When conservation steps onboard a fishing vessel – a conflict between grey seal conservation and coastal fishery

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1 Introduction

This paper deals with interactions between grey seals and coastal fisheries. The Kvarken region in the Bothnian Bay is selected as an illustrative example of the interaction. The problem in the region is basically that grey seals cause economic losses to fishing. As a result of growing number of seals in the coastal waters of Northern Baltic Sea, damages caused by seals to fisheries have increased rapidly. However, the number of grey seals in the Baltic Sea area has been very low and it is not certain that the population has recovered. Seal conservation is still justified, which makes the mitigation of damages caused by seals even more complex than it would be in a situation when e.g. hunting of seals did not create any risk for seals on a population level.

The model region is located in the Kvarken area in the Northern Baltic Sea (Figure 1). It is a narrow and shallow sea area between Sweden and Finland with a very large archipelago. The area has a long tradition in small-scale coastal fishing, although fishery has changed and decreased during the last few decades.

The paper describes first a historical development of grey seal conservation and the coastal fishery. These developed separately, but successful conservation policy lead to a collision that now seems to be an inevitable outcome. The main focus in the rest of the paper is on a regional initiative to deal with the conflict. It is presented as a (sort of) co-management of the conflict. The case shows the difficulties in common-pool resources (CPR) management, especially in a case like this that is not about managing a clearly identifiable resource and which have strong multi-level characteristics.

The paper is based on analysis of written material and 27 qualitative interviews conducted between 2002 and 2004. Interviewed persons were representing mainly fishery,

hunting and environmental sectors on different levels, local regional and national. These sectors have the strongest interest in the interaction between seal conservation and fishery. Interviews of ecotourism entrepreneurs showed that they have an import stake in the conflict. Also researchers were interviewed.

The approach in the paper is clearly a descriptive one. It aims at proving its points by describing the case in enough details.

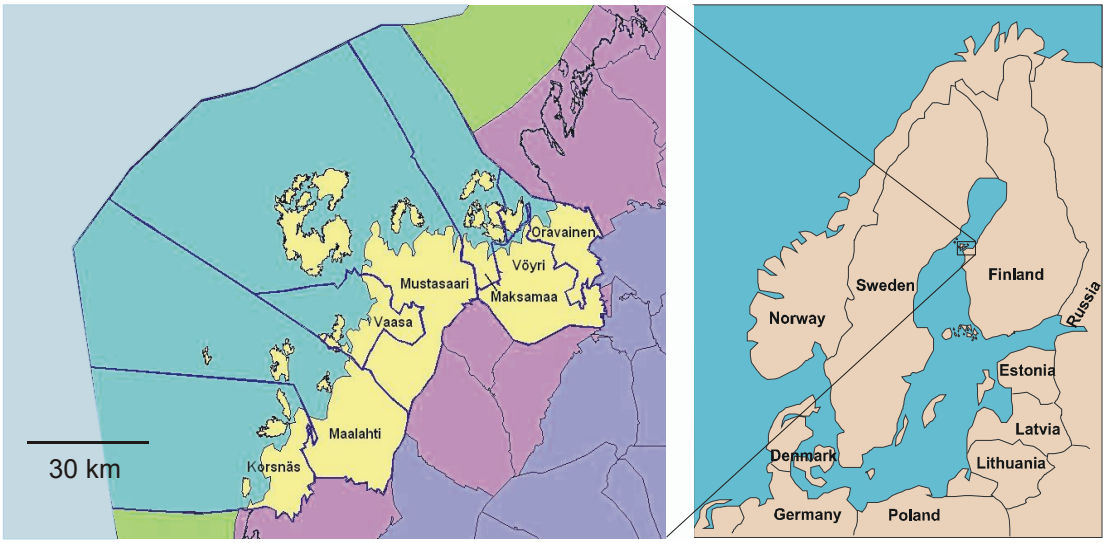

Figure 1. The study area "Kvarken" is located in the Gulf of Bothnia, Northern Baltic Sea. It is administratively the 'Vaasa sub-region', which consists of seven municipalities (Korsnäs, Maalahti, Vaasa, Mustasaari, Maksamaa, Vöyri and Oravainen).

1.1 Grey seal populations

The present situation with interactions between grey seals and coastal fishing heavily driven by the development of seal populations. This is especially because of dramatic changes in the number of grey seals. It has developed from a very high number via near extinction to rapid growth again.

Seal populations were declining the whole 20th century the decline being rather steep from 1940's to 1970's (see Figure 2). In 1906 the number of grey seals in the whole Baltic Sea have been estimated to be 88 000-100 000 individuals. Due to heavy hunting, the number of seals dropped to ca. 20 000 in 1940. After the Second World War hunting together with increased contamination of the Baltic Sea have effected the grey seal populations. The population was at its lowest in late 1970's early 1980's. Depending on sources the lowest number was between 3 600 in 1975 (Harding and Härkönen 1999.) or

below 2 000 in early 1980's (Eero Helle pers. comm. 2004). After that, the grey seal populations have been growing – in 1999 it was estimated that there were ca 7200 individuals (Helander 2000) and the latest count from the year 2003 found 16 000 grey seals. The actual number of seals has been estimated to be 22 000 to 25 000 (MoAF 2002 and Olle Karlsson pers. comm. 2004).

The main explanation for the decline has been a heavy hunting pressure (Harding & Härkönen 1999). Another reason that contributed to the decline especially after WWII is contamination (Bergman & Olsson 1986, Bergman 1999, Nyman et al. 2003).

