

Biodiversity conservation in the north: history of habitat and species protection in Finland

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Biodiversity conservation in Finland has developed from old hunting and forest-use regulations towards habitat conservation based on ecological research and international agreements on protection of wildlife. Hunting of game animals and persecution of species considered as pests have been legally regulated in Finland since the Middle Ages. The first attempts to control forest destruction date back to the 1600s. Banning of spring hunting of waterfowl was suggested already in 1769. The rise of “modern” nature conservation in the late 1800s was apparently influenced by the European bird conservation movement (introduced to Finland in 1870 by Z. Topelius), the widespread criticism towards the 1898 Hunting Decree, and the growing interest towards conservation issues among biology and forestry professionals, inspired by an article published by A. E. Nordenskiöld. Already in the 1800s both hunting/persecution and habitat changes were perceived as threats to wildlife. The Nature Conservation Act, which became the cornerstone for Finnish conservation policy, was enacted in 1923. In the 20th century the numbers of protected species and conservation areas have increased. For more than a century Finnish conservationists have participated in international conservation efforts, in which Finland now participates as a member of the European Community.

Introduction

In a review of the Finnish biodiversity conservation inclusion of the northern dimension presents no particular problems. Finland is located as far

in the north as the main body of Alaska, and belongs biogeographically to the hemiboreal and boreal floral regions (Kalliola 1973). Finland's location in the Fennoscandian shield, close to the arctic area, Russian taiga and the more temperate

East-Central Europe, implies that organisms representing different biogeographical elements co-occur in the country. This has influenced Finland's biodiversity policy in at least two ways. First, many species (for instance hemiboreal or subarctic species) have for natural causes restricted ranges and small population sizes in Finland, and may therefore be particularly sensitive to even modest human influence. Globally, these hemiboreal or subarctic species are usually not threatened. Second, for this same reason it has been in many cases difficult to assess whether an observed extinction risk has resulted primarily from climatic reasons or from human activities. The sensitivity of Finnish biodiversity to climatic conditions will become an even more acute problem due to the predicted climate change.

From the European or global perspective the most unique habitats in Finland may be those associated with the coastal archipelago areas, certain nutrient-rich mire types (Häyrinen 1970), and the post-glacial land uplift zones especially along the coasts of the Gulf of Bothnia. Today also the few remaining old-growth taiga forests in southern and central Finland are highly vulnerable and need urgent protection (Hanski 2000). Also the sub-marine habitats along the Baltic Sea coast are now endangered due to locally severe and in large areas moderate eutrophication (Kirkkala 1998), and the substantial decrease of salinity of the Baltic Sea since the late 1970s (Matthäus & Schinke 1994).

Although Finland is still one of the most sparsely populated (15 inhabitants per km²) and most forested (68.7% forest cover) countries in Europe (Europe's Environment 1995), the relationship between man and nature has been problematic for centuries. This is exemplified by the government attempts to control land-use, hunting and fishing ever since the Middle Ages (*see below*). Finland may even have had her own megafauna extinction problem. The extinction of the harp seal (*Pagophoca groenlandica*) from the Finnish coastal areas in the late Litorina Sea phase, or perhaps as late as in the Middle Ages, may have been partially caused by human predation (Korvenkontio 1938), although it is probably impossible to distinguish between the human and abiotic influences on the prehistoric population

decline of this species (Ylimaunu 2000).

This paper is a historical review on habitat and species concern and conservation in Finland. As elsewhere, the concern for habitat preservation has arisen later than problems resulting from habitat destruction. This can be largely attributed to ignorance of the long-term effects of certain land-use practices, but also to lack of ecological thinking before World War II. This can be clearly seen in the development of the Finnish game management policy. In spite of extensive legislation, the only forms of game management that were practised in Finland until the 1940s were persecution of predators of game animals, and to a lesser extent transfers of game animals into new areas (Lampio 1953). Conservation of habitats for game animals was only introduced into management in the 1940s and early 1950s as a result of the emerging ecologically-based wildlife management research in Finland (Lindgren 1943, Siivonen 1946, 1951). Another possible explanation for the slow development of habitat conservation may have been that early conservationists did not believe that large-scale habitat conservation could be possible for political or economic reasons. This is supported by the very modest goals they set for nature conservation. In 1881, the Director of the Evo Forestry Institute, A. G. Blomqvist, suggested that two natural parks would be enough for the entire country, one located in the north and the other in southern Finland (Pekurinen 1997). Much later, Kujala (1941) still seriously pondered whether it is possible at all to create any new nature parks in southern Finland.

Habitat and species conservation before the Nature Conservation Act of 1923

Species conservation before 1923

Until the end of 19th century all legislation on species conservation in Finland aimed at conserving species that had some resource value for people. Behind these laws was the fear that uncontrolled hunting or fishing of most desirable species, or cutting of most valuable trees, could lead to depletion of these resources. The first

piece of legislation that granted full protection to species without any economic value was the Hunting Decree of 1898, which protected the woodpeckers, cuckoo and most passerine birds. The corvids, shrikes, house sparrow and starling however remained outlaws, and in the hunting period also the thrushes and waxwing (Hunting Decree 1898).

The Land Law of King Magnus Ericsson of 1347 AD was the first legal code for the entire kingdom of Sweden (Holmbäck & Wessén 1962). It banned hunting on other landowner's property with the notable exception of hunting of brown bear, red fox and wolf, which anyone had a right to kill anywhere. (Interestingly, the right to kill brown bear or wolf on anyone's land survived in the Finnish legislation more than 600 years, until the 1962 Hunting Act.) Killing of moose was forbidden from the beginning of Lent to late July. Hunting of red squirrel, pine marten and stoat, important fur-bearing animals, was not allowed before All Saints' Day, i.e. the 1st of November (Holmbäck & Wessén 1962). Essentially the same regulations were included in the Land Law of King Christopher of Bavaria a century later (Haltia 1950). Apparently these laws could not prevent overhunting of most popular fur-bearing animals in southern and central Finland. There is good evidence that exports of the most valuable furs declined in the late Middle Ages (or in the case of black fox in the 1600s) due to overexploitation (Lampio 1972). Overhunting of fur-bearing animals was common throughout Russia and western Europe in the late Middle Ages, and thereafter (Ponting 1991). The only fur-bearing animal species that was eventually exterminated from Finland by hunting was the beaver (*Castor fiber*), the last specimen of which was shot in Salla, NE Finland, in 1868 (Mela & Kivirikko 1909). The species was, however, reintroduced in the 1930s.

