14. ENGLISH SUMMARY

The sealing cultures and the human-seal relationship of the Baltic Sea

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This study is a multidisciplinary analysis of the relationship between humans and seals in the Baltic Sea and the large lakes (Lake Ladoga and Lake Saimaa) of the Baltic Sea area from the prehistoric times to the modern days, as well as of the sealing cultures and techniques in this region. Similar studies have not been done before in the Baltic Sea region. In addition, this study includes a scenario of the near future alternatives in the human-seal relationship: for instance, an examination of the conservational viewpoint and alternatives in sealing and ways to prevent the seal-caused damages to the fishing industry.

The study was performed from a cultural-ecological and environmental historical viewpoint. This is emphasized in the examination of the sealing and human-seal relationship of the past, while the cultural-ecological and ethnographic viewpoint is emphasized in the mapping of the sealing methods. An attempt has been made to combine the material acquired is this fashion and the natural historical knowledge of the seals in the examination of results and in discussion of the alternatives for the future human-seal relationship, which is the current environmental scientific research problem.

The primary research problems were:

1. Which seal species are in question, and how have the humans obtained, used, or competed with them?
2. What were the sealing techniques and equipment, and how have they changed?
3. How have seals been utilized and what attitudes people have had toward them from the prehistoric times to the present?
4. What are the alternatives in the human-seal relationship in the near future?

The research material was:

1. Previously published information of the seals or sealing in different disciplines.
2. Ethnographic and other literary descriptions, such as diaries, dealing with sealing.
3. Unpublished archival material, for instance, manuscripts from Finland and Sweden.
4. Interviews of certain Finnish and Swedish fishermen and sealers used to complete the above information.
5. Written discussion of the environmental and animal ethics and how they relate to the seals.

Four seal species have occurred in the Baltic Sea since the last Ice Age: the grey seal (*Halichoerus grypus*), the ringed seal (*Phoca hispida botnica*), the common seal (*Phoca vitulina vitulina*) and the Harp seal (*Pagophilus groenlandicus*). The last mentioned one disappeared from the Baltic Sea possibly during the first few centuries A.D. In addition, the ringed seal has occurred in the lakes of the Baltic Sea region. Of these, only the Lake Saimaa ringed seal (*Phoca hispida saimensis*) and the Lake Ladoga ringed seal (*P. h. ladogensis*), both of which form an isolated population, have survived. The biology, ecology and population trends of these seal species are presented in chapter 4. Also, the terminology dealing with these species used by the Finnish- and Swedish-speaking sealers of the main sealing area, the northern parts of the Baltic Sea, is presented. The knowledge of terminology is often necessary when dealing, for example, with the sealing techniques.

In an examination of the archaeology and environmental-history (chapter 5), it is concluded that the seals were possibly the earliest and, in any event, an important factor attracting the human populations to the Baltic Sea region. There is plenty of archaeological evidence that the Neolithic period postdating the formation of the Litorina Sea was "the golden age of sealing". Factors behind this were the greater biological diversity and productivity of the Litorina Sea's ecosystem in comparison to the recent Baltic Sea and the warm Atlantic climatic stage, which made hunting of the ringed seals whelping on ice easier due to reduced winter ice. The foragers of the northern Litorina Sea region belonged to what could be called the ringed seal sealing culture. More southern foragers focused mainly on the grey and harp seals.

The archaeological material from the Neolithic period settlement sites of the northern Litorina Sea and the knowledge of the techniques of catching the ringed seals indicate that the ringed seal hunting occurred during late winters with the help of trained sealing dogs. This was particularly characteristic of the Gulf of Finland and the Gulf of Bothnia. The use of dogs trained to hunt the ringed seals continued in the Gulf of Finland and the Gulf of Riga until World War II.

The cooling of the climate and the slow birth of the recent Baltic Sea had negative effects on sealing possibilities. A widely spread boiling of the seal fat for oil started in the Baltic Sea at the end of the Stone Age and continued to the historical times. This is evidenced, for instance, by the burnt-stone mounds and cooking pits, which can be interpreted as indicators of mass production. On the other hand, only a few intact relics of the Iron Age sealing have survived.

