

Legal Limits and Adaptive Management of Wildlife Populations in Swedish Law

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Abstract: During the last century the variety of species has decreased dramatically and numerous species are today classified as endangered or threatened. The main determining factor is human related activities such as forestry, farming, intensive hunting and fishing. Since the middle of the last century, a number of legal instruments concerning the use and conservation of natural resources have been applied, such as protection of individual species and their nests and restrictions on hunting and fishing, without hindering the eradication of species. One proposition for the failures of traditional legal instruments is the lack of a holistic approach in regarding ecosystem characteristics such as inter-species and habitats relations and biodiversity. The paper finds that the legal instruments mainly are concerned with the rational use or protection of a certain species rather than dealing with inter-relations and the sustainability of ecosystems. E.g. the motive for legal protection is based on a definition of a sustainable population which is determined with respect to the conservation status of the targeted species rather than with aim of achieving sufficient diversity of species in the ecosystems and legal limits related to the use of wildlife populations fail to integrate ecological concepts such as biodiversity for determining such limits. Another proposition is that since ecosystems are dynamic and complex it is important that the legal system has the capacity to respond to ecological changes. The analysis will show that the legal system concerning the protection of species generally lacks adaptive elements. A legislative approach which is more holistic and adaptive is thus necessary; otherwise there is a risk that the preservation of biodiversity will be further frustrated.

Key Words: Protection of species, biodiversity, hunting, wildlife management, adaptive management, the Environmental Code, The Hunting Act.

Introduction

The variety of species has decreased drastically during the last century and many species are today classified as endangered or threatened. The current extinction of species is one of the most destructive changes in world history known today¹ and goes beyond what can be explained by natural evolution; the determining factor is instead factors such as building, forestry,² farming, intensive hunting and fishing and other human related activities.³ Since the middle of the last century, an array of instruments concerning the use and conservation of natural resources has been applied, however, without being successful in hindering the eradication of species.

¹ The extinction of species is not a new phenomena, however the current extinction of species is comparable with the mass extinction that took place 65 million years ago when the dinosaurian disappeared (Gröndahl, 2000).

² It is estimated that, due to the forestry alone, 27.000 species are extinct every year around the world, which is equivalent to 74 species per day or 3 species per hours and the pace is increasing (Brandt and Gröndahl, 2000).

³ Daily, G. (1997).

There may be several reasons for why the law has not been successful in hindering the eradication of species. One proposition for the failures of traditional legal instruments to achieve environmental goals such as a diversity of species lies in the lack of regard to inter-relations with other species and its ecosystem. Since ecosystems are complex and dynamic a system of protection that focuses on single targets rather than on the characteristics of ecosystems risk to frustrate the protection of biodiversity and lower ecological resilience.⁴ The paper aims to assess whether the existing legal instruments concerning the protection and utilization of species applied in Swedish law incorporates criteria that is suitable for achieving an efficient protection of biodiversity and ecosystems.⁵ Before proceeding it should be emphasized that the study is limited to assessing the protection of *diversity between species*, leaving out other levels of diversity.⁶

Moreover, since biodiversity is complex and dynamic, it is not sufficient that legal instruments correspond to these ecological criteria, the instruments must also be made dependent on whether the goal was achieved or not.⁷ This calls for legal systems which are adaptive in a way so that ecological reactions feedback to the legal system and from there into enforceable stipulations. Another aim of the paper is therefore to assess whether there are adaptive elements in the legislation regulating the protection of species and biodiversity.

Background to Swedish Laws on the Protection of Species and Biodiversity

The legislation concerning the conservation and utilization of species has developed over a long period. The rationale for developing these laws was originally based on anthropocentric interests, such as the desire to facilitate recreational hunting or increasing economic values. E.g. until the 19th centuries hunting was allowed without quantitative limits and the moose was almost extinct. In 1825 a ten year ban on moose hunting was set to hinder the loss of a valuable game species. There were no corresponding measures for the protecting

⁴ Ecosystem resilience is the magnitude of disturbance that can be absorbed or buffered before the ecosystem redefines its structure by changing the variable and processes that control its functional characteristics, that is, the ability of ecosystems to remain within a stability domain. See e.g. Holling and Meffe (1996), Gunderson (2000), Berkes et al. (2003).

⁵ The assessment is limited to the instruments concerning protection of species laid down in the Environmental Code, which is applicable to all species, and the hunting legislation applicable to wildlife species. The general provisions in the Environmental Code is supplementary by covering species not covered by the hunting legislations and by protecting species from activities that cannot be referred to as hunting.

⁶ Biodiversity is usually defined as “the variety of life at all levels of organization, from the level of genetic variation within and among species to the level of variation within and among ecosystems and biomes”. See e.g. the Convention on Biological Diversity.

⁷ Carlman (2005).

large carnivores; on the contrary the hunting of large carnivores was encouraged.⁸ During the 17th century, a bounty system which gave hunters a small sum of money for killing certain pest animals, was established by two Royal Decrees on Hunting with the purpose of eliminating predators.⁹ The 1734 State Law extended the number of animals to be included in the bounty system and in 1741 the Royal Decree on Avian Pests set bounties for pest birds.¹⁰ The national bounties continued to be paid until statutory protection was introduced.

During the 20th century, other principles and values of the relationship between man and nature arise and conservation laws and instruments for the protection and use of natural resources are developed. The instruments that evolved were for example the protection of individual species and their nests, individual protection of areas and general protection of certain types of habitats, licensing of harmful activities and restrictions on hunting and fishing, such as licensing and catch quotas.¹¹ Still the motive of the laws and instruments was and is often based on anthropocentric interest rather than conserving species or biodiversity for their intrinsic values.

Another feature of the instruments applied during the last decades is that they mainly been concerned with the rational use or protection of a certain species rather than dealing with the sustainability of ecosystems. However, the Convention on Biological Diversity of 1992 was an important development towards a more holistic perspective of the protection of the natural environment.¹² The Convention emphasizes that the protection of biodiversity incorporates the interactions among the various components of biodiversity, including humans, and that biological diversity is to be preserved for its own sake, beyond the anthropocentric values which biodiversity gives rise to. The Convention has been adopted by Sweden and biodiversity is implemented as one of the main goals of the Environmental Code.¹³ Since the entrance in the European Union in 1995, the Swedish laws on the conservation and use of natural resources have also been influenced by the EC Directives,

⁸ The large carnivores attacked domesticated animals and were thus seen as a threat to economic interests.

⁹ The decrees were part of general forest use regulations of 1647 and 1664.

¹⁰ Mykrä et al. (2005a), p. 285.

¹¹ Wilson et al. (1994), Gunderson et al. (1995), Michanek-Zetterberg (2004), p. 194ff.

¹² The Convention has however been criticized to be too weak and too general leaving much room for interpretation. See Boyle (1994).

¹³ In 1994 a national strategy to reach the biodiversity goal was enacted (Prop. 1993/94:30) which stated that the conservation efforts should focus on ecosystems and habitats and that species must be maintained in viable long-term populations and that the approach taken to maintain ecological processes and long-term survival should be holistic. This strategy has been developed by government bills and by written communications from the Government. In 1997, a government bill on the protection of endangered species and action plans for biodiversity was enacted.

such as the Habitat and Bird Directives¹⁴, and several of the stipulations discussed in this paper derives from these directives.

The Environmental Code and Bases for Protection of Species and Biodiversity

Article 1, chapter 1, of the Environmental Code (1998:808) lays down that the purpose of the Code is to promote sustainable development and to achieve this overall goal, the code shall, as one of five requisites, be applied to ensure that biological diversity is preserved. In the preparatory work for the Environmental Code it is stated that the national environmental goals established by the Parliament¹⁵ give guidance for the interpretation of the goal and in the environmental objective on a rich flora and fauna¹⁶ it is emphasized that the conservation of biological diversity should be based on an ecosystemic approach, that the resilience of ecosystems should be maintained, and that the emphasis of the conservation of species and their habitats should not be limited to species that are considered threatened or endangered.¹⁷

Chapter 8 of the Environmental Code lays down specific rules on the protection of species¹⁸ with the purpose to preserve biodiversity and the Code makes it an offence to break these prohibitions.¹⁹ Article 1 concerns the protection of animal species and establishes that the *killing, injury or capture of wild animals* or the *taking of or causing of damage to the eggs, spawn, roe or nests* of such animals can be prohibited by the Government²⁰ when there is a risk of a wild animal species becoming extinct or being subjected to exploitation or when it is necessary for compliance with international undertakings to protect the species.²¹ Article 1 establishes a general derogation in cases of attacks of persons or valuable goods.²² For plant species the *removal of, the causing of damage to or the taking of seeds or other parts of wild plants*²³ can be prohibited under the same conditions as for animal species (article 2).²⁴

¹⁴ Directive 79/409/EEG, O.J. 1979 L103/1 and Directive 92/43/EGT L206, 1992.

