Fisheries Regions is decided according to surveys of fishing pressure made by FGFRI.

People under 18 or over 65 do not have to pay for licenses. It is estimated that half a million people do not pay for fishing licenses.

Our discussion turned to the Finnish Management Plan for Cormorants. The Federation of Finnish Fishing Associations could not get a place in the working party set up to design the management plan. Chris says "*We wanted to be involved but we could not get a place in the working group, as we were with the plan for the Grey Seal. It was a political decision*." He believes that the Ministry of Environment did not want to include them because they had already decided what they wanted to appear in the management plan and their presence would have prevented that.

The plan was written and presented in Finnish, whereas the coastal fishermen are largely Swedish speakers who represent only 5 per cent of the population. Associations were sent a questionnaire to canvas their opinion but the questionnaire was written in Finnish. The fishermen wanted the plan to be *broader.* They wanted the cormorant to be treated as a game bird, a resource and not just a problem animal. The working group also excluded hunters. The fishermen think that the cormorant should be hunted for food just as they are allowed to take limited amounts of seals under license. Previously they had run a project to get people to understand how the

[6] **Note added after meeting:** Sandra is right in the sense that because of the aging of rural inhabitants, the challenge of getting active people involved in the local (statutory) shareholders associations is becoming an issues – especially in remote areas. This has implications for the Fisheries Regions because representatives of the water owners (nominated mostly by the shareholders associations) undertake the majority of the decision-making in the Fisheries Regions.

[7] **Note added after meeting:** This statement presumably relates to this being the case in this specific area. However, more generally, Finnish Game and Fisheries Research Institute's research on the subject show that there are many summer cottage owners who would like to participate in the work of the shareholders associations. Many feel that the local water owners want to keep the power in their own hands, don't spread information and, for example, hold their annual meetings in winter/spring when second-home owners can't easily participate.

seal could be a food resource. They published a recipe book and encouraged seal meat to be introduced into restaurants. Finish speaking people also eat grey seal.

They have not lobbied politicians because they see the decision as having been made by the civil servants of the Ministry of Environment. Chris believes that if the cormorants spread and begin to have an impact on the inland fisheries then something will be done. Right now it is considered to be a problem that affects only a small percentage of people who are anyway Swedish speaking. They feel that they generally receive lower standards of public services than do the majority Finnish-speaking portion of the population. They feel discriminated against. Among this group there is a feeling that the cormorant population will continue to grow as it has done over the past 10 years. It is not a coincident that fluctuations in the fish stocks are occurring close to the cormorant colonies. The current management plan is not a tool for dealing with the problem it is just a background paper, although it could provide the foundation for a proper management plan.

There is a political party that is seen to represent the interests of the Swedish speaking population but it is a small party and relatively powerless.The fishermen think that it should be permitted to do something to help reduce cormorant numbers – eggs could be oiled, roosting trees cut down. Imported fish is also a threat to full and part-time commercial fishermen. Over half the fish eaten in Finland is imported, particularly Norwegian farmed salmon and also tuna.

The EU is blamed for a much of the current situation. The EU banned the use of drift nets, which was a very popular form of fishing. They did this to protect harbour porpoises, but these animals are largely restricted to the southern Baltic. There have been no sightings of them in the Gulf of Finland for a long time. Fishing boats have every so often to take observers along to look for these animals and none have been sighted. Local fishermen who have drift net gear at home are perplexed and angry about not being able to use it. The Finnish government objected at the EU level but agreed to an observers programme. Fishermen were shocked that some of the Finnish environmental organizations went along with this EU rule because they are afraid that it will compromise the ban on drift nets throughout the Baltic.

It is not correct to say that fish stocks have declined overall. There are more of some species than there were 10 years ago. There are lots of whitefish and roach have increased but they are not a sought after species. The salmon populations are quite high but they are hard to fish because the grey seal damages the fish in the nets so out of 10 fish you might have only one or two that are undamaged. This is very demoralizing for fishermen. Young people do not want to become commercial fishermen and it makes the salmon fishing season shorter. Young people do not want to take up fishing as it is too uncertain – it already faces the problems of quotas, the drift net ban, and the threat from cormorants.

The fear is for the future. At present the cormorant problem is a nuisance but the real anxiety is that it is certain to get worse.

The area we visited on the field trip is not really one of the problem areas so we did not see how bad it is. Eutrophication is a big issue and a trigger for other problems. The cormorants are the “straw that has broken the camel’s back”.

(5) General working sessions: regular Work Group tasks

DAY ONE 13 April (after pm coffee), DAY THREE (3 sessions)

5.1 Work Group 1: Ecological databases and analyses

Local stakeholders: Anna Gaginskaya (St. Petersburg State University)
Mennobart van Eerden, Stef van Rijn, Stefano Volponi, Karlis Millers, Mikael Kilpi, Ivailo Nikolov, Catarina Vinagre, Vilju Lilleleht, Marijan Govedic, Zeev Arad, Botond Kiss, Jean-Yves Paquet, Manfred Enstipp, Szymon Bzoma, Reinhard Haundschmid, Mindaugas Dagys, Daliborka Barjaktarov, Svein-Håkon Lorentsen

WG1 discussed efforts to organise the database of Cormorant colonies in all European countries. The database is organised in several parts: colony (its size, year of establishment, clutch size); habitat, management. In that way it contains data about each colony. Most countries have sent data, but we are still lacking data from France, Georgia, Moldavia, Ukraine, Montenegro and Albania. We are working on establishing relationships with these countries. The general issue discussed was how best to use this database?

Marijan Govedic and the rest of WG1 worked on strategies and final goals to be achieved, to address the final INTERCAFE outputs from an ecological point of view. Also we would like to recommend how best to use the database and, from a biological point of view, what can we do in order to offer possible conflict solutions.

Beside Cormorant colonies, another important issue is their winter roosting. However it is very difficult to organize the counting of night roosts of Cormorants and their numbers but **Rosemarie Parz-Gollner** and the rest of WG1 plan to do this. A second source of information is the winter-roost data based on the results of the first pan-European midwinter count conducted in 2003 - data compilation will be completed before the next INTERCAFE meeting in Italy.

Reinhard Haunschmid and **Catarina Vinagre** discussed preparing the fish part of the Water Systems Database and further criteria that have to be entered into the database. Catarina will arrange the new data for the Open Sea, Estuaries and Inland Seas. Reinhard will do the same for Streams and Rivers. A list of criteria and a time plan for adding the missing data were discussed. It was agreed that each country had to be contacted by email and asked for the missing data.

The following topics need to be asked again on a case-by-case basis:

- Type of system (e.g. large rivers or stream/small rivers
- Maximum water temperature
- Slope gradient (m/km)
- Lake type and area
- Width
- Altitude

An STSM was planned for June to discuss the first results from the Water Systems Database. A new idea to examine any predatory effect of cormorants on fish

populations in Austrian streams was also presented and this work too would be continued as part of the STSM

Stefano Volponi, **Jean-Yves Paquet** and **Stef van Rijn** worked on colony counts and the colony database. Most of the data are now entered in the database. **Jean-Yves** and **Rosemarie** worked on roosts and the midwinter count (within IWC). It is easier to organize midwinter counts of waterfowl and Cormorants than roost counts, but all data are very valuable. Data input, control and analysis (winter-roost counts) will be part of the STSM activities in Vienna (Stef, Rosemarie).

Cormorant Manual
Jean-Yves Paquet and Rosemarie Parz-Gollner worked on Manual chapters – text contributions about counting cormorants on winter roosts. Finalization of Manual content: STSM was planned, invitation for Bruno who will contribute with a chapter (WG2) and will help as native speaker.

WG1 agreed that the Cormorant Manual should have a chapter about the pygmy Cormorant. **Zeev Arad** and **Ivailo Nikolov** will be in charge of this task and start to work on it as soon as possible - probably it will be finished before the Italian meeting. Planned STSM will also include continued work on the Manual

5.2 Work Group 2: Conflict management and resolution

Participants (all or part of sessions): Arild Espelien (Norwegian invited expert), Nils Rov, Ger Rogan, Bruno Broughton, Redik Eschbaum, Tamir Strod, Henrik Lykke Sorrenson, Ferenc Levai, Robert Gwiazda, Mikael Kilpi, Petr Musil, Thomas Keller, Kareen Seiche, Michal Adamec, Ion Navodaru, Timo Asanti, Local invited expert: Chris Karppinen (Finland).

WG2 Presentations
by Bruno Broughton and Thomas Keller
In Finland WG2 continued its regular work. Six presentations on cormorant conflicts and management were given and discussed.

