

Integration of Nature Protection in Forest Policy in the Netherlands

INTEGRATE Country Report



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EUROPEAN FOREST INSTITUTE
CENTRAL EUROPEAN REGIONAL OFFICE AND THE
OBSERVATORY FOR EUROPEAN FORESTS – EFICENT-OEF

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Summary

This report describes the current state of nature protection in the Netherlands with emphasis on forests. Further, the legal framework and other issues that have an effect on forest and nature are discussed.

The Dutch forest knows a long **history** of human influence. This influence is visible today, for example, by the dominance of Scots pine (*Pinus sylvestris* L.) as a result of large afforestation programmes initiated around 1900.

The principles of close-to-nature forestry and the Dauerwaldbewegung have influenced Dutch forestry especially in the second half of the 20th century. *Integrated forest management* was developed, which aims at an integration of the three main forest functions (wood production, nature and recreation – ‘multiple use’) at a small scale, using mainly natural processes.

Currently, around 10% of the land **surface** in the Netherlands is covered by forest. That amounts to approximately 360.000 ha. However, Dutch forests are rather fragmented with forest patches often being smaller than 5 ha. The distribution of forests by ownership types ‘state’ and ‘private’ are with 50% equal. The growing stock accounts to nearly 200 m³ per hectare. The annual increment is at around 8 m³ per hectare ~55% of which is harvested every year. Production forests are of limited **economic importance** as far as wood production is concerned. The returns of private forest companies comprise the sale of wood, subsidies and other gains, e.g. from hunting and recreation. Subsidies consist of contributions from the government for management to maintain the forest and nature, and for specific measures in the forest. Economic results have shown to be negative. It is estimated that around 2.200 persons work in the forestry sector.

The main **tree species** in Dutch forests are Scots pine and oak, both sessile (*Quercus robur* L.) and pedunculate oak (*Quercus petraea* (Matt.) Liebl.). Coniferous species occupy 55% of the forests, while broadleaves account for 45%. Around 52% of the forest area is composed of single species forest stands, 21% of which are broadleaves and 31% conifers.

In the Netherlands, around 550.000 ha, ~13% of the land surface, is **protected**. Protection areas include beside others 20 national parks and 60 forest reserves. The average amount of dead wood in Dutch forests amounts to circa 10 m³/ha, from which 4.6 m³ is standing dead wood and 5.3 m³ lying dead wood. In 1/3 of the Dutch forests dead wood amounts are very low, whereas in 1/5 of the forests also >20 m³/ha of deadwood can be found. Through subsidies forest owners are encouraged to increase the amount of dead wood in their forests.

Main forest **functions** of the Dutch forest that can be distinguished are wood production, protection of soil and water, conservation of biodiversity, social services, multiple use, and other functions like biomass and carbon sequestration. In earlier times, wood production was regarded as the main function of the forest. Over time, the importance of nature protection and recreation increased, which

resulted in integrated forest management and multifunctional forest. Around 75% of the Dutch forest can be considered 'multiple use'.

Potential **conflicts** arise between nature conservation and wood production. Wood production is a central source of income for forest owners. Through the availability of subsidies, measures targeting biodiversity conservation and enhancement are supported. Second, management conflicts may arise with recreationists or society at large having their specific demands towards forests. Integrated forest management was thus regarded as a viable approach, as functions can be combined, whereby harvesting contributes to reshape the forest in the context of wood production. Practice however has shown this to be challenging, especially as demands of stakeholders and interest groups are subject to change.

The increased importance of nature protection and recreation, the participation of numerous organizations in the development of **policies and legislation** on nature conservation, and the commitments made by the Dutch government by signing international agreements for the protection of species have influenced the content and direction of new policies. Since 1961, the Forest Act ensures sustainable forest management. The Nature Conservation Act regulates the protection of areas (including Natura 2000 areas), and the Flora and Fauna Act the protection of species. Further, the Natural Beauty Act provides fiscal advantages to owners and leaseholders of country estates, allowing them to maintain their estate. The Act for Archaeological Monumental Provision aims for the protection of the cultural heritage.

There has been an attempt to create a new act called *Wet Natuur* (act nature), which would integrate three existing nature acts: the Forest Act, Nature Conservation Act and Flora and Fauna Act. After consulting numerous organizations, Dutch citizens and the council of state, who regarded the concept as critical, the proposed act *Wet Natuur* was not accepted.

Regarding **strategies and policies**, one important to mention is the *national ecological network (EHS)*, which was introduced in the 1990s. The goal was to designate 728.500 ha in the EHS by 2020 representing about 17,5% of the land surface of the Netherlands. This would allow for a connection to nature reserves in other European countries through the pan-European Ecological Network (PEEN). In order to achieve that, an additional area of 275.000 ha still needed to be newly created. By 2009, roughly 100.000 ha were realized. However, the previous government, in power between 2010 and 2012 (cabinet-Rutte I) cut expenses for nature protection. This affected also the further designation of areas under EHS and provinces had to take over and new agreements were made.

In 1992, the Dutch government signed, together with 185 other countries including the European Union, the Convention on Biological Diversity. As *invasive species* have been identified as the biggest threat for biodiversity after habitat loss and exploitation, a policy 'Invasive Species' was developed regulating the prevention of introducing species that may negatively affect indigenous species or ecosystems.

Both the above 'Invasive Species' policy, and the passive protection regulated through the Flora and Fauna Act and the Nature Conservation Act could not prevent for many species becoming endangered. Therefore, a new strategy was proposed, in which the protection of the habitat with active measures is targeted rather than the protection of an individual species, the so-called *habitat approach*. The policy document *Nature for People, People for Nature* provides a framework for the conservation and sustainable use of biodiversity, aiming at a more coherent nature policy approach.

The Netherlands Environmental Assessment Agency (PBL) has written a *Nature Outlook 2010-2040*. It contains ideas for a new vision on nature and nature policy, and aims at providing a source for inspiration to support governmental bodies and societal organizations in formulating the long-term policy for nature and the landscape. It contains four nature perspectives, namely, Vital Nature, Experiential Nature, Functional Nature and Tailored Nature.

Several **subsidy programs** exist to provide forest and nature owners with financial support for managing their properties with regards to the protection of certain plant and animal species. The Dutch National Fund for Rural Areas finances projects for nature, forest and landscape and gives financial advice to public authorities as well as to private individuals and organizations. Further, the Investment Budget Rural Area (ILG), a subsidy arrangement between the state and provinces to keep the rural area beautiful and vital, includes a subsidy system Nature and Landscape Management (SNL). It aims at an effective and efficient agricultural management as well as nature management.

Various educational programs are available addressing the forest sector and forest and nature management/conservation. These can be schools providing vocational education, universities of applied sciences and/or universities.

Advisory services are available to represent or support land owners (including forest owners) or owners of country estates. There are also several organizations active in data collection (e.g. Association for Research on Flora and Fauna (VOFF)), some of which being actively engaged at political level. For those not involved or engaged in the forest or nature sector, but interested in forests and nature, or people who want to contribute to maintaining landscape elements, other organizations are in place. With their activities these organizations create increased awareness for nature and biodiversity with society at large.

Certification of forests shows an increasing trend. Although neighboring countries mainly have PEFC-certified forests, in the Netherlands only FSC-certified forests exist to date. They cover around 44% of the forest area. The Union of Forest Associations developed a group certification system for FSC. This has been done due to the following reasons (i) the costs are lower for small forest owners, as monitoring- and control measures can be executed by the organization itself, and (ii) some standards can be better met by the group than by an individual. Recently, the Dutch PEFC Standard has been approved.

The **national forest inventory (NFI)** provides information on the state of forests in the Netherlands. In the past, all forest and nature areas were subject to monitoring, but this has shown to be too expensive. Also the focus in monitoring through NFI's has shifted, as other forest services, such as e.g. recreation, but also biodiversity are receiving increased attention as compared to wood production. The last inventory was carried out from 2001-2005 according to a new approach, namely a network of 3.622 plots called *Meetnet Functievervulling*. In 2012, the 6th Dutch NFI started, and results are expected in 2014.

Besides the *Meetnet Functievervulling*, the implementation of the Birds and Habitats Directives resulted in the establishment of the Network Ecological Monitoring (NEM). It is maintained in order to track emerging changes as well as effectiveness of policy implementation. Such monitoring networks are useful tools for detecting development trends for plant and animal species, tracking Red List species, analyzing effects of fragmentation, desiccation and eutrophication or the effects of climate change.

About 62% of the Dutch forests have a **management plan**. Although a management plan is useful to improve the quality of the management and may provide more insight in revenues of the management, it is only compulsory if you want to certify your forest according to FSC or PEFC Standards. Also Natura 2000 areas are obliged to have a management plan, which includes measures to reach the conservation goals. These plans are made in close cooperation with environmental organizations, municipalities and recreationists.

Evaluations on forest and nature policy in the Netherlands show that with the increase of actors, obligations towards the EU and international processes, decentralization of responsibilities and increase of regulations, the implementation of measures have become quite complex. In the last years, biodiversity loss was slowed down, but not halted. For some species a decline is observed due to, for example the lack of suitable habitats, desiccation, eutrophication, acidification and fragmentation. A multicriteria-cost-benefit analysis of the Nature Outlook 2010-2040 has shown that the four perspectives that are described (Vital Nature, Experiential Nature, Functional Nature and Tailored Nature), differ in financial costs and benefits, but also in their effects on biodiversity. By combining societal challenges and linking nature policy with enjoyment of living and recreation, it will be possible to increase both cost effectiveness and biodiversity.