¹⁵ 16 objectives have been adopted (15 objectives were adopted in 1999 and one on biodiversity in 2005, "A rich diversity of plant and animal life", prop. 2004/05: 150, p. 203-227). They provide the basis for the environmental policy in Sweden, but are not legally binding.

¹⁶ See prop. 2004/05:10, p. 203-227.

¹⁷ Prop. 2004/05:10, p. 210.

¹⁸ Protection of a species includes protection of subspecies as well as hybrids, if both animal parents are protected. The rules are specified in the Regulation on protection of species (1998:179).

¹⁹ Environmental Code, chapter 29, article, 8 paragraph 9.

²⁰ Or by the authority appointed by the Government.

²¹ Author's italics.

²² The prohibition shall not apply where animals must be killed, injured or captured in order to defend a person or valuable property against attack

²³ Author's italics.

²⁴ According to the preparatory work, the causing of damage to or the taking of seeds or other parts of wild plants refers to acts such as picking, breaking of twigs, the removal of whole plants or the spraying of plant species (prop. 1997/98:45, part 2, p. 104).

There are thus three legal bases for protection. The *first* legal basis for protection is when there is a *risk of the species becoming extinct*. If the species is endangered or if there is a risk of it becoming endangered in the whole or parts of its natural range, the species can be listed and protected nationally or regionally. The risk of extinction must not be global and the threat must not be caused by human activities.²⁵ To determine whether a species is endangered or if there is a risk of the species becoming endangered the conservation status of the species must be evaluated in some way. According to article 16 of the Regulation on protection of Areas²⁶ the conservation status of a species is favourable when the population dynamics data on the species concerned indicate that it is *maintaining itself on a long-term basis as a viable component of its natural habitats*, and the *natural range* of the species is *neither being reduced nor is likely to be reduced for the foreseeable future*, and *there is and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis*.²⁷ That is, if viable populations of the species cannot be maintained on a long-term basis within their natural range,²⁸ protection of the species is justified.²⁹

The *second* legal basis for protection is when the species is not endangered, but it is being subjected to exploitation.³⁰ E.g. the species may become regionally extinct due to the picking, killing or capturing of the species. The *third* reason for protection is that protection of the species is necessary for compliance with international undertakings. The species must then be protected even if it is not threatened in Sweden.³¹ The EC law creates a comprehensive

²⁵ Prop. 1997/98:45, part 2, p. 103.

²⁶ Regulation (1998:1252) on protection of areas according to the Environmental Code. Conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations according to article 16(4).

²⁷ Author's italics. The provision originates from article 1 (i) of the Habitat Directive.

²⁸ *Natural range* is a dynamic concept which refers to the whole of the geographical area in which the species has occurred regularly and naturally during some period of time or where it could occur. It can for example be estimated on the basis of the likely distribution of the species. This concept should be distinguished from concepts such as natural habitats or habitats of species which are biological concepts determined by the species actual occurrence. See table 1.

²⁹ Guidelines for interpretation of the criteria for protection of species can be found in the environmental quality objectives which describe what quality and state of the environment are sustainable in the long term. Guidelines can also be found in the red-list system. The system is used to classify species into different categories to reflect the relative risk of extinction faced by the species assessed and to facilitate the priority of protection measures. There is no legal connection between the red list and the lists of protected species, the red list however has an important indicative value. The Swedish Environmental Protection Agency states that the view of the Swedish Species Information Centre should be taken into account at an early stage when a decision on protection is being planned.

³⁰ This basis for the protection of animal species was implemented by the Environmental Code. See Prop. 1997/98:45, part 2, p. 103.

³¹ The species protected by e.g. the EC Habitat and Bird Directives and the Bern Convention must thus be protected. E.g. species marked with *N* in the annex to the Regulation on the protection of species are listed in annex 4 of the Habitat Directive and therefore requires strict protection in Swedish law.

system, of protection of species with the overall aim of achieving biodiversity.³² The system is especially comprehensive for birds since all birds, whether threatened or not, should be protected.³³

The Protection of Habitats of Threatened Species

The protection of species laid down in the Environmental Code and the regulation on the protection of species is limited to acts that directly damage the protected species or their eggs, nests or roe. According to the Regulation on the Protection of Species it is prohibited to *deliberately* capture and kill and disturb animals, *deliberately* destruct or take egg and deteriorate or destruct breeding sites or resting places and to *deliberately* pick, collect, cut, uproot or destruct plants.³⁴ Acts that are not deliberate, but that lead to e.g. the killing, or disturbing of protected species e.g. by damaging habitats that are critical for the survival of the protected species (such as the logging of trees which embrace the nests of a protected bird) are thus not prohibited. However, it is questionable if the term deliberate should refer to only intended actions or if it is enough to be aware of the consequence of the act for the protected species. A case from the EC Court³⁵ gives some support for the former interpretation. However, a more extensive interpretation necessitates a change in the provisions concerning the legal right to compensation to be compatible with the constitution.³⁶

The law provides other possibilities, with differing strengths, to protect habitats of endangered species, such as the establishment of protected areas (e.g. nature reserves, habitat protection areas, wildlife and plant sanctuaries and shore protection areas).³⁷ However, the protection of areas is limited to the targeted area and/or requires listing and the protected area approach therefore has a disadvantage compared to the system of protecting habitats as it fails to protect scattered habitats which often is important, especially when species are wide ranging. A habitat protection system which goes beyond the system of protecting areas can therefore be more adequate for the protection of threatened species which ranges outside legal borders. However, the protection of scattered habitats can have adverse consequences e.g. on

³² See article 3 of the Habitat Directive.

³³ However, this stipulation on the protection of species is not fully implemented in Swedish law, since only those birds listed enjoy protection in Sweden. The stipulation is however implemented in the hunting legislation which will be discussed below.

³⁴ Author's italics.

³⁵ Case 412/85 *Commission vs. Germany* [1987] ECR 3503.

³⁶ See Instrument of Government (RF) 2:18). At the moment there is no right to compensation connected to the provision on the protection of species laid down in chapter 8, article 1 and 2 of the Environmental Code. See chapter 31, article 4, Environmental Code.

³⁷ See chapter 7 of the Environmental Code. The general rules of considerations in chapter 2 of the Environmental Code are applicable as well, however, these rules are not criminalized.

predictability and legal certainty. For example, in the United States, where the protection of species in the Endangered Species Act includes protection of the habitat of the endangered species, the building of a dam was halted, although 80 percent of the work had been completed, when the *snail darter* (a new species of perch) was discovered. As the *snail darter* was listed as an endangered species and the river where the dam was being built declared as its critical habitat, the building of the dam was halted.³⁸

The Protection of Biodiversity between Species

The overall purpose with the specific rules on the protection of species provisions laid down in chapter 8 of the Environmental Code is to preserve biological diversity. The underlying assumption is that to secure the achievement of biodiversity the *species* that are or may become threatened must be protected to assure their long-term survival. However, the focus of the instruments for protecting species described above is principally limited to the targeted species without taking account of the interrelations with other species or the ecological function or value as an indicator of the ecosystem to which the species belong. The determination of a species conservation status is based on criteria which relates to the size of the population of the targeted species and the size and quality of the natural range of the population of the targeted species and species are considered threatened and reasonably protected if there are signals of adverse changes of these criteria. The protection is thus based on the degree of threat to the species itself including its natural range.