Presentation 1: Pekka Salmi
The Finnish Grey Seal Problem and the Management Plan

In the coastal and archipelago areas of the Baltic Sea the increasing grey seal (*Halichoerus grypus*) population hampers the fish farmers and - especially - the livelihood of commercial fishermen. The seals take fish from nets, injure fish and damage the nets. According to fishermen the seals also change the behaviour of fish.

After a period of low reproduction, the seal populations started to grow in the early 1990s, and it increased from about 9,700 individuals in 2000 to 18,300 in 2005. In 2001, seven protection areas for seals were established in Finnish sea areas. Fishing was restricted in these areas, but most of the commercial fishermen had already moved to other fishing grounds due to the seal problems. When the seals turned up at new sites along the coast and archipelago, and seemed to be less afraid of people, the Finnish fishermen started to demand action from the State to mitigate the seal damage, provide compensation and the development of seal-proof gear.

The grey seal is categorized as a game animal in Finland and the authorities have allowed limited seal hunting since 1998. The hunting quota was around 1,000 seals in 2006, but only a part of the annual quota has actually been killed. The fishermen cite hunting as an important method for managing the conflict due to the benefits of killing the most problematic individual seals - those which have learned to use fishing equipment as a supply of easy food. Hunting has not affected the growth trend of the Baltic grey seal population. Attempts have been made to revitalize the hunting traditions and develop new ways of using the hunted seals as a resource - a source of income. Fishermen have been compensated for a part of the economic losses induced by seals, but only in years 2000 and 2001.

In addition to hunting and financial compensation, technical methods for conflict mitigation have been developed. The idea of developing 'seal-proof' fishing gear has become popular among authorities, researchers and many fishermen. Compared to hunting, the gear development seems to be politically less controversial and an easier path for balancing profitability and the acceptability of coastal fishing. The fisheries authorities have subsidized both the gear development projects and investments in seal-proof pound nets. EU funding has been linked with developing options for selective salmon fisheries.

The 'push-up' type pontoon pound nets turned out to be most efficient and easy to use, but they are more expensive than the more traditional types. This gear was initially developed in Sweden and became popular in Finland a few years ago. The idea of the pontoon pound net is to make the fish bag strong enough to keep the seals outside and away from the catch.

Subsidies for investing in the seal-proof fishing gear were introduced in 2004 and most of the funded pound nets were of the Swedish type. The Finnish coastal fishery struggles with low profitability and only a few fishermen are able to invest in the new seal-proof gear innovations without external funding. The seal-proof fishing technology provides a partial solution to the seal/fisheries conflict since modified pound nets for salmon have not yet been fully developed; gill nets are the most important gear in coastal fisheries and there are several target species more important than salmon.

A management plan for the Baltic seals is about to be published by the Finnish Ministry of Agriculture and Forestry. The following information is based on a draft of the plan. The management plan was prepared following eleven gatherings with local people along the coast and questionnaire surveys with a variety of stakeholder groups.

The general aims in the plan concerning the Baltic grey seal are: -

- To enable the coexistence of people and seals in a way that allows the seal to be seen as a natural resource which can be used in a diverse and sustainable way, and

- To take the regional fishing and fish farming livelihoods into account by intensifying cooperation and communication between stakeholder groups in order to prevent, and compensate for, seal damage.

In the management plan the coastal sea areas are divided into three population management areas, each with a specific target. The plan also suggests actions concerning seal hunting, the utilization of seals (including seal tourism, the use of meat and fur, etc.), preventing seal damage, monitoring and research, education and information, and collaboration between stakeholder groups. The last action may include the formation of regional negotiation forums in which different interest groups are invited to participate. The regional administration may become more influential, but the management plan stresses that national game administration will have at least a coordinator role for the present.

Discussion

Chris: It is a big improvement that the grey seal management plan is in the Swedish language. Thus, local people (many of whom speak Swedish) can comment on it!

Ger: What makes the pound nets seal-proof? A second net?
Chris: Yes.

Tamir: This was done in Israel in the Red Sea to protect fish in growing-on cages against attacks by sharks and other predators. The cages were vulnerable to attack by overwintering cormorants, so they were protected with finer nets, a measure which proved very effective during winter 2006-7.

Thomas: Is shooting an important tool in the management plan?
Pekka: Shooting is only one aspect. The plan provides local people with the opportunity to participate for the locals and negotiate. Also important are investment subsidies for the purchase of the new seal-proof gear.
Chris: As stated in Pekka's presentation, the seal-proof gear is only a partial solution, albeit an important one.
Pekka: The complicated ownership structure for fishing rights makes things worse. Commercial fishermen have in many areas put in a lot of effort to get access to particularly good fishing grounds through long negotiations with the water owners. In areas where the seals have started to cause problems for fishing activities or scare fish shoals away the fishermen normally face the need to change their fishing area. Many water owners do not want commercial fishers operating in their waters. In areas of fragment ownership structure it is almost impossible, at least quickly, to arrange the renting of alternative large fishing sites in areas where seals are causing less harm. The fisherman may find himself competing with grey seals in one place and water owners and people's recreational interests in another.

Chris: The subsidy was split between fishermen, but these funds were restricted and insufficient to pay for the complete replacement of equipment with seal-proof gear.

Michal: In the management plan, has a research budget been identified?
Pekka: No.

Presentation 2: Ferenc Lévai
The Cormorant situation in Hungary - legal framework, environmental judgement & conflicts

Facts and observations
A steady increase of the nesting population of the great cormorant has been recorded in Hungary since the 1980s, with a larger increase towards the end of the 1990s. Today, there are said to be approximately 3,200 nesting pairs in the country, mostly in national park areas. At the same time, a large boost in the migrating population of birds occurred in Hungary.

There are two main peak seasons in the year, one in the fall, and a smaller one in the spring. In the autumn the numbers can reach up to 26,000 birds. In mild winters, like the one of 2006/07, the autumn and the spring peaks merge together because the birds can find food throughout the winter due to the lack of ice.

1,000ha of fish farm ponds produce mainly common carp (75-80%), as well as grass and silver carp. Fish consumption by cormorants in Hungary is an estimated 23 kg/ha/year (against annual production of 700-1,200kg/ha), of which about 16.1kg/ha/year comprises high-value fish. This estimation is based on international scientific data, using an average fish daily consumption of 500g per bird. In total losses amounted to fish worth 46,000 Euros and an additional 20,000 Euros are spent annually on anti-cormorant measures.

Legal framework
The great cormorant is not a protected bird in Hungary but it enjoys an intermediate status - as it is not a game bird either. Each protected bird in Hungary is ascribed a value related to its level of protection, and this information influences the size of fines as punishment for killing one of them. There is an approximate value of 4 Euro per cormorant, a low figure.

A permit is required to hunt the species but the hunting authorities accept no responsibility for controlling the cormorant population because they could then be held accountable for the damage caused by the birds. Permits are given by the environmental authorities in almost all cases, except when this might endanger highly protected habitats.

The national regulations do not mention the cormorant damage on fish farms, and the national authorities do not feel responsible to compensate for it. Moreover, national environmental authorities claim not to have the physical or monetary resources to deal with the situation.

Environmental judgment
Fish farmers and environmental authorities work closely together on the problem. However, environmentalists feel that it is the responsibility of the fish farmers to protect themselves from cormorants and to reduce the bird population. Co-operation consists of exchange of information on bird numbers, scientific data, and other solution ideas. Both parties agree that the problem should be solved internationally, as most of the damage is caused by migrating cormorants.

Fisheries judgment
Most fish farms in Hungary are situated on protected areas with high natural values. Fish is produced in polyculture, with common carp being the main product. Most of the fish lost to cormorant predation are 1-2 year-old stock. Other than the direct loss to predation, there is a considerable loss of yield due to stress factors. Moreover, a considerable amount of habitat and foliage is lost due to the cormorant, hence destroying biodiversity. The defensive actions taken are costly and not very efficient, with no reimbursement of costs.

On natural waters, the situation is even worse. The rivers and ponds that have just recovered from decades of industrial pollution are finally capable of hosting protected and endangered fish species. The fisheries community has made great efforts to re-stock the natural waters with indigenous species but, due to cormorant predation, most of these efforts have been wasted and the programmes had to be stopped. On natural waters there is no defence against this bird and biodiversity is disappearing rapidly.

Discussion

Kareen: Is there a monitoring programme?
Ferenc: Yes, in National Parks, and there was a study in the winters of 1999 – 2002.