Moose (*Alces alces*) has always been a highly valued game animal in Finland, which is shown for instance by the fact that moose is the most popular motif in the surviving Stone Age rock paintings of Finland (Kivikäs 1995). Moose populations were not only protected by the mediaeval land laws, but also by attempts to keep moose hunting as a royal privilege. The Åland Islands

were in 1537 proclaimed a royal hunting reserve, where only the King and his associates had a right to hunt these large game animals (Nordberg 1951). In 1620, King Gustavus II Adolphus ordered either capital punishment or exile in Inkerinmaa (a remote eastern province) as a punishment for unauthorised killing of moose in the Åland Islands (Melander 1903, Löyttyniemi & Lääperi 1988). This strict hunting policy was later abandoned, and the last known moose in the islands was shot in 1778 (Melander 1903).

The later developments of hunting legislation during the Swedish reign of Finland (which ended 1809) included the important hunting laws of 1647 and 1664, which largely transferred hunting rights from peasant land-owners to the nobility, and the 1734 law that encouraged killing of pest animals (Haltia 1950). The well-known royal decree of 1789 returned the traditional hunting rights to peasants. Interestingly, a decree by King Charles IX in 1608 forbade killing of lekking forest birds (Haltia 1950). In addition to hunting regulations of useful game animals, the legislation included orders for killing pest or "harmful" animals. The practice of paying a small sum of money for every killed pest animal was first introduced in the 1664 hunting law (Haltia 1950). In the 1664 law a price was defined for killing of brown bear and wolf, and in the 1734 law in addition to them for killing of red fox. Bird species considered as pests were apparently first listed in the 1664 law (Kongl. Ordning 1664). A royal decree of 1741 added to the list of those animals whose killing was financially rewarded a number of bird species, including eagles, goshawk, eagle owl, five corvids, and even the house sparrow and other passerines considered as pests (Kongl. Förordning 1741).

Already in the Swedish era there was some concern on the adverse effects of spring hunting of waterfowl that had been traditionally practised in the coastal and archipelago areas. The famous botanist Linnaeus recommended restrictions on spring hunting, after having acquainted himself with this tradition in the islands of Gotland and Öland (Hario 1993). J. Gummerus recommended banning of spring hunting in his academic dissertation "Oeconomisk Afhandling om Sjö-Fogels Wård och Ans i Finska Skärgården", and

suggested instead that eiders could be domesticated and kept in households like geese or ducks (Gummerus 1769, Vuorisalo *et al.* 1999).

Hunting legislation was profoundly revised during the Russian reign of Finland (1809–1917), and the Hunting Decree of 1868, which replaced the old Swedish laws, has been regarded as the foundation of Finland's present hunting legislation (Suomus 1968). In the 1868 decree all wild mammals and birds in Finland were classified as either 1) useful species, the populations of which should be maintained and increased by protection, 2) harmful or pest species such as the brown bear, wolf, lynx, wolverine, red fox, pine marten, "eagle", eagle owl, "hawk" and osprey, which should be persecuted, and 3) other species, on whose protection or persecution there were no rules (Hunting Decree 1868). The list of useful game animals included, in addition to moose, arctic hare, waterfowl and gallinaceous birds, also species such as the beaver (which died out in the same year as the new decree came into force) and, perhaps surprisingly, the starling. Although listed as game animals, both moose and (the extinct) beaver were "so far" protected throughout the year. Moose populations in Finland were extremely small in the mid-1800s (Löyttyniemi & Lääperi 1988).

The Hunting Decree of 1898 protected, as already mentioned, nearly all passerine birds in Finland. On the other hand, the list of pest animals that were to be persecuted was longer than in any previous law. It included brown bear, wolf, lynx, wolverine, red fox, pine marten, polecat, European mink, otter, "lake seal", golden eagle, sea eagle, eagle owl, hawk owl, snowy owl, all hawk species, osprey, great black-backed gull, skuas, black-throated diver, red-throated diver, grebe species (in Finnish "uikku eli härkälintu"), cormorant, raven, hooded crow, magpie, jay and siberian jay (Hunting Decree 1898). The responsibility of paying killing fees of pest animals was in part laid upon local municipalities. The result of this "spare-time hunters' Magna Charta", as the new hunting decree was once mockingly called (Renvall 1902) was a clear increase in persecution levels of many predatory birds (Erkamo 1990). Due to this the Hunting Decree of 1898 was severely criticised by nature

conservationists (e.g., Renvall 1912).

The legal protection given to nearly all passerine birds in the Hunting Decree of 1898 is consistent with the impressive rise of interest in bird protection in Finland in the late 1800s. Author and historian Z. Topelius founded in 1870 in Helsinki a "Spring Society", that aimed at conservation of "little birds" (Topelius 1898). Similar societies were quickly founded elsewhere in Finland, and in 1878 about 30,000 schoolchildren were counted as members (Topelius 1898). Although this activity soon dwindled, the Spring Societies as well as "The Spring-Book" (Topelius 1874) probably contributed remarkably to the spread of conservation ideas in Finland. For instance, an article in the hunting and fishing magazine *Sporten* condemned the hunting and selling of waxwings in Helsinki marketplaces (Anon. 1883). The Animal Conservation Society of Finland adopted bird conservation as one of its objectives in 1902 (Forstén 1909). Levander (1917) explicitly noted that protection of small birds, if successful, could serve as a model for nature conservation in a broader sense.