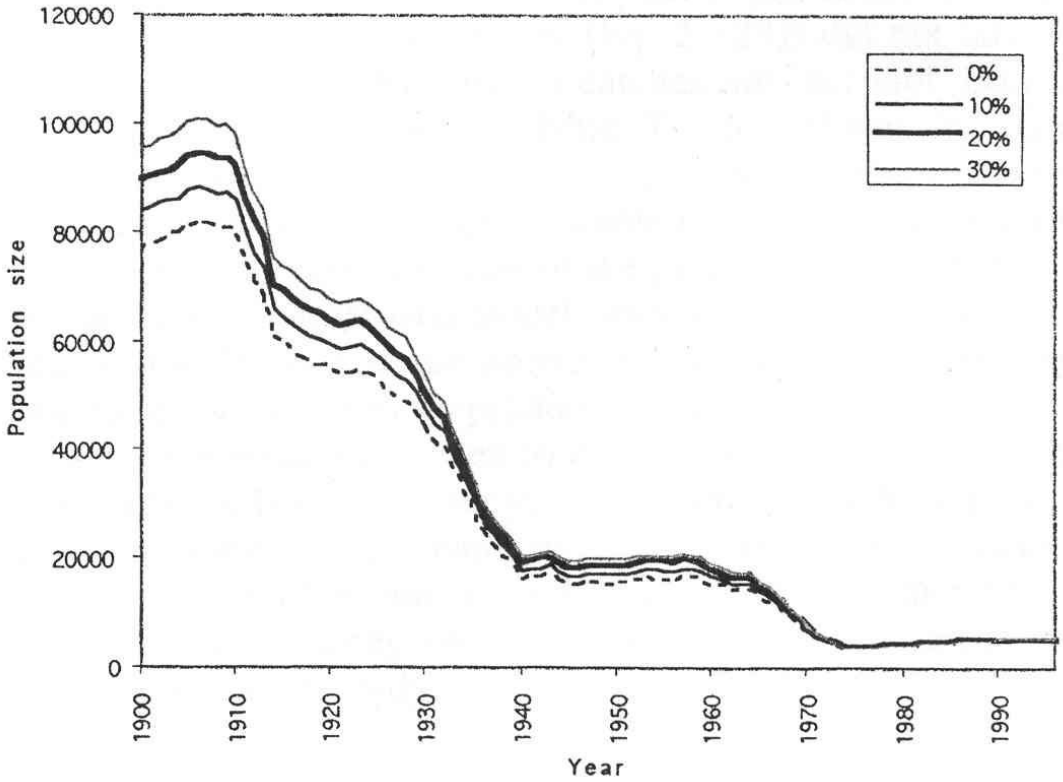

Figure 2. The lowest grey seal population sizes during the 20th century. The estimate prior to mid 1960's is based on number of seals killed and reported by hunters. In the highest curve the assumption is that 30% of killed seals are lost while the lowest curve describes the situation in which none of the killed seals are lost. (Harding & Härkönen 1999 cf. Naturvårdsverket 2001). In late 1990's and early 2000's the growth has been rapid. The estimated population size is 22 000 to 25 000 in 2004.

Decreased hunting and increased protection of seals - and reduction of contamination of the Baltic Sea in general - lead to positive development of the grey seal populations. On

the regional level changes have been even more dramatic. The growth of the seal populations takes place in certain regions, generally in the northern parts of the Baltic Sea. For instance, in the Finnish coastal areas the (counted) number of grey seals increased from 500-600 in late 1980's to 1 900-2 200 in late 1990's (Below & Soikkeli 2000). In addition, there are certain indicators that the behaviour of seals has changed. They forage in the areas closer to human habitation and closer to the coastline than earlier (Ylimaunu 2000, HELCOM 2001).

There have always been interactions between seals and fishery. Seals and fishery are competitors in a sense that they both aim at catching their share of fish resources. Grey seal is a clever and strong animal and they learn easily how to take fish from fishing gear. In many cases they must use force to take fish from nets, which causes damages on fishing gear. The interaction has occurred thus on two levels. On the level of populations seals and fishermen compete over utilization of fish stocks, whereas on individual level the interaction concentrates on the fishing gear, when the important issues determining the intensity of interaction are seals' behaviour near fishing gear and vulnerability of fishing methods that fishermen choose.

The population level interaction fluctuates with a size of seal populations, volume of fishing and state of fish stocks, which all are interconnected, of course. The decline of seal populations (see Figure 2) has dramatically changed the interaction on this level. Similarly the individual level interaction has changed over the years. The decline in number of seals has been one factor, but it is perhaps not as important factor as in changes in population level interactions, since even a low number of seals can in principle cause damages in fishing gear. There are some indications that some of the seals specialise in taking fish from fishing gear instead of foraging on freely swimming fish. Other issues that influence the individual level interaction are changes in fishing areas and methods, but also changes in seals' behaviour. This aspect was emphasised in many interviews. Especially fishermen argued that seals behaviour is not 'natural', because they are not afraid of humans like they were earlier. 'Earlier' referring to the time when seals were still abundant and seal hunting was common. The interviewed persons have experienced this as a child or heard it from older people. The view that seal's behaviour has changed is shared by many other interviewed persons as well, even a seal biologist.

The interaction between seals and coastal fishery occurs in different ways in different times. To understand the present situation and how it became, perhaps a good point to start to describe the development is to start from 1970's when number of seals was very low. 'Absence of seals' has been an import factor making it possible for coastal fishing to develop – under influence of other factors – in a way that made it vulnerable to seal damages in 1990's and 2000's.

Below the development from 1970's till the early 2000's is described. At first there are two almost separate stories: a story of seal conservation and a story of coastal fishery. The two did not have many links from 1970's to beginning of 1990's, but in the latter part of 1990's the two stories started to merge more and more. The story of coastal fishing has become a story of interactions with seals, in fact, a story about a conflict between nature conservation and coastal fishing. The interaction touches also seal conservation, but it has developed more independently of the interaction. The story ends with a regional stakeholders' attempt to find common understanding.

2 Development of grey seal conservation

This chapter describes how grey seal conservation has developed in Finland. The grey seal's status has changed during the 20th century from being a resource and a pest via strictly protected species to a pest and finally it has become a resource once again.

Conservation of the grey seal is also an international issue. It is a subject of international conventions, of which the most relevant for the case discussed in this paper are the Bern Convention and the Convention on the Protection of the Marine Environment of the Baltic Sea Area (HELCOM). The European Union also protects grey seals in its Habitats Directive. Finland joined EU in 1995 after which the nature conservation policy is to a large extent directed by the EU legislation.

Since the grey seal has a legal status of a game animal its conservation is to a large extent been implemented as hunting regulations. The grey seal 'conservation' literally started in 1970's when a need for its protection was clearly articulated in nature conservationist terms. Before that the measures that have protected seals in practice were a measures aiming at proper management of grey seal populations, i.e. it was hunting management. Below also the period of hunting management is handled as part of the grey seal conser-

vation's development. In fact, it is impossible to really find the point when 'hunting management' turned to 'species conservation'.

2.1 Driving down the hunting – 1900 to 1980's

The grey seal has always been a game animal in legal terms in Finland. The grey seal management and conservation has been stipulated under hunting legislation and regulation. The grey seal was an economically important animal till the WWII although its importance had been declining already since mid 19th century. After the WWII seal hunting has had very small economic importance. For instance, in 1950 there were only ten hunting teams that made hunting trips on ice in the west coast of Finland. This shows a clear difference to 1920's and 30's when there were about 50 such teams. In fifties the productivity of hunting was low due to low number of seals, low prices of fat and low bounties. In 1920's and 1930's teams were competing over hunting areas, but in 1950's the teams could quite easily choose where they hunt. Still, productivity of hunting in 1950's was not good. (Bergman 1957: 81-82.)