Robert: Are there conflicts with anglers?
Ferenc: Yes, but from an economic perspective, only a few people rely on river fisheries for income.
Robert: Are there any data on cormorant diet in Hungary?
Ferenc: The conclusion from several studies is that the average daily consumption of fish by each cormorant comprises 500g. Prey selection appears to take place because even where carp are only one component in a mixed fish community, cormorant diets are dominated by carp. Re-stocking of rivers has stopped because of the cormorants.

Kareen/ Tamir: On what are your damage calculations based? Are there also species of low commercial value in your ponds? On what is the pond fish densities based? The overall damage seems low, only about 3–4 %. (Tamir reported that in Israel, the fish-growers' assessment of damage was about 16% by weight, but when this was actually measured it turned out to be 10t of fish from 2,150t, only about 0.5% by weight. Kareen reported that in some Saxony fishponds, loses of 80-90% can occur with second-year carp.)

Ferenc: It is mostly carp produced in the ponds. My company has to spend about $10.000/annum on measures to protect fish from cormorants.

Thomas: Which techniques are used?

Ferenc: Gas cannons and shooting of a few hundred birds in the farms.

Thomas: What would be your wish to the Hungarian and EU government?

Ferenc: Compensation for damage and protection efforts, as well as an international cormorant management plan.

Presentation 3: Tamir Strod
Cormoshop - acoustic deterring technique using Orca sounds

Principle of operation

Underwater loudspeakers diffuse the underwater sounds produced by cormorant predators. Depending on the area to be protected, these loudspeakers - supported by floats - are immersed 40 cm under the water surface. Once connected to the Cormoshop power station, the loudspeakers diffuse sound waves designed to frighten the cormorants when they are diving. Various frequencies were tested until the most effective was found. This was at 90 kHz, the frequency for sounds from a killer whale (*Orcinus orca*).

The demonstration/testing was conducted in private ponds in Forez, France where – typically, each fish farm owner or manager runs about 1,000ha of ponds. In the experimental pond, covering 12-15ha, four loudspeakers were used because of the pond size. Caroline Champailler conducted the evaluation. Feedback from the pond owners was positive but the device seems to work on ponds only where there is low fish density (< 300 kg/ha). Experience showed that diving cormorants took flight immediately, moved away and did not seem to return. At higher fish densities, it may be less effective as the cormorant dive time to catch a fish is less.

The unit is available commercially for 3,000 Euros, and 30-40 units have been sold in France, two in Belgium and a few in Italy. French farmers, some of whom had used the device for up to two years, were said to be happy with its performance.

Advantages of Cormoshop

- No external harmful side-effects or risks of pollution
- No wounding or changes to fish behaviour or frightening of other water birds
- No habituation of the cormorants
- Reliability of the equipment under all climatic conditions
- Quick and simple installation (only an electric source needed)

Description

- Waterproof and ventilated trunk containing a powerful professional amplifier
- Digitalized and interchangeable sound source
- Autonomous electronic management
- Power supply case protected according to European standards
- 3 subaqueous loudspeakers of 350W each with floats for positioning of the loudspeakers
- 3 electric cables, each 100m long

Technical information can be obtained from:
Sodicre, La Petite Garenne, F-18330 Neury Sur Barangeon, France
Tél: 02 48 51 63 00 ; Fax: 02 48 51 63 09
Email: info@cormoshop.eu; Website : www.cormoshop.eu

Recommendation

Tamir considered that we talk repeatedly about killing and culling but, in addition, we should suggest other non-lethal means which prove useful. The Cormoshop system should be tested because the basic idea seems convincing in spite of the poor scientific results available right now.

Discussion

Thomas: I have seen other electronic sound devices before. Experience shows that they are not very effective or only for a short time, and the birds can soon become accustomed to them.

Tamir: This system is not producing electronic sounds. Instead, the sounds of cormorant predators are used to which cormorants cannot get used. The Cormoshop should be given a chance and be tested scientifically.

Ferenc: Do they produce something more attractive to fish farmers?

Tamir: I agree that this is a limited device, especially suited to small ponds.

Ferenc: More studies are needed, including before/after studies.

Bruno: The effect on the fish needs to be checked too: it could be scaring the fish, rendering them harder to catch by cormorants.

Ger: What is the difference between artificial vs. natural predator sounds?
Tamir: As I said in the presentation, the bird cannot get used to the sounds of their predators while they get quickly accustomed to artificial sounds.

Timo: The sounds of sea eagles might be used as well!

Presentation 4: Erik Petersson
The Current Cormorant situation in Sweden

Before the rapid increase of the great cormorant population in Sweden, the species was found almost exclusively in Kalmar Sound (the water in the Baltic Sea between the Swedish mainland and the island of Öland). There were about 200 breeding pairs in the 1970s, and by the late 1980s and early 1990s the birds had spread inland and also expanded rapidly along the coasts (see Figure 1).

At present (2006) the number of breeding pairs is stable, or fluctuating, in the old core-areas along the coast in the south-east, together with some of the larger lakes. Colonies still grow and new colonies have been formed, particularly in the archipelago of Stockholm, in the Gotland area and in the Lake Vänern. The population has also expanded fast recently along the Swedish west coast, especially in the northern parts.

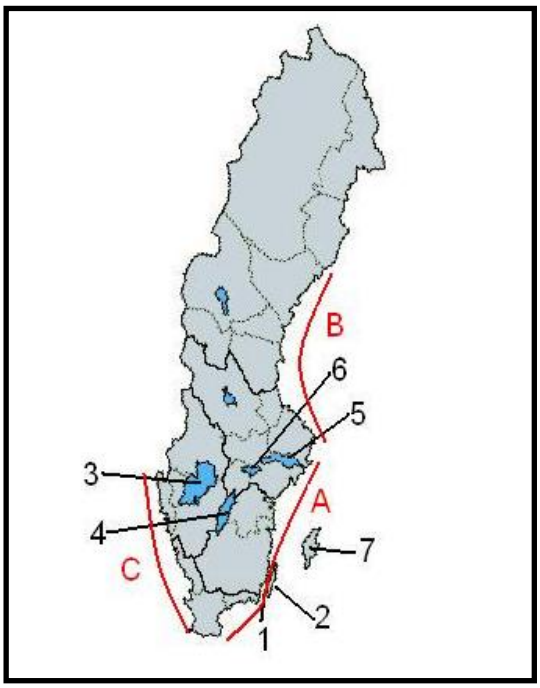


Figure 1. Map of Sweden showing 3 coastal areas and several localities important for cormorants

According to the latest estimates, the number of breeding pairs in Sweden now is about 45,000 in more than 200 colonies. The main shooting area is on Lake Hjalmaren, where two thousand birds are shot annually. This is the most northerly lake where the birds have become established. (Note – this is still south of Finland and may explain why there are no inland colonies in Finland).

1 = Kalmar Sound (north of the digit); 2 = the island Öland; 3 = Lake Vänern; 4 = Lake Vättern; 5 = Lake Mälaren; 6 = Lake Hjälmaren; 7 = the island Gotland; A = southern east coast; B = northern east coast; C = Swedish West Coast.

There are two 'new' issues that are discussed in Sweden (the 'old' conflict is still going on). Firstly, how can the number of breeding pairs (BP) be counted accurately, and secondly, whether or not cormorants are the reason for the declining results of sea-ranching programs of Atlantic salmon (*Salmo salar*) and sea trout (*S. trutta*).

1. The common way to count the number of breeding pairs in ground-breeding colonies is to go ashore during the peak breeding season and count the number of active nests. However in 2005 one colony in the Stockholm archipelago was counted from boats because of restrictions on entering the island. This resulted in only a fraction of the colony being counted. Later the same year the colony was counted from land and the colony was found to be significantly larger because many nests were hidden from the observations points at sea. Among some people this was misinterpreted as a deliberate underestimate of colony size and they emphasized that the total population was much larger than previously said (i.e. 135,000 BP vs. 45,000 BP).

2. The recapture rates of stocked salmon and trout have decreased in Sweden during the last few decades (see Figure 2). During the last 15 years the recapture rates have been low for both species, whereas it has been low for the salmon for almost 30 years. One explanation put forward is that cormorants may feed to a considerable extent on the stocked smolts, as studies have shown this to be the case in Denmark. During two years in River Dalälven a significant proportion of the stocked smolts were tagged with coded wire tags and Carlin tags, and these were traced in the cormorant pellets found in nearby colonies (collected several times during the smolt migration period). The preliminary results indicate that 1–2 % of the smolts are eaten by cormorants. In addition, observations reveal that cormorants fish infrequently in the river mouth and usually most birds fly to other areas for feeding.

   The focus has then been switched to another fish-eating bird species, the goosander. The plan now is to study the diet of this species by shooting 20 - 40 males after the egg-laying period and examining their stomach contents.