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List of Abbreviations

- C CBS: Statistics Netherlands
- D DLG: Government Service for Land and Water Management
- E EGM: effect-oriented measures
EHS: national ecological network
EL&I: Ministry of Economic Affairs, Agriculture and Innovation
- F FPG: Dutch Federation for Private Landownership
FSC: Forest Stewardship Council
- G GaN: National Authority for Data concerning Nature
- I IenM: Ministry of Infrastructure and the Environment
ILG: Investment budget rural area
IVN: Institute for nature education and sustainability
- K KNBV: Royal Dutch Forestry Society
KNHM: Dutch heathland cooperation
KNJV: Royal Netherlands Shooting Association
KNNV: Royal Dutch Society for Natural History
- N NDDF: National Database Flora and Fauna
NEM: Network Ecological Monitoring
NFI: National Forest Inventory
- P PBL: Netherlands Environmental Assessment Agency
PEFC: Programme for the Endorsement of Forest Certification
PGO's: private data-managing organizations
- R RWS: Rijkswaterstaat
- S SBNL: organization for private and agricultural nature management
SNL: Subsidy system Nature and Landscape
- U UNFF: United Nations Forum on Forests
- V VOFF: Association for Research on Flora and Fauna

1 Introduction

Forests are *hot spots* of biodiversity, depending on the age of the growth place, surface of the forest, fragmentation and forest type (e.g. tree species) (cf. Hermy & Bijlsma, 2010). But forests are also much more than that. Forests also produce wood, and they are a place to recreate.

In a densely populated country like the Netherlands it is difficult to decide which function of the forest is most important. Therefore, most of our forests are multifunctional. But is protection of biodiversity in multifunctional forests sufficient?

This report describes the current state of nature protection in the Netherlands, the legal framework and other kind of instruments that have an effect on forest and nature.

The structure of this report is as follows. Chapter 2 gives a short introduction on the historical development of forest management and provides facts and figures about forests and biodiversity, e.g. main tree species and surface of protected area. Chapter 3 then describes the major forest functions and potential conflicts between nature protection and other functions. In Chapter 4, the legal framework with relevant acts, regulations, strategies and action plans is being addressed, whereas Chapter 5 gives an overview about the financial instruments. In Chapter 6 educational institutes and advisory services are described, Chapter 7 is on forest certification and Chapter 8 on monitoring and planning tools. Finally, Chapter 9 provides a discussion regarding forest and nature protection in the Netherlands.

2 Forests, forest management and nature conservation

2.1 Historical development

2.1.1 Forest composition

The Dutch forest knows a long history of human influence. This influence is still visible today, e.g. through lanes with very old and majestic trees, forest walls, firebreaks and the high share of certain tree species, particularly Scots pine (*Pinus sylvestris* L.). To explain the dominance of Scots pine, especially at the sandy soils of the Veluwe (big forest and nature area in central-east of the Netherlands), we have to go back to the middle ages. Between the 10th and 13th century, the melting of metals from ore was one of the main activities, and it asked for large amounts of wood for the production of charcoal. The forest area decreased drastically. Besides, a special agricultural system existed that was characterized by the *potstal*. This was a stable in which sheep or cows stayed overnight. During the day the cattle grazed at the pastures. The farmer took sods at the heathlands and mixed these sods with the dung in the stable. Once in a while, this high-fertile mixture was distributed over the farmlands. It was a highly sensitive system, as one had to take care of a right balance between the different components. A disturbance of the equilibrium could result in unproductive soils and finally in less cattle and grain. Or even worse... When heathlands were used too intensive, drift sands could arise. At the Veluwe, many of such drift sands existed, which threatened villages or even buried them.



Picture: Marieke van der Maaten-Theunissen

Figure 1: A drift sand today

But, through the invention of chemical fertilizer the potstal system lost importance, besides coal and oil were more and more used as a substitute for wood (Den Ouden et al., 2010b).

Further, at January 5, 1888, the Dutch heathland cooperation (Koninklijke Nederlandse Heidemaatschappij; KNHM) was founded: (i) to develop the farmlands, (ii) to reafforest the sandy soils, and (iii) to improve the employment. Together with the in 1899 founded Staatsbosbeheer (state forest service) they bought large areas to reafforest. As a result, more than half of the production forest in the Netherlands dates back to around 1900, and the majority consists of coniferous species; exotic species, like hemlock (*Tsuga* spp.), Norway spruce (*Picea abies* (L.) Karst.), silver fir (*Abies alba* Mill.), Douglas fir (*Pseudotsuga menziesii* (Mirb.)), but also indigenous species, like European yew (*Taxus baccata* L.), common juniper (*Juniperus communis* L.) and Scots pine, from which especially this latter species has been planted in large numbers. The wood was intended for construction wood in the mines (Den Ouden et al., 2010b).

A problem of these production forests is the uniformity, as all trees belong to the same species, are even-aged and planted in rectangular parcels. As the economical importance of the forests has decreased, current management is more focused towards natural and recreational values (Den Ouden et al., 2010b).

2.1.2 Silvicultural practices

The beginning of the development of forest science in the Netherlands coincides with the miserable condition of the forest in the 19th century. As both people and industry needed wood, it was necessary to develop techniques that protected the soil, restored the ecosystem productivity and also supplied valuable products. Initially, the emphasis was on growth, yield and benefits. However, in Europe discussions arose on the naturalness of the forest. Based on the principles on close-to-nature forestry of Karl Gayer, professor in München, and the Dauerwaldbewegung that was initiated by Alfred Möller, professor in Eberswalde, small-scale forestry systems developed, e.g. at ETH Zürich a.o. the so-called 'Femelbetrieb'. These ideas influenced Dutch forestry especially in the second half of the 20th century. (Den Ouden et al., 2010b) Here, integrated forest management (*geïntegreerd bosbeheer*) developed, and since the 1990s it has been stimulated by the government. It is a management type aiming at an integration of the three main forest functions (wood production, nature and recreation – 'multiple use') at a small scale (stand level), using mainly natural processes. Measures focus on the development of a forest with a mix of different tree species and different age classes. Forest owners may choose which of the three functions they find most important, but all three must be available. Interferences are relatively small, but preferably accomplished over larger areas, as this is efficient and cost-effective. Besides, after the interference the forest can be left in peace for a while, which is good for plants and animals.

Integrated forest management has much in common with Pro Silva management and close-to-nature forestry, as these also work with small interferences, natural regeneration, working towards a mixed forest with trees of different sizes and in different stages of development. Originally, both Pro Silva and close-to-nature forestry mainly focused on wood production. However, in the Netherlands, Pro Silva management has changed in such a way that it can be considered similar as integrated forest management.

2.2 Facts and figures about forests and biodiversity

2.2.1 Forests and forestry at a glance

In the Netherlands, around 10% of the land surface is covered with forest, that is 359.848 ha. Since 1982, the forest area has increased with on average 1.434 ha/year, especially in the agricultural areas of Groningen and Friesland in the north. However, the Dutch forest is very fragmented (Fig. 2). When counting an uninterrupted forest area that is surrounded by other land use types, e.g. grassland, water, heathland, as one, 46.139 of these forest areas (83%) are smaller than 5 ha and less than 1% of these uninterrupted forest areas is bigger than 100 ha. But, this latter group occupies 30% of the total land surface covered by forest (Table 1). (Dirkse et al., 2001; 2007)

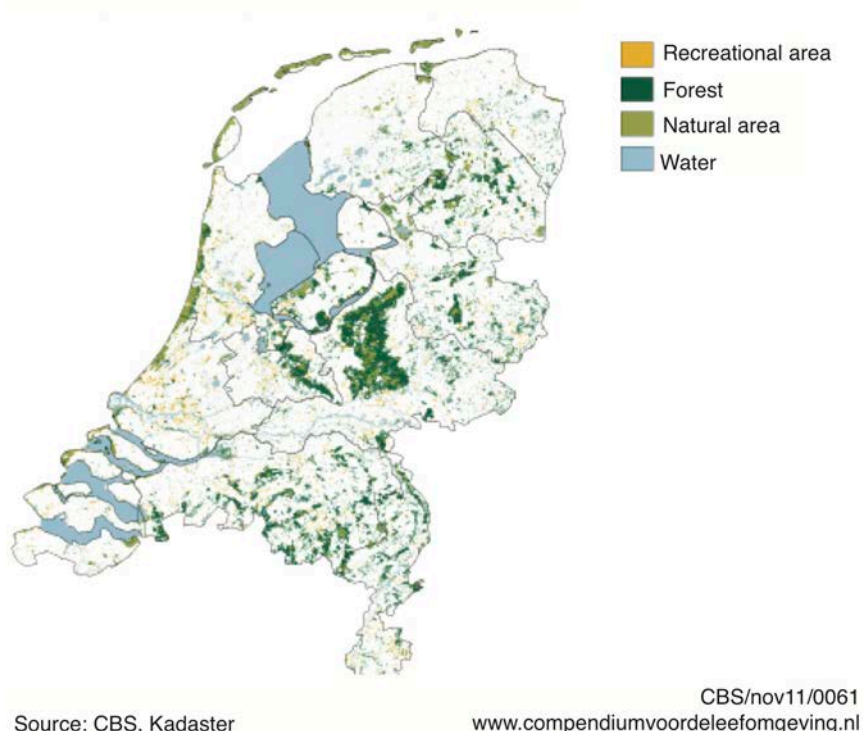


Figure 2: Distribution of recreational area, forest, natural area and water (Compendium, 2012)