In the Medieval period and especially in the 16th century, there is a plenty of literary information of the sealing in the northern parts of the Baltic Sea. At that time, the sealing and cooking seal fat to produce oil was large-scale especially in the Gulf of Bothnia: especially the inhabitants of the modern day Finnish coast produced a significant part of the (seal)oil products of the European markets. The massive sealing occurred in 5-10 men boating units in the late winter in the whelping and resting areas of seals. These trips lasted for weeks and, in the Finnish coast, practically a man from each house participated in them. The mass sealing on ice was according to the 16th century tax information a specialty of the Finnish- and related-language speaking cultures in the Baltic Sea, but starting at least in the 16th century, together with the increasingly common use of guns, this sealing method and its techniques were transmitted, for instance, to the Swedish coast. The sealing using nets was more common in Scandinavia and the southern Baltic Sea coast. Especially the Danish islands, Öland, Gotland and a part of the Swedish coast were known from use of a special surprise technique in catching the grey seals.

Starting in 1575, the Small Ice Age resulted in the decline of the blooming late winter grey seal hunting of the Gulf of Bothnia. The increased extent of sea ice made the sealing more difficult and resulted in the relocation of the gray seal's habitation and reproduction areas further south from the Gulf of Bothnia. This development, as well as the whale and seal oil from the Arctic Sea and the introduction of the vegetable oils satisfying the demand of oil in the central European markets, resulted in a collapse of the economic affordability of the Baltic Sea sealing especially starting in the 18th century. However, occasionally dangerous late winter sealing trips made by boats continued to be commonly made from Finland, Sweden, and the Estonian islands until World War II, and in the Gulf of Bothnia until the 1970s. This is because the sealing still continued to be economically important to the inhabitants of the coast and islands and also, in some areas, provided food for households.

According to the historical period information, more seals were always killed along the Finnish coast than elsewhere in the Baltic Sea. The sealing was also significant for the Finns (Karelians) in

the Ladoga, but it has never been worth mentioning as subsistence in Lake Saimaa, where it was done occasionally to prevent seal-caused damage to the fishing.

Excessive sealing decimated the seal populations already during the 19th century from the Danish, German and Polish coasts. The introduction of the bounty in Sweden and Finland resulted in excessive sealing starting in the 1910s also in the northern Baltic Sea, gradually making the seal populations endangered as the 20th century went by. Also, toxic pollution of the sea resulting in reproductive problems had a similar effect. Protections of the seals by law came in use in the southern Baltic Sea after World War II, but only the complete protection by law in the significant seal areas in the northern and central Baltic Sea in the 1980s resulted in the seal population growth.

The sealing methods used in the Baltic Sea are divided in ethnographic discussion (chapters 6-8) into active and passive methods. Of the active methods, techniques to seek and locate the seals, as well as the sealing trip organization are examined first. It was possible to divide the traditional late winter sealing trips into four types according to their object. It was possible to demonstrate, for instance, that trained dogs were used in hunting gray seal groups on ice in the Baltic Sea until the beginning of the 19th century. These dogs later disappeared as a breed and earlier studies have not been able to differentiate them from dogs used to hunt the ringed seal.

The active sealing methods were also divided according to the method by which the seals were approached:

1. surprise methods without the use of a gun,
2. stalking and camouflage using techniques,
3. techniques to lure and deceive the seal,
4. techniques to catch the seal through holes in ice,
5. techniques including the use of a gun,
6. mass sealing techniques.

Based on this division, it was possible to trace 48 different active sealing methods or techniques used in the Baltic Sea. Of these many are derived from the Stone Age sealing cultures, while those involving firearms have developed since the 16th century. It is known that there are 19 different active sealing techniques where guns are not used alone. For instance, the Stone Age technique of catching the seal through holes in the ice continued to be used in the Gulf of Finland until 1939 when the Soviet occupation ended this sealing tradition.

Of the most important tools in approaching the seal, only *ajopuu* (*skredstång, driving tree*) is shown, contrary to some earlier theories, to have been commonly used in the 16th century, and this sledge runner is possibly a prehistoric invention developed to be used in approaching the seal. Some other sealing tools used in the Baltic Sea, such as a small boat and a seal sledge have been technically modified for other uses (jolly boat, kick sledge).

The distribution, techniques of use, and variations of the most important sealing weapons are presented in broad outline. The equipment used to catch seal on ice and through ice holes resembles markedly, for instance, Inuits' equipment. The so-called *kuutinrauta* (the seal whelp/cub iron) was the only equipment known only in the Baltic Sea. The sealing guns, which come in different forms according to their use, developed in the Baltic Sea starting in the 17th century into its own traditional weapon type. They were commonly handcrafted by the gunsmith of the local parish or village. Rifles replaced them in the beginning of the 20th century.