Habitat conservation before 1923

Another early model of bird protection came from the Åland Islands. In 1868 the small island of Långskär (0.8 km²) that belongs to this archipelago was made an unofficial bird sanctuary by the island's lighthouse-keeper F.H. Mangelus (Palmgren 1912). When Mangelus arrived at the island in 1865 there was only one breeding pair of the eider (*Somateria mollissima*). Due to active protection against hunting and egg-collecting, the breeding population of eiders increased to 150 pairs by 1890 (Kärki 1928). Some years later the population had increased to about 300 pairs, of which 60 had made their nests quite at the base of the lighthouse (Anon. 1894). Bird sanctuaries have also later played an important role in the habitat conservation of the archipelago areas. Some private bird sanctuaries were founded already in the 1910s and early 1920s, such as Pähkinäinen in 1912, Nothamn in 1913, and Klävsjär in 1920 (Kärki 1928). Of these, Nothamn was later (1926) protected "officially" by the

new Nature Conservation Act (Söyrinki 1954).

In the field of habitat conservation the main issue until late 1800s was protection of the forest resource from overexploitation, although regulations existed already in the Middle Ages that protected rivers from construction or other projects that could harm fishing (Holmbäck & Wessén 1962, Lahtinen 1999). The first real conservation areas were also established in the late 1800s (*see below*).

Within forest conservation it is important to make a distinction between concern for the forest resource and concern for the forest habitats. The concern for the forest resource in Finland dates back to the 1600s and 1700s, when the government repeatedly attempted to restrict slash-and-burn agriculture to save forest resources for more useful purposes such as mining industry and water sawmills (Kuisma 1993, Roiko-Jokela 1997). For example, the law of 1734 restricted forest burning for agricultural purposes, and forbade cutting of “fruit trees” such as the oak and apple tree (Peurakoski & Rautapää 1921). The idea of sustainable use of the forest resource can already be found in the 1886 Forest Act (Jäppinen & Lappalainen 1998). In spite of these legal attempts the forest resources of Finland seem to have declined in the 1800s (the main reason was almost unlimited fuelwood use), and only started to grow in the 1910s as a result of introduction of efficient forest management methods (Myllynäntä 1999).

The concern for forest habitats originated much later than the concern for forest resources. Topelius wrote in “Spring-Book” that excessive cutting of trees and bush-layer in the forest deprives the “little birds” of safe and suitable nest sites (Topelius 1874). As a solution he recommended construction of nest-boxes for the hole-nesting birds. Ståhlberg (1917) claimed that agriculture and forestry had a greater impact on the avian diversity of the Finnish forests than hunting, and was especially concerned about the harmful effects of slash-and-burn agriculture, which was still common in the early 20th century. Like Topelius, Ståhlberg also noted that the tendency of modern forestry to clean the forests of dead trees and dense bush layer has a negative impact on forest bird diversity. On the other

hand, Ståhlberg (1917) and later Siivonen (1951) listed a number of ways by which the habitat mosaicism created by the slash-and-burn agriculture could also increase avian diversity.

The 19th century also saw protection of some scenic landscape areas in Finland. Emperor Alexander I forbade cutting of trees in the scenic Punkaharju Esker (SE Finland) already in 1802 (Borg 1984). The scenic Imatrankoski in SE Finland was purchased by the state to be protected in 1883, and so were the rapids of the River Oulujoki in 1913–1917 (Borg 1992). Both have been later constructed for hydropower production. One purpose of protection of these (and other) famous landscape areas in the 1800s was promotion of tourism (Borg 1984).

In 1880, explorer A. E. Nordenskiöld suggested that state parks should be established in Finland to conserve at least fragments of “pristine nature” for future generations (Nordenskiöld 1880). Nordenskiöld’s article has been regarded as the starting point of Finnish nature conservation (e.g., Linkola 1938, 1941, Borg 1984, Pekuriinen 1997). Although there is no doubt that Nordenskiöld’s article strongly influenced early ideas concerning establishment of nature conservation areas, it did not have much influence on species protection. For example, legal protection for “little birds” was already suggested during the preparation process of the 1868 Hunting Decree (Haltia 1950), and Topelius’ work on bird protection must have been well-known by the time Nordenskiöld published his paper.

The main importance of Nordenskiöld’s article was that it started a lively discussion on establishment of genuine nature conservation areas in Finland (Borg 1984). The details of this process, which included establishment of some small conservation areas both on state-owned and private lands, have been described by Borg (1984) and Pekuriinen (1997). Most participants in this discussion were either forestry professionals or biologists, and in May 1917 *Societas pro Fauna et Flora Fennica*, the oldest scientific society in Finland, suggested to the Senate that a law on nature conservation would be necessary to promote establishment of nature conservation areas in Finland (Anon. 1917). The society noted that conservation legislation should be created ur-

gently, “before the raping of nature” has proceeded as far as in some “civilised” European countries (Anon. 1917). Preparations for such a law started soon, and the Nature Conservation Act came into force on 1st July 1923.

International contacts before 1923

International contacts influenced the early development of Finnish conservation. Topelius (1874) noted that his Spring societies had had predecessors in Sweden since 1869. There were also attempts to promote conservation abroad. In the 1890s the Animal Conservation Society of Helsinki appealed to both the Queen and Parliament of Italy for protection of migratory birds in that country (Kärki 1928). Constance Ullner, the leading figure of Finnish animal conservation in the early 1900s, gave talks on bird conservation in international congresses at least in London 1909 and in Rome 1914 (Brander & Krogius 1935).