The grey seal has been seen as a resource, but since late 19th century it has also had a status of a pest. There has been a clearly stated policy to decrease the number of animals perceived detrimental to human economic interests (Kalliomäki 1998). The same policy was applied to grey seals. From 1909 a bounty has been paid for killing the grey seal. The last time when the bounty was raised was in 1964. Since seals had lost their economic importance as a resource, the state encouraged hunting by the bounty system. The bounty was decreased in early 1970's and totally removed in 1976. (Ylimaunu 2000.)

The reason for rapid policy change was a concern that scientists brought up in Finland when the decline in number of grey seals was recognised. The decline was noticed already in 1960's, but during the next decade the need for conservation measures was clearly brought up in public (e.g. Niemelä 1973). In addition, an international interest in grey seal conservation was rising. First restriction on grey seal hunting became in 1975, when a closed season during the breeding season in spring came into force. A year later the bounty system ended and in 1978 the closed season in grey seal hunting was expanded. A total ban on seal hunting took effect in 1982. Grey seal had still a status of a game animal and its management was kept under the Hunting Act and as a duty of hunting authorities. The strict conservation of grey seal was implemented under the Hunting Act.

2.2 Recovering populations – hunting is reintroduced

The development of grey seal populations during the 1990's was positive and the number of seals was growing fast. The consequence for the fishermen was that seals were causing losses to fishery in form of broken fishing gear and fish taken from fishing gear. In mid-1990's the fishermen started public advocacy in fishermen's journals and newspaper and by contacting authorities in order to raise the awareness about the problem and to reintroduce seal hunting. Seal hunting was started again in 1997. First it was only meant for scientific purposes and to target individual seals that are known to take fish from fishing gear. During the first year the hunting quota was 30 grey seals. Gradually the quota has been increased, so that during the hunting season 2003/2004 it is 395 individuals. The study region is a part of the Swedish-speaking Ostrobothia Game Management District where the regional quota in the season was 110 individuals. (Hunters' Central Organisation 2004.) There has been a change in seal hunting policy in a sense that after the first years the hunting is not anymore only for prevention of damages to coastal fishery. The hunting has got new interpretation: it is normal hunting of a viable population of a game species. After all, the grey seal has all the time been legally a game animal.

The hunting season has also been made longer. The breeding season and the period when pups are lactating have been kept as a closed season. The grey seal hunting season was at first only during open water season. Seal hunters have strongly emphasised the importance of ice-season hunting in early spring, since at that time the hunting can be done efficiently without the fear that seals will drown after they have been shot. In those springs when ice-period is long, hunting on ice is possible. In those years almost the whole quota has been hunted in the study region.

2.3 Designation of grey seal reserves

Parallel to the reintroduction of grey seal hunting, which made seal conservation less strict, there has been a process that has made grey seal conservation stronger. In 2001 Finland designated seven grey seal reserves. In 1986 the WWF Finland designated its grey seal working group, which further raised the status of grey seal conservation. The working group consists e.g. of leading seal scientists and has had rather high status in the development of grey seal conservation policy in Finland. In 1995 the working group proposes to the Ministry of the Environment that Finland should designate grey seal reserves. The background of the designation was the HELCOM recommendation 9/1 on

the protection of seals in the Baltic Sea and the EU Habitats directive. Both of the international commitments require protection of grey seal resting and breeding places. The Ministry of the Environment started the preparation that was finalised in 2000. Seven grey seal reserves along the Finnish coasts were designated in 2001. The reserves are divided into two spheres. Traffic in the core area of the reserve is forbidden. Hunting as well as fishing with fishing gears that may cause harms to seals is forbidden in the whole area. (Bäck *et al.* 2004, Metsähallitus 2004.)

Interesting part of the designation process was in 1989, the Finnish Game and Fisheries Research Institute (FGFRI) proposed designation of six grey seal reserves in Finland. The proposal was made to the Ministry of Agriculture and Forestry (MoAF) – the highest authority responsible of game species management. The FGFRI proposed that rather small areas around central islets of seals' haul-out sites would be protected from disturbance. Each of six reserves would cover approx. 67 ha (Stenman 2000?). The MoAF's respond was negative. The seven seal reserves designated in 2001 cover much larger areas, the seven reserves cover 19 150 ha. (Bäck *et al.* 2004.)

One of the grey seal reserves (called Snipansgrund-Medelkalla) is located in the study area. The designation was a very controversial issue. All regional actors – including regional nature conservation authorities – resisted the designation, because of the damages that seals cause to fishery. Only in very recent years the environmental authorities in the study region have changed their view about the reserve. Volume of seal hunting has increased gradually and now the environmental authorities have seen the value of the reserve as 'one safe spot for seals'.

The designation of grey seal reserves was a process in which fishermen's interests did not have high importance. The interviews in the study region reveal the frustration in the fisheries sector. Their view is that their interests were totally neglected. The environmental administration did arrange public hearings and allowed stakeholders to comment the plans and, in fact, the plans were changed. It is true though that from the regional perspective the changes were meaningless. The majority of stakeholders opposed the designation completely.

The reserves did have impacts in the area. The area where the reserves is used to be an important white-fish fishing area. Thus some of the fishermen lost a profitable fishing ground. Hunters lost the most important seal hunting area. It is a shallow area where seals that where resting on islets could be shot from other nearby islets. If seals were shot in the water they were not lost. Shot seals drown, but in shallow water they can be collected. Also seal tourism felt negative impacts: the only place where seal can be surely seen during the summertime was lost, because boats are not allowed closer than half an nautical mile. It is too long distance for a seal-safari.

2.4 Grey seal's status as a subject of policies and development as a resource

As it is shown above, the grey seal has had different statuses as a subject of management and conservation activities over the decades. During the first half on 20th century it was a resource for utilisation and a pest at the same time. While its markets decreased – or rather vanished – during that time its status as a pest became dominant. The authorities kept up economic incentives to hunt seals by paying bounty, which only underlined the grey seal's status as a pest.

Then 1970's brought a clear change. The growing national and international interest to nature conservation together with clear indications of the poor state of grey seal populations rapidly increased the need of grey seal conservation. During that decade the grey seal became more and more strongly a subject of conservation policy. In 1982 grey seal hunting was totally banned. After that decision the grey seal had only a status of a protected species. Of course, legally it remained as game animal.

The story of grey seal conservation is the same as the story of many other top predators. For instance, another seal species in Finland – the Saimaa ringed-seal – a land-locked seal that lives in big lakes in Eastern Finland, was also seen as a pest and a resource until it also became a protected species. However, the story of grey seal conservation got a new turn when grey seal hunting was started again. A strong, and at first the only, motivation to this change was that seals a detrimental to human economic interests. In other words, the grey seal's role as a pest was highlighted. When seal populations have continued to grow the seal hunting quotas have been increased. Seal hunting has become closer and closer to a 'normal' hunting. It is not only seen as a measure to mitigate damages that

seals cause. After these changes the grey seal has got again a status of being a resource and a pest at the same time.