The environmental goal on biodiversity lies down that species that are maintaining itself in viable long-term populations today must not be neglected in the work to reach the biodiversity goal. No species occurring naturally in Sweden should be or become endangered or vulnerable.³⁹ This means that even non-listed species should be protected. Species that are not listed enjoy a different and dispersed system of legal protection. The principle concerning the right to public access to private land gives restrictions on the use of nature.⁴⁰ Moreover, article 1, chapter 7 of the Environmental Code states that any person who exercises the right of access to private land shall treat it with due care and consideration. The general rules of consideration laid down in chapter 2 of the Environmental Code give further restrictions; however, these are not criminalized. Species and their habitats are also protected by the

³⁸ See case *Tennessee Valley Authority v. Hill*. In Finland the protection of species incorporates protection of habitats as well. In two cases the protection of the flying squirrel has led to restriction of activities (limited rights to forestry and cancelled permission to quarrying of rock). See cases 25.06.2003/1540 (HFD 2003:30) and 25.06.2003/1541.

³⁹ See prop. 2004/05:150, p. 210 and 214.

⁴⁰ Some actions are criminalized through the Criminal Code, chapter 12, article 2(2) and 4.

protection of areas, such as nature reserves with adherent by-laws which may prescribe restrictions and prohibitions on e.g. logging, hunting and fishing, and since the protected area may inhibit a wide range of species, non-listed species and biodiversity may enjoy protection as well. Species that are not listed and biodiversity can also enjoy an indirect protection through the protection of threatened species, since conservation measures taken for threatened species may benefit other species and biodiversity as well.⁴¹

The Hunting Act and the Protection of Wildlife Species and Biodiversity

The modern hunting legislation was established in 1938 and amended in 1987 by the Hunting Act (1987:259)⁴² and the Hunting Regulation (1987:905).⁴³ The current hunting legislation regulates hunting activities within the Swedish territory, wildlife management and the right to hunt.⁴⁴ According to article 2 of the Hunting Act wildlife species refers to all *wild mammals*, including marine mammals, and *birds* and hunting refers to *capturing* or *killing* wild animals.⁴⁵ According to article 3 *all* wild mammals and birds are protected.⁴⁶ The protection of species according to the hunting legislation also covers the *eggs* and *nests* of the animals.⁴⁷ Hunting is therefore always forbidden as long as it is not permitted by the law or by by-laws or decisions based on the law.⁴⁸ E.g. the annexes of the Hunting Regulation list species for which general hunting during the hunting seasons is allowed. The principle that all wild animals are protected was implemented in the legislation in 1967 to emphasis that the protection is part of the general management of the environment and not only a means for protecting species for hunting purposes.⁴⁹

The law provides several derogations from the protection of species in addition to the general hunting of listed game species. Hunting of a limited number of bear, wolf, wolverine

⁴¹ Prop. 2004/05:150, p. 218.

⁴² The Hunting Act of 1987 replaced the Hunting Act from 1938.

⁴³ The Hunting Regulation of 1987 replaced the Hunting Statute of 1938 and the Regulation on hunting season of 1976.

⁴⁴ See article 1. The law is also applicable the Swedish economic zone, to hunting from Swedish ships from the free ocean outside the economic zone and to hunting from Swedish airships above the free ocean outside the economic zone in certain situations laid down in the law according to article 1(2).

⁴⁵ Author's italics.

⁴⁶ These protection rules are complemented by the general protection of species laid down in the Environmental Code since the Code applies to other species and to other activities. Author's italics.

⁴⁷ See article 2 and 3.

⁴⁸ Illegal hunting is criminalized. E.g. a sentence for serious instances of illegal hunting or receiving illegally hunted animals can be between six months' and four years of imprisonment. See articles 43-51b of the Hunting Act. If an act is criminalized according to article 46 of the Hunting Act and at the same time criminalized according to the provisions in the Environmental Code, the latter legislation applies, article 46(3). The higher scale of sentence is therefore excluded.

⁴⁹ Prop. 1986/87:58, p. 26. Derogations from the protection should only be allowed in those cases when hunting can be considered justifiable from different viewpoints.

and lynx can be permitted through by-laws or decisions on a case-by-case basis by the Swedish Environmental Protection Agency after consultations with the county administration board for areas with viable populations if there are no satisfactory alternative and a favourable conservation status of the populations in its natural range is not jeopardized.⁵⁰ Moreover, hunting to prevent damage caused by wild animals can be permitted if there is a risk for apparent traffic accidents or serious damage (article 7) or if there is a risk for considerable damage due to the existence of the wild animals (article 8).⁵¹ The hunting regulation specifies that this hunting can only be allowed if there is *no satisfactory alternative* and the derogation is *not detrimental* to the *maintenance of the population* of the species at a *favourable conservation status* in their *natural range* in four cases.^{52,53}

When hunting is allowed it is subjected to several conditions and limitations laid down in law and in subsidiary legislations. The purpose of the limitations of hunting is to achieve a sustainable use of a renewable resource; wildlife populations. All wild animals occurring naturally in Sweden are to be conserved in viable long-term populations and hunting is consequently allowed only if it is carried out in a sustainable way. Limitations to hunting are e.g. limits in time when animals can be hunted (so called *open and closed hunting seasons*), limits in the quantity of animals that can be hunted (hunting quotas through e.g. licences), limitation of the place where animals can be hunted and limitations in which weapons and other methods that could be used. Article 29 of the Hunting Act authorizes the Government to decide on hunting season of wild animals in different parts of the country, to issue licences for hunting during specific hunting periods and to issue permits to hunting for the preventing of damage caused by wild animals and the Swedish Environmental Protection agency has been delegated by the Government to issue by-laws concerning administrative provisions on hunting.⁵⁴ By-laws exist e.g. for moose hunting, ammunition and other means of hunting.⁵⁵

⁵⁰ See article 6 of the Hunting Regulation (selective hunting methods are required). This provision is however not compatible with the Habitat Directive since it does not require that the hunting is carried out for preventive purposes.

⁵¹ According to the preparatory work, the *risk* of damage should be sufficient for allowing hunting for protective reasons. The legal ground for allowing protective hunting is thus extended with the Hunting Act of 1987 in comparison with the Hunting Act of 1938. The risk must however be immediate and the damage that arise severe.

⁵² The derogations can be permitted in the interest of public health and safety or for other imperative reasons of overriding public interest, in the interest of aerial safety, to prevent serious damage, in particular to crops, livestock, forest, fisheries, water and other types of property and to protect wild animals and plants and to conserve natural habitats for these animals and plants. Author's italics.

⁵³ See articles 5 and 9 of the Hunting Act, amended for compliance with the Habitat Directives (Prop. 1999/98:45, part 1, p. 312).

⁵⁴ See e.g. article 7 concerning licensed hunting of moose and red deer and article 12 concerning weapons and other hunting methods.

Guidelines are issued on the management of wildlife which has been developed through recommendations on hunting seasons.⁵⁶ Moreover, certain wildlife management measures are required by law and there is also an obligation to carry out the hunting so that the wild animals do not suffer more than necessary.⁵⁷

Wildlife Management and Hunting

Article 4 of the Hunting Act lays down a general rule on wildlife management.⁵⁸ The objectives of provision on wildlife management is to conserve wild animals occurring naturally in Sweden including birds occurring, naturally but temporarily in the country⁵⁹ as well as promoting a development of the populations⁶⁰ of wild animals that is suitable according to public and private interests.⁶¹ Wildlife management measures include the taking of specific measures to ensure that wild animals are protected, such as habitat protection and enhancement through e.g. feeding and construction of arable land for wild species and water for wild species,⁶² and the adaption of the hunting according to the number of wild animals.⁶³

Wildlife management measures aims not only at maintaining or increasing the number of wild animals, but as well as keeping the number of wild animals down. Since the law requires that the development is suitable according to public and private interests, a balancing between the size of the population and the adverse effects of this size on economic and social interests or on the conservation status of other wild animals or plants.⁶⁴ Hunting can e.g. be motivated to prevent damage to biodiversity resulting from excessively large populations or to prevent

⁵⁵ See by-laws 2002:18 (*Naturvårdsverkets föreskrifter och allmänna råd om jakt och statens vilt*) and 2002:19 (*Naturvårdsverkets föreskrifter och allmänna råd om älg, kronhjort och stora rovdjur m.m.*). These by-laws have replaced the Hunting Promulgation SNFS 1983:1.