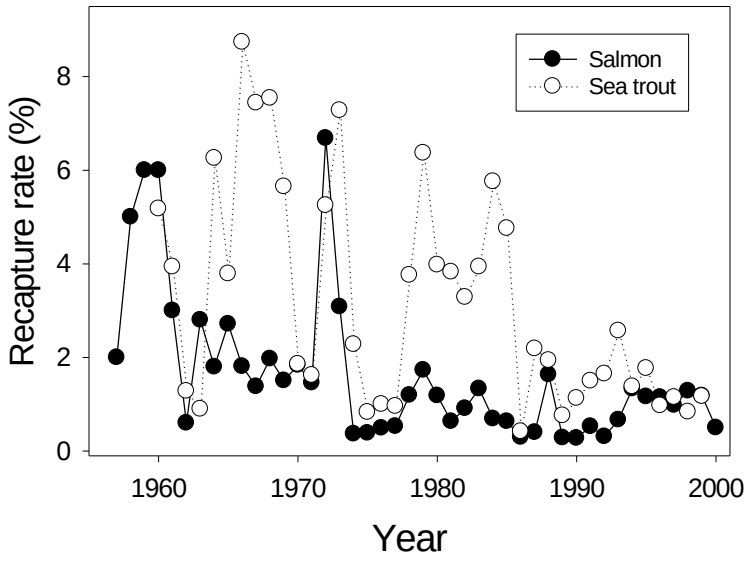


Figure 2. Recapture rates of Atlantic salmon and sea trout at River Dalälven, Sweden.

Discussion

Thomas: Usually, occupied nests are counted. Wouldn't this be more accurate?
Erik: This is not possible in Sweden because of the inaccessibility, the size, and the large number of colonies.

Tamir: What about aerial counts? This is very efficient.
Erik: We cannot use aircraft because of the cost implications and the reluctance of workers to accidentally scare white-tailed eagles.

Nils: In Norway we counted 20 % of the breeding pairs in 2 days only, working from the plane.

Timo: This is similar in Finland as well.

Petr: Solving conflicts often starts by agreeing on methods!

Bruno: Who are the conflict partners?
Erik: The main conflicts are – in order of importance – commercial fishermen, anglers and fish farms (of which there are very few in Sweden).

Tamir: Aerial photos could be given to fishermen as proof. This should help to reduce the conflicts about breeding pair numbers.

Thomas: We should not talk about cormorant individuals but breeding pairs instead. These figures are much more accurate.

Ferenc: Consensus is needed on this as it is the individual birds that eat the fish.

Nils: The best way would be to count breeding pairs and then model the number of individuals by incorporating information on age classes as Thomas Bregnballe did. Also numbers on non-breeders need to taken into account.

Henrik: The numbers of non-breeders in Denmark are difficult to count.

Nils: In Norway it should be about 10 % of the breeding birds.

Henrik: What is a figure worth? It does not get you anywhere!

Ferenc: Local bird numbers are needed. For individual fish farms damage calculations are based on the bird numbers.

Bruno: One problem with politics is that the circumstances under which numbers have been calculated get forgotten very quickly.

Nils: There might by some natural restrictions to the range expansion of the cormorants.

Timo: In Finland great cormorants are still expanding their range northwards. The ongoing climate change might give them more opportunities to move on. Food would be available there.

Mikael: If the cormorants reach the Finnish Lake District all hell will break loose!

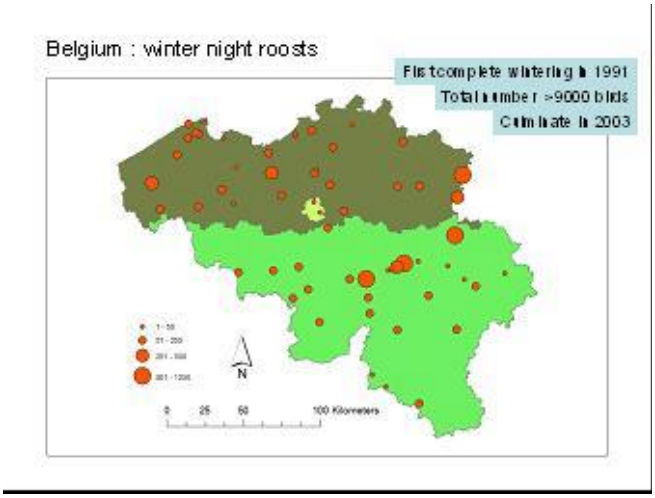
Erik: As I said before, Lake Hjälmaren is the most northerly lake where the birds have become established. This is still south of Finland and may explain why there are no inland colonies in Finland.

Nils: Finally, I would like to point out that a study in Norway showed that moulting male goosanders hardly feed on any salmon smolts.

Presentation 5: Jean-Yves Paquet
Cormorant conflicts and management in Wallonia (Southern Belgium)

Belgium is located at the crossroads between major breeding and wintering grounds of the North-West European *sinensis* great cormorant population. However, it was not until 1991 that a real wintering population of great cormorants was established, following the well-known general increase of this population. Numbers in mid-winter have increased regularly to culminate in 9,000 individuals in 2003, with a small decrease since then. The great cormorant also re-established itself as a breeder from 1992, with a regular increase of 10 % every year to reach 1,500 pairs in 2006.

Belgium is a federal country with three different environmental legislations according to the three federated regions - Flanders, Wallonia and Brussels. We will focus here on Wallonia, where most of the conflicts occur, because of the relatively higher density of cormorants in winter and higher density of fish-related human activity.



Recreational angling is a declining but still a socially important activity in Wallonia (about 75,000 permits are sold every year for 3.3 million inhabitants). Essentially, two types of water bodies are present: (a) slow-flowing rivers, including the large river Meuse and associated ponds and canals in the lower parts, where angling is concentrating on cyprinid, perch, etc., and (b) fast-flowing rivers of better water quality in the forested area known as the Ardennes, where angling is concentrated mainly on salmonid species (trout and grayling).

Small-scale fish farming in artificial ponds is found all over the region, essentially to supply stocking or, locally, food production (trout); there are a few coarse fish farms.

Cormorant conflicts have been evolving in parallel with changes in habitat occupancy by wintering cormorants. First, wintering was only observed on the River Meuse. Then, from 1997 onwards, cormorants progressively occupied all type of water bodies, even small streams in the Ardennes. Conflicts first occurred with Meuse river angling clubs, then rapidly with fish farms and finally with small river angling clubs. Conflicts often followed a seasonal pattern, with increase of 'conflict indicators' all along through the winter (i.e. articles in fishing journals) and management discussion occurring, especially at the end of the winter. The breeding population is currently not a real subject of conflicts, being confined to private or protected area in the western part.

In the Meuse river, conflicts arose as soon as 1992, when the first large flocks of cormorants appeared in the winter. Winter cormorant numbers increased to 5,300 but – recently – they have declined to about 3,500 birds. However, the birds are now largely tolerated in this ecosystem. In a recent proposal from angling societies for a shooting plan in Wallonia, the Meuse river was left as an accepted non-shooting habitat for cormorants. Co-existence for more than 15 years, better knowledge of the species (leaving aside the initial fear of a super predator eating more than 1 kg of fish every day!) and a cormorant diet study joined with roach and bream stock assessments showing no decline of fish stock, probably explain this relative tolerance.

Concerning fish ponds, in 1997 the Wallonian government developed possibilities for financial compensation for losses caused by protected animals, including cormorants. However, this compensation scheme is only available to a restricted number of fish farmers and the money attributed to it is said to be too low. In addition, fish farmers can now generally obtain derogation for shooting a limited number of cormorants and

grey herons. Although nothing is known about the effectiveness of these shootings, complaints seem to be at least temporarily lowered at the moment.

In contrast, there are numerous complaints about cormorant predation in the small river systems of the Ardennes, principally because of supposed impact on fragile natural trout and grayling populations. However, cormorant impacts on small river ecosystems have never been thoroughly studied in Belgium. Shooting is not allowed yet in natural habitat: it is most wanted by angling clubs but major conservationist groups are against it. A way forward is perhaps being implemented in the Ambleve river valley, where discussions are under way between conservationists, angling associations, forestry and fishing administration, as well as with the 'contrat de rivière', an association of valley stakeholders, including tourism and local authorities.

High-risk locations have been identified in this valley, places where cormorant presence is believed to be particularly detrimental (spawning areas, fish gathering points during migration, etc.). A series of management tools, including shooting to reinforce disturbance, should be applied to these identified locations. If this way of consensus management to specific locations proves to be efficient, then it will probably be applied in other river valley.