The designation of grey seal reserves made the status of the grey seal as a protected species very visible. After Finland has ratified international conventions that protect the grey seal and joined EU, which also protects the grey seal, the grey seal conservation has been strongly institutionalised. The conservation has been concretely institutionalised in amendments in legislation and creation of administrative responsibilities to ensure implementation, but designation of reserves makes it even more concrete.

Seeing the grey seal again as a resource and a pest again is not a step back to a previous situation that prevailed in the period before the WWII after the conservation goals have been included in the grey seal policies in Finland since 1970's. Today the grey seal is at the same time a renewable resource that is hunted, a pest that causes damages in coastal fishery and a protected species that has protected areas.

The changes in the grey seals status over the years are the changes in the utilisation of the grey seals in Finland. At first its use was extractive when seals were hunted. When the grey seal was totally protected the utilisation was non-extractive, of course. In fact, in 1970's and early 1980's when the number of seals was very low, they were very seldom seen. At that time seals had only an existence value, the value of knowing that seals exist. These two ways of utilisation existed together in the period when conservation interests were growing in 1960's and 1970's. Today seals are utilised in many different ways. Hunting that was started again is extractive use of seals. Seals are used as meat and as source of raw material (fat and skin). There exist also a small market for seals, which gives seals a value as a source of income. Seals are used also in a non-extractive way. For many conservationists and to large proportion of the public seals have an existence value, but ecotourism by organising 'seal-safaris' has also started to use seals in a non-extractive way.

The grey seal is a typical common-pool resource: exclusion of beneficiaries through physical and institutional means is especially costly and exploitation by one user reduces resource availability for others (see Ostrom et al. 1999). Grey seal populations are a government property and in Finland the state has successfully been able to regulate the utilisation. It requires management activities and monitoring, which is costly, but hunting is

today quite well controlled. In the interviews it was said that before grey seal hunting was legalised again there were rumours about illegal hunting. Management of hunting is regionalised. On the regional level hunting managers can guide hunting for instance to target those seals that are known to regularly visit fishing gear, but after a licence has been granted to a hunter it is up his/her decision where in the limits of a game management district (approximately the 'Vaasa sub-region' in figure 1.) and when during the hunting season the licence is used. In that sense the system has characteristics of private property as well. Individual seals become a truly private property when they are killed. However, a hunting licence gives an obligation for a hunter to send entrails to the Finnish Game and Fisheries Research Institute. The hunter does not have a total ownership of the dead seal. The grey seal can be seen again as a property.

3 Changes in fisheries in the region

This chapter describes the other 'story' – the development of coastal fishery in the study area. The fishery developed during the 1970's and 1980's when seals were practically absent in the coastal area. The absence of seals is one of the reasons why the fishery today is so vulnerable to seals.

The fishery that this paper deals with is a small-scale coastal fishing. It has always been a multi-species fishery, which has used trap-nets and gill-nets. The main trends in the fishery have been a specialisation on fewer species, gill-nets' increased importance and the fishery's move from inner archipelago to outer archipelago.

3.1 1970's – coastal fishery moves to outer archipelago

Still in 1960's coastal fishing was concentrated in the inner archipelago areas in the study area. The fishery was a multi-species fishery. In 1970's fishing moved to outer archipelago. Especially environmental changes lead to decline in inner archipelago fishing when stocks of river-spawning species collapsed. Fishermen had to seek for other fishing strategies. Moving to outer archipelago and specialising on few species, herring or white-fish and salmon, became the dominant strategies. Technological development that started a decade earlier made this strategy possible together with changes in fish markets. For instance, white-fish has always had relatively high price. (Tuomi-Nikula 1981, Österbottens fiskarförbund 1990.)

Especially the introduction of nylon as a material for fishing gear in 1950's was an important innovation. Nylon is cheap, light and durable material. It made gill-net fishing more important than before. Fishermen could carry in their boats a large number of nets, which enlarged the fishing area. Gill-net fishing targeted especially white-fish, but also salmon. Another important fishing gear innovation took place in early 1960's, when a trap-net for salmon fishing was developed. Trap-net (pound-net) is suitable for fishing in outer archipelago. It used increased rapidly in 1970's. Long-line for salmon fishing was also introdused in the area during the 1970's. (Tuomi-Nikula 1981, Österbottens fiskarförbund 1990.)

There have been some changes since 1970's in the fisheries policies that can be argued to have relevance for the interactions between seals and fishing. Regarding salmon fishery, which was and still is an important fishery, the 1970's was the decade when restocking programmes became intense. During that decade the amount of reared salmon exceeded that of the wild salmon in the Baltic Sea (Christensen *et al.* 1994). Spawning areas of salmon in most of the 'salmon rivers' were destroyed during the three decades after the WWII as a consequence of building dams for hydropower production or as a result of siltation in the spawning areas. Restocking of salmon was chosen as a measure to compensate the losses to fishermen. In the 1970's restocking programmes increased rapidly and during the next decade the restocking increased even further. As a consequence, the number of salmons in the Baltic Sea increased (Christensen *et al.* 1994). Together with changes in fishing technology this lead to an increased fishing and increased catches during 1970's (Vasa vattendistrikts vattenbyrå 1976, Hudd & Svanbäck 1987). Salmons pass Kvarken in their spawning migration up North to their spawning rivers. Salmons do not come into inner archipelago and, therefore, increased restocking was a further intensive for fishermen to move to fish in the outer archipelago.

3.2 1980's – white-fish and salmon fisheries grow

In addition to compensatory restocking that hydropower companies did, fisheries associations have their own fish stock enhancement activities. In Kvarken especially white-fish and sea trout restocking has been important. Also the salmon restocking programmes were continued in the 1980's. The volume of restocking increased the whole decade. In 1980's white-fish fishing increased rapidly. Prices fro white-fish were increasing (SVT 2001). Restocking made the fish more abundant and yet another technological

innovation, floating gill-nets, made fishing more efficient. Trap-nets were modified to catch white-fish and at the same time salmon trap-nets became more effective than earlier. Technological development of fishing gear and boats made larger areas available for fishermen and also allowed fishing closer to the open sea than before. During the 1980's the number of fishermen increased a little. The increase was in the number of part-time fishermen. (Österbottens fiskarförbund 1990.)