Habitat and species conservation from 1923 to EC membership

Species conservation since 1923

Enforcement of Nature Conservation Act in 1923 made necessary a division of labour between the new law and the hunting legislation both in species conservation and in listing of animals not protected by law (*see* Amendment to Hunting Decree 1923). The bird species that had been protected by section 17 of the Hunting Decree of 1898 were hereafter protected by section 13 of the Nature Conservation Act, and so were a number of other, previously unprotected bird and mammal species. New protected bird species included the crane, storks, herons, coot, grebes, most wader species, razorbill, guillemots, most gull species, terns, fulmar, skuas, great grey owl, short-eared owl, long-eared owl, Tengmalm’s owl, pygmy owl, rook, jackdaw, hoopoe, bee-eater, roller, and nightjar (Nature Conservation Act 1923, section 13). The first mammal species to be protected by the Nature Conservation Act (section 13) were bats, hedgehog, and flying

squirrel. Although the list of protected species changed in the following decades, the division of labour between Nature Conservation Act and Hunting Act remained essentially similar, which has sometimes been criticised. This is because it is legally easier to cancel protection by Hunting Act than by the Nature Conservation Act. Possibly to avoid this, the arctic fox, which was first protected by a decree based on Hunting Act (Decree on Protection of Certain Fur Animals 1940), was in 1962 transferred to protection by the Nature Conservation Act (Amendment to Nature Conservation Act 1962, section 13). Since 1989 arctic fox has been listed as a species under special protection (Council of State Decision 1989).

The list of pest animals whose persecution was encouraged by hunting legislation was much shortened in 1923. It only included the brown bear, wolf, lynx, wolverine, seals, golden eagle, eagle owl, goshawk and sparrowhawk (Amendment to Hunting Decree 1923). On the other hand, the Nature Conservation Act listed as non-protected species the woodcock, snipes, fieldfare, great black-backed gull, glaucous gull, shrikes, and house sparrow (Nature Conservation Act 1923, section 13).

The number of protected species increased in the course of the 1900s. Figure 1 shows the increase in the number of protected vascular plant species in the territory of Finland. Since 1992 also some bryophytes have been protected by the Nature Conservation Act. Figure 2 shows the increase in the number of invertebrate species protected by the Nature Conservation Act. The first invertebrate species to be protected in Finland was the pearl mussel (*Margaritifera margaritifera*). By 1955, when it was protected, the populations of this mollusc species had dramatically decreased due to excessive pearl-hunting, habitat destruction (e.g., clearing of rivers for timber floating, and hydropower construction), and spread of an important predator, the muskrat *Ondatra zibethica*, to Lappish inland waters (Itkonen 1963).

Progress in species conservation was made possible by a gradual change in the public attitude especially towards the legal status of species traditionally considered as pests. Old hunting legislation explicitly aimed at extermination of

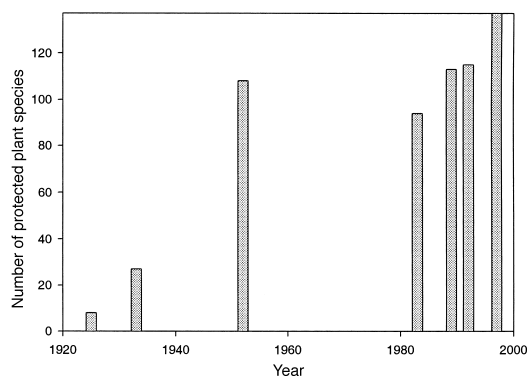


Fig. 1. Development of the number of protected vascular plant species or subspecies in Finland. Since 1952 the red-flowered forms of *Nymphaea* spp. have been included in the species number (as one species). Based on the acts/decrees 58/1925, 59/1925, 191/1933, 182/1952, 402/1983, 494/1989, 450/1992, and 160/1997 in the Statute Book of Finland.

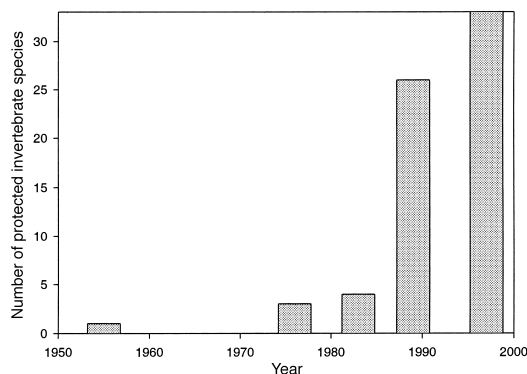


Fig. 2. Development of the number of protected invertebrate species in Finland. Based on the acts/decrees 447/1955, 440/1976, 403/1983, 492/1989, and 160/1997 in the Statute Book of Finland.

pest animals such as large mammalian or avian predators. Although the division of birds into “useful” and “pest” species was already criticised by Renvall (1912), the change in attitudes especially among hunters was slow. Large predators were considered as a serious threat to useful game animals (Lindgren 1943). One of the first hunters to criticise systematic killing of avian predators was Ylänné (1948), who listed a number of reasons for protecting most hawk and owl species, including the aesthetic pleasure they provide, and noted that also bird predators belong to the Finnish nature. As one of the first in Finland, Linkola (1963) suggested that one should altogether abandon classification of animals as “useful species” or as “pests”, and instead argue for conservation on more ethical grounds. Due to the change in attitudes, as well as Finland’s participation in the most important international agreements on species conservation, all Finnish raptor species were fully protected by 1989 (Table 1). Today all “pest animals” mentioned in the 1923 Amendment to Hunting Decree are either totally protected (wolverine, golden eagle, eagle owl, goshawk, and sparrowhawk), or their hunting is strictly regulated (brown bear, wolf, lynx, and seals). In the 1993 Hunting Act, now in force, there was for the first time in the history of

the Finnish hunting legislation no listing of pest animals. There was, however, still a list of outlaw species (Hunting Act 1993, section 5).