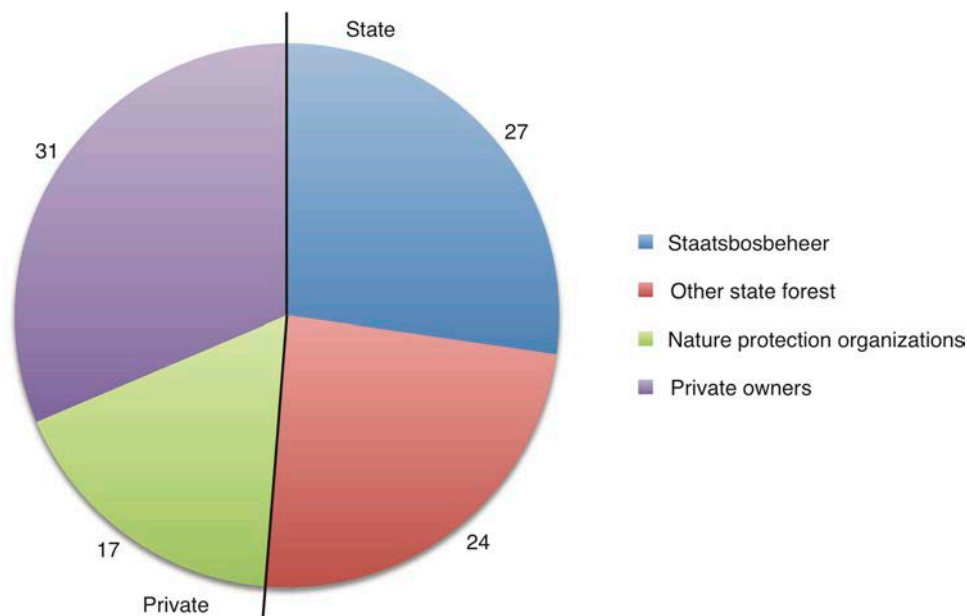
Table 1: Distribution of forest area over different area sizes (Dirkse et al., 2007)

Class	Area (ha)	Number
0,5 till 5 ha	70.737	46.139
5 till 10 ha	30.249	4.351
10 till 20 ha	32.870	2.355
20 till 50 ha	49.520	1.601
50 till 100 ha	40.653	581
100 till 200 ha	41.442	295
200 till 500 ha	44.768	148
500 till 1000 ha	27.336	42
1000 and more ha	22.274	14
Total	359.848	55.526

2.2.2 Forest sector

Ownership. The type of forest owner is an important factor in the development and appearance of the Dutch forest, as a private forest owner is guided by different goals than for example a nature protection organization (Dirkse et al., 2007). The share of forest owned by the state and by private owners is almost 50-50 (Fig. 3). Staatsbosbeheer manages a large area of nature reserves as commissioned by the Dutch government. The group 'Other state forest' covers among others the forestland owned by provinces (0,6%) and municipalities (15%).

Growing stock. Growing stock (= the living tree component of standing trees) counts around 198 m³ per hectare (Dirkse et al., 2007).

**Figure 3: Forest ownership in % (Dirkse et al., 2007)**

Increment and harvest. It is estimated that the annual increment lies around 8 m³ per hectare and that 55% of this amount is harvested every year (Probos, 2011).

Economic importance. In the Netherlands, production forests are of limited economic importance as far as wood production is concerned. Besides production, the economic feasibility of forests depends on other functions (Nillesen & Vanlerland, 2006).

Research on the economic results of private forest owners with more than 5 ha forest land (on average 40 ha), even shows that figures are negative. In 2004, the loss was 63 euro per ha, which was an improvement compared to the year before. The returns of the private forest companies comprise the sale of wood, subsidies and other gains, e.g. from hunting and recreation. In 2003 and 2004, 50% of the revenues came from subsidies and 25% from wood sales. The subsidies consist of contributions for management to maintain the forest and nature, and for specific measures in the forest (cf. section 5.2). The low profits from wood sales are caused by the low harvest and a decline of timber prices. (Berger et al., 2005; Compendium, 2012).

As the Statistics Netherlands (CBS) registers the employment in the forestry sector together with agriculture and fishery (primary production), the total number of people employed in forestry is not exactly known. It is estimated to be approximately 2.200 persons (FAO, 2010).

2.2.3 Nature protection and biodiversity

Tree species composition. The main tree species in Dutch forests are Scots pine and oak, both sessile (*Quercus robur* L.) and pedunculate oak (*Quercus petraea* (Matt.) Liebl.) (Fig. 4). Coniferous species occupy 55% of the forests, and broadleaves 45%.

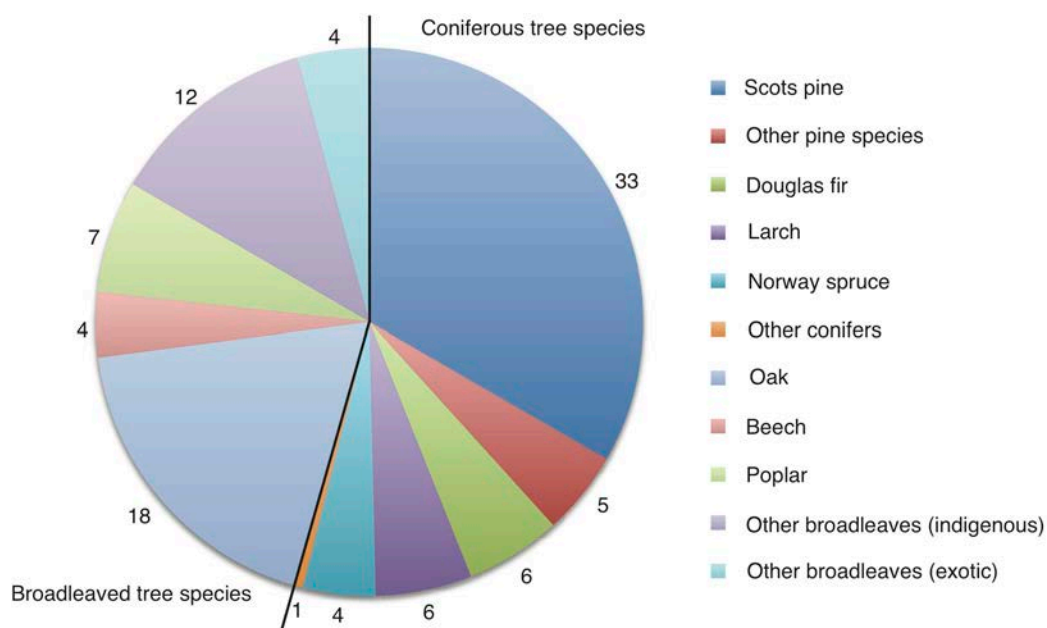


Figure 4: Distribution of tree species in % (Dirkse et al., 2007)

Naturalness / biotope quality assessment. The Dutch forests still have a large share (52%) of unmixed forest stands, from which 21% is monoculture of broadleaves

and 31% is monoculture of conifers. A forest stand is defined as mixed, when the most common tree species in the stand covers less than 80% of the basal area. The share of mixed forests, either mixed broadleaves, mixed conifers or mixed broadleaves and conifers, counts 43% (Dirkse et al., 2007). Further, the fifth national forest inventory (Dirkse et al., 2007) indicated that 13,6% of the forest is reorganized from even-aged to uneven-aged forest.

Concerning assessments, van Hinsberg et al. (2007) analyzed the ecological effects of different types of nature management in forest and nature reserves, i.e., normal agricultural management, subsidy agricultural nature management (SAN), subsidy nature management (SN), Staatsbosbeheer. They examined, e.g. the differences in amount dead wood, absence of exotic species and the number of species between the types of nature management. The results show that Staatsbosbeheer has the lowest share of forest with sufficient indigenous tree species (49%), and SN the highest (52%). Further, the analysis reveals that in stands with an exotic species as main tree species, the share of exotic species stayed 86-87 % over the last years. In stands with an indigenous species as main tree species, the share of exotic species decreased from 12,9% in 1985-1985 till 8,5% in 2001-2005. The structure of the forest has become less open, which negatively influences organisms that depend on open space in forests, like certain butterflies. (van Hinsberg et al., 2007)

Protected areas. The first national park was established by Natuurmonumenten in 1930 (5.000 ha), namely National Park Veluwezoom. In 1935 followed De Hoge Veluwe (currently 5.400 ha), and in 1950 De Kennemerduinen (1.253 ha; since 1995 part of a new national park called Zuid-Kennemerland (3.800 ha)). All national parks can be entered for free, except the Hoge Veluwe, which is owned by a foundation. Revenues from the entrance tickets are used to manage the reserve, which is done almost without governmental subsidies.

In 1980, the Dutch government decided to establish a network of national parks, which had to form a representative image of the Dutch nature and bigger ecosystems. Currently, 20 national parks exist (Fig. 2.5, left). The surface of the national parks is over 130.000 ha, around 3% of the total surface of the Netherlands.