A shooting plan was devised in 2002, and the first shooting was in 2005-6 on fish farms in the Meuse valley. Cormorants tend to be tolerated in this area, despite 10% predation on fish. Compensation is not really working, being too complicated and at too low a level. In the River Ambleve area in the Ardennes, the plan was to clean up and restore the river but it has been claimed that cormorants, which are preventing grayling becoming re-established, have held this back. The plan provides special protection for specific areas (e.g. fish spawning and juvenile areas) through a programme of shooting and scaring. Discussion with stakeholders is ongoing, and a management plan has been devised. This is awaiting ratification by the Government minister.

In conclusion, cormorant conflicts in Wallonia have been constantly evolving, leading to some level of tolerance in some habitat, although no strong management measure, such as a global shooting plan, has been implemented.

Perhaps the traditional Belgian consensus attitude is responsible for this rather mild way of treating the conflict, leading to some habituation to cormorant presence in the long-term. Nevertheless, feelings of frustration are still real among part of the angling community, especially in the more natural rivers.

Discussion:

Bruno: Is it possible that the intensive shooting of cormorants in France is the reason for the observed decline in overwintering birds in Belgium since 2003?

Jean-Yves: There are no declines observed in France. Birds breeding in Belgium get shot in France.

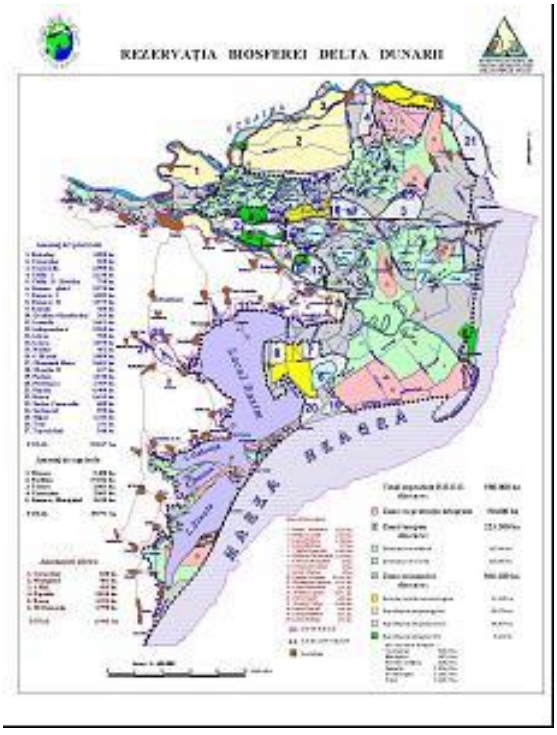
Tamir: What do you mean by 'progress'?

Jean-Yves: The conflicts have declined on the river Meuse and at fish farms. In addition REDCAFE led to communication with the anglers on smaller rivers. This is similar to the way of conflict resolution in England.

Presentation 6: Ion Navodaru & Janos Botond Kiss
Fishery and piscivorous bird interactions in the Danube Delta, Romania

INTRODUCTION
Description of area

The Romanian Danube Delta is included in the Danube Delta Biosphere Reserve (DDBR) and lies at the intersection of 45^{o} N latitude and 29^{o} E longitude. With a total area of 580,000 ha, the DDBR is one of the largest wetland areas in Europe. It is an area of high species diversity, with 125 species of fish and 325 species of birds (Oţel, 2000), highlighting the high environmental importance and biodiversity value of such Delta wetlands.



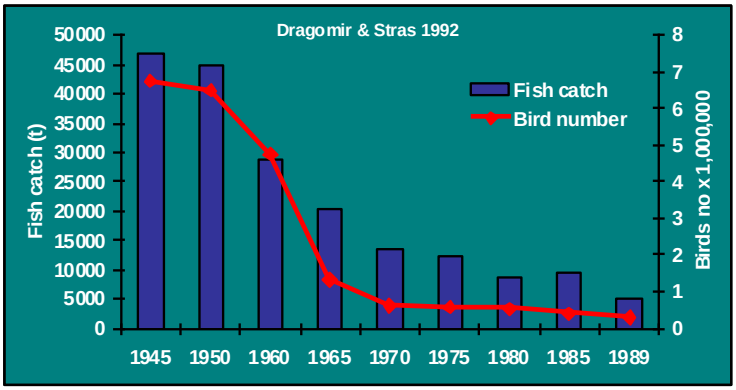
Some bird species are piscivorous and exert an important trophic pressure on fish resources. Given that the Danube Delta is home to about 15,000 people, including 1,500 licensed fishermen who are highly dependent on fish resources, the presence of piscivorous birds is seen as a threat to their income. This results in a negative perception of the birds within the community.

Fishing has been the main traditional activity in the Delta since ancient times. Hunting, small-scale agriculture, and sheep and cattle breeding have been complementary activities. Since the 1960s other activities have developed, including industrial reed exploitation, agriculture in polders and fish culture in ponds.

Environmental change
There were major environmental changes in the last half of the 20th century with the impoundment of about 500,000ha in the Lower Danube floodplain and 100,000ha in the Danube Delta for polder agriculture and fish pond aquaculture.

The river regulation work and dredging of the Delta canal network affected the hydrological balance of the Danube Delta by increasing flooding of the Delta and – substantially - increasing the residence time of water in the Delta lakes. Increasing input of nutrients to the Danube river also resulted in eutrophication of the Delta lakes.

Changes in bird numbers and fish catches
Since 1945 numbers of birds in the Danube Delta have decreased from 7 million to less than 1 million (Dragomir & Staraş 1992). This decline has been caused by loss of habitat and environment degradation (Andone *et al*. 1969). There has also been a reduction in the biodiversity of birds, but with increases in species typically associated with agricultural land as a result of the wetland impoundment for agricultural use (Marinov & Hulea 1997). Populations of wetland bird species have generally decreased, with the exception of cormorant species.



The Danube Delta supports multi-species fisheries, which exploit freshwater, migratory and marine fish. However, the total catch (from both the local population and tourists) has decreased from 47,000t in 1945 to 5,000t in 1989 (Dragomir & Staraş 1992). The collapse of the former main fishery for common carp was caused by the loss of habitat due to the large, new impoundments upstream in the Danube River floodplain (500,000 ha) (Bacalbaşa-Dobrovici 1989) and in the Danube Delta (approximately 100,000 ha) (Năvodaru & Staraş 1998).

Degradation of the habitat due to increasing nutrient levels in the Danube River, and the subsequent eutrophication of the Delta lakes, caused a change in the fish communities. The populations of species such as carp (*Cyprinus carpio*), crucian carp (*Carassius carassius*) and tench (*Tinca tinca*) have decreased, while bream (*Abramis brama*), roach (*Rutilus rutilus*) and the exotic gibel carp (*Carassius auratus gibelio*) have increased, possibly as a consequence of change in turbidity (Staraş & Năvodaru 1995).

INTERACTION BETWEEN FISHES AND BIRDS

Fish-eating birds

The most common fish-eating birds in the Danube Delta are: white pelican, *Pelicanus onocrotalus*, cormorant *(Phalacrocorax carbo)*, pygmy cormorant (*Phalacrocorax pygmaeus)*, grey heron (*Ardea cinerea)*, purple heron (*Ardea purpurea)*, squacco heron (*Ardeola ralloides*), little egret (*Egretta garzett*a), night heron (*Nycticorax nycticorax)*, and great-crested grebe *(Podiceps c. cristatus)*.

Earlier studies have indicated that white pelican, cormorant and pygmy cormorant are exclusively fish-eaters, while the other 6 bird species are partially piscivorous (Andone *et al*., 1969). Public opinion is more favourable towards pelicans and other fish-eating birds than it is for cormorants. Pelicans are seen as a tourist attraction and provide an additional source of income.

Most fish-eating birds in the Danube Delta live in mixed colonies. The relative abundance of most species has decreased in the last half of century but the cormorant population has increased. The increase in the Pygmy Cormorant population coincided with development of fish-culture in the Danube Delta, reaching a peak in the 1980s when the highest levels of fish pond stocking were reached.

Numbers have since fallen, coincident with the collapse of fish-culture in the 1990s. It is concluded that the development of fish farms, and especially nursery ponds, has served to stimulate increases in some fish-eating bird populations, such as pygmy cormorant and great cormorant.

A large diet study (n = 873 bird stomachs) carried out over the period 1959 to 1962 (Andone *et al*., 1969) on 9 bird species indicated the presence of up to 29 species of fish in the diet of birds, of which 11 species were regarded as being of high economic value, 6 of medium economic value and 12 of no value for the Romanian market. More recent studies have revealed large plasticity in the species consumed by cormorants and pygmy cormorants, including organisms other than fish (Gogu-Bogdan 1998, Oţel and Kiss, 2002). Despite the presence of guards around fish ponds, the survival of stocked fish is still only about 50 %. To guard the ponds is also very costly.