Of the passive sealing methods (chapter 8), it was possible to trace nine different seal net types or techniques to string nets. Also the grey seal has been caught by nets, although the main object of using the nets was to catch the ringed seals and, in the southern Baltic Sea, also the common seals using rocks for resting.

Sealing with nets was at one time probably done everywhere in the Baltic Sea, although the most intensively in the Gulf of Bothnia, especially in the early 20th century. In the Gulf of Bothnia, this was because of catching seals wandering on the early ice in the autumn. In this sealing, the nets were either strung next to the seals' resting rocks or special surface nets anchored on open sea. These net-using sealing techniques differ from other net-using sealing techniques known elsewhere in the world. The net-using autumn sealing had developed its own equipment, for instance, its own boat type.

The technique to use nets in sealing known in the White Sea and in northern Norway, the bottom nets, spread as an experiment to the Baltic Sea mainly after World War II. The professional sealing using nets ended on the Finnish side of the Gulf of Bothnia in 1975.

There is information from different parts of the Baltic Sea of a probable prehistoric method to catch seals with hooks (*koukut, krokar*) attached to the resting rocks. These hooks were also attached to a log sunk in the sand. Different passive seal traps have been used in the Gulf of Bothnia mainly to protect fixed fish traps. The seal irons (*hylkiraudat, själsaxar*), as well as seal fykes and seal traps (*hyljemerrat, sälfällor*) probably developed from the fish traps, were the most important of these. The poison capsules hidden inside a fish used as bait were started to be used in the early 20th century to kill gray seals and prevent damages to fishing. This method may have been effective from the point of view of some particular fisherman, but it did not have a broader significance.

In the study (chapter 9) the seal in relation to humans are examined as

1. material resource,
2. natural resource,
3. competitor for the same fish populations,
4. symbols of nature and animal conservation.

From the prehistoric times all the way to the 19th century, the seals were utilized in the Baltic Sea and the Lake Ladoga areas as in the arctic regions: as a rule, almost all body parts were utilized. The seals were especially in the late winter often the staple of the coast and the archipelago, but with the development of practices such as cattle breeding they became less important. The seal fat apparently became an exchange and trading material already during the Late Neolithic period, which changed the nature of the sealing in the Baltic Sea already at that time.

Evidence was discovered in this study of traditions derived from the prehistoric period to protect the seals and forbid the sealing during certain periods and ownership of the sealing places. The purpose of such traditions was to guarantee an optimal number of the game in the area during the sealing season and thus safeguard the livelihood of the sealing community, for example, a village.

The Finno-Ugric cultures (the Finnish, Estonian and Liv) had a clearly animistic attitude toward the seal expressed, for instance, in word taboos and perceiving the seals as creatures, which are human-like, equal with humans and understanding speech. This attitude appears to have disappeared from the southern and western parts of the Baltic Sea earlier, but remained as part of the hunting-gathering culture especially in the Gulf of Finland until World War II. The custom is very similar to the animism known among the Inuits.

At least during the Middle Ages, when commercial and fiscal fishing increased and the Christianity changed the world view, the seals came to be seen as man's competitor over the fish resources. This kind of thinking was promoted by movements such as utilitarianism and enlightenment and by the perception of people as masters of the created things. As a result of this view, the seals were seen in the 19th and the early 20th centuries as predators that should be killed to extinction. Due to demands of the Baltic Sea fishermen and fishing officials, bounty was commonly paid to decimate the seal until World War II, and in the primary sealing and seal distribution area, in Finland and Sweden, until the1960s and the 1970s.

This study has examined how the seal became the symbol of nature- and wild life conservation. This development resulted from the seal populations becoming threatened as a result of excessive sealing, but also from the Atlantic seal war, the campaign in Western Europe and U.S.A. opposing the butchering of the harp seal cubs. The main issues of this social discussion in Western Europe and the Nordic countries have been brought to light.

The significance of the sealing to the expansion of the prehistoric human settlement to the Baltic Sea and its social significance to the hunting community, among others, are examined in the summary and conclusion of this study (chapter 10). The Baltic Sea was until the 18th century, before the period sailing was directed to the Arctic Sea, Europe's most important sea mammal hunting and train-oil production area. Especially the northern coasts of the Baltic Sea was the area of the sealing and fishing culture which techniques were diverse and, for instance, due to the availability of material and different species of game, more diverse that those of Greenland's Inuits, who live by sealing.