⁵⁶ See Dnr 410-5056-00 Nf and 410-5057-00 Nf.

⁵⁷ Article 27 of the Hunting Act.

⁵⁸ There is also an obligation for everyone to treat wild animals with due care and consideration.

⁵⁹ This part of the article was laid down as a consequence of the Bird Directive. See prop. 1997/98:45, part 1, p. 312.

⁶⁰ A *population* is a group of individuals of the same species that live together in an area of sufficient size to permit normal dispersal and/or migration behaviour and in which numerical changes are largely determined by birth and death processes.

⁶¹ Article 4 of the Hunting Act thus lays down the goal of the Swedish hunting and wildlife management policy. See prop. 1999/2000:73, p. 57.

⁶² Prop. 1986/87:58, p. 19.

⁶³ Empirically habitat management and enhancement is one of the most important measures in wildlife management. See motion 2005/06: MJ487.

⁶⁴ However, since the species should be conserved in viable populations this balancing is only possible when the genetic variation within the population is ascertained. See prop. 1986/87:58, p. 21.

damage caused by alien species. Hunting is also a means of preventing traffic accidents and damage to economic activities such as forestry and agriculture.⁶⁵

According to the preparatory work, hunting is allowed only if it is compatible with the objectives of the provisions on wildlife management.⁶⁶ Wildlife management is thus a prerequisite for hunting. At the same time hunting is a part of the wildlife management since hunting is a method of regulating the number of species and its composition. The landowner or other owners of the hunting rights are jointly responsible for the taking of wildlife management measures.⁶⁷ The Swedish Environmental Protection Agency is the responsible sectoral agency for the management of wild mammals and birds⁶⁸ and the county administration boards are responsible at the regional level.

Time Limits to Hunting

According to article 2 of the Hunting Act, general hunting of wild animals is allowed during the time periods⁶⁹ laid down in appendix 1 of the Hunting Regulation during the hunting year which runs between 1st of July and 30th June.⁷⁰ The county administration board is authorized to issue by-laws to limit these time periods if it is necessary due to snow, ice and climatic conditions. According to article 3 a and 5 of the Hunting Regulation, the hunting of moose is allowed during time periods laid down in appendix 2 and the hunting of red deer during the time periods laid down in appendix 3. Hunting of mature moose, which is only allowed through licences issued by the county administration board within licence areas regulated in article 33(2 and 3, paragraph 2) or without licences within moose management areas established by the county administration board, continues for one or several periods during a minimum of 70 days, but no longer than the end of February.⁷¹ For licence areas regulated in article 33(3), paragraph 1, the hunting season is five days or shorter. The hunting

⁶⁵ Prop. 1986/87:58, p. 21. Predator control of large carnivores, e.g. the wolf, lynx, bear and wolverine is only allowed under strict conditions laid down in law. Hunting of protected species for preventing damage should only be permitted if there is *no other satisfactory solution*.

⁶⁶ Prop. 1986/87:58, p.19- 21.

⁶⁷ Article 4(2) of the Hunting Act. When the owner of the hunting rights and the landowner is not the same person, the responsibility for both wildlife management measures and the regulation of the number of hunted animals should be shared. It is also suggested, from a cost-efficient perspective, that owners of hunting rights should cooperate when taking wildlife management measures. See prop. 1986/87:58, p.28.

⁶⁸ Regulation (2001:1096) with instructions for the Environmental Protection Agency, article 4. The wildlife management practices taken by the Swedish Environmental Protection agency includes decisions on hunting and controlled hunting, as well as producing action plans to protect endangered species.

⁶⁹ The time periods when hunting is allowed is referred to as general hunting seasons (*allmänna jakttider* in Swedish).

⁷⁰ Article 29 of the Hunting Act authorizes the Government to decide on hunting season of wild animals in different parts of the country.

⁷¹ The specific hunting season for moose is laid down in annex 2 of the Hunting Regulation.

period could be limited in certain counties by the county administrative board, if it is necessary due to reindeer herding or snow conditions.⁷² In the preparatory work it is proposed that the decisions on the hunting seasons should be made after consultation, through *local forums*,⁷³ with representatives for hunting interests and other interest concerned by the decision and ultimately after consulting the wildlife management board.^{74,75} The hunting seasons are set on a yearly basis by the county administration boards. These provisions do not apply to the hunting of moose calves.⁷⁶ Moose calves can be hunted during a period of five days; however, the period can be limited by the county administration board. The county administrative board decides the hunting periods of red deer hunting within the time period laid down in the Regulation.⁷⁷ Annex 4 of the Hunting Regulation lays down the time periods for protective hunting. There are also limits of the possibility to hunt during the day for certain species and the hunting of these species can be prohibited between sunset and sunrise.⁷⁸ The county administration board may give exemptions from the provisions concerning the limits of time during the day.⁷⁹

The hunting in Sweden is thus limited through general and specific hunting seasons laid down in law. The hunting of the largest part of the species are limited to autumn and winter, however the time periods can vary considerable between species and counties.⁸⁰ When and

⁷² The hunting season for moose within A- E- and moose management areas was set to 28, 44 and 72 days in the different municipalities in Norrbotten in 2004.

⁷³ *Samråd* in Swedish. The Swedish Association for Hunting and Wildlife Management has together with the Hunters National Association, the Farmers National Association and The Forestry Industries developed guidelines for the local forums. There is no legal obligation to arrange or participate in the local forums, but it is suggested by the government that the procedure with local forums should be intensified (Prop. 1991/92:9).

⁷⁴ The wildlife management boards consist of eleven or twelve members who represent different interest are regulated in article 46 of the Hunting Regulation. The Swedish Environmental Protection Agency is authorized to determine the obligations of the board. According to NFS 2002:19, article 29, the wildlife management board shall meet once a year and shall on a yearly basis follow up the work within the local forums.

⁷⁵ See prop. 1986/87:58, p. 45. It is further stated that the Swedish Environmental Protection Agency should give general advises for the county administration boards when deciding hunting seasons for moose. Such general guidelines have been established.

⁷⁶ Article 33(1).

⁷⁷ The time period runs between the middle of October and end of January within red deer management areas in the county of Skåne. In the rest of the country, the hunting goes on from the 16th of August to the end of January (only hinds and calves may be hunted through sitting up or stalking until middle of October).

⁷⁸ Hunting with firearms for moose is only allowed from one hour before sunrise until sunset, the hunting of brown bear only from one hour before sunrise until two hours before sunset and the hunting of wolf, wolverine, lynx, red deer, roe deer and mouflon sheep is only allowed from one hour before sunrise until one hour after sunset. Only sitting up or stalking (*Vakt- och smygjakt* in Swedish) is allowed during the hour after sunset. See articles 9-9b of the Hunting Regulation. Other species can be hunted 24-hours a day provided it is during the open hunting season.

⁷⁹ If the permission on hunting falls under article 27 or 31(1), the permission should be tried by the Swedish Environmental Protection Agency.

⁸⁰ E.g. moose hunting in southern and central parts of Sweden goes on for about two months with its start in the beginning of October. In northern Sweden the season for moose is divided into two parts starts, the first part goes on between 5th of September and 2nd of October and the second period is between 15th of October and 27th of November (in some parts the hunting period is shorter). In the smallest hunting areas moose hunting is allowed

where hunting will be allowed will depend on both ecological and economic criteria. It is stated in the preparatory work⁸¹ that one criterion for allowing open hunting seasons for species is that the hunting is not detrimental to the population of the hunted species. The hunting season should thus be allowed in accordance with a favourable conservation status of species. Derogations can however be made for wild alien species. Hunting should moreover not be allowed during the breeding times of the animals and the hunting during the time when the young animals are dependent on the animal parents should not be allowed due to animal protective reasons.⁸² The hunting season is also to be based with care to public and private interests, such as the interests of forestry and traffic.⁸³ E.g. the hunting season of moose could be extended in order to increase the amount of shooting to limit grazing damages and decreasing the number of traffic accidents. It is further stated in the preparatory work that the effect of the length of the hunting season on the population should not be overvalued and that other methods could be more efficient in regulating the population dynamics.