The Great Cormorant (*Phalacrocorax carbo*)

The cormorant population in Romania in 2002 was reported to be the sixth highest in the world (after: Denmark, Norway, the Netherlands, Sweden, United Kingdom), with approximately 15,000–16,000 pairs (i.e. 30,000–40,000 birds), and with an increasing population trend (Plattheuw *et al*. 2001). In more recent years, resources did not permit monitoring of the cormorant population over the whole Delta, but just in the main colonies. However, in 2007 it is believed that the great cormorant population in the Danube Delta reached 20,000 pairs (JB Kiss, personal communication).

The majority of cormorants in Romania nest in the Danube Delta and in the lagoon complex Razim–Sinoe. In the rest of the country, breeding numbers are relatively insignificant, with nesting in other wetlands probably accounting for less than 1 -2 % of the breeding population in the Delta.

Fish culture development: a new source of fishery-cormorant conflicts

Fish-culture activity started in the Danube Delta in the 1960s following impoundment of 48,910 ha of fishponds (47.5% of the total polder area in the Danube Delta). The main farmed species were: common carp (*Cyprinus carpio)*, silver carp (*Hyphophthalmichthys molitrix)*, bighead carp (*Aristichthys nobilis)*, grass carp (*Ctenopharyngodon idella)* and black carp (*Mylopharyngodon piceus)*. The development of fish-culture in the Danube Delta (the so called 'paradise of birds') has escalated the conflict between fishermen and birds.

Analysis of fish farm production data in the Danube Delta (stocking, survival rates, and output) has indicated that fish-culture is impacted due to the low survival of stocked fish, mainly due to bird predation. Munteanu *et al*. (1996) noted differences in the diet of birds feeding in natural waters (mainly bleak *Alburnus alburnus*, roach *Rutilus rutilus*, and aquatic insects) and those feeding in fish ponds, where small fry (3-9 cm in length) comprised most of the diet (e.g. common carp 58-72% by weight, and gibel carp *Carassius gibelio*, 18-42% by weight). Bacalbaşa (1997) estimated that the loss of fish from hatcheries to cormorants ranged between 12 and 75 % by number, with the size of fish consumed ranging from 3-70 cm (1-900g).

Estimation of food requirements for piscivorus birds

The estimation of fish biomass necessary for sustaining piscivorous bird populations in the Danube Delta is important in understanding the relationships between species. Even allowing for uncertainty regarding the accuracy of the data on bird numbers, the period of residency and the seasonally of daily food requirements, it seems that the Delta has to produce more than 7,500 t of fish, particularly fry and smaller size ranges of fish, to sustain the piscivorous avifauna of the Danube Delta (Navodaru *et al*., 2004).

The legislative framework

In Romania, the great cormorant does not have universal protected status. However, all birds are strictly protected in the core protected area of the Danube Delta Biosphere Reserve and in other protected areas, where they nest and breed together with other protected birds. The Romanian Law of Game Protection (No 407/12006) includes the cormorant in Appendix 1, which lists wild fauna allowed for hunting. The hunting season is open from 1st September to 28th February. However, the birds are not widely hunted because they are not regarded as being edible according to Romanian food traditions.

The new Hunting Law (No. 406/2006) provides some statements regarding damage compensation by wild animals in Article 13, as follows:-

- If game fauna result in damage of agriculture fields or domestic animals, compensation can be provided by the Ministry of Agriculture.

- Any compensation arising from game fauna that it is forbidden to be hunted will be the responsibility of the Ministry of Environment.

The rules for providing compensation will be established by Government Order in 60 days (although the regulation had not been released by May 2007).

The National Strategy Plan for Fishing and the Operational Programme for Fishing, 2007-2013, include some measures and actions for mitigation of fisheries–cormorant conflicts. Thus, the European Fisheries Fund will grant 45% for investment in sustainable use of aquaculture for:-

- protection of aquaculture against predatory birds,
- compensation for a maximum of 2 years for designation of farms as Natura 2000 sites.

Although there are some legislative means to seek compensation for damage resulting from fauna, there are no known cases for cormorant damage compensation.

CONCLUSION

For centuries, fish and birds have coexisted together in the Danube Delta, and both are important components of the food chain and the energy flow through the ecosystem. Piscivorous birds and fish form a natural trophic chain.

Fish and birds are in a prey-predator relationship that, in normal conditions, would be regulated by ecosystem processes. The population dynamics of both groups are influenced by factors dependent and independent of densities, and the populations of both birds and fish have decreased as a result of anthropogenic impact. The conflict between fisheries and piscivorous bird is acute in fish farms within the Delta, but tolerated in wild fisheries. There are few legislative or management techniques available to mitigate this conflict, but little has been implemented as yet.

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5.3 Work Group 3: Linking science with policy and best practice

INTERCAFE: Mariella Marzano, Dave Carss, Ilona Cheyne, Miha Janc, Jaroslav Boháč, Nikolay Kissiov, Simon Nemtzov, Renata Kpecka (née Martincova), Erik Peterssen, Michael Andersen, Susana Vinagre, Scott Jones, Trude Borch, Vilju Lillileht, Faustas Stepukonis, Sandra Bell, Pekka Salmi.

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Local stakeholders who attended on Day One: Henrik Lundberg (Local land and water owner), Mika Asikainen (BirdLife Finland).

Facilitator: Scott Jones
Rappateurs: Mariella Marzano/Sandra Bell

WG3’s Normal Group Activities focussed primarily on addressing the main sub-group outputs (1-5 as discussed in Slovenia) planned by this WG. In addition, Ilona provided an overview of a project she will initiate (theme 6) investigating law, regulation and ethics – essentially examining how legislation might constrain solutions. Finally, Dave and Mariella described forthcoming work for the final theme (No. 7) exploring “what EU policy makers need”.

The overall Work Plan for WG3 (described in Section B) is based on these well-chosen sub-group outputs informing the three main overall outputs of WG3. For clarity, all four WG3 sessions are summarised here by sub-group theme (rather than chronologically as discussed during the sessions over two days).

Section (A) describes the objectives, progress and important dates for WG3's seven major research themes. Section (B) shows how each of these will fit into the three overall outputs of WG3.

(A) Research Themes

(1a) A Rough Guide – bibliography – Scott *et al.*

Objective: The rationale here is to produce an impartial list of references offering reading material on "what is needed to fill common knowledge gaps" for people considering human:wildlife conflicts and covering many of the main issues address by INTERCAFE's exploration of cormorant-fisheries interaction in particular.

Progress etc. It was agreed that there needs to be a relatively short introductory text to the Rough Guide (i.e. why a Guide is needed, what it will help to do, etc) and to each of the themes addressed within it (i.e. this theme is important because of……). WG3 also agreed that key references need to be annotated – to put them in context and to explain their 'relevance and value' to the reader. Scott had devised 8 basic sub-sections for the Rough Guide:

- Conflict Management
- Tools
- Human:Wildlife Issues
- Birds and Wetlands
- Science/Policy
- Something Science (DNC: can't read my own writing!)
- Law
- Ethical Perspectives

Scott's next step was to sort out the references he had collated, according to these 8 sections, producing a 'top ten' for each one. He was also going to subdivide his own 40+ suggested references and write an introductory draft for the Rough Guide.

Important dates: Draft of Rough Guide to WG3 23 April, continue to request pertinent references from key people, request to have comments back to Scott by 1 June, and all completed by 31 August 2007.

(1b) Scott *et al*'s STSM – This STSM was devised to explore **"*scaling up issues that address best practice in the context of conflicts at local, district, national and international levels*"**. Scott reported that he had agreed a 'govenance' element of the STSM report with Pekka, Ian, Stefano and Thomas. Version 4 of the STSM report would be circulated to INTERCAFE participants by 23 April. Scott would request comments back by 18 May, and have something available/publishable by end of June 2007.

(2a) Scientific input into management plans - Erik/Rosemarie/Pekka

Objective: The rationale here is to explore how science is incorporated into management plans for so-called conflict species. The main issue is *"where in the process does science come into management plans?"*, secondary issues include the amount of stakeholder involvement and the time taken to prepare/agree on management plans. Data are being collected through an email questionnaire to relevant people/institutions. For reasonable coverage, data are needed for 2-4 conflict species in each of 10 countries.

Progress etc. Some progress had been made since the INTERCAFE meeting in Slovenia.