Cultural and geographical evidence indicates that there was in the eastern and northern Baltic Sea coasts a foraging culture typical of the Finno-Ugric linguistic area, which specialized in catching especially the ringed seal on ice. On the other hand, a foraging culture specialized in catching seal herds by using surprise and nets can be identified in the Scandinavian-Germanic area. Also, there is linguistic proof of the Saami participating in sealing in the Gulf of Bothnia.

Techniques and the terminology, such as terms dealing with the sealing equipment, have been transmitted across cultural and linguistic area probably for millennia. For example, the sealing terminology of the Swedish-speaking coastal regions of Finland has influences from the Finnish, Estonian, and Saami languages, and there is a plenty of Swedish influence in the terminology of the Finnish-speaking coastal regions. The Estonian loan words used to be common among the Swedish-speaking sealers of the Estonian islands.

The human predation has affected the seal populations of the Baltic Sea for millennia. It may be a result of avoidance of this predation that the Baltic Sea grey seal whelps on ice and often alone, as a difference from the Atlantic populations.

The ultimate reason for the disappearance of the harp seals from the Baltic Sea may have been human predation, although the living conditions of the population may have already been reduced by the Litorina Sea becoming less productive Baltic Sea and possibly by competition with the grey seals.

Most archaeologists have posited that the harp seals appeared in the Baltic Sea only during the spring migrations. This study, however, supports a theory presented by the Finnish researchers in

the 1930s that the species may have had its own separate population in the Baltic Sea. This is based on the following:

1. a specimen harpooned on an open sea (ice) in Närpiö during the late winter (ca. 3,000 BC),
2. the summer migrations of the species directed toward the north (not toward the south as presenters of an opposing hypothesis have presented) wherever this species occurs,
3. it is not believable that an Arctic Sea or a North Atlantic population of some sea mammal would have migrated to nutritionally poorer Baltic Sea passing, for example, the productive Norwegian coast,
4. the plentiful appearance of the harp sea in the refuge fauna of the human settlement sites in the Baltic Sea is a proof of intensive and regular sealing specialized in this species. During the historical period, migrations of the species toward the south, for example, from the Arctic Sea, have been rare,
5. analysed bone material from the Åland Islands supports the view that the species was hunted mainly during autumn and winter, not during summer,
6. the smaller body size of specimens from the Baltic Sea as compared to the Arctic Sea specimens indicates the Baltic Sea population was separate from that of the Arctic Sea,
7. the lack of bone material from pups of the species form the central Baltic Sea may result from the whelping area of the Baltic Sea population being the drift ice of the Gulf of Bothnia (e.g., the osteological find from Närpiö). The lack of whelps' skeletal remains may be a result of economic hunting decisions or cultural factors: for example, only the fat layer and skin were commonly taken from a seal on the drift ice even during the historical times.

Culturally, the human relationship with the seals in the Baltic Sea also reflects social ideals and views. As a result of Christianity and the rational utilitarian considerations, e.g., the church and the state tried to wipe out the animism from the Finnish sealers. The rational considerations resulted in perceiving the seals as competitors of humans and predators to be decimated from the nature. The merciless excessive sealing also resulted in the dramatic decline of the seal populations to the verge of extinction during the 20th century. The development was typical robbery economy/exploitation of the natural resources directed toward the sea mammal populations also elsewhere.

Differing from the sea mammal hunting in oceans, however, the hunting in the Baltic Sea was never based on large ship-using, industrial-scale butchering or just fur production. The sealing in the Baltic Sea had always been part of the coastal and fishing culture, which was especially in the northern parts of the area, in its diverse, original and small-scale exercised at most by boating parties, most closely comparable with the foraging culture of the aboriginal people of the arctic and sub-arctic coastal regions.

The change of the sealing methods is examined through examples in this study. These have also been compared with information from elsewhere in the world. The increased economic intensification resulting from some sealing techniques was followed by rapid development also in other equipment. Three technological changes may have had a significant effect of the seal populations: the introduction of firearms starting in the late 16th century, the introduction of the rifle in the early 20th century, and the increasingly more common use of the rifle scope starting in the 1930s.

This intensification is seen, for example, in sealers' diaries and interviews used as sources. Based on these, it is estimated in this study that the number of the ringed seals killed in the Baltic Sea was 20-30% larger than that in the official statistics during the 20th century because of mortally wounded but sunken seals. This percentage for the gray seals would be at least this much.