The general hunting seasons are ultimately decided by the Government⁸⁴ after consulting authorities and organizations, such as the Swedish Environmental Protection Agency and the Swedish Association for Hunting and Wildlife Management. An assessment of the governmental decisions concerning hunting seasons, show that the motives for the decisions are often not laid down in the decision. In one case, concerning the hunting season of Eurasian woodcock, the decision to not amend the hunting season is laid down.⁸⁵ The application to extend the hunting season of repositioning male Eurasian woodcock was rejected since the bird species is protected according to article 7 of the Bird Directive during breeding and rearing times and the suggested hunting period falls within the rearing period of the species and a general hunting season is not compatible with the derogation requisites laid down by the Directive.

Proposals to change time limits are generally made by The Swedish Environmental Protection Agency or by the Swedish Association for Hunting and Wildlife Management. The

for only a few days. The season for roe deer is longer and starts on 16 August with hunting for bucks. In southern and central Sweden hunting for kids is allowed from 1 September, and all roe deer can be taken from 1 October. In northern Sweden roe-deer hunting finishes on 31 December and in the rest of Sweden on 31 January. Certain provinces also permit hunting for bucks between 1 May and 15 June. Hunting of hazel hen, black grouse and capercaillie is permitted from 25 August, except in Skåne and on Gotland.

⁸¹ See prop. 1986/87:58, p. 26 and 29-30.

⁸² The hunting of rats and mice during the breeding times is exempted from the protection out of practical reasons (prop. 1986/87:58, p. 26).

⁸³ Prop. 1986/87:58, p. 31.

⁸⁴ The hunting season can as mentioned above in certain cases be limited by the county administration board and by owners of hunting rights which may limit the general seasons for certain species by starting the season later or closing the season earlier.

⁸⁵ See decision Jo2005/997 (2005-06-16).

Agency has established guidelines on hunting seasons which form a basis for the proposals of amended hunting seasons.⁸⁶ The guidelines emphasize that the purpose of hunting is to achieve sustainable stocks of wildlife species occurring naturally in the country and that the hunting seasons is a central tool in achieving sustainable hunting manners. The primary criterion for the decision on hunting seasons is thus to achieve sustainable stocks, in an international, national and regional perspective. Other criteria for the determination of hunting seasons include that hunting seasons for general hunting and licensed hunting should not be set to periods when wild animals return to their breeding places, when the animals reproduce, heat, breed, bring up young animals or when young animals are dependent on the animal parents unless the hunting is carried out of scientific reasons and permitted by licence, that hunting season should be removed if there is scientific evidence that the hunting is a critical factor for the long-term survival of a wildlife species and if there is a lack of scientific evidence, the precautionary principle should be applied. When it comes to hunting of protective reasons, the hunting seasons should be as short as possible and the hunting should be carried out with hunting methods that are as efficient as possible.

Quantitative Limits to Hunting

The hunting in Sweden is, as described above, primarily regulated through general and specific hunting seasons laid down in the Hunting Regulation. When general hunting seasons apply to a game species an unlimited number of animals can generally be hunted. However, the hunting can also be regulated by quotas. In Sweden the hunting for moose in the whole country and the hunting of red deer in Skåne is regulated through licences and the licences are issued by the county administration board on a yearly basis.⁸⁷ According to 33 of the Hunting Act the hunting of moose is only permitted *within an area* registered by the county administration board⁸⁸ and in accordance *with a licence* issued by the county administration board, the hunting of moose calves is exempted from the licence requirement. For an area to be registered as a licence area for moose, the area must be suitable for allowing moose

⁸⁶ Dnr 410-5057-00 Nf. These guidelines are used by the Swedish Environmental Protection Agency when the agency gives proposals on amendments of hunting seasons, takes decisions concerning licensed hunting and establishes by-laws and general advises concerning hunting. They should also be used by the county administration board when taking decision concerning hunting seasons. See above.

⁸⁷ Below, primarily the hunting system for moose will be described. The hunting system for red deer is similar with some exceptions; the hunting of red deer in Skåne requires licences and should be carried out within registered areas and outside these areas hunting licences are not required, but the hunting is limited by hunting seasons. In the rest of the country hunting can be carried out within *red deer management areas* without licences within the hunting seasons laid down in annex 3 of the Hunting Regulation. See prop. 1986/87:58, p. 48-50.

⁸⁸ *Licensområde* in Swedish.

hunting.⁸⁹ The county administration board can decide according to annex 2 of the Hunting Regulation that only moose cows or moose calves can be hunted within these areas⁹⁰ if this is necessary for the management of the moose population.⁹¹ If the area is not large enough to shoot one mature moose per year the county administration board can refuse to register the area.⁹² Despite this, the county administration board can register an area and allow the shooting of one optional moose per year if there are specific reasons for that or one moose calf per year if the area is at least 20 hectares.⁹³ The licences can be given for more than one year at the time.⁹⁴ A prerequisite for deciding the number of animals for a period longer than one year is that the conditions within the area are predicted to be *stable*⁹⁵ during the years when the licence is applicable.⁹⁶ When licences run over a longer period the owners of hunting rights can decide how many moose to shoot during each year.

The licenses issued by the county administration boards thus allocate the number of moose to be harvested from the specific land area for which the license is issued.⁹⁷ Guidelines for deciding the quotas of animals can be found in the preparatory works of the hunting legislation. One principle emphasized is that the hunting of moose should be adjusted to the production of moose within that area.⁹⁸ In the preparatory work on hunting and wildlife management⁹⁹ the government pronounced that the populations of primarily moose, red deer, fallow deer, and roe deer should be managed to balance the number of animals against the damage caused by the animals and that landowners and owners of hunting rights should have a greater responsibility for achieving this balance.

When the county administration board decides on the quantity of animals to be shot, local forums, organized by the Swedish Association for Hunting and Wildlife Management and comprised by representatives for hunting interests and representatives for other concerned interests such as agriculture and forestry, can take place. The local forum leaves suggestions about the number of animals to be shot, as well as suggestions on the distribution of the

⁸⁹ Article 33(2), Hunting Act.

⁹⁰ That is, areas regulated in article 33(2) of the Hunting Act.

⁹¹ See also prop. 1993/94:173, p. 16.

⁹² Article 33(2), Hunting Act.

⁹³ Article 33(3), Hunting Act.

⁹⁴ Article 3(2), paragraph 2 of the Hunting Regulation.

⁹⁵ Authors italics.

⁹⁶ See prop. 1986/87:58, p. 44.

⁹⁷ This hunting must also be carried out within the time limits set by the county administration board. The hunting seasons generally extend for at least 70 days. The hunting is thus limited *both* by quotas and time in these cases.

⁹⁸ See prop. 1986/87:58, p. 40, bet. 1986/87:JoU15, rskr. 1986/87:190, prop. 1991/92:9 and prop. 1993/94:173, p. 7. This principle is referred to as *produktionsanpassad jakt* in Swedish. It is noted in 1993/94:173 that an adjustment to the production of the moose includes the shooting of moose calves (p. 15).

⁹⁹ Prop. 1991/92:9.

licences. These suggestions are based voluntary observation made by hunters concerning e.g. sex and age composition of the populations and to consideration to the damage caused by the populations such as grazing damages and the number of traffic accidents. This suggestion is given to the wildlife management board which thereafter leaves its suggestion to the county administration board which takes the final decision.¹⁰⁰

An exception from the licence requirements is given for hunting within *moose management areas*. An area which is large enough to sustain a moose population can be registered by the county administration board as a moose management area.¹⁰¹ The possibility to establish moose management areas was introduced in 1992 and the purpose is to increase flexibility by transferring the responsibility of moose management to landowners and owners of hunting rights.¹⁰² The moose management area is a voluntarily organization and is not regulated by law in the same way as the wildlife management areas.¹⁰³ Since licences for hunting are not required within the moose management areas, the number of animals is regulated by the owners of hunting rights and not by the county administration board.¹⁰⁴ Since the hunting for moose is considered to have a significant effect on the population dynamics,¹⁰⁵ owners of hunting rights play an important role in the management of the moose. For moose management areas, management plans should be established.¹⁰⁶ It is recommended that the management plan should be established in the local forums and that it should include a description of the goal of the management of moose in a long-term perspective, as well as information about planned measures for preventing grazing damage and traffic accidents caused by moose, information about the limits of the area concerning the number of moose and the number of moose that should be shot each year.¹⁰⁷ The amount of moose shot within a moose management area is thus determined by the hunting season of a minimum of 70 days, if there are no specific reason for the county administration board to limit the number of days, and the mandatory management plan.