During the meeting, people volunteered to add more cases for Erik, he sent them all out an email questionnaire (and worked Swedish examples for wolf, cormorant, and noble crayfish. People also signed up to get information on different management plans, as follows:

(a) Sweden - wolf, cormorant, noble crayfish
(b) Denmark (HLS) - cormorant, seal
(c) Czech Republic (Jaroslav) - otter, lynx, cormorant
(d) Austria (Rose P-G) - cormorant, beaver
(e) Norway (Ketil) - wolverine, wolf
(f) Slovenia (Miha) - cormorant, bear
(g) Scotland (DNC) - hedgehog, American mink
(h) Finland (Pekka) - seal, wolf, cormorant
(i) Portugal (Susana) - wolf, a sea thing!
(j) Israel (Simon N) - wolf, cranes, pelican

Important dates: INTERCAFE people to email the questionnaire (and advice on how to answer the questions: Swedish completed examples) as soon as possible. Leave it for 10 days, then hassle. By 28 May - get everything back to Erik (including a contact email for the person completing the questionnaire). Draft will be produced for all by 31 August 2007.

(**2b) Ethical issues relating to hunting** - Erik, Ilona (and Ketil)

This is an additional issue - Erik was also going to work with Ilona, they intend to produce a list of references and are exploring what is mentioned in legislation. The fact that some ethical issues are more of a cultural nature was mentioned – there was a call for clarification between cultural ethics and those enshrined in legislation.

(3) African-Eurasian Management Plan - Trude, Micheal Andersen, DNC

Objective: The rationale here is to explore very specifically how science was incorporated into the original Action Plan for the Management of the Cormorant in

the African-Eurasian Region. Information was to be collected through interviews (face-to-face and email) with key players in Denmark, Netherlands and Brussels.

Progress etc. DNC had now taken over the main role in this (he holds much of the original documentation and is able to suggest the most pertinent people to interview).

Important dates: DNC will have a draft report of this process by the end of June and a 'final' version by the end of August. It is hoped that some face-to-face interviews can be conducted through an STSM before June 2007.

(4) Focused review of conflict case studies that were somehow effective or successful - Simon/Susana.

Objective: The rationale here is to produce a "helpful essay" on situations where human:wildlife conflict have been resolved successfully. Importantly, this review will be more than a list of useful publications by giving context to the subject through theoretical perspectives taken from the wider literature.

Progress etc. A target of 10 cases had been set. It was decided to concentrate on waterbirds (but to include others if appropriate). Work included producing summary abstracts of each paper used in the essay. It had been found that scientific reviews seldom examined management programmes holistically – the essay was concerned with community-based issues. However, this sub-project is to be more than just a list of papers – it needs to explore the processes(es) involved. The idea is that the essay would draw out best practices, relationships, and communication issues - feeding into WG3's three main outputs (see Section B).

Important dates: Essay draft to be completed by 31 August 2007, all INTERCAFE participants invited to comment thereafter.

(5) Media Analysis – Faustas, Jaroslav

Objective: The rational here is that both REDCAFE and INTERCAFE appreciate that the media often has an important role to play in cormorant-fisheries conflicts. Although this is a vast subject, and one not explored yet specifically in terms of INTERCAFE's interests, it is felt important to at least make an initial exploration of how cormorant issues are portrayed in the media across Europe. 'Document analysis' was proposed for material collected – importantly in a standardized manner - and forwarded to Faustas. Data were to be collected (10 articles per country) through a Google search for the words "Cormorant" and "Cormorants" in the relevant national language. Google was chosen specifically because most national media sources appear to provide material to it.

Progress
To date, nine countries had responded to Faustas' appeal for information prior to the original deadline of 28 February 2007 (and a few more had been provided at this meeting). Data were collated in Faustas' Table 1: CZ (n = 10 + 10 articles), DK (7, not all recent), EST (10), ISR (3), FIN (10, but not all from Google), LITH (10), SERB (4), SLOVAK (7), UK (10), POL (8).

So, around 90 articles had been collected to date. However, there were some problematic issues with the current 'dataset':

- Not all countries covered
- Some countries provided fewer than 10 articles
- Some articles were not from Google
- Although most articles were from 2005-07, some were not so recent
- Assessments of the 'reliability' of the information presented in the articles (to be determined by the person submitting the article to Faustas) were not always compatible

Faustas was also collating national media articles from personal or other archives. So far, had information from four countries. Data were collated in Faustas' Table 2: CZ (4), FIN (10), POL (11), SLOV (11). Collection of these was not standardized but this analysis was for more specific (illustrative) purposes.

It was agreed that the sample size for Table 1 data should be increased (and that people should try hard to complete the 'reliability' section of the datasheet. Also, more data were needed for Table 2. Erik P also promised help with statistical analyses. Catarina and Susan volunteered to get 10 references for Portugal, and relevant people have since been contacted for several other countries: Sweden, France, Germany, Italy, Netherlands, and Austria.

Important dates: Additional countries for the dataset have been asked to send their completed tables by 20 May. Faustas will analyse the data during June and then pass the material to Erik. Faustas, Erik, Sandra and Jaroslav will be involved in producing a draft - by the end of August 2007.

(6) Exploring legislation - Ilona Cheyne, Newcastle Law School

Law, Regulation and Ethics

Ilona presented a summary of this complex area of law and policy, concluding as follows:

Conclusion
Although we cannot altogether eliminate the element of human choice in our ethical decisions, we can be aware of the issues and responsibilities that attend our actions. For example, most schools of thought would agree that it is unethical to cause deliberate cruelty to animals. We should be aware of the demands of animal welfare, particularly where animals are dependent upon us or are directly affected by our actions. Although opinion is divided as to the ethical justification of hunting, the methods used must also be carefully considered. Most difficult of all, perhaps, is the question of conservation and the justifications for human intervention which affect, directly or indirectly, the welfare and survival of other species. This involves all the questions considered in this talk, particularly moral considerability, the balancing of basic and non-basic human interests against those of other species and the environment in general, and the knowledge that we can never be certain that we fully understand consequences of our own actions.

Ethical analysis of law does not tell us what we ought to do, but it does begin to uncover the assumptions about values made at the policy-making stages. These assumptions may be explicit but are more often implicit or not fully thought through. Understanding them allows us to engage in a constructive discussion about what we believe we ought to do in situations of human conflict over the environment.

Objective: The rationale here is to consider compiling a 'legislation database' to explore cormorant-fisheries issues in legal contexts at regional, national and international levels. Ultimately, to explore how legislation might constrain solutions.

Basic idea was to send material to Ilona (but she will give us guidance on what she wants) - questionnaire out to INTERCAFE by the end of August.

(7) Linking science with policy: what EU policy makers need – DNC/Mariella

Objective: The rationale here is to explore one important strand (but one of many important strands) of the relationship between science and EU policy. This theme has emerged recently, as a result of Ilona's participation in INTERCAFE, Micheal O'Briain's presentation on "*The Cormorant in the context of the Birds Directive*" at the Slovenia meeting, and INTERCAFE's discussions with DG Environment in Brussels. By necessity, we have to take a broad-brush approach but this issue seems particularly pertinent.

The plan is to devise a short questionnaire – or set of questions – asking policy makers to say in what form they want scientific information, and how they want science to be communicated to them. Once questions have been devised, they will be asked of policy makers in Brussels (e.g. DGs Environment, Research, Fish). It is hoped that a collation of this material will provide an overview of policy-makers' requirements for 'science' at the EU level. It is then hoped that INTERCAFE participants can either (1) ask the same questions or (2) discuss the EU-level results with policy makers at the national level in their own countries – in an attempt to explore, compare and contrast policy-makers' needs of 'science' at both national and international levels.

This theme is currently at the planning stage but it is hoped that a questionnaire/set of questions can be devised and asked of Brussels policy-makers before the INTERCAFE @Po Delta meeting in September 2007.

(B) Linking WG3 Research Themes with Outputs

There are to be three main outputs from WG3:

(I) A Rough Guide – basically addressing key issues (and relevant writings) that INTERCAFE has had to consider whilst addressing the deceptively simple issue of cormorant:fishery conflicts. Essentially this will be a means of giving context to the issue. It will be a mechanism for INTERCAFE to say *"If you are thinking about X you may find Y is important too….It may not be immediately obvious, but you cannot really address A without sorting out B first……We found in many cases that S was*

indirectly related to T but only by thinking about U could we really appreciate it….and at the end of the day, we were still very much constrained by V". So, the Rough Guide is all about context.