One of the main themes in the salmon fishery policy has been the protection of wild salmons. Since salmon fishing in the sea area, the river mouths excluded, cannot efficiently specialise to catching only reared salmon, regulation of the overall salmon catches has been the way to ensure that enough wild salmons will return to spawn in rivers. Already in early 1980's fisheries scientists were concerned about the impacts of increasing catches on the wild salmon populations. Restriction on salmon fishing started in early 1980's. First the number of trap-nets was reduced and since 1986 there has been closed seasons for salmon fishing in the Northern Baltic Proper and the Gulf of Bothnia. The salmons migrate from the Southern Baltic Sea to spawn in rivers in the Northern end of the Gulf of Bothnia. The wild populations migrate a bit earlier than reared ones, therefore the closed seasons in the late spring and early summer are set so that the wild salmons, or at least a fair proportion of them, have passed the zone, before fishing is allowed in that zone.

The restrictions on salmon fishing, together with sinking prices (SVT 2001), counteracted the incentives that restocking programmes created to invest in salmon fishing. However, salmon fishing became one of the cornerstones of coastal fishing in Kvarken during the 1980's. The other important species were white-fish and herring. The present characteristics of the coastal fishery are a result of the development during the 1970's and 1980's. The ecological and technological changes have been important drivers in the fishery.

3.3 The coastal fishery in Kvarken today

In 1990's the coastal fishery did not face substantial changes. The trend that has lead to white-fish's economic importance strengthened. The 1990's was a decade when salmon fishery became more and more regulated, which has lead to gradual decline of catches (SVT 2001). International Baltic Sea Fisheries Commission started to set annual quotas

for salmon fishing each Baltic Sea state. The quota system has been used to regulate salmon fishing since 1991. The quota has decreased gradually. Salmon fishery regulations have lead to some positive results in conservation of wild salmons. In late 1990's and early 2000's there has been some rather good spawning years, which has resulted increased amount of wild salmon. During the 1990's price of salmon was very low and kept decreasing. In fact, the price has decreased gradually since 1970's when the real price was 75% higher than in mid 1990's (SVT 2001, MMM 1993).

During the whole 1990's a number of fishermen gradually decreased in the study area, but the decline has not been very deep. The main trend in the profession is that young people do not invest in fishing. Ageing of the fishermen is a clear trend in the whole Finland.

Today the fishery is a small-scale coastal fishing. The fishermen are mostly part-time fishermen. Approximately two thirds of the fishermen get less than 30% of their income from fishing. The number of coastal fishermen registered in the registry of commercial fishermen in the study area (see Figure 1) has decreased by 13% (from 323 to 280) between 1996 and 2002. On the municipality level, the biggest proportional loss of fishermen, 21%, has occurred in Korsnäs, followed by Maksamaa (19%) and Mustasaari (15%). The number of fishermen has increased slightly in Vaasa and Vöyri. In the Vaasa subregion the number of coastal fishermen is highest in the municipality of Mustasaari, where there were 82 costal fishermen in 2002.

The most important fish species in weight is herring, followed by whitefish and smelt. Economically the most important species is whitefish. The economical importance of salmon catch is very small, but salmon has had quite high price and the fishery has a great symbolic value. The catches have decreased on the study area since 1995, although there is much year-to-year variation.

Gill-nets, salmon and white-fish trap-nets (a pound-net type floating trap-net) are important especially when fishing economically valuable species. The use of different gear varies both temporally and locally. Trap-net fishing takes place mainly in the outer archipelago, whereas gill-nets are used closer to the mainland. The inner archipelago area is very

shallow, and this restricts the number of possible gill-net sites. Nets are usually placed closer to mainland in autumn than in spring and summer.

4 Development of the conflict between seal conservation and fishery

Above development of the grey seal conservation and the region's fishery were described (the Table 1 summarises the development). The conflict that there is between the conservation and fishery is a consequence of economic losses to the fishery. The present situation is an outcome of a long development or rather an outcome of several parallel developments. Fishery adopted fishing gear that is vulnerable to seals and moved to outer archipelago at the same time when seals were practically absent. As a result of a successful[1] conservation policy the number of grey seals has grown rapidly during the 1990's and 2000's. This created a whole new environment for the fishery. In comparison to situation in 1950's and 1960's fishing has moved from inshore areas to outer archipelago, especially in salmon fishing, but also the main white-fish fishing areas are located close to open-sea area. The problem for coastal fishing in the interaction with seals is that grey seal is a species that prefers areas close to open sea.

[1] The conservation policy has been, in fact, surprisingly successful. According to a biologist who took part in preparation of HELCOM's recommendation on the protection of seals in Baltic Sea in mid-1980's, the biologist at time thought that with high probability grey seals will be extinct by the year 2000. Therefore, anything that can be done to save seals should be done.

Table 1. The events in the seal conservation and in the study region from 1970's till today.

	Events in Seal Conservation and Management	Events in the Region
1970's	early 1970's: decline of grey seals was recognised 1975: Springtime (10.3.-31.5.) closed season in seal hunting 1976: The end of bounty hunting 1978: Longer closed season for grey seal hunting	early 1970's: seal hunting did not have an economic importance anymore during 1970's: fishing moved from inshore to outer archipelago and number of fishermen decreased during 1970's: white-fish and salmon catches are increasing
1980's	1982: Total ban on grey seal hunting 1986: a grey seal working group was started in the WWF Finland 1988: HELCOM recommendation on seal conservation (ban on hunting and designation of reserves) 1989: FGFRI proposes designation of grey seal reserves to the Ministry of Agriculture and Forestry	whole 1980's: white-fish restocking became intense in the area and catches increased early 1980's: salmon catches increasing whole 1980's: number of fishermen increased late 1980's: salmon restrictions stated whole 1980's: salmon prices are sinking, white-fish prices increasing
1990's	1995: WWF Finland (grey seal working group) proposes designation of grey seal reserves to the Ministry of the Environment 1995: Finland joins EU (Habitats directive) 1997: experimental hunting for research purposes (in Finland and in Sweden) 1998: Hunting allowed with small quota	whole 1990's: number of fishermen declining whole 1990's: more stringent salmon fishery regulations, decreasing salmon catches and the price on salmon whole 1990's: white-fish prices are slowly increasing whole 1990's: seal damages are growing
2000's	2001: designation of 7 grey seal reserves in Finland (by the Ministry of the Environment as response to Habitats directive and HELCOM recommendation and to the proposal from WWF Finland) early 2000's: gradually increasing hunting quota on grey seal and expanding hunting season	early 2000's: white-fish has become commercially the most important species early 2000's: seal damages growing

The growing seal populations lead to growing damages on fishery. During the 1990's the situation developed to a real problem. The year 1995 was mentioned in the interviews as the year when the seriousness of the problem was really recognised. One indicator of the problem was that in that year the amount the regional fishing gear insurance association paid to fishermen for the damages the seals cause exceeded first time 100 000 FIM (17 000 EUR) in the study area.