In 1983, another program started, called *Bosreservaten*, to establish forest reserves that represent the different forest types in the Netherlands. Between 1983 and 1999, 60 forest reserves have been established (Broekmeyer, 1999) (Fig. 2.5, right). They vary in size from 4 to 441 ha (van Dort, 1999). In the reserves inventories take place regularly, to study which spontaneous processes occur, why they occur and how the forest develops without human influence.

From the forestland, 1% falls under these strict forest reserves (together ca.~3000 ha; IUCN-code I), 9% is national park (IUCN-code II) and 16% is protected according to IUCN-code III till VI. See Dudley (2008) and Lausche (2011) for an explanation of the different codes.

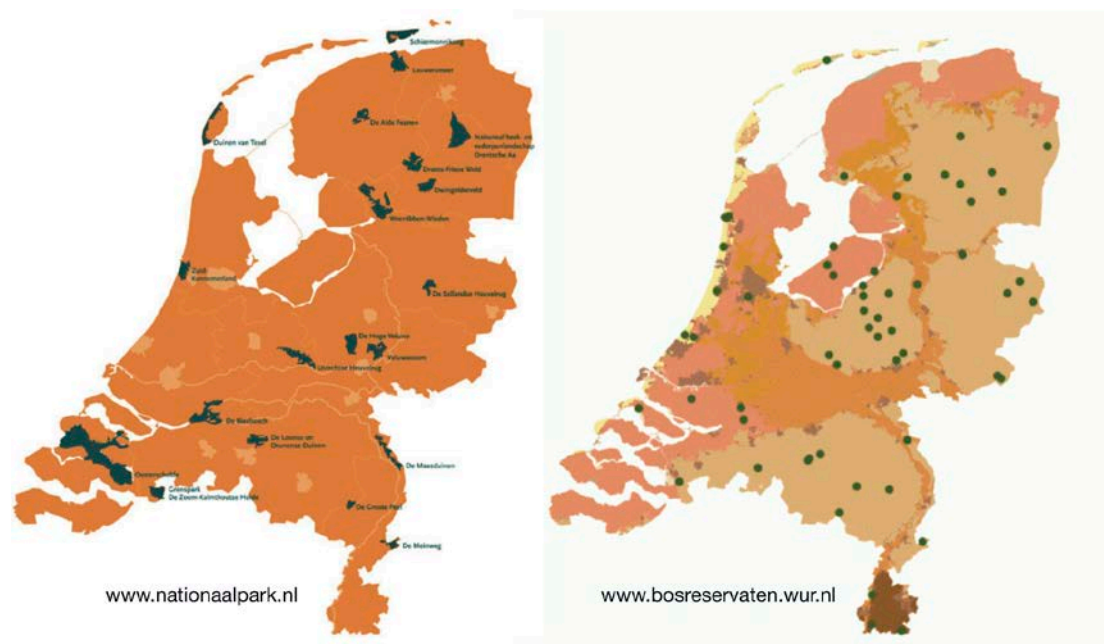


Figure 5: Locations of national parks and strict forest reserves in the Netherlands

Further, around 550.000 ha forest and nature reserves is now protected as they are part of the national ecological network (Ecologische Hoofdstructuur; EHS, section 4.3.1). Around 45% of the EHS on land is also Natura 2000-area. Natura 2000 is a European network of nature reserves that provides habitats for specific plants and animals, seen from a European perspective (Birds and Habitats Directive). The Netherlands counts 166 Natura 2000-areas, but these include also lakes and river forelands to protect certain birds, and peatlands for the conservation of rare *Sphagnum* spp.

Dead wood. Dead wood plays an important role in forest ecosystems, as many organisms depend on it. However, it is only very recent that dead wood is present in larger amounts in Dutch forests again. Before, all parts of felled trees were used, and storm damage was immediately removed to prevent insect outbreaks (Wijdeven et al., 2010).

Dead wood was part of the subsidy program Program Management (Programma Beheer; section 5.2.3) and currently falls under the new subsidy system SNL (section 5.2.5). Program Management aimed, in nature-oriented forests, at a minimum of three standing or lying dead trees per hectare thicker than 30 cm at DBH, which is 4 m³/ha (Wijdeven, 2005). The amount of dead wood counts circa 10 m³/ha, from which 4.6 m³ is standing dead wood and 5.3 m³ lying dead wood (Dirkse et al., 2007), but in 1/3 of the Dutch forests almost no dead wood is available, whereas in 1/5 of the forests >20 m³/ha can be found (Wijdeven, 2005; 2006). In neighboring countries an amount of 30 m³/ha is advised to preserve dead wood-dependent organisms, which is much more, but compare with natural forests, where on average >100 m³ deadwood/ha is available (Wijdeven, 2006).

Around 11-16% of the forests of nature protection organizations (Natuurmonumenten, De 12Landschappen and others) contain enough dead wood. For Staatsbosbeheer and municipalities it is only 6% of their forest area. But, Staatsbosbeheer owns many forests with more than one function (*multiple use*; see Chapter 3), and many young forests (40% is <40 years old, compared to 22% for other organizations like Natuurmonumenten), which could explain the lower amount of dead wood. However, also per age class, the forests of Staatsbosbeheer contain less dead wood compared to forests under SN. (van Hinsberg et al., 2007)

The diversity of organisms on dead wood depends on the amount of dead wood as well as its appearance, i.e., tree species, lying or standing dead wood, and the stage of decay (Wijdeven et al., 2010). A forest with a selective cutting management will be better for more different species to survive. Next to specialists of stumps and small branches, only species with a broad niche can survive in managed forests (Moraal, 2005). For fungi, leaving fine woody debris might not be enough to increase the natural values of the forest, as the small material decomposes very fast (Veerkamp, 2005). Through girdling, Dutch forest managers could rapidly increase the amount of dead wood in stands where nothing was available. However, for certain beetles that live on fresh dead wood applies: the longer the tree needs to die the better.

With the amount of dead wood, the number of mushrooms increased. However, still it are mainly general species. Bigger dimensions and more dying trees are needed, for more threatened species, but also for other organisms. Besides, a slow increase of the amount of dead wood is recommendable to have a more equal distribution of decay stages. But, even then, the high fragmentation of forest areas may hinder the presence and dispersal of organisms, as dead wood is a temporary substrate. (Wijdeven et al., 2010)

3 Forest functions

Forests in the Netherlands fulfill several functions. This chapter will give a brief overview of the legal foundation of different forest functions in the Netherlands. Besides, potential conflicts between the described forest functions and nature protection goals are discussed.

3.1 Legal basis

In earlier times, wood production was the main function of the forest. Over time, the importance of nature protection and recreation has increased.

Since the 1990s, the government stimulated integrated forest management (Forest Policy Plan of 1993). Here, wood production, nature protection and recreation go together (*multiple use forests*; see also section 2.1.2). Basic thought of the Forest Policy Plan was to increase the natural values of the multifunctional forest without sacrificing the goals for wood production.

However, in the successor of this policy, Nature for People, People for Nature (see section 4.3.4), the ambitious target for wood production in the Forest Policy Plan has been released, but must reach the level of the preceding years in at least 70% of the area. Nature and recreation now take a central place.

3.2 Forest functions

The main forest functions in the Netherlands as indicated by Oldenburger & van den Ham (2010) (wood production, protection of soil and water, conservation of biodiversity, social services, multiple use, and other functions), and the area where they are the primary function, are listed in Table 2. The functions are described in more detail below.

Table 2: Primary designated forest functions (Oldenburger & van den Ham, 2010)

Category	Forest area (x1000 ha)			
	1990	2000	2005	2010
Production	31	4	4	4
Protection of soil and water	0	0	0	0
Conservation of biodiversity	19	90	90	90
Social services	9	0	0	0
Multiple use	280	266	271	271
Other	0	0	0	0
No / unknown	6	0	0	0
Total	345	360	365	365

The primary function or management objective assigned to a management unit either by legal prescription, documented decision of the landowner/manager, or evidence provided by documented studies of forest management practices and customary use (Oldenburger & van den Ham, 2010)

Wood production. This category contains forests that are primarily designated for production of wood, fibre, bio-energy and (or) non-wood forest products.

The decline in the forest area primarily assigned for production from the 1990s up to now, is related to the shift towards a more nature oriented and multifunctional forest management. The area under wood production only contains stands that are considered as productive plantation.

Protection of soil and water. In these areas protection of soil and water is the primary function.

Conservation of biodiversity. Forest area where conservation of biological diversity is most important. The area in Table 2 includes the protected areas.

Social services. Forest area for social services, i.e., recreation.

Multiple use. This category contains the areas with more than one purpose; where neither wood production, nature conservation or recreation can be considered as the predominant designated function alone.

Other. Forest areas designated primarily for a function other than production, protection, conservation, social services or multiple use. (Oldenburger & van den Ham, 2010)

Further, forests can be divided in forest with a special designation and management categories, as listed in Table 3, and described in more detail below.

Table 3: Special designation and management categories (Oldenburger & van den Ham, 2010)

Category	Forest area (x1000 ha)			
	1990	2000	2005	2010
Area of permanent forest estate	31	4	4	4
Forest area within protected areas	0	0	0	0
Forest area under sustainable forest management	19	90	90	90
Social services	9	0	0	0
Multiple use	280	266	271	271
Other	0	0	0	0
No / unknown	6	0	0	0
Total	345	360	365	365

Area of permanent forest estate (PFE). The 60 forest reserves in this category (Fig. 5) may not be converted to other land use, it must retain forest. No management activities are allowed (cf. Broekmeyer, 1999; van Dort, 1999).