Effective species conservation requires accurate data on the population trends of potentially threatened species. The first, rather tentative, list of threatened species in Finland was published by the WWF Finland in 1975. This list included 229 animal and plant species that were thought to need protection (Borg & Malmström 1975). Since then, three comprehensive reports have been published on the status of threatened species in Finland (Rassi *et al.* 1985, 1991, Alanen & Mannerkoski 2000). According to the latest report, 11% of the evaluated 15 000 species are either extinct or threatened. The total number of species in Finland is estimated as 43 000. Two thirds of the threatened species depend either on forest habitats (especially mature coniferous forests and herb-rich forests) or cultural habitats (Alanen & Mannerkoski 2000).

Accurate data on the status of threatened species in Finland that has been available since the report of Rassi *et al.* (1985) has made certain legal improvements possible. Since 1987 it has been possible to declare an “endangered species”, which is at obvious risk of extinction, as a species under special protection, which means that the Ministry of Environment shall, if necessary, draw up a protection plan for the preservation of such species (Nature Conservation Act 1996). In the present legislation this requires,

however, that the species in question has been first declared as an “endangered species” (Nature Conservation Act 1996, sections 46 and 47). In contrast to ordinary species protection, special protection preserves not only the organisms belonging to specially protected species, but may also preserve habitats important for the species (Nature Conservation Act 1996, section 47). The possibility for species protection was first applied in 1989, when the Council of State declared 2 species of mammals, 11 species of birds, 23 species of butterflies, 2 species of beetles, and 33 species of plants as specially protected (Council of State Decision 1989). The Nature Conservation Decree of 1997, now in force, lists as many as 485 species or subspecies that are specially protected. 62% of the specially protected taxa are either invertebrates or fungi (Nature Conservation Decree 1997). The inclusion of the Habitats Directive and the Directive on the conservation of wild birds in the revised Nature Conservation Act (1996) has also strengthened species conservation in Finland.

Habitat conservation since 1923

The Nature Conservation Act of 1923 made possible establishment of nature conservation areas both on state land and in areas that belong to private individuals (Nature Conservation Act 1923, chapters 1 and 2). Nature conservation areas on state land were called either general nature reserves (these were later called nature parks) or special nature reserves (national parks and smaller conservation areas on state-owned land) (Nature Conservation Act 1923, section 1). The new law also enabled protection of so-called natural formations, such as old scenic trees or groups of trees, caves, and erratic boulders (Nature Conservation Act 1923, section 6). Legal protection of such natural formations was a German innovation that was strongly influenced by the writings of H. Conwentz (Borg 1984).

Since the enforcement of the Nature Conservation Act there was a delay of 15 years before the first national and nature parks were established in Finland in 1938 (Linkola 1938). This

Table 1. History of legal protection of the Finnish raptor species. NCA = Nature Conservation Act. The legal source is mentioned in parentheses (numbers refer to index numbers in the Statute Book of Finland). ¹: Rough-legged buzzard was not protected in Lapland province from 1962 to 1979; ²: Golden eagle has been protected outside the reindeer husbandry area already since 1926, but in the whole country only since 1962; ³: Goshawk has been protected from 1 May to 31 July since 1979, from 1 April to 31 July since 1983, and totally protected since 1989.

Species	Totally protected since
Black kite <i>Milvus migrans</i>	1 July 1923 (NCA 71/1923, 13§)
Red kite <i>Milvus milvus</i>	1 July 1923 (NCA 71/1923, 13§)
Buzzard <i>Buteo buteo</i>	1 July 1923 (NCA 71/1923, 13§)
Rough-legged buzzard <i>B. lagopus</i>	1 July 1923 (NCA 71/1923, 13§) ¹
Honey buzzard <i>Pernis apivorus</i>	1 July 1923 (NCA 71/1923, 13§)
Harrier sp. <i>Circus</i> spp.	1 July 1923 (NCA 71/1923, 13§)
Kestrel <i>Falco tinnunculus</i>	1 July 1923 (NCA 71/1923, 13§)
Hobby <i>F. subbuteo</i>	1 July 1923 (NCA 71/1923, 13§)
Red-footed falcon <i>F. vespertinus</i>	1 July 1923 (NCA 71/1923, 13§)
White-tailed eagle <i>Haliaeetus albicilla</i>	27 February 1926 (Decree 60/1926, 1§)
Osprey <i>Pandion haliaetus</i>	27 February 1926 (Decree 60/1926, 1§)
Gyr falcon <i>Falco rusticolus</i>	27 February 1926 (Decree 60/1926, 1§)
Spotted eagle <i>Aquila clanga</i>	4 March 1955 (Decree 109/1955, 1§)
Lesser spotted eagle <i>A. pomarina</i>	4 March 1955 (Decree 109/1955, 1§)
Peregrine <i>Falco peregrinus</i>	30 April 1959 (Decree 210/1959, 1§)
Golden eagle <i>Aquila chrysaetos</i>	13 April 1962 (Hunting Act 290/1962, 27§) ²
Merlin <i>Falco columbarius</i>	13 April 1962 (Amendment to NCA 292/1962, 13§)
Sparrowhawk <i>Accipiter nisus</i>	15 May 1979 (Decree 455/1979, 1§)
Goshawk <i>A. gentilis</i>	1 June 1989 (Decree 493/1989, 1§) ³

slow start in the build-up of a comprehensive network of nature conservation areas was in part caused by land-ownership ambiguities in eastern Finland (Linkola 1938, Borg 1984). Finally, four national parks and six nature parks were established. A drawback for further development of the Finnish conservation area system was the Second World War, in which one national park and four nature parks were permanently lost to Soviet Union. In addition to the Heinäsaaret National Park that was lost to Soviet Union, the small Porkkala National Park in the archipelago of the Gulf of Finland suffered from the occupation of Soviet troops so much that its status as a national park was abolished (cf. Kalliola 1957). Due to the relatively small sizes of these lost national and nature parks the effect of war in the development of total protected area was however not very dramatic (Fig. 3).