The problem has become worse all the time, as the seal populations have grown rapidly. The number of seals is not the only aspect that is changing. Seal behaviour has changed in a way that changes the interaction between seals and the coastal fishery. According to the fishermen interviewed in the region, seals come closer the shoreline than they used to come - some have been seen even well up to river mouths. The area where fishermen can

fish without the risk of seal damages is decreasing year by year. Similar trend can be seen the species the grey seal take from fishing gear. While seals earlier took only salmon and white-fish, today they take also other species, like pike-perch and pike.

There are two compensation mechanism that can be used as an indicator of the seal damages' severity. In 2003 the state paid compensations to fishermen on the basis of the damages that seals caused to fishery in 2000 and 2001. The regional fisheries authority estimated the damages in different fishing gear and fishing areas in the region in collaboration with fishermen's organisation. It was estimated that in the study area the seal damages to the catch of professional fishermen was 415 000 EUR per year. Estimated damages to catch in salmon and white-fish fishing in the area varied from 20 to 80 per cent depending on fishing gear and fishing place (TE -keskus 2002). The ministry of the Agriculture and Forestry paid the compensations to professional fishermen, of whose catch seals have taken or damaged more than 20%. Only professional fishermen (more than 30% of income comes from fishing) were eligible for applying compensations. The system took account only the damages to catch in the fishing gear. An insurance system covers damages to fishing gear. In 2001 the value of damages in the study area was 118 000 EUR - seven times higher than the value in 1995[2]. A proportion of seal damages from the value of fishing gear varies according to fishing areas. The damages in comparison to a value of the fishing gears that are the most common coastal fishing gears (trap-nets and gill-nets) varies between 3,5 to 11%. (Österbottens fiskeriförsäkringsförening 2002.)

The damages that seals cause are severe. But where is the conflict actually in this case? Incompatible interests in environmental resources – seals as objects of conservation and as detrimental pests - result in conflict, but the interviews conducted reveals that the conflict is not actually between stakeholder groups. There are some differences in views about the conflict among different stakeholders, especially between the environmental and fisheries sector actors in the Kvarken region, but they are not really contradictory. Differences, that there are, are mainly different views in quantitative terms, e.g. how many seals can be hunted and what is the right length of closed season? None of the

[2] One must notice though that the insurance system is a voluntary system in which only professional fishermen are eligible. On one hand it does not tell about the damages to all fishermen and, on the other hand, changes between year reflect changes in the damages as well as changes in the amount of gear that are insured.

stakeholders oppose hunting as such, not even the environmentalists. Similarly national level actors are aware of the problems that grey seals cause to fishermen and environmental NGOs are sympathetic to fishermen and approve seal hunting as long as it is well controlled and at reasonable level.

The conflict must be seen as a controversy that was created when a successful grey seal conservation policy, based on national and international level priorities, meets local level livelihood and activities. It is more of a coordination problem than a sharply divided controversy of interests.

4.1 Mitigating the conflict

The fishermen and their organisations started actively to contact authorities and to make their problem know already in mid-1990's. Their advocacy has been successful in the sense that there are quite many mitigation measures available (see Table 2). The conflict started to escalate in mid-1990's and most of the instruments are developed and introduced after that. The situation is dynamic and still developing, but many of the instruments have been practiced already for several years and some of the instruments are well established and stabilised. Mostly the instruments have also a solid legal and institutional background. Even though authorities on the national level have introduced different mitigation measures the only coordinated activity to deal with the problem has been initiated on a regional level in Kvarken.

Table 2. Table of the mitigation measures in the Finnish case.

Mitigation measures	Mitigating effect in relation to the conflict	Future of measures
Seal hunting	Change seals behaviour (and control seal populations)	Increase Hunting quotas will probably grow. A possibility of protests if too high.
Compensations of catch damages 2000-2001	Eases economic losses	Not practiced Unlikely, but not impossible, that will be paid in the future
Fishery insurance	Eases economic losses	Stable The system is permanent
Testing 'seal-proof' fishing gear	Raising awareness about technical measures	Changes Is being redirected and becomes even more relevant than today
Stakeholder forum	Better relationship between stakeholders	Continues New project between stakeholders has started

Training of seal hunters	Hunting becomes more effective and ethical	Continues Training continues, but on the local level
Change of fishing method	Helps to avoid seal damages	Increases? Development of theses methods will be coordinated

When seen as a mitigation measure in the hunting aims directly at mitigating the damages that seal cause to fishing. The purpose of hunting in this respect is to change seals behaviour. It is believed that hunting would make seals afraid of humans again, which would keep seals away from fishing gear. Another, less common, perspective is that hunting would regulate the population size and thus keep the damages on certain level.

Damages that seals caused to catch in years 2000 and 2001 were compensated. The system was planned to be a permanent one, but such system was found to be against EU state aid regulations and accepted only as a temporary compensation. Another compensation system is the fishery insurance. It is partly financed by the state and can be seen as a policy instrument. This system compensates only damages to fishing gear.

Testing of 'seal proof' fishing gear aims at minimising damages that seals cause to fishery by developing and promoting new types of trap-nets that are less vulnerable to seals.

A stakeholder forum created in a Kvarken Council's project "Grey Seal in Kvarken" is the most relevant policy instrument that is directed at civil society. Another policy instrument of this type is training of seal hunters, which was in fact done under the Kvarken Council's project. The stakeholder forum is a policy instrument that aimed at mitigating the conflict between stakeholders, whereas the training had a clear practical goal of improving the skills of hunters.

The last mitigation measure is a change of fishing practices. It is not supported by any public policy instruments – it is fishermen's voluntary activity when they try to adapt to the damages that seal cause to coastal fishery. Some of the fishermen have given up fishing with stationary gear. Today they concentrate on gill-net fishing in a new way. They keep nets in the water only for a short period and change locations where they fish. For some fishermen this has been a quite successful strategy.

High number of available mitigation measures is a strength. Most of them are specially planned to mitigate this conflict and have also quite solid legal and institutional background. The following table summarises the mitigation measures. Even though there are many relevant instruments available, the problem is getting worse. It is evident that none of the practiced policy instruments is very effective in reducing the damages that seals cause and also that together they do not form an effective combination of policy instruments. Only four of the measures are directly mitigating the damages, namely, compensations, fishery insurance, hunting and a change of fishing methods. However, when we talk about conflict mitigation we should also pay attention to relationships between stakeholders. One of the mitigation measures is deliberately addressing this issue. The Kvarken Council's grey seal project has done valuable work in this respect and succeeded to bring the views of stakeholders closer to each other. The project is continuing, which should help to find common ways of working together also in the future.