¹⁰⁰ <http://www.jagareforbundet.se/> (2006-04-22).

¹⁰¹ Article 3(2) paragraph 1 of the Hunting Regulation. This possibility was proposed in the preparatory work 1991/92:9 concerning hunting and wildlife management and the Parliament decided to implement this possibility. See bet. 1991/92:JoU5 and rskr. 1991/92:48.

¹⁰² Prop. 1991/92:9, p. 16.

¹⁰³ Act (2000:592) gives the wildlife management areas the right to take binding decision for its member, such as limiting the quotas decided by the county administration board (article 23).

¹⁰⁴ See prop. 1993/94:193, p. 6.

¹⁰⁵ <http://www.jagareforbundet.se/> (2006-04-22).

¹⁰⁶ Article 3, Hunting Regulation.

¹⁰⁷ See by-laws NFS 2002:19. The Swedish Environmental Protection Agency is authorized by the Government to issue by-laws on the registration of licence areas and management areas and licences for moose and red deer according to article 7 of the Hunting Regulation.

Hunting quotas are also set for the hunting of protective reasons.¹⁰⁸ Hunting quotas for large carnivore populations are based on population estimates, reproductive rates, and levels of predation on reindeer, sheep, and other domestic animals.¹⁰⁹

Protection of Biodiversity in the Hunting Legislation

All wild animals are protected according to the Hunting Act. Wild animals include birds that rest temporarily in the country, after an amendment of article 4 of the Hunting Act for compliance with the Birds Directive.¹¹⁰ All wild birds and wild mammals are thus protected unless hunting is allowed by the Hunting Act or subsidiary legislations and the overall principle for hunting is that it is defensible from a wildlife management perspective.¹¹¹ This stipulation is compatible with the biodiversity goal that all species are to be conserved in viable populations in a long-term perspective.¹¹² The environmental goal on biodiversity further states that biological diversity should be maintained through a combination of sustainable use of biological resources and the conservation of species and their habitats and that species that are exploited through hunting should be managed in such a way that they can be harvested as a renewable resource in the long term without affecting ecosystem structures or functions.¹¹³

Hunting should consequently only be allowed if it is managed in such a way that the targeted species is conserved in a viable long-term population and biological diversity is maintained. The stipulation that all wild species are protected gives a strong legal protection not only for threatened species but for the diversity of all wild mammals and birds. However, the strength of the protection will depend on the number exemptions which allow derogations from the protection of species and the design and constraints of these exemptions. In Sweden, exemptions are made for a number of mammals and birds and the hunting of these species is mainly regulated with time limits and to some extent with licence requirements.

Since species will react differently to the hunting limits it is necessary to develop limits with regard to the characteristics of the targeted species to achieve favourable conservation statuses of species. In general the fluctuations of small game animals are not significantly affected by hunting, and hunting limits can therefore be generous, while the opposite goes for

¹⁰⁸ E.g. hunting quota for lynx with the reindeer herding area during 2006 is set to 27 animals. Decision Dnr 411-6660-05 Nf. The decision is based on articles 23 a and 24 of the Hunting Regulation. See above.

¹⁰⁹ <http://www.jagareforbundet.se/> (2006-04-22).

¹¹⁰ Prop. 1997/98:45, part 1, p. 312.

¹¹¹ See above and prop. 1986/87:58, p. 60. Hunting should also be regulated to meet animal protective and safety interests.

¹¹² Prop. 2004/05:150, p. 210.

¹¹³ Ibid.

large game animals such as moose. This single-species approach may however not be sufficient to achieve or maintain biodiversity since ecological knowledge shows that it is important that there is a holistic approach of the regulations for securing maintenance of biodiversity. To achieve both favourable conservation statuses of species and biodiversity goals, these legal limits should therefore not be set only with regard to targeted species but with regard to the interrelations with other species and its ecosystem as well. If not, there is a risk that management will be ineffective and biodiversity may be adversely affected.

To illustrate, take the case of the ptarmigan for which hunting is allowed in Sweden during the specific hunting seasons laid down in the Hunting Regulation. The number of ptarmigan is important for the survival of several endangered and protected species, such as gyrfalcon, golden eagle, rough-legged buzzard, arctic fox and wolverine. There is thus a motive to protect the survival of ptarmigan not only for the survival of the ptarmigan alone. By regarding the interrelations between these species it may be motivated to restrict the hunting of ptarmigan further. On the other hand, the number of predators of the ptarmigan may be regulated, when not being threatened, to increase the number of ptarmigans. However, in the case of the ptarmigan studies show that the fluctuations of the ptarmigan population is unrelated to the number of predators and that the fluctuations depend on other factors such as weather conditions, the availability of insects, fluctuations in the stocks of small rodents.¹¹⁴ This shows that there is often a more complex set of relationships than that of linear predator-prey relationship which must be taken into account when deciding on hunting limits.

There are no biodiversity goal incorporated in the Swedish hunting legislation as in the Environmental Code and the legal limits to hunting are generally set with the overall purpose to prevent excessive hunting of the species and to uphold a sustainable use of species, but not with direct regard to biodiversity goals. In Sweden most species are regulated solely with time limits which is a rather imprecise management tool. Time limits are set within a biological framework for each species which means that the limits are determined with care to knowledge about ecological factors such as the conservation status of the species, breeding times, young animals' dependency on the parent animals and climatic variations. The biological framework is thus based on ecological factors that mainly concern the targeted species. However, the limits take, to some extent, regard to the interrelations with other species and to biodiversity aspects by controlling species that cause damage to other species or biodiversity.

¹¹⁴ Sandberg (2001), p. 37.

Hunting to control species that cause damage is a form of wildlife management measure, usually referred to as predator control, which can be highly beneficial for both species and to the diversity of species. E.g. in Sweden the hunting of mink is allowed during the whole year due to its effect on the fauna of birds in the archipelago and especially due to its predation effect on colonies and land living birds. White birds, such as mew gull and terns, which live in colonies, are affected by the number of mink both in a direct and in an indirect way. The mink kills the young birds and eggs and the bird may also leave the nests for such a long time that young birds freeze or starve to death. Studies have show that the number of these white birds in the colonies increases when the number of minks decreases. However, other species related to the white bird colonies, such as tufted duck, ruddy turnstone and ringed plover, and to some extent mallard and velvet scoter, increase as well. These species are mainly dependent on the colonies as resting places. The colonies of mew gull and terns thus have a key role in the ecosystem of several birds. By regulating the number of mink through hunting, the number of several different bird species can be affected. However, by reducing the number of mink, other predators can benefit through decreased competition and increase or change their predation behaviour. Moreover, by decreasing the number of mink, the competition within the mink species decrease and the mink species left can increase predation.¹¹⁵

There is also another link between hunting and the preservation of biodiversity. A serious threat to species and biodiversity is the fragmentation of habitats and by requiring management measures, such habitat enhancement measures, the hunting legislation can contribute both to the protection of the targeted species and to non-targeted species and biodiversity as well. E.g. hunters in Sweden take measures to establish and enhance wetlands to improve the life conditions for mallards. However, studies show that populations of shoveler, pochard and northern pintail have benefited from the measures taken for mallards as well.¹¹⁶ To prohibit hunting of a species to protect the species can therefore have an adverse effect on the targeted species as well as on biodiversity. It is for example argued that this will be the case for the populations of common snipe since the incentives to take wildlife measures for the species disappear when hunting is prohibited.¹¹⁷ This can thus have negative effects on the targeted species and on other species which benefited from these measures. This argument is particularly reasonable when the hunting is not a critical factor to the population dynamics

¹¹⁵ Hildén and Hario (1993).