Figure 3 shows the cumulative increase of total area of national and nature parks in Finland. The area of national parks increased most rapidly in the 1980s, when 14 new national parks were established. The growth probably reflects the increasing environmental awareness in Finland since the late 1960s (Nienstedt 1997). The area of nature parks did not increase as clearly, which may be caused by the fact that nature parks in Finland are more strictly protected than national parks, and their establishment therefore politically more difficult.

Since the late 1970s the Finnish conservation area policy has been based on sectorial protection programs that (with the exception of the 1978 program for the development of national and nature parks) have focused on listing and planning of conservation of areas that represent vulnerable habitat types. The protection programs approved by the Council of State have dealt with mires, wetlands important for waterfowl, eskers, herb-rich forests, shorelines and coastal areas, and old-growth forests. Realisation of these programs, the success of which has been very variable, has been an essential part of the Finnish conservation policy in the last two decades (Salminen 1993). The current state of these sectorial protection programs has been summarised by Anon. (2000). In addition to these protection programs much attention has been paid to protection of rapids (*see below*) and northern wilder-

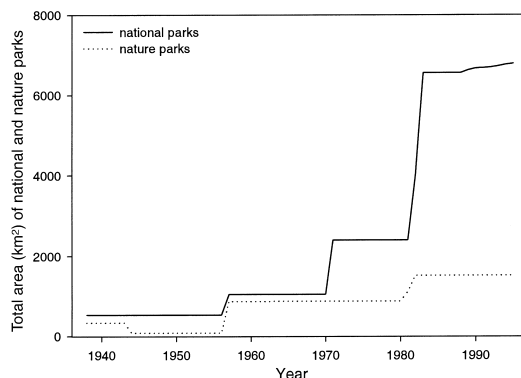


Fig. 3. Development of the total area of Finnish national and nature parks. Mainly based on Linkola (1938), Kalliola (1957), annual reports of the Finnish Forest and Park Service, and the Statute Book of Finland.

ness areas. A specific Act on Wilderness Reserves came into force in 1991. All the 14 wilderness areas are located in Lapland, and together they cover a larger area (13 778 km²) than all national and nature parks together (8 379 km²; Anon. 2000). As conservation areas these wilderness areas are problematic. Restrictions on land-use in them are so modest that they could probably be best described as “areas managed mainly for the sustainable use of natural resources” (Eidsvik & Bibelriether 1994).

As examples of trends in habitat conservation we present history of protection of inland waters and mires. Lakes and rivers are in large areas dominating elements of the Finnish landscape. According to a recent census there are about 188 000 lakes in Finland, and they cover 9.9 per cent of the country (Raatikainen 1986). The mean depth of the Finnish lakes is only seven meters, which means that they are easily polluted (Söyrinki 1954).

Although scenic lake and river areas already belonged to some of the first Finnish national and nature parks established in 1938, the idea that lakes and rivers need protection as ecosystems is younger. The first attempts to list valuable aquatic ecosystems in Finland (both inland and marine) were made by the Finnish Limnological Society in 1965–1967 as part of the international Project Aqua. The purpose of the Project Aqua was to conserve representative samples of all

types of aquatic ecosystems for research purposes. The list of 14 valuable Project Aqua sites included lakes, rivers and coastal areas (Heikkinen *et al.* 1984). In October 1975, the Ministry of Agriculture and Forestry set a working group to prepare a more comprehensive list of valuable natural water areas with the purpose to both ensure the availability of aquatic ecosystems for human needs, and to establish a representative network of protected aquatic habitat types in Finland (Haapanen *et al.* 1977b). The report of the working group was completed in 1977. The group also identified several factors that underlined the need for protection of the Finnish aquatic habitats. For example, 6 000 km of waterways had been cleared and constructed for traffic, about 40 000 km of rivers had been cleared for timber floating, and ca. 20 per cent of the lake area were considered as polluted by the time the report was published (Haapanen *et al.* 1977b).

The report of Haapanen *et al.* (1977b) included 59 sites of both inland and coastal waters. Special attention was given to sites that were considered as nationally or internationally unique. Although no specific protection program was launched to protect the areas included in this report, several of the areas have been later protected as parts of new national parks (such as the Archipelago Sea National Park, established 1982), or by the Act on the Protection of Rapids of 1987. In 1992 an updated report was published that recommended special protection for 68 inland water areas, that were considered nationally or internationally valuable (Haapanen *et al.* 1992). One goal of this report was to promote conservation and sustainable use of entire drainage areas. So far, this plan has not resulted in a specific protection program.

Rivers, and especially rapids, have been in the focus of the Finnish conservation policy for a very long time due to the economic importance of rivers for traffic and transport (e.g., timber floating), fishing (especially of lax and salmon), and hydropower. Already in the Middle Ages there were conflicts over fishing rights in rivers (Lahtinen 1999), and construction projects that could create obstacles for the upstream migration of fish have been regulated in many ways (Vilkuna 1975). Scenic rapids were also one of the first sites that were purchased by the state for protec-

tion purposes. Protection of rapids has been particularly difficult in Finland. In the post-war years, the influential power companies aggressively promoted construction of rapids for hydropower production with the result that only 10% of the Finnish rivers (longer than 50 km) are now in natural condition without any dams (Wahlström *et al.* 1996). As a result of the Act on the Protection of Rapids and two other specific laws on protection of individual rivers there are now 55 rivers or parts of rivers that are protected against dam construction (Anon. 1999).