Forest area within protected areas. Forest area within formally established protected areas independently of the purpose for which the protected areas were established.

Forest area under sustainable forest management. The management of the total forest area in the Netherlands can be considered sustainable, as the forest is protected by the forest act, which prevents the forest area from decreasing. But in Table 3, only the area that has been independently certified by a third party has been counted. In 1990, forest certification was not in practice yet, and consequently area under sustainable forest management was zero.

Forest area with management plan. This category contains the forest area that has a long-term (ten years or more) documented management plan, aiming at defined management goals, which is periodically revised. 62% of the Dutch forest area is covered by management plans. (Oldenburger & van den Ham, 2010)

In 2000, on 24% (86.000 ha) of the forest area (excl. productive plantations) the emphasis of forest management was on nature conservation. Recreation does take place, but is not so important. Wood is harvested, but only during a transitional period in which exotic tree species are removed. (Oldenburger & van den Ham, 2010)

In the fifth national forest inventory (NFI) (Dirkse et al., 2007), two other forest functions are mentioned, which are environment and landscape. The indicators that have been measured to define these two functions are biomass and carbon stock, and the size of forested complexes, respectively. These functions, however, are no primary functions of the forest.

3.3 Potential conflicts between nature protection and other functions

The nature function, or conservation of biodiversity, is a major function of the forest. However, as private forest owners and also the bigger landowners also want to earn money, or at least want to break even, wood production has to take place. Through subsidies certain measures in forest and nature areas, in favor of biodiversity, can still take place. But in periods when the government decides to cut down expenses on subsidies, the need to harvest wood increases. Interferences like harvesting not necessarily need to decrease biodiversity, but it is good to have some strict nature reserves though.

Beside it, society also wants to join in the conversation what to do with the forest. Dutch forests are seen as everybody's backyard, and people don't like it when things change or when it is all of a sudden forbidden to enter a certain area. One could decide for a separation of functions or an interweaving. As outer space is scarce in the Netherlands, interweaving seems the most logical option. But it is difficult to decide which considerations to make, especially as forest and society continuously change. Integrated forest management seems a good solution, as functions can be really combined, whereby harvesting is more a way to reshape the forest rather than for the production of wood. (Houtzagers, 1998)

4 Legal framework

4.1 Development of forest legislation and nature conservation policy

The first written documents with rules and legislations on land use, including forests, are from around 800, the time of Charles the Greatest. The forest managers were called *holtrichters* (wood judges) that also really judged. The control on wrong use of forests was very strict. Also rulers and noble people started to interfere with the forest management, mainly because they wanted to hunt and have a pleasant environment.

After 1000-1200, so-called *maalschappen* managed the common properties (forest, heath land and agricultural land that was part of the potstal system; see section 2.1.1). Individual properties were organized through shares. A person with a share was called a *maalman*, and got a part of the annual timber yields. From the beginning of the 19th century, the maalschappen disappeared, because of the discovery of the chemical fertilizer (the potstal lost its function) and the competition of wool from Australia (sheep farming was not profitable anymore). Only the maalschappen with forest, and the ones that were still important for agricultural management were kept in function. In 1886, the maalschappen were dissolved. The land was bought by bigger parties, e.g. the Dutch heathland cooperation (KNHM) and Staatsbosbeheer, which were founded in 1888 and 1899, respectively. These organizations reforested many areas, as already explained in section 2.1.1. The first protection of our forests, valid in law, dates back to 1917, with the *Nood Boschwet* (crisis forestry act). In 1961 the real forest act came into force ("*Wat bos is, moet bos blijven*" / what is forest now, must remain forest) (see section 4.2.1).

The first nature protection organization, Natuurmonumenten (natural monuments), was established in 1906, and immediately founded the first nature reserve *Het Naardermeer*. Further, in the twenties and thirties of the 20th century every province founded a so-called *landscape* (De 12Landschappen), to protect the areas that were cultivated rapidly.

Whereas in the 1960s still policy frameworks existed aiming at an innovative and competitive forestry sector, nowadays forest policy is almost completely integrated in nature policy. Over time, policy objectives shifted from wood production towards a stronger emphasis on the nature/biodiversity and recreation function of the forest, all as a result of changing perspectives of society. (Arts et al., 2010)

Further, the Dutch government has signed several international agreements for the protections of species (e.g. Birds and Habitats Directive).

4.2 Relevant acts and regulations

4.2.1 Forest act

The Forest Act (1961) includes all plantings of trees bigger than 1000 m², or, when a row of trees is concerned, when it consists of more than 20 trees. Only forest outside the built-up area is considered, forests in cities and villages fall under the acts of the municipality. Poplar (*Populus* spp.), lime (*Tilia* spp.), common horse chestnut (*Aesculus hippocastanum* L.) and weeping willow (*Salix* spp.) are not enclosed, just like one-row plantings of poplar and willow around agricultural land, orchards and nurseries. The forest act knows three important instruments, which will be discussed.

Duty to announce / meldingsplicht. At least one month before a parcel under forest act will be felled, this must be announced. Within one year after the announcement the felling must be accomplished, when not, you have to announce again. The announcement is not a permit (needed in some municipalities). The duty to announce especially serves the duty to replant, which will be discussed next. Thinning and coppice generally do not fall under the duty to replant and thus need not to be announced. A judge determined the boundary between thinning and felling: if the canopy cover is reduced till below 60%, it is considered a felling.

Duty to replant / herplantplicht. Within three years after a forest has been felled it must be replanted, also when the forest was lost through fire, storm, illnesses and epidemics. When the duty to replant is not followed, high fines are imposed. Further, the duty to replant is restrained to the property. When the property is sold, the duty to replant moves to the buyer.

The Forest Act contains the possibility to replant on another parcel than which was felled, but it must occur on a silvicultural justified way on at least a similar-sized area. Officially, natural regeneration is no replanting, but in practice it doesn't matter how reforestation occurs, only if it is successful.

Prohibition of a felling / kapverbod. In exceptional cases, the Ministry of Economic Affairs, Agriculture and Innovation (EL&I) can lay on a felling prohibition, e.g. when natural beauty or the landscape is threatened by the felling. In practice, this nearly never happens, as the stands or lanes must be of extraordinary natural value.

4.2.2 Nature Conservation Act

The Nature Conservation Act (1998) regulates the protection of areas that have been indicated by the government as protected natural monuments. Further, it protects areas according to international commitments, like the Birds Directive (1979; Vogelrichtlijn) and Habitats Directive (1992; Habitatrichtlijn) (the so-called Natura 2000-areas), and the Ramsar Convention from 1971 (protecting wetlands). In 2005, the Nature Conservation Act has been amended to integrate

the obligations of Habitats Directive in the Dutch law in a better way. For the Natura 2000-areas, special management plans must be developed. First, an inventory must be done to list the special habitats that should be protected. The management plan then provides an overview of the measures that will be taken to protect these habitats. Measures that are listed in the management plan may be accomplished without licensing, but for other activities permission by the province is required. Agricultural companies around protected areas require a license for activities that may cause damage to the special nature. This also applies to cattle farms, as the ammonia emissions (nitrogen deposition) may, amongst others, negatively impact nutrient-poor ecosystems.

4.2.3 Flora and Fauna Act

Where the Nature Conservation Act protects areas, the Flora and Fauna Act protects species. The act came into force on April 1, 2002, and both indigenous and exotic plants and animals are now protected in a more strict way. Thereby it is trivial whether the species is useful for human being or not. It is not allowed to kill, trap or startle protected species, it is forbidden to pick or collect plants, and holes and nesting places are not allowed to be disturbed.

The act entails a 'no, unless'-principle, which means that protection comes in the first place and interference is an exception. Only under strict conditions specific actions are possible, e.g. hunting, management and damage reduction, which are distinguished as three different things. Hunting is possible on the wild duck, pigeon, pheasant, rabbit and hare. Outside the hunting period they, and also other species (red deer, roe deer and wild boar), can only be shot in case of damage reduction for which you need a dispensation.

In the Netherlands you are only allowed to hunt when you own a valid hunting license. This license is can be applied by the principal of the regional police force. You have to meet some requirements to receive a hunting license, e.g. in the last two years you have not violated the Flora and Fauna Act, and you have a possibility to hunt, i.e., a hunting field of at least 40 ha or an invitation.

It is not allowed to hunt outside the hunting periods determined for the different species, not on Sunday or public holidays (New Year's Day, Easter Monday, Whit Monday, both Christmas Days and Ascension Day), and not before sunrise or after sunset.

4.2.4 Natural Beauty Act

The Natural Beauty Act (NSW; 1928) has been conceptualized to maintain country estates in their current state. Under certain conditions, the NSW offers owners, usufructuaries and leaseholders of a country estate, fiscal advantages. A prerequisite is that the estate is (at least partially) open to the public. Further, the country estate must be minimal 5 ha, interconnected, or a (part of a) historical outdoor place that is minimal 1 ha. At least 30% of the estate must be forest or nature area, or a combination of both.

4.2.5 Natural and cultural heritage protection

The act for archaeological monumental provision (Wet op de Archeologische Monumentenzorg; 2007) is the Dutch elaboration of the Valetta Treaty (Verdrag van Malta). The act aims for a protection of the cultural heritage, especially the archaeological heritage, which includes all physical remnants, above and under the soil surface that provide insight in former human societies (e.g. a tumulus, Fig. 6).