Below the paper concentrate on the Kvarken Council's grey seal project, because it provides an interesting case of a regional initiative to try to manage a complex CPR problem. It also allows to discuss about multi-level nature of the problem and a (potential) co-management arrangement's location in continuum from local to international level. The Kvarken Council's project is the only attempt that there is in Finland to manage the conflict in a coordinated way. On the national level the authorities have introduced mitigation measures, but coordination between different sectors is not effective. In this respect the project in the study area is the only attempt to really manage the conflict. They took a collaborative approach in their project in order to bring different stakeholders together to discuss about the issue and to develop solutions. It can be seen as an attempt to create co-management of the problem, although it is far from a fully developed co-management arrangement (Pinkerton 2003).

5 The Kvarken Council Grey Seal Project

The regional actors that were already involved in different projects under the Kvarken Council started to discuss about the problem in late 1990's. They started to prepare a project to deal with it. The Kvarken Council was an appropriate forum for co-operation, since there already was a lot of co-operation between the actors either related to fisheries or to environmental issues. Also the problem itself was the same on both sides of the Gulf of Bothnia. In addition, the seal population is the same. The main actors in the dis-

cussions were regional fisheries organisations (Österbottens fiskarförbund in Finland and Fiskareförbundet Västerbotten in Sweden), hunters organisations (Svenska Österbottens jaktvårdsdistrikt in Finland and Jägareförbundet in Sweden), regional environmental authorities (Regional nature protection unit of Parks and Forest Service and the West Finland Regional Environmental Centre from Finland and Västerbottens Länstyrelsen from Sweden), regional fisheries authorities (fisheries unit in the Ostrobothia Employment and Economic Development Centre in Finland and Västerbottens Länstyrelsen from Sweden).

When the content of the project was discussed, environmental authorities in both countries wanted the project to have a rather strong emphasis on biological research on seals (population trends and seal's behaviour). At that time the project was thought to be included into a larger frame of environmental co-operation in the Kvarken region that is one of the main forms of co-operation in the Kvarken Council. However, the fisheries and hunting sector representatives wanted the project to concentrate on promoting hunting and developing practical solution in fishery to minimise the seal damages. In the end, the environmental sector's perspectives were not given as high importance as they would have wished. When the proposal was formulated the project mostly concentrated on the issues that fisheries and hunting sectors had preferred. It was then decided also that the project will not be a part of the environmental co-operation under the Kvarken Council, in stead it will be an independent project in the Kvarken Council's project portfolio. The project was funded from the EU's Interreg IIIC programme. The main objectives for the project were to

- find a common understanding about the seals role in the Kvarken regions ecology and about the problem
- reduce the seal damages by developing fishing gears
- perceive grey seal as a renewable and utilisable resource, use of which can become an income generating activity

Project activities concentrated on informing the public and the national and even international level actors about the problem, fishing gear development, training of hunting and development of seal product. However, the project started with the first objective and according to participant in the fisheries, hunting and environmental sectors it was an important phase. Finding a common understanding of the situation helped the discussion

between the stakeholders in later stages of the project. In some interviews it was mentioned as an exercise that pulled different and earlier even antagonistic groups closer to each other.

The project did not emphasise the issues to the extent the environmental sector actor's wanted to. This influenced these actors' contribution to the project. They did not withdraw completely from it, they had representatives in the project's steering group, but they did not invest a lot of resources in form of work input to it, either. Another aspect is that, had the project be included in the framework of Kvarken region's environmental co-operation, it would have got a stronger, or at least different, institutional setting. Since the project implementation progressed well, it cannot be argued, though, that it lacked something that a stronger institutional backup would have contributed.

The project published a regional plan of action to deal with the seal question (Kvarken Council 2003). The plan suggested actions to be taken both in the region, but also on national and international level.

5.1 Kvarken Council's project and other levels

The Kvarken Council's grey seal project is located between local and national level actors. The main actors were regional level authorities and organisations. Of course the boundaries between these levels are not sharp. Local level actors, e.g. fishermen and hunters, even though they were not present in the project meetings, had frequently contacts with different project partners and they were represented in the project by their organisations. On the other hand, the regional level authorities are part of the state administration and is receiving guidelines and instructions from above, but often also informing the ministry level decision-makers about development in the regions.

The interviews of fishermen and hunters showed that seen from the local level the project was perceived very differently from the perception that project partners had. People on the local level were aware of the Kvarken Council's project, but often only about some aspects of it. They had recognised the project's activities in fishing gear development and especially in hunting training. Some 50 persons from the region took part in hunting training courses and the project spread information about the courses very actively in the regional media. In the interviews hunting training was seen important and

useful. Hunting training and activities of developing the use of the grey seal as a resource was perceived as an important effort for revitalising a long seal hunting tradition of the area. It was valued also because there is a strong belief among the fishermen and hunters that seal hunting will reduce the seal damages.

However, fishermen mostly argued that fishing gear development is useless, since they do not believe that seal proof fishing gear – that would still catch fish – could be constructed. In this respect, it can be argued, that had the project planning been in the hands of fishermen, this aspect of the project would have been refused. One must notice that the fishermen's organisation was very active in the fishing gear development. The project had a strong emphasis on fishing gear development in spite of the fishermen's scepticism about these fishing gear. And the project partners were well aware about the scepticism. This kind of activity is a typical information based policy instrument. The project aimed at testing a feasibility of the instrument and spreading information about the gear among the fishermen. The tests proved that the new trap-net gives better catches than traditional trap-nets in areas where seals are abundant[3] (Österbottens fiskarförbund 2003). Testing of the gear was done in co-operation with fishermen with the result that those fishermen who took part in testing had a very positive perception of the gear. In the hunting training and fishing gear development the project built links to the local level.

The regional actors had also activities directed at the national ands even international levels. They informed the actors on higher levels by spreading leaflets. The plan of action that the project published in 2003 (Kvarken Council 2003) includes several proposed actions that are related to national and international level laws and policies. They suggest for instance, that the validity of HELCOM's recommendation should be evaluated, since seal populations are growing fast and that management of the grey seal population in the Baltic Sea should be regionalised.

A very important way of building the connections to higher level and lower level was a seminar that the project organised in the end of the project period. They had invited representatives from the EU administration, ministries responsible for nature conservation, hunting and fishing in Finland and Sweden, and environmental and fisheries organisations.

[3] Similar tests in Sweden has given the same results (Lunneryd pers comm.. 2004).