(II) A Good Practice Manual – detailing the *process* of preparing and writing management plans, covering such issues as *"what works well and what not so well in devising management plans, what is essential to them, and what should be avoided, how can this be done, how can that be done."*

(III) Informing EU policy - detailing how to link science with policy from the perspective of the national and international policy/decision-makers themselves – from their perspective, *"What do policy-makers want from science? What form do they want it in?"*

Starting with these main WG3 outputs, participants have developed seven research themes (see Section A) that will feed into them. Given that the stated outputs of the WG are necessarily broad, areas of work (the 'themes') were not tightly prescribed when WG3 began work. There are clearly numerous issues that could be incorporated into the delivery of WG3's outputs – thus WG3's strategy has been to let specific themes emerge organically as the group has discussed relevant issues during INTERCAFE meetings. In this way, the seven working themes have both (1) grown out of individuals' personal research interests, and (2) received WG3 support as being important issues for synthesis, exploration, review and analysis.

These seven themes are not the only ones that could have fed into WG3's outputs but group consensus is that they are all important and demonstrate the broad range of issues pertinent to WG3's activities - they are thus all key to WG3's remit to give context to Cormorant-fisheries conflicts and to its exploration of "linking science with policy and best practice." The seven Research Themes described above have evolved to fit into the three overall outputs of WG3 as follows:

Theme (1) A Rough Guide – bibliography – equates to **output I**, but by necessity will cover all the other themes of WG3 – each will inform the content of this output.

Theme (2) Scientific input into management plans - feeds into **output II** (e.g. how is science incorporated during the process of devising a management plan?) and **output III** (e.g. in what form is science most useful to policy-makers?).

Theme (3) African-Eurasian Management Plan - closely associated with theme (2) but more specific, feeds into **output II** (e.g. how is science chosen to be incorporated into a management plan?) and **output III** (e.g. how is a management plan used as a tool by policy-makers?).

Theme (4) Focused review of (effective or successful) conflict case studies - associated with themes (2 and 3), feeds mostly into **output II** (e.g. how best to engender best practices, good relationships and better communication between actors devising action plans) but also to **output III** (e.g. how is a management plan judged to be effective or successful by policy-makers?).

Theme (5) Media Analysis – feeds into **output (II)** (e.g. in terms of articulating - even fuelling - a conflict, or the perceptions that there is one).

Theme (6) Exploring legislation - feeds into **output (III)** (e.g. how is the information available to policy-makers incorporated into policy? Is much of the available information ultimately 'filtered' through 'legal constructs', thus diminishing it?)

(7) Linking science with policy: what EU policy makers need – equates to output (III) but by necessity will cover all the other themes of WG3 – each will inform the content of this output (e.g. how do policy-makers deal practically with the complexity/context explored in WG3's themes?).

(6) 2006/07 Short Term Scientific Missions

(a) First Round STSMs

During the meeting, a mini conference was held so that participants could hear of progress made in the first round of INTERCAFE STSMs. Three presentations were given covering INTERCAFE's first round STSMs:

(1) **Exploring partnership and consensus-building approaches to cormorant-fisheries conflicts.** Freising, Germany, 30 January – 2 February 2007. Scott, Thomas K, Stefano, Pekka, Ian.

(2) **Organisation of data on cormorant roosts and breeding colonies in Europe, including preliminary analysis of data.** NERI, Rønde, Denmark, 19-23 February 2007. Thomas B, Stefano, Jean-Yves, Stef.

(3) **Cormorant-fishery conflict in carp fishpond regions across Europe**. Forez and Dombes, France, 28 February – 4 March 2007. Daniel, Kareen, Petr, Robert, Tamir.

Full reports of these First Round STSMs are available on the Forum pages of the INTERCAFE web site.

(b) Second Round STSMs

The second round of INTERCAFE STSM proposals were discussed by participants during the Hanko Peninsula meeting. Shortly afterwards (01.05.07), a summary of proposals was drawn up and circulated to the MC:

Post-Finland STSM proposal summary (01/05/07)

This is the second round of INTERCAFE STSM/Small Meeting proposals. To date, we have had proposals for 8 STST/Small Meetings. Brief details are given in the table below. All STSMs have to be undertaken by during May-June 2007. Three of these proposals (Nos. 7a-c) can be combined into one meeting to ensure input from all three WGs. Due to time constraints – all STSM money has to be spent within ten weeks of the Hanko Peninsula meeting (i.e. by 30 June 2007) – a further 2 proposals (Nos. 8,9) will be put on hold until next financial year. Thus, four Second Round STSMs will be undertaken within INTERCAFE's 2006/07 Annual Grant spending period (Nos. 4-7 below).

No.	Work Group	Proposer	General Theme	Location	Comments
4	WG1	Mennobart *et al*	Tenchnology transfer: aerial cormorant colony counts, interpretation of data and training in relevant techniques	Danube Delta	With Botond and Szymon
5	WG1	Mennobart *et al*	Technoilogy transfer: Colour ringing, colony counts, diet analysis methods – training in relevant techniques	Estonia/ Russian Gulf of Finland	With Karlis, Vilju and Anna
6	WG3+1	Simon	Technology transfer – Israel/UK/Ukraine	UK/Ukraine	Postponed from 1st round. With Ian/Bruno
7a	WG1+2	Stef	Water Systems Database – data collation, analysis and interpretation	Vienna	With Reinhard etc
7b	WG1+2	Rosemarie/Josef	Cormorant Manual – writing, editing	Vienna	With help of native English speakers
7c	All WGs	Mariella	INTERCAFE Overview – integrating outputs into 'overview' document	Vienna	With input from all three WGs
8	WG3	Ilona	Work with colleagues to write-up legislation activities	?	Hold until next financial year?
9	WG3	Dave	Trip to Netherlands, Denmark (and Brussels) to meet key players in development of African Eurasian management plan	NL, DK, BE	Hold until next financial year?

INTERCAFE@Hanko Peninsula (Finland)
April 13-15th 2007

AGENDA

"What to do when the cormorant comes"

Expected arrival of INTERCAFE participants: Thursday 12/04/07
Landing at Helsinki airport
Transportation (approx. 2 hours) to **Tvärminne Zoological Station**.
Shuttle buses arranged.

Thursday 12th - Dinner from 19.00

DAY ONE (Friday 13th April)

07.30 Breakfast

08.30 Opening session with Dave Carss and Scott Jones. Welcome and Introduction.

Short presentations (15 minutes each)

09.00 **Anna Gaginskaya** (St Petersburg): "The development of the cormorant population in the Russian Gulf of Finland".

09.15 **Henrik Lundberg** (Local land- and water owner): "Why we do not want Cormorants".

09.30 **Mika Asikainen** (Birdlife Finland) "Why we should want Cormorants"

09.45 Discussion

10.00 **Harri Kuosa** (Helsinki University, Tvärminne zoological station): "The hopeless state of the ecosystem".

10.15 **Meri Härmä** (Finnish Game and Fisheries Institute): "Fish community changes in a eutrophicated Baltic"

10.30 **Chris Karppinen** (Uusimaa Regional Fisheries Association) "The future of small-scale fisheries on the Finnish coast".

10.45 Discussion

11.00 Coffee break

11.30 **Kjell Andersson** (Swedish School of Social Science, Helsinki University):"The changed economy and the rural setting in the archipelago".

11.45 **Mikael Kilpi** (Åbo Akademi University & Sydväst Polytechnic)"Insight into the development of the management plan".

12.00 Open discussion

13.00 Lunch

14.00 Integrated working session: INTERCAFE and local experts

15.30 Working groups report back

16.00 Coffee break

16.30 Normal Working Group activities:
(WG1) Biology
(WG2) Mitigation
(WG3) Society & Culture

18.30 Plenary session with Dave Carss and Scott Jones

19.00 Dinner at Station

DAY TWO (Saturday 14th April) FIELD TRIP

08.00 Breakfast

09.00 Field trip to Hanko Bird Station HALIAS (team leader Aleksi Lehikoinen). Boat tour if possible, on the converted trawler "Anna" cruise to cormorant colony and grey seal haul out (another problem species).

Lunch aboard "Anna".

Talks and discussions with local experts to be arranged.

18.00 Arrive back at hotel

18.30 Group A: Management Committee meeting
Group B: Fieldtrip group collates field trip data

19.30 Dinner at the Station and "night school"

DAY THREE (Sunday 15th April)

08.00 Breakfast

09.00 Opening session with Dave Carss and Scott Jones

09.30 Mini conference – STSM presentations (10-15 minutes each)

11.00 Coffee

11.30 Normal Work Group Activities

13.00 Lunch

14.00 Work Group Activities cont.

15.30 Coffee break

16.00 Work Group Activities cont.

17.15 Plenary and Work Group feedback

18.00 Dinner at Station

20.00 Subgroup meetings

Monday 16th October – Participants leave. Shuttle buses arranged.