4.2.6 A new act?!

A concept for a new act called Wet Natuur (act nature) has been developed, which integrates three existing nature acts: the forest act, Nature Conservation Act and Flora and Fauna Act. The new act would be better adapted to the international nature protection agreements, more concise and easier to interpret. The number of species that is allowed to be hunted would be increased. It would be expanded with the greylag goose, white-fronted goose, wigeon, fallow deer, red deer, roe deer and wild boar.

Regarding the forest, the duty to announce the felling of trees and the replanting would also count for poplar, lime, common horse chestnut and weeping willow. Fellings in the framework of nature development would not need to be reported anymore and released from the duty of replanting. The protection of natural monuments would become less strict.



Figure 6: Tumulus from the late bronze age

In October 2011, a concept was sent to all organizations related to nature, and also Dutch citizens could react on a consultation on the internet that lasted six

weeks. There was many criticism, amongst others that the reduction of rules would mean a reduction of the protection status. In February 2012, the bill was handed over to the council of state (Raad van State) for advice. On August 20, 2012, the bill was presented in the Dutch House of Representatives (Tweede Kamer). However, on October 9, 2012, the act was declared controversial. The opposition now hopes that their proposal for a new act, presented in spring 2012 and called *Mooi Nederland* (Beautiful Netherlands), will make it.

4.3 Strategies and action plans

4.3.1 National ecological network (EHS)

In the 1990s, the Dutch government introduced the national ecological network. This is an interconnected network of both existing nature reserves (e.g. 20 national parks) and nature that must be developed. Goal: realizing 728.500 ha in the EHS on land in 2020 (ca. 17,5% of the land surface of the Netherlands), which will form a connection with nature reserves in other European countries through the pan-European Ecological Network (PEEN). In 1990, existing forest and nature areas already accounted for 453.500 ha. The other 275.000 ha still had to be realized, by buying land to create new nature, by private nature management, and nature management by farmers. On January 1, 2009, roughly 100.000 ha was realized, from which 42.000 ha was newly created nature, 5.500 ha nature managed by private owners, and 54.000 ha managed as nature by farmers. (PBL, 2010)

The previous government (cabinet-Rutte I) decided to cut down on expenses for nature. The state and provinces made an agreement on the decentralization of nature policy. The financial resources left according to the agreements 2007-2013 were divided. As this was a quite complex task, the provinces established a special commission called External Commission Development Assignment Nature (Externe Commissie Ontwikkelopgave Natuur). The state would be still responsible for the international agreements that have been made, but the provinces would have to reduce the size of the EHS, realize it by taking into account the international agreements. The size and position of the EHS was recalibrated, and it would become 90.000 ha smaller than originally foreseen. (Jansen et al., 2012) However, the current cabinet (Rutte II) then decided to stick to the original size of the EHS anyhow, but prolonged the period for realization.

4.3.2 Exotic species policy

An exotic species is a plant, animal or microorganism that cannot reach the Netherlands on its own, but ended up here because of human action (transport, infrastructure). In general, these species do not cause many problems, but sometimes they become invasive. Species that enter the Netherlands because of climate change are not defined as exotic. These species are considered less dangerous.

In 1992, the Dutch government has signed, together with 185 other countries including the European Union, the Convention on Biological Diversity. In this treaty, invasive exotic species have been identified as the biggest threat for biodiversity after habitat loss and exploitation. Therefore, the countries were forced to develop policies to prevent the introduction of species that can affect indigenous species or ecosystems. This has resulted in a policy document on invasive species (LNV, 2007a).

Exotic species that already established are the responsibility of the owner or manager. Examples of exotic species named in the policy document are, for example, the muntjac (*Muntiacus reevesi*; problem for biodiversity), *Ambrosia* spp. (public health) and muskrat (*Ondatra zibethicus*; undermines the protection against water - dikes).

An example of a very invasive species in Dutch forests is black cherry (*Prunus serotina* Ehrh.), a species that has been planted in large numbers in the first half of the 20th century, as quality timber and for soil improvement in coniferous stands on sandy soils. When the negative effects of this species became clear in the 1950s, ambitious control actions were started, which included mechanical control (digging up), and chemical control (herbicides, e.g. Roundup). Experiments are going on using biological control, for example with the plant pathogen *Chondrostereum purpureum*. (Vanhellemont et al., 2010) Recently, a book was published providing a totally different view on (the management of) black cherry (Nyssen et al., 2013).

Further, another exotic species policy already existed at the bigger forest and nature organizations, Staatsbosbeheer and Natuurmonumenten. Since the nature function of the forest increased in importance, more and more exotic and coniferous species, e.g. northern red oak (*Quercus rubra* L.) and European black pine (*Pinus nigra* var. *corsicana*), were felled for the development of an indigenous broadleaved forest. Exotic tree species would have no or few ecological value. After protests, for example to protect rare mushrooms that only grow at certain coniferous trees, they adjusted their strategy.

4.3.3 Habitat approach

Research of the Task Force Impulse Species Policy (Impuls Soortenbeleid) showed that the traditional active species policy could not realize the biodiversity targets, and that responsible parties did not involve this policy in the planning of projects. Passive protection through the Flora and Fauna Act and the Nature Conservation Act could not prevent that certain species had difficulties to survive. Therefore, the Task Force proposed a new strategy, in which the protection of the habitat with active measures is important rather than the protection of an individual species (LNV, 2007b). When a habitat can be preserved, you will be able to preserve a big group of species that requires comparable measures.

The habitat approach focusses on ca. 300 plants and animals, but it is expected that less threatened species will profit from the measures as well. However, for

some species it will be inevitable to take species-specific measures. Further, the procedure prescribes that other measures, policies and plans, e.g. development plans, are integrated. Responsibility is with the provinces, which have to cooperate with nature organizations, municipalities, farmers and developers. The National Authority for Data concerning Nature (Gegevensautoriteit Natuur; GaN) has been established to realize that information on distribution of species becomes available for all involved parties (section 8.2).

4.3.4 Nature for People, People for Nature

Nature for People, People for Nature is a policy document for nature, forest and landscape in the 21st century, and it was presented in 2000. It took the place of four previous green policy programs: the Nature Policy Plan, the Landscape Memorandum, the Forest Policy Plan and the Strategic Action Plan for Biodiversity. The document provides a framework for the conservation and sustainable use of biodiversity in sectors like agriculture, fisheries, tourism and water, aiming at a more coherent nature policy approach.

The document confirms the Dutch support for the international commitments, such as the Forest Principles, UNFF and the Convention on Biological Diversity (see Appendix). During the composition of the policy document, governmental bodies and advocacy organizations were involved, to take care that all parties using the forest could contribute and were satisfied with the final result. (NFP, 2000)

4.3.5 Nature Outlook 2010-2040

The Netherlands Environmental Assessment Agency (PBL) has written a Nature Outlook 2010-2040. It contains ideas for a new vision on nature and nature policy, and aims to provide a source of inspiration to support government authorities and societal organizations in formulating the long-term policy for nature and the landscape. Four nature perspectives have been chosen, which differ in the balance between conservation and utilization: Vital Nature (nature protects biodiversity), Experiential Nature (nature offers a pleasant environment in which to live), Functional Nature (nature supplies people with products and services) and Tailored Nature (nature provides an attractive setting for economic activity). Depending on the policy that is aimed for from now on, the Netherlands could look quite different in 2040. (PBL, 2011b)

5 Financial instruments

5.1 Extent and development of public financing

The last decennia, the Dutch government has spent on average 0,1% of the Gross National Product (GNP) on nature conservation. In 1981 and 2011 there were substantial savings because of the economic crises. The net expenditures for nature and landscape management stayed comparable between 2000 and 2007 (Fig. 7). Annual costs for the government have been ~€500 million since 2001, costs for nature protection organizations and business have been ~€400 million since 2003. Private nature protection organizations receive contributions from households, e.g. membership-fees, donations, legacies, and contributions from lotteries, which counted €136 million in 2007. At least half of the gross costs for nature and landscape management are spent on buying land for the EHS and the creation and management of nature areas (in 2007 65% of the gross costs). A quarter is spent on personnel and resources. Other expenditures are on are education, information and research. (Compendium, 2012)

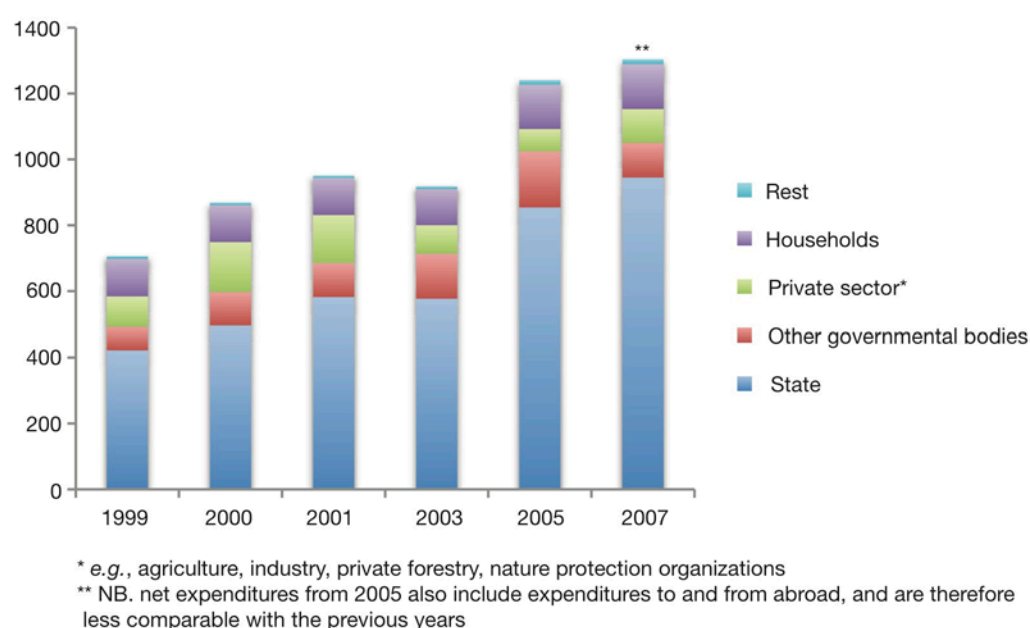


Figure 7: Net expenditures on nature and landscape management (Compendium, 2012)