5.2 The Kvarken Council's project as collaborative management

The Kvarken Council's project is the only attempt to tackle the problem in a coordinated way in Finland. It should not be seen only as an effort to form a regional statement about the problem to be delivered to decision-makers on the national and international levels. This aspect is clearly identifiable in the project, e.g. in suggestions for changing national and international policies articulated in the plan of action. The project was, however, more than just an example of advocacy. The project carried out concrete actions: it formed a stakeholder forum to create better relationship between regional stakeholders, new types of fishing gear were tested and it aimed at improving circumstances of seal hunting by training seal hunters and developing seal products. All these activities were directed to find solutions to the problem. The project included representatives of regional authorities that had a mandate, although limited, and resources to do something about the problems in the region. It was an attempt to manage the problem.

The project has characteristics of collaborative management or co-management (see. e.g. Pinkerton 1989 and 2003, McCay & Jentoft 1989). It created a forum for stakeholders to debate and make decisions. It could channel some of the state resources and even decision-making power vested in the regional authorities to deal with the problem. The stakeholders that are directly influenced by the interaction between seals and fishery were represented in the project.

It could also bring some of the positive results that co-management is thought to bring. By bringing different actors with operational power in the region helped to coordinate resources and enhanced the knowledge base (Pinkerton 1989, Jentoft 1989). Collaboration between regional authorities in the project helped coordination of resources that could be used to mitigate the damages. One example was that some of the seal hunting licences were deliberately meant for shooting specific seals that were known to visit trap-nets. It improved horizontal coordination of activities in the region (Pinkerton 2003).

As the project was a self-appointed attempt to manage the problem it lacked many of the characteristics of a complete co-management (Pinkerton 2003). The main deficiency from this perspective was, of course, due to its informal and ad hoc nature: it lacked an official status and mandate. The project has no role in the higher-level decision making.

A self-appointed management body can become an influential party and a real co-manager (see Pinkerton 2003). In the Kvarken case this could happen also. In the final product of the first project they clearly stated their wish of having more official role in decision-making in the future. The project partners continue their work in another project and in some other collaborative activities, which continues the co-operation in the region.

6 Conclusions

The conflict between the conservation of grey seals and coastal fishery in Kvarken is an outcome of several parallel, but interacting processes. The basic developments were that the grey seal conservation started and achieved outstanding results and during that time the fishery developed to its own direction until in 1990's these two started to interact with each other. Neither the conservation policy nor the fishery were prepared for the intensity of interactions.

The processes that lead to the conflict have large geographical and administrative scales. The geographical area that the grey seal populations cover is vast. Management of seal population is an international level issue with its strong legal basis in international conventions and EU legislation. Similarly the fluctuations of fish stocks, especially migratory species like salmon and white-fish, is a large-scale issue. Global fish markets influence prices paid in fishing harbours. Therefore, a scale becomes an important aspect in management of this very complex problem like in many other cases (see Wilson 2003). Complexity is increased because the basic problem becomes concrete only on local level, but decisions made on higher levels substantially limit the possibilities to deal with the problem. Especially the mitigation measure that is preferred on the local level – hunting[4] – is strictly regulated.

The scale is an important issue, but which level would then be the optimal to manage the problem. Often in co-management literature the standard answer is that the lowest level is the right level to manage natural resources (Agrawal 2003). Usually the lowest level

[4] This refers only to a perception that local and some of the regional level stakeholders share. Effectiveness of seal hunting as a measure to minimise the damages that seals cause to fishing has not been proved, although hunting has been going on only a few years in rather high volume and its potential impacts on seals behaviour can realise later. The main argument in favour of hunting is that it will make seals afraid again.

translates to 'a community'. Even though the preference of the lowest level has been lately turned to discussion emphasising the importance of 'subsidiarity' principle (e.g. Wilson 2003) meaning that decision-making power and resources should be invested to the lowest possible level, which is not necessarily a community level, the tendency in papers seeing co-management in a positive light is to emphasise the community.

The Kvarken region's project shows certain problems in a perspective that prefers the community[5] level approach. Especially interesting in this respect seems to be that the project invested in fishing gear development even though they knew the fishermen's sceptical attitude. One could argue that neglecting the local fishermen's opinions shows serious problems in how representation of local actors was arranged in the project – the fishermen's representative in the project was not listening to the ones it is supposed to represent (see e.g. Pinkerton 2003). However, the tests proved that new technical solutions are possible in spite of the fishermen's scepticism. The point here is not that the fishermen were wrong. They seem to be wrong in this one particular issue, the importance of which should not be exaggerated. The point is that regional level actors in this case had resources and that local level actors lacked and even a very different perspective to management of the problem. They had different know-how that the fishermen, but also had a possibility to test new fishing gear, that fishermen did not have. Local level actors could not afford to take the risk.

The case in this paper is such that its management cannot be done on local level and, in fact, there is not a single level that could manage the problem. It needs a multilevel approach. The conflict between grey seal conservation and a coastal fishery is a multi-level phenomenon. The processes that lead to it link several levels. Management of the problem should be able to cope with that. One should note that the problem is concrete or real only on a local level, meaning that before actual damages really happen there only is a potential for problem because the interests of seal protection and coastal fishing are controversial. Therefore, a management of the problem does not necessarily require management of all levels at the same time. More importantly than the phenomenon's multi-level nature from ecological point of view, the institutional structures in the case have also strong multi-level characteristics. The grey seal has high conservation value, which is

[5] Space in this paper does not allow discussion about the concept of community and boundaries of communities.

recognised in international conventions and EU legislation. Principles and partly even concrete conservation measures given on the high level creates strong obligations for national decision making. There are international policies and legislation that regulate fisheries, as well. Even though many aspects of coastal fisheries in the European Union are not regulated in the EU fisheries policy, some principles restrict possibilities to react to the damages that seals cause. For instance, financial compensation of damages is a complicated matter and so far Finnish authorities have rejected a possibility to create a permanent compensation system.

The multi-level nature of this conflict creates a real challenge to management. There are different strengths on different levels in CPR management. From the local level management's ability to deal with nuances and complexity to high-level management's simplicity and predictability (Wilson 2003). To combine these strengths is not an easy task. One interesting idea regarding the case this paper deals with is the Kvarken Council's grey seal project suggestion that management of seal populations should be regionalised (Kvarken Council 2003). According to their suggestion the Baltic Sea would have two grey seal management regions, the Northern and Southern regions. The region relevant for the study area would be managed in collaboration with the Swedish authorities and stakeholders. The plan of action (Kvarken Council 2003) argues that this management arrangement would be according to the subsidiarity principle and would help to create co-operation with regional and local level actors in the management. Their argument has a clear ecological basis: the grey seal is abundant in the North, but not in the South. Management in the area of an abundant population would allow more liberal policy on seal hunting. If technical solution like the new fishing gear cannot bring the local level solution to the problem seal hunting could be the only solution. It is not easily implemented and it has risks. Would there be enough willing hunters on the local level and will international level stakeholders accept seal hunting in high volumes?

7 References