Mires are very typical and diverse Finnish wetlands. Originally, there have been about 10.4 million hectares of mires, but by now two thirds of them have been changed into forest plantations, agricultural land, peat production areas, or to artificial lakes for the needs of power production (Kangas *et al.* 1998). By the early 1950s, there were no protected mires in the southern part of the country, and the few mires that were protected belonged to the large national parks and nature parks of northern Finland, none of which had been primarily protected for their mire nature (Söyrinki 1954). In 1955 the Finnish Nature Conservation Society informed the forest administration of the need to protect mires (Annanpalo 1968). As a modest start, three of the 19 new national and nature parks that were formed in 1956 were primarily chosen due to their unique mires (Kalliola 1957, Ruuhijärvi 1965).

A greater concern for the Finnish mires arose in the mid-1960s as a response to the large-scale drainage programs that were generously supported by government funding (Elo & Lindholm 1980). As much as 300 000 hectares of mires were drained annually mainly for afforestation purposes (Haapanen 1973). The Finnish Nature Conservation Society and the Mire Society compiled together the first lists of valuable mires on state land. The lists for southern and central Finland (1966, 1969) included 79 and the list for northern Finland (1969) 130 sites (Häyrinen & Ruuhijärvi 1966, Haapanen *et al.* 1977a). Based on these lists, the Finnish Forest and Park Service decided to protect 150,000 hectares of mires on state-owned land (Salminen 1977).

In the 1970s several plans were prepared to promote mire conservation. This work culminated in two protection programs on mire conserva-

tion that were approved by the Council of State in 1979 and 1981, respectively (Haapanen *et al.* 1977a, Salminen 1984). The two programs together covered 490 000 hectares of mires on both private and state land, which corresponds to 4.7% of the total original mire area in Finland (Salminen 1984). Based on these programs 416 060 hectares of protected mires have been formed so far (Anon. 2000). As there are protected mires also in national and nature parks and in other types of conservation areas, the total area of protected mires is now 840 000 hectares, which is eight per cent of the original mire area (Aapala & Lappalainen 1998).

International cooperation since 1923

Finland has been continually involved with international conservation cooperation. Already in spring 1925 the Finnish Ornithological Society sent a delegate, Dr. I. Hortling, to participate in

an international ornithological congress in Luxembourg that dealt with bird conservation (Anon. 1925). In 1928 the national section of Finland in the International Committee for Bird Preservation (ICBP) was established (Kärki 1928). The Finnish Nature Conservation Society was one of the founding members of the International Union for the Protection of Nature (later IUCN) in 1948 (Anon. 1948). Since the 1970s Finland has signed several international agreements on conservation of wildlife. A complete list of these agreements is presented in Table 2.

Finland has since January 1995 been a member state in the European Community. This has strongly influenced the conservation policy of the country (e.g., Bromley 1997, Kangas *et al.* 1998). The contents of the Council Directive (79/409/EEC) on the conservation of wild birds and the Council Directive (92/43/EEC) on the conservation of natural habitats and of wild fauna and flora have been incorporated into the thoroughly revised new Nature Conservation Act

Table 2. Multilateral agreements on protection of wildlife that are in force in Finland. Later protocols and amendments are not included. Mainly based on Ministry of Environment (1998).

Title of agreement	Date of entry into force in Finland
Statutes of the International Union for Conservation of Nature and Natural Resources	18 December 1967
Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention)	21 December 1975
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	8 August 1976
International Convention for the Regulation of Whaling (Whaling Convention)	23 February 1983
International Tropical Timber Agreement (1983)	1 April 1985
Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)	1 April 1986
Convention Concerning the Protection of the World Cultural and Natural Heritage	4 June 1987
Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)	1 January 1989
Convention on Biological Diversity	25 October 1994
Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas	13 October 1999
Agreement on the Conservation of Bats in Europe	20 October 1999

(1996). The most important changes have been the strengthening of conservation status of species of Community interest (i.e., the species listed in annexes IVa and II of the Habitats Directive), and establishment of the Natura 2000 network in Finland. The majority of areas that will belong to the network have already been protected by earlier decisions (Kangas *et al.* 1998).

Perception of threats to biodiversity

Already in the late 1800s both hunting and persecution by people and habitat changes were considered as threats to wildlife in Finland. Illegal hunting was common (Haltia 1950), and even the list of game animals included species, such as starling, that were later protected. In archipelago areas widespread egg-collecting was considered a serious problem (Hario 1993). Due to the fact that early conservation measures were targeted at “useful species” only, conservation practices included persecution of predators and competitors of game animals and “small birds”. For instance, persecution of the house sparrow was encouraged because the species competes for food and nest sites with other passerines (Böök 1898, von Berlepsch 1928). In the bird sanctuary of Klåvskär extermination of great black-backed gulls was one of the duties of personnel (Kärki 1928).

The importance of habitat changes for species diversity was apparently first observed in Finland with respect to urban and forest habitats. In urban areas, where human impact was perhaps most visible, habitat quality was early perceived as a factor affecting bird diversity. Böök (1898), Mela (1900, 1902) and Kivirikko (1922) complained about the impoverishment of avian diversity in urban parks (mainly in Helsinki) caused by excessive cutting of old trees and undergrowth. Active persecution of birds, mammals and reptiles was also common in urban areas, and was criticised for instance by local newspapers (e.g., Anon. 1893).

Homogeneity and fragmentation of forest habitats created by forestry were early recognised as threats to forest birds, although some bird conservationists did not like the traditional slash-and-burn agriculture either (Ståhlberg 1917).

A newspaper commented on the effects of intensive forest cutting as follows: “Forest areas in southwestern Finland are nowadays so small, that forest birds do not any more thrive in them. After the black grouse and capercaillie have disappeared, they do not return to these small forest patches any more” (Anon. 1929). Lindgren (1943) was well aware of the impoverishment of forest habitats caused by forestry, and noted that sensible forestry “has for a long time attempted to make our forests to resemble parks. Undergrowth, that provides shelter and food for game animals, has been cleared away as carefully as possible. At one time one tried to divide forests into stripes, in which only one type of forest was allowed to grow. Thus many insects and small plants important for forest birds were deprived of possibilities to survive” (Lindgren 1943, p. 13). As a remedy to this problem Lindgren (1943) recommended maintenance of bush layer and protection of key habitats of game animals such as small mires and springs. Lindgren’s recommendations on protection of key habitats (and those of Siivonen, 1951) closely resemble the lists of protected key habitats included in the revised Forest Act (1996) and Nature Conservation Act (1996) half a century later.