¹¹⁶ Jo2000/2712 *Remiss ang. förslag från Naturvårdsverket om ändrade jakttider.*

¹¹⁷ <http://www.jagareforbundet.se/> (2006-04-22).

and when the fragmentation of habitats is the largest threats to the survival of the species. However, the requirement of landowners and owners of hunting rights to take wildlife management measures or adapt the pressure of hunting laid down in article 4 focuses on the size of the populations in relation to public and private interests and there is no reference to wildlife measures to ensure the diversity of species.

The stipulation that all wild animals should be protected is an important principal standpoint since it shows that the hunting is a part of the general management of natural resources.¹¹⁸ The preparatory work also emphasizes that the balancing against other interests only is permissible when the conservation status of the species is secured. Hunting is therefore not allowable, with some exceptions such as protective hunting, if the conservation status of the population is non-favourable no matter how high the economic or social values are. However, hunting is permitted for several species that are red-listed without protective reasons.¹¹⁹ There are also cases when hunting is forbidden although the species are not considered threatened, such as conserving species due to medial or political interest based on aesthetics values. Despite the stipulation that all wild animals should be protected, there seems to be a rather impartial system of protection which supposedly is insufficient for regulating complex and dynamic systems such as biodiversity. Protecting biodiversity necessitates a protection system that is non-preferential since keynote species may be other species than those threatened or species with aesthetics values.

Adaptivity of the Legislation on the Protection of Species and Biodiversity

The Swedish legislation on species protection imposes a duty to maintain or restore species and habitats at a favourable conservation status as well as maintaining biodiversity. It is therefore necessary to develop legal criteria that correspond to appropriate ecological criteria. However, since ecosystems are complex and dynamic, and since there is a considerable amount of uncertainty surrounding the interaction between species and with their ecosystems, it is not sufficient to set rules that are fixed once and for all. The stipulations must also be continuously evaluated to see whether they achieve the intended effect or not. This calls for a legal system that is adaptive, a system that includes means of learning about ecosystem dynamics, so that, when environmental conditions change and new problems arise,

¹¹⁸ See prop. 1986/87:58, p. 26.

¹¹⁹ Examples of species that hunting are permitted despite the fact that they are red-listed are the velvet scoter, capercaillie and bean goose.

existing knowledge and understanding, which form the basis for decisions, is reinterpreted and evaluated so that laws and rules can be changed in accordance.¹²⁰

Such system necessitates the monitoring of the conservation status and possible changes of species and biodiversity. Information on relevant features, so called environmental indices, must therefore sequentially be collected and assessed. The Convention on Biological Diversity, article 7, obligates parties to identify components of biological diversity for the conservation and sustainable use of biodiversity and requires the monitoring of those components.¹²¹ Moreover, article 11 of the Habitat Directive requires the surveillance of the conservation status of the natural habitats and species referred to in article 2 with particular regard to priority natural habitat types and priority species. The information gained in the monitoring can then be used for assessments and if necessary amendments of processes with adverse effects on the achievement of established goals. If the monitoring shows that species or biodiversity is not maintained at favourable conservation status it is necessary to take measures to recover or achieve this status. Such measures could include the extending of the number of protected species or the scope of the protection, amending general hunting seasons or the number of animals to be shot with a licence, or the establishing of new stipulations which take better regard the new knowledge on the interactions of populations and their ecosystems.

The Hunting Act and the Monitoring of Wildlife Species and Biodiversity

A prerequisite for achieving sustainable management of wildlife resources is thus that there are comprehensive and continuous programs for monitoring so that the effects of the hunting stipulations on species and biodiversity can be evaluated. The monitoring of wildlife species is a part of the general environmental monitoring programmes, for which the Swedish Environmental Protection Agency is responsible.¹²² The monitoring of game species is partly delegated to the Swedish Association for Hunting and Wildlife.¹²³ This responsibility is a part of the general assignment that has been established for the Association in parliamentary decisions in 1938, 1951 and in 2000. The content of the general assignment is not laid down

¹²⁰ Gunderson (1999).

¹²¹ Annex 1 of the Convention sets down three categories of indices.

¹²² Since 2001, the *Environmental objectives council* at the Swedish Environmental Protection Agency has the overall responsibility to co-ordinate and promote environmental work on both a national and international level (Regulation (2001:1096), article 1). This responsibility includes allocating funding for as well as drafting and operating environmental monitoring programs.

¹²³ See prop. 1999/2000:73, decision 1999/2000:MJU17 and Governmental report Jo2004/2247.

in law, but has been investigated by the Government in 2004.¹²⁴ The report states that the monitoring process include to document changes in the status of all game species in Sweden, which includes estimations of sex and age composition, reproductive rates, and levels of predation of the wild animals as well as estimations on the damages caused by wild animals, and to coordinate statistical data on the number of shot game animals.¹²⁵

The owners of hunting rights play an important role in the monitoring of game species by reporting the number of animals killed.¹²⁶ However, only the reporting of game hunting of moose and red deer is regulated by law. Article 5 of the Hunting Regulation,¹²⁷ requires that owners of hunting rights report the number of shot moose within moose licence areas and the number red deer within red deer licence areas no later than two weeks after the ending of the hunting season. The reporting shall include information about where and when the animal was shot, the gender and information about whether the animal was a moose calf of the year and should be submitted to the county administration board. There is also an obligation concerning the reporting of shot animals for the hunting for protective reasons. Individuals must report to the county administration board and the county administration board shall report to the Swedish Environmental Protection Agency on a yearly basis.¹²⁸ The Agency shall continuously evaluate if the stipulation in article 28(2) is detrimental to a favourable conservation status of the species in its natural range.¹²⁹ There is no corresponding obligation for the reporting of shooting other game animals and there is therefore a risk that there will be insufficient information for the regulation of these species.¹³⁰

New Knowledge and Adaptivity of Legislation

The information gained in the monitoring process should provide for a basis for the regulation of species and diversity. Whether the management will be adapted in accordance

¹²⁴ Jo2004/2247.

¹²⁵ Ibid., p. 39

¹²⁶ The reliability of this statistics is however questionable since it is often difficult to determine if the selections are representative or not. It is however a good trend measure, especially in areas where the same unit report the number of shot animals (<http://www.jagareforbundet.se/>, 2006-04-15).

¹²⁷ The Government is authorized to prescribe rules on the responsibility to report the number of shot animals. See Hunting Act, article 26.

¹²⁸ See article 24 and 26 of the Hunting Regulation.

¹²⁹ See article 28(4).

¹³⁰ The systems for monitoring population status of moose and large carnivores are consequently among the most developed. The most frequently used inventory method for moose is the so called ÄlgObs, which requires that hunters write down the number of observed moose during the first seven days of the hunting season. The method has shown to be a good measure for moose productivity. However, other inventory methods are used as well, such as airplane inventories, dropping methods and inventory methods that measure grazing damages (Äbin). The populations of large carnivores are generally estimated through observations supplementary to surveys of other wildlife species, local or regional field studies of carnivore species and their prey relationships, and other techniques. See <http://www.jagareforbundet.se/> (2006-04-30).

with the new knowledge will depend on several factors. To simplify, there are two different legal approaches of achieving adaptivity in the management of resources. In the *first* case, the management of the resources is regulated on a *central* or a *regional level* and stipulations will be fixed by law or subsidiary law (this is usually referred to as a “top-down” management system). In those cases the Parliament or the Government will take the determining decision on management of the resources. In Sweden, the decision-making of several administrative stipulations concerning hunting are delegated to the Government. When stipulations are laid down in subsidiary legislation, the procedure of amending stipulations is more flexible than if the stipulation would have been laid down in the principal legislation. The Government can in turn delegate power to national or regional authorities, such as the right of the county administration boards to limit the hunting seasons under certain ecological conditions or the power to permit hunting licences of certain species. Since central decision-making often is argued to be slow, the delegation to the regional level could increase adaptivity further.

Whether the top-down management system will be adaptable or not will depend on properties such as the ability to identify measurable objectives, continuance of the monitoring of these objectives, the capability of evaluating the information and the possibility to adapt the stipulations in accordance with the new information. E.g. for the hunting seasons to be an adaptive management tool, the Government should continuously monitor and assess the effect of the hunting seasons on the species with reference to the objectives to be achieved and if necessary amend the hunting seasons in accordance with the new ecological knowledge.