The Baltic Sea sealing cultures and their sealing strategies are generally in concordance with the general cultural ecological theory, including the technological adaptation to local conditions. Based on the diversity and variability of the sealing methods in the Baltic Sea and comparisons of them with the sealing methods of other northern people, it can be concluded that the following is typical of the sealing strategies of the hunting societies:

1. The sealing technology adapts to both local ecological conditions as well as the special behavioral and locational features of the hunting object.
2. Numerous similarities in techniques, e.g., with those of the Inuits prove that the foraging cultures of different geographic regions with the same environmental conditions and game species have become similar. Therefore,
3. The foraging cultures' annual migrations and seasonal variations of the sealing/foraging methods also appear to have become similar in geographically distant regions.
4. The existence of alternative foraging strategies and tactics is important (for example, when the accustomed behavior and occurrence of the game species changes temporarily) because there are never permanent hunting conditions to be predicted and quick decisions are often necessary.
5. The size and technique of the foraging group change depending on time and place to achieve the optimal relationship of the hunting effort and product, and this may be the most important factor behind the development of the foraging technology.

Views people have about seals in Finland revealed during this study are outlined in an examination of the future alternatives of the human-seal relationship (chapter 11). At the moment the most common and socially most accepted views are (1) human centered ones permitting the sealing, or (2) nature-centered, conservational ones. An increasingly common Central European and metropolitan view emphasizing animal rights is still unfamiliar in rural and coastal Finland.

In an alternative where the human predation, that is sealing, continues in the Baltic Sea, the seal would be probably seen as equivalents with the predators of the dry land ecosystem (the bear, wolf, fox, etc.) or with animals causing economic and safety concerns to humans (for example, the elk). In this case, the sociological carrying capacity of a species would form the basis for hunting. Because it is difficult to find economical grounds for the Baltic Sea sealing, an alternative is presented in this study that the sealing should be organized according to the traditional Nordic way and included as part of the coastal fishing people's way of life. The motivation for sealing should be found within the nature conservation and traditions of the hunting/foraging culture.

There are no pressures for sealing in Lake Saimaa and Lake Ladoga, nor it is socially acceptable, due to small seal populations.

In an alternative where the Baltic Sea seal populations develop without direct human control, only nature's carrying capacity would control population sizes. In reality, however, humans in many ways indirectly affect the seal populations by various means such as pollution, ship traffic, and the use of shores/beaches. This alternative would also result in increased difficulties for the fishing industry and the coastal communities. Changes in the seals' behavior has been noted, for example, in respect to the use of guns in sealing: as a result of a complete protection by law, the seals known to be shy in the 20th century have become fearless toward humans.

The following strategies or their alternatives are possible to resolve the conflict between the seal and the fishing (industry/economy):

1. the seal population control including elimination of individual seal appearing in the fishing places,
2. chasing the seals away from near the fish traps,
3. the use of seal-proof fish traps,
4. the development and adjustment of the fishing methods and periods to minimize the damages caused by the seals,
5. the economic compensation of damages caused by the seals to fishermen,
6. no attempts to solve the conflict are made and, therefore, the industrial fishery (fish raising) is favored.

These alternatives are examined in this study. None of them has been adapted so far except in individual experiments. Nor is there an easy solution expected for this problem. The sealing and its methods have been in Europe a specialty of the coastal cultures of Finland, Scandinavia, and Estonia, especially. The know-how of the sealing methods is disappearing from Europe at the same time when there is discussion to restart the sealing. Questions dealing with damages to the fishing industry and the seal population control will continue, especially in Finland and Sweden.

International animal rights and environmental conservation campaigns continue to have effect in countries with Baltic Sea shorelines. Problems caused by the seals to the fishing typical for the Finnish and Swedish fishermen are not known especially in the southern Baltic Sea (Germany, Poland and the Baltic states). The fishermen's demands to reduce the seal population sizes will inevitably result in a conflict.

Different views of hunting in the Baltic shoreline states makes the discussion of the Baltic Sea sealing more difficult. This is mainly based on differences between the southern feudal organization and the independent Nordic village communities and their historically different rights to use natural resources. In the northern Baltic Sea coasts, hunting and fishing are still socially accepted everyday "everyman's" hobbies and subsistence. In Central Europe and the Baltic states, on the other hand, hunting is perceived as an upper class killing sport. The different old cultural background of the Baltic Sea sealing in comparison to the mass butchering and industrial fur acquisition of the Atlantic seal is not known in Europe, either.