Before the report of Rassi *et al.* (1985), and the sectorial protection programs of certain habitat types no quantitative data were available on the relative importance of various threats to biodiversity. These and later reports have shown that forest use and changes in agricultural landscapes account for a major part of species extinction risk in Finland (Hanski 2000, Alanen & Mannerkoski 2000). According to Rassi *et al.* (1991), forest use was the main reason for threatened status of 40.9% of all threatened species, and overgrowth of meadows for 15.9% of threatened species. Hunting, formerly considered so important, was the main risk for only 23 animal species (1.4% of all threatened species). Thus, also in Finland habitat change has replaced hunting and persecution as the main threat to biodiversity.

Discussion and conclusions

Our review shows that from Magnus Ericsson’s mediaeval Land Law to the late 1800s all legisla-

tion that aimed at protection of species or habitats from overexploitation was based on the need to preserve some vital resource, such as game animals or valuable forests. We found no data that would have indicated that species or habitats were thought to have some inherent (non-utilitarian) value before the 1800s. Still it is impossible and unnecessary to try to draw boundaries between, for instance, the "utilitarian" hunting legislation and later "biocentric" nature conservation legislation. There is a perfect continuum from the old Swedish hunting laws to the important Hunting Decree of 1898, which in turn formed the basis for species protection sections of the 1923 Nature Conservation Act. Similarly, the idea that forest resources (and thereby forest habitats) should not be wasted can be traced back to more than 300 years of continuous forest legislation.

Our results shed new light on the origins of the Finnish conservation policy. It seems that in addition to Nordenskiöld's influential 1880 article, and the subsequent discussion within the academic and forestry circles (emphasised e.g., by Linkola 1941 & Pekurinen 1997), also the strong animal conservation movement of the late 1800s had a great impact on Finnish species conservation policy. For instance, the first bird sanctuary in Finland, the island of Långskär, was protected already in 1868, twelve years before the publication of Nordenskiöld's paper. It is also likely that active bird protection of the late 1800s contributed to protection of most passerine birds in the 1898 Hunting Decree. Due to activity of Topelius' Spring societies and writings of other animal conservationists the idea that many animal species need protection must have been widely known (and perhaps also accepted) by the 1880s.

Finnish animal and nature conservationists have had international contacts ever since Topelius founded his Spring society in 1870, based on Swedish models. The attempt to promote protection of migratory birds in Italy in the 1890s was probably the first Finnish contribution to international species or habitat protection. Finnish bird conservation was presented in international meetings already before the First World War, and Finland became an active member of the ICBP already in the 1920s. This international activity

has continued and widened to the recent decades (Table 2).

The hunting and forest use restrictions in the Swedish reign of Finland are fairly similar to those known from elsewhere in Europe. The declaration of the Åland Islands as a royal hunting reserve in 1537 was probably based on the model of royal forests in England (and later elsewhere), where they were originally established by William the Conqueror (Evans 1992). Other hunting restrictions were also common already in the Middle Ages. In the reign of King John (1199–1216) falconry was banned in England for a season to allow the stocks of game to recover (Evans 1992), and in the late 15th century even the wolf had a hunting season in England, from 25th of December to the 25th of March (Harting 1994). In Estonia, the first restrictions on felling of trees are from 1254 (Kongo 1998), and in the territory of the Czech Republic first attempts to protect forests were made in the 14th century (Roudna & Urban 1998). In Denmark the first forest conservation law was issued in 1593 (Kongo 1998). Conservation of valuable resources such as game animals or woods thus has a long history in many European countries.

Besides Finland, bird conservation was very active in many other European countries in the 1800s. The German Bird Conservation Society was founded in 1875, and the Royal Society for the Protection of Birds (in Britain) in 1889 (Evans 1992, Kongo 1998). Even before that, in 1869, the British Seabird Protection Act had been enacted (Nettleship 1996). It was mentioned earlier that in Sweden bird conservation organisations existed since 1869 (Topelius 1874). It thus seems that the rise of bird conservation in Finland after 1870 was not a separate phenomenon, but rather parallels with developments in other European countries, and was influenced by them.

In the course of history species or taxa have not been treated equally in terms of conservation efforts. Both in Finland and elsewhere species conservation efforts have been taxonomically focused on birds, mammals and valuable tree species. The first plant species were protected in Finland in 1925 (Fig. 1), the first invertebrate in 1955 (Fig. 2), and first bryophytes in 1992. Protection of animals traditionally considered as pests has been most difficult, as our example of

protection history of raptors (Table 1) shows. The Hunting Decree of 1898 that protected most passerine birds can be seen as an early and progressive step towards a more unbiased conservation policy (cf. Harrop 1999). Paradoxically, in the early phases of bird protection persecution of mammalian or avian predators and competitors of "useful" species was understood as a conservation method (e.g. Bööck 1898, von Berlepsch 1928). Until the 1970s it was possible to be paid by killing certain pest species. The long persistence of this tradition can perhaps be explained by the Finnish conditions as a European frontier land with a sparse human population, extensive land areas with relatively abundant game populations, and the popularity of hunting as a hobby.

In the 1900s the number of species protected as well as the total protected land areas increased both in Finland and in other countries (cf. World Conservation Monitoring Centre 1992). At the same time, and especially since the 1970s, conservation has become an increasingly international activity. As a member state of EC, the nature conservation policy of Finland will develop in the next decades largely according to the strategic objectives cooperatively set with other member states, as well as with other contracting parties of the Convention on Biological Diversity.

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