In the *second* case, the management of the resources is regulated on a *local level* (a “bottom-up system”). An example is the case when the owners of hunting rights can decide how much moose to shoot. One of hypotheses of adaptive management theories is that decentralized management is more adaptable than centralized management since local resource users often have more knowledge of ecosystem dynamics and management practices which should be incorporated into the decision-making. This notion is also recognized in the Convention of Biological Diversity¹³¹ and the Swedish Government emphasises that the knowledge of local resources should be incorporated in the management of natural resources and ecosystems.¹³² However, a bottom-up system does not *per se* mean that the system is adaptive. There are several of possible difficulties that could hindrance the achievement of

¹³¹ See article 8j.

¹³² Skr. 2001/02:173, p. 121.

adaptivity.¹³³ The remainder of this paper will discuss the hunting limits concerning the management of wildlife species discussed above with references to adaptivity.

Hunting Seasons and Adaptivity

The Government is authorized to determine the general and specific hunting seasons for game species. However, the county administration board is authorized to issue by-laws to limit the general time seasons if it is necessary due to snow, ice and climatic conditions. The county administrative board decides the hunting periods of moose and red deer hunting within the time framework laid down in the Hunting Regulation. The county administration board can thus limit the hunting periods under the conditions laid down in the Regulation, but not extend the periods. The decisions should be after consultation through local forums and the wildlife management board on a yearly basis. The association of wildlife management areas does not have the authority to decide on hunting seasons. The motive is that the county administration board can limit the hunting seasons and that further limitations are not necessary. Property owners and owners of hunting rights can limit the general seasons for certain species by starting the season later or closing the season earlier.

The general hunting seasons apply until the government decides to amend the seasons. The hunting seasons were earlier reviewed first on a yearly basis and later every second year and then every third year.¹³⁴ The reason for changing the procedure of updating the hunting season regularly is that ecological knowledge has shown that the hunting and consequently the hunting seasons often does not have a significant effect on the dynamics of populations, which is especially noticed in the case of small wild animal. The hunting seasons determined by the county administration boards are set on a yearly basis after consultation and review of statistical reports.¹³⁵

The more often monitoring and evaluation are carried out, the more increases the possibility to achieve adaptivity and the more significant the effect of the hunting is, the more important is continuance. This can motivate that surveillances of the effects of the hunting seasons for moose are carried out more often than for small wild animals. However, it is important to not forget that there may be small wild animals that do not react in the same way

¹³³ For a more detailed discussion see Wennberg-DiGasper (2006).

¹³⁴ The Swedish Association for Hunting and Wildlife Management was responsible for the review of the hunting seasons.

¹³⁵ E.g. the hunting season for moose within B-areas was limited to four days during 2006 in the county of Norrbotten due to the large number of hunted animals during 2005 while the length of hunting seasons within A-, E- and moose management areas was not amended since the effect of the hunting season set the previous year was considered positive. Decisions 218-4580-2005 and 218-4677-2006.

as the majority of small animals and that unpredictable changes may occur. It therefore seems inappropriate in accordance with adaptivity to have hunting seasons for the majority of species that apply “forever”. Another limitation is the fact that the monitoring is not very well developed for most species, and not always reliable in those cases when the monitoring is more developed, which makes the decision-making subject to uncertainty. This motivates increased regularity as well.

Hunting Quotas, Management Plans and Adaptivity

Hunting of mature moose is only allowed through licences issued by the county administration board within licence areas (except within moose management areas) on a yearly basis. The regulation of moose through licences is thus decentralized to the regional level with the county administration board responsible for the managing moose population. It is argued in the preparatory work that the requirement on licences is necessary to be able to achieve a moose hunting that is adjusted to the production of moose.¹³⁶ It is also argued that this requirement gives incentives to increased cooperation between landowners, which increases the possibilities of adjusting the hunting in a suitable manner. Moreover, as in the case with hunting seasons, the decisions on the hunting seasons should be made after consultation, through local forums, with representatives for hunting interests and other interest concerned by the decision and ultimately after consulting the wildlife management board. Licences can also be given on a three year basis, leaving the decision to owners of hunting rights to decide how much moose to shot.. Since hunting of these animals can have a significant affect on the population dynamics as well as on biodiversity, licences are important management tools. If it is an adaptive management tool will depend on the ability of the decision-makers to adapt the hunting quotas in accordance with reliable ecological information.

Hunting of moose within moose management areas established by the county administration board is allowed without licences. The power to decide on the number of animals to hunt is thus delegated to property owners and owners of hunting rights. Since the hunting of moose has a significant effect on the moose population, owners of hunting rights play a critical role in the management of the moose population. There is a requirement to establish management plans for the hunting of moose within moose management areas. The Swedish Environmental Protection Agency recommends¹³⁷ that the management plan describe

¹³⁶ Prop. 1986/87:58, p. 41.

¹³⁷ NFS 2002:19.

the long-term goal of the management of the moose population, including measures to be taken to reduce grazing damages and the risk for traffic accidents, and that it should be reviewed every third year. Whether the management within moose management areas will be adaptive or not will depend on many different factors, such as the local users knowledge concerning the ecosystem, if proper monitoring methods are utilized, efficient sanction systems and so on. A study on the moose management areas in Sweden finds that the systems are not adaptive.¹³⁸ Decentralized management rights thus not *per se* lead to higher adaptivity.

Concluding Remarks

There may be several explanations for why traditional legal instruments have not been successful in hindering the decreasing variety of species. One proposition for the failures of traditional legal instruments is the lack of a holistic approach in regarding ecosystem characteristics such as inter-species and habitats relations and biodiversity. The review of selected legal instrument for the protection of species show that the instruments mainly are concerned with the rational use or protection of a certain species rather than dealing with inter-relations and the sustainability of ecosystems. E.g. the motive for legal protection is based on a definition of a sustainable population which is determined with respect to the conservation status of the targeted species rather than with aim of achieving sufficient diversity of species in the ecosystems and legal limits related to the use of wildlife populations fail to integrate ecological concepts such as biodiversity for determining such limits. Another limitation is that the protection of species does not comprise protection of the habitats of protected species and since loss and fragmentation of habitats often is a serious threat to species and biodiversity an extended protection of the habitat of the protected species should be appropriate and species not considered threatened enjoy a weaker and a rather dispersed system of protection.

Another proposition is that since ecosystems are dynamic and complex the legal system should have the capacity to respond to ecological changes so that the instruments are made dependent on whether the goal was achieved or not. The review of some of the legal limits laid down in the hunting legislation show that the management of species is often found on a central or a regional level, however, that decision on these levels are usually taken after consultations with local resource users. One drawback is that there is no legal obligation to

¹³⁸ Wennberg-DiGasper (2006).

arrange or participate in the local forums. In the case of moose management the level of responsibility is in certain cases transferred to owners of hunting rights. A decentralized system is often argued to be more adaptable since local resources have valuable information about the species and the ecosystems which can increase efficiency of the management. However, the delegation of power to local users does not *per se* lead to adaptivity since several difficulties may hinder the achievement of adaptivity. In Sweden the law requires more frequent reviews of the hunting limits when hunting is a more significant determinant on the population dynamics. However, limits are general and not adaptable to unpredictable changes. Moreover, there is a lack of comprehensive and reliable monitoring methods for most of the species. Only the reporting of moose and red deer is required by law and the statistics of all other game species is carried out on a voluntary basis.

The analysis thus show that despite the stipulation that biodiversity is to be preserved, there seems to be a rather impartial approach of the protection which seemingly will be insufficient for achieving complex and dynamic goals such as biodiversity. Protecting biodiversity necessitates a protection system that is non-preferential since keynote species may be other species than those threatened or species with aesthetics values. Moreover, there seems to be several features lacking for achieving a system that is adaptive to unpredicted changes in the ecosystems. It is therefore proposed that a legislative approach which is more holistic and more adaptive is necessary; otherwise there is a risk that the preservation of biodiversity will be further frustrated.

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