5.2 Subsidy programs

5.2.1 The Dutch National Fund for Rural Areas

The Dutch National Fund for Rural Areas (Nationaal Groenfonds) has been founded in 1994 by the state and provinces. The fund finances project for nature, forest and landscape and gives financial advice to public authorities as well as to private individuals and private organizations. Thereby it tries to utilize the money available for rural areas in a more efficient way and when possible find new funding sources. Further, the Dutch National Fund for Rural Areas finances state

and provincial nature development projects throughout the Netherlands, which are often within the EHS. The fund administers the subsidies for these nature investments and supplements them with private money flows from banks. It also offers financial facilities for special governmental projects, operates as a banker and provides the financial reporting on nature projects.

5.2.2 Effect-oriented measures (EGM)

The knowledge network development + management nature quality (Kennisnetwerk Ontwikkeling + Beheer Natuurkwaliteit), comprised measures to counteract the effects of acidification, eutrophication and desiccation. From 1989 till 2009 the state provided subsidies via the agreement EGM. These subsidies were meant for several measures, like:

- taking away organic material (e.g. burning, mowing, dredging)
- adding alkaline substances
- applying nutrients
- improving the hydrological situation
- adjusting forest vegetation

All these measures aimed at the recovery of the ecosystems within forest and nature areas, as they reduce the negative effects of acidification, eutrophication and desiccation, to preserve life communities in these areas. Measures were needed until the situation was considered appropriate for a sustainable conservation of the ecosystem. The accomplished EGMs resulted in the return or increase of numerous endangered species.

5.2.3 Program Management

This program started in 2000 and in 2007 it was absorbed into the Investment budget rural area (Investeringsbudget Landelijk Gebied (ILG) - see section 5.2.4). It was a coherent package of measures and subsidies for the management of forests, nature and landscape in the Netherlands. It consisted out of two agreements, which are described below.

Provincial subsidy agreement nature management (PSN). The PSN was meant for areas under permanent nature protection, and provided money for management of nature reserves, and transforming agricultural land into nature. In this latter case, it could also compensate for a possible decrease in value of the agricultural land.

Provincial subsidy agreement agricultural nature management (PSAN). The PSAN was meant for fields where agriculture would stay the main function. The subsidies were for maintenance of nature values on agricultural land, management and maintenance of landscape elements, and the planting and management of temporal forest. Farmers could also receive a contribution to adapt their management, so that meadow birds or indigenous plant species were able to persist.

From January 1, 2010, both PSN and PSAN have been merged into the subsidy system nature and landscape management (SNL) - see section 5.2.5) of the ILG.

5.2.4 Investment budget rural area (ILG)

The ILG is a subsidy arrangement to keep the rural area beautiful and vital. Agreements have been made between the state and the provinces for the period 2007-2013. The responsibility for the implementation lies mainly with the provinces, whereby they have to cooperate with municipalities and waterboards. Goals and agreements under ILG include the realization of the EHS and the creation of recreational areas around the cities. For the period 2007-2013 the state would provide €4,1 billion, provinces €900 million, and third parties €1,5 billion. However, in the coalition agreement the cabinet-Rutte took in a reduction in the contribution of the state of €600 million. The progress of ILG is very slow.

5.2.5 Subsidy system Nature and Landscape management (SNL)

As the provinces found the Programma Beheer too complex, they developed a new subsidy system. The SNL aims at a more effective and efficient (agricultural) nature management. The reimbursement depends on the management, not anymore on the result of the management, e.g. the number of a certain plant species. Further, regional differences in landscape are taken into account. Subsidies can be requested for a six-year period, for:

- *nature management*. This subsidy is a reimbursement for the management of a certain management type that has to meet certain requirements. A prerequisite is that the property is open to the public at least 358 days per year, for which you will receive an extra recreational subsidy (for nature management this currently is €33,34/ha). However, then the property must contain enough paths, which also have to be taken care of, and the opening must be recognizable by signs.
- *agricultural nature management*. An annual subsidy for a certain agricultural management type, or for the management of meadow birds.
- *landscape management*. This subsidy is an annual fixed reimbursement for the maintenance of existing landscape elements, such as shrubberies, pools and knot trees.
- *quality impulse nature and landscape*, which consists of an investment subsidy and a subsidy for function change, or a combination of both. An investment subsidy is meant for making an area suitable for nature management, or for increasing the quality of the nature. The subsidy for function change is meant to compensate for the reduction in value of arable land when converted into forest or other nature.

5.2.5 Catalogue greenblue services

The catalogue provides a list with maximum prices for measures executed by landowners concerning development and management of nature, landscape, water and accessibility. For example, maintenance of shrubberies and canals, flowering borders around the arable land and footpaths.

6 Informational instruments

6.1 Education

In the Netherlands, several educational directions exist when one wants to work in the forestry sector or in forest and nature management/conservation. Below these have been split in the level of education, i.e., vocational, university college and university level, and training possibilities. Second, organizations supporting forest and nature owners are described, besides organizations that collect data, are politically active and promote protection of nature by learning interested people about it, or by organizing field campaigns managing small landscape elements.

6.1.1 Vocational education (MBO)

Helicon. Helicon offers education in the green sector on a pre-vocational and vocational level with several establishments in the provinces of Gelderland and Noord-Brabant. In Apeldoorn and Velp (both in Gelderland), Helicon offers the study Forest and Nature Conservation at two different levels (levels 3 and 4), taking three or four years, respectively. One can become a forester, site administrator or field assistant and will be able to work at harvesting companies, Staatsbosbeheer, Natuurmonumenten, provinciale landschappen, tree care companies, or environmental education centers.

AOC. Also AOC de Groene Welle offers Forest and Nature Conservation at the same two levels as Helicon, in Zwolle and Hardenberg. AOC Terra offers Forest and Nature Conservation at three levels, taking two, three or four years.

Wellant College & IPC Groene Ruimte. Since September 1, 2007, Wellant College and IPC Groene Ruimte have merged and offer schooling in the green sector at vocational level, both full and part time. For example, urban forestry, where one learns how to plant, manage and fell trees.

6.1.2 University college (HBO)

Van Hall Larenstein. At Van Hall Larenstein, one can study Forest and Nature Conservation with the following study fields (majors): tropical forestry, urban forestry, nature- and landscape techniques, international timber trade, real estate and land transactions.

Many possibilities exist for future career and employers. The direction can be influenced by the study field one chooses. Some typical jobs are: ecological advisor, developer or manager of nature reserves, assessor of outdoor space, real estate expert, steward or instructor.

Possible employers are: Staatsbosbeheer, Natuurmonumenten, ministries, provinces and municipalities, research institutes and consultancies, NGO's, wood industry or other commercial companies in the green space.

InHolland University of Applied Sciences. InHolland has establishments in several Dutch cities. In Delft, one can study Landscape and Environment Management, which takes four years. After a general part in the fields of ecology, environment, policy, legislation and spatial planning, one can specialize in two directions. These are 'Space, Environment and Water' and 'Nature, Landscape and Recreation'. In the first, focus is on spatial and environmental aspects of cities and their direct neighborhood. One learns about consequences of air pollution for new residential area, of chemical fertilizer on surface water, and which soil is more suitable for buildings or nature. In the second, arrangement, use and management of the green space is important, i.e., nature reserves, parks and the national ecological network. One will learn about the effects of recreation on nature, and which plant species grows on which soil.

6.1.3 University

Wageningen University. This university is the only one in the Netherlands that is specially focused on topics like healthy nutrition and environment. There exist three Bachelor programs, which deal most with forest and nature, namely Forest and Nature Conservation, Soil Water and Atmosphere, and Biology. Here, we will only elaborate on Forest and Nature Conservation further. The Bachelor program consists of a general part with statistics and social geography, and a specific part with topics like ecology and forest, nature and society. After three years, one can continue with the Master Forest and Nature Conservation, specialization: ecology & management or policy & management, but also choose for a Master Leisure, Tourism and Environment, Climate studies or Geo-Information Science and Remote Sensing. Alumni from the Master Forest and Nature Conservation work at ministries, consultancies, research institutes, or at universities, e.g. as a PhD-student.

Biology. A Master in biology is possible at almost all universities in the Netherlands. When one would like to work in forest and nature conservation, one could study at Wageningen University (specialization: Conservation and systems ecology, or Evolution and biodiversity), University Utrecht (specialization: Ecology and Natural Resource Management of the Master Environmental Biology), Leiden University (specialization: Evolution, Biodiversity and Conservation), University of Groningen (specialization: Ecology, or the Master Ecology and Evolution), Radboud University Nijmegen (specialization: Water and Environment). In Amsterdam, one could study at the University Amsterdam (UVA) (specialization: General biology) and University Amsterdam (VU) (specialization: Ecology), or one could choose their joint Master-program Ecology and Evolution.

With these Masters one can start working at universities, government agencies, NGO's, or conservation organizations. One can become a researcher or PhD-student, policy-maker or consultant on issues of conservation, the sustainable use of resources, land use planning and management, global development, tropical forest management and environmental change.

6.1.4 Training

Boscursus. Boscursus (forest course) is an initiative of the Probos Foundation. They noticed that many people working in the forest sector were interested in practical courses. Together with other organizations, they now offer a whole list of courses, which cover topics like practical forestry, pruning of trees, or current diseases and damages. Once a year a course guide is published, but the website is updated regularly.

IPC Groene Ruimte. Annually, IPC organizes over 10.000 professional courses and trainings related to the green sector, on different levels. For example, an introduction into nature policy (1 day), chainsaw training (3 levels; 3 or 4 days), or game management (16 days).

6.2 Advisory services

Several advisory services exist, to represent or advise forest and nature owners, or owners of country estates. Some organizations have been established by the government, others by the own sector.

6.2.1 Bosschap

The Bosschap is a trade organization. On request of the forest sector, it was established by the government in 1954 as a trade organization for forestry and wood production. On January 1, 2009, this was changed into forest and nature. The future of the Bosschap is unclear, as the government is planning to dissolve this kind of organizations.

The Bosschap is a platform for consultation and tuning within the sector forest- and nature conservation (e.g. management problems and working conditions). The organization looks after the interests of the sector, for example when new policies, laws or subsidy systems are being developed. It also provides practical advices and information, however, not on an individual basis. As an owner of forest and (or) nature area (>5 ha), or a forest contractor with an annual turnover from forestry services above €11.345, you are obliged to join the Bosschap. This registration is connected with a fee, as the government does not finance the Bosschap. The fee includes a basic rate of €40 plus additional fees per hectare forest/nature area or height of the turnover.

6.2.2 Forest Associations

Three regional Forest Associations (Bosgroepen) exist, which have been established between 1975 and 1995 by forest owners. The working area of Forest Association North-East Netherlands includes the four northern provinces, Overijssel, Drenthe, Groningen and Friesland, plus the Noordoostpolder. The Forest Association Central Netherlands is active in the provinces Gelderland, Utrecht, Noord-Holland, Zuid-Holland and Flevoland. Forest Association South Netherlands works in the provinces Zeeland, Noord-Brabant and Limburg.

All Forest Associations are cooperative associations that have the objective to manage forest and nature areas of members in an efficient way, non-profit. Further, they take care of subsidy requests, selling of wood, advice and execution of management and recovery projects. Members are mainly private owners, but also municipalities and organizations like Staatsbosbeheer and Natuurmonumenten. Together, the Forest Associations have 1.200 members, which own together more than 400.000 ha forest and nature area. The member fee differs per Forest Association and per property size:

- North-East: €1,50/ha, with a minimum of €75 and maximum of €450
- Central: <50 ha - €75; 50-100 ha - €75 plus €1/ha above 50 ha; >100 ha - €125 plus €0,75/ha above 100 ha with a maximum of €500
- South: €1,50/ha, with a minimum of €50 and maximum of €350

All members receive both a nationwide and regional newsletter four times a year, containing information on nature legislation, subsidy possibilities, etc. Further, members may participate in the regional meetings and the general meeting of members that take place two times a year.

In 1991, the Forest Associations have founded the Union of Forest Associations (Unie van Bosgroepen), which acts as an umbrella organization. It bundles all subsidy requests and is the contact point for the government.

6.2.3 Dutch Federation for Private Landownership (FPG)

The FPG is an association for private owners of agricultural land, (old and new) real estates, forests and nature areas. The association counts 1.800 members, which together own almost 200.000 ha. There is one main office that covers the whole country, and 10 provincial offices with few paid staff and lots of volunteers.

Five commissions look for the interests of the sector, namely Land and lease policy, Agriculture, Real estates, Forestry and nature conservation, and International business. Thereby they operate on political and administrative level. Further, the FPG organizes workshops, writes publications and gives advices to improve the expertise of private owners.

The FPG also developed a certification model for private nature managers. When one is certified according to this model, one is recognized as a capable nature manager, can exchange knowledge with other certified people, and has no annual controls by the Government Service for Land and Water Management Dienst Landelijk Gebied; DLG) anymore.

6.2.4 SBNL

SBNL is an organization for private and agricultural nature management. In practice, it is an organization that provides advice but also looks after the interests of the sector. It was founded in 1981 as an antithesis of the existing

nature organizations. The initiators were the opinion that private people are able to create and manage nature as good as these nature organizations. Currently, around 130.000 ha nature is managed by private owners.

SBNL can exist because of donations and ca. 3000 people that pay a contribution of minimal €35 annually. Contributors receive a magazine, newsletter, and discount on advices. Further, all over the country, groups of volunteers are active with the maintenance and management of small landscape elements, in total around 700 persons.

6.2.5 Royal Dutch Forestry Society (KNBV)

The Royal Dutch Forestry Association was founded in 1910 and is the association for professionals in Dutch forestry. The association has ca. 600 members of various backgrounds such as forest owners, forest managers, advisors, researchers, policy makers, and students, which are member on a personal basis.

The association advocates the functions and values of forests. Further, it tries to increase the professional knowledge of its members and to stimulate the exchange of experiences, knowledge and information. To do so, the KNBV organizes several events each year, for example symposia and excursions. The association also participates in debates on policy, research and education and formulates position statements relating to forestry issues.

6.3 Data-collecting and politically-active organizations

6.3.1 Association for Research on Flora and Fauna (VOFF)

VOFF is a collaboration of ten private data-managing organizations (Particuliere Gegevensbeherende Organisaties; PGO's). Within VOFF, the PGO's work on an accurate and effective information provision on flora and fauna in the Netherlands. This information is meant for public information and education, scientific research and education, management, protection and development of the Dutch nature, besides advising, monitoring and evaluation of the governmental policy. The PGO's are ANEMOON (flora and fauna in the sea), BWLG (mosses and lichens), EIS (invertebrates), FLORON (plants), NMV, RAVON (reptiles, amphibians and fishes), SOVON (birds), TINEA (little butterflies), De Vlinderstichting (butterflies) and the Zoogdiervereniging (mammals). They count, every year, the number and distribution of different organisms in nature reserves and keep up statistics.

Together with the National Authority for Data concerning Nature (GaN), the PGO's developed the National Database Flora and Fauna (NDFD) and Het Natuurloket. Governmental bodies and business can subscribe to covering, reliable and up to date information that they need for spatial policies and realization of infrastructural projects. In January 2012, the VOFF has signed a Memorandum of Understanding with LifeWatch, whereby they intend to better

connect their networks with each other. Both parties want to increase the scientific research on plants and animals by exchanging knowledge and expertise.

6.3.2 Species protection Netherlands

Soortenbescherming Nederland is an association of several species-protecting organizations. Its goal is the protection of biodiversity in the Netherlands, and keep it high on the agenda.

Soortenbescherming Nederland tries to influence policy and management and works on the following topics: habitat approach, nature policy and legislation (among others, the integration of the forest act, Nature Conservation Act and Flora and Fauna Act), enforcement nature legislation, code of conduct, Red list of threatened species, reintroduction and exotic species, and Natura 2000.

The association does not accomplish projects. This is done by its members: EIS, FLORON, RAVON, Vlinderstichting, Vogelbescherming Nederland, and the Zoogdiervereniging. Further, the association works together with VOFF, provinces, several recreational organizations and the Dutch Construction and Infrastructure Federation (Bouwend Nederland). Temporary members that join when certain topics are discussed are Landschapsbeheer Nederland, SOVON, BLWG, De 12Landschappen, Natuurmonumenten, Staatsbosbeheer and Werkgroep Grauwe Kiekendief.

6.3.3 Landschapsbeheer Nederland

Landschapsbeheer Nederland is a cooperation of 12 provincial organizations, which take care of a qualitative and quantitative sustainable landscape, where we can work, live and recreate. They do this in cooperation with others.

The five strategic topics are:

- the preservation and development of the quality and quantity of the landscape, including biodiversity and heritage
- participative development with citizens and companies
- connecting landscape with new sectors (e.g. energy, welfare and health)
- area development and integral cooperation in these processes
- financing the landscape

The organization has more than 300 employees and 60.000 volunteers. The national office represents the cooperation at national (and international) level.

6.4 Other nature-related organizations

For people that are not directly working in the forest and nature sector, but are interested in learning about plants, animals, or want to help maintaining landscape elements, other organizations exist. With their activities they try to create awareness for nature and biodiversity, and by this they contribute to

nature conservation in the Netherlands. A selection of these organizations is listed below.

6.4.1 IVN

The IVN is the Institute for nature education and sustainability. The idea of the IVN is that when people are involved in nature, sustainable action is stimulated. The organization has 130 employees and 170 local divisions with around 20.000 volunteers. These volunteers organize many excursions, courses, walks, expositions and schoolings every year. By this, a large number of people becomes acquainted with nature. IVN is financed by members and contributors. Members receive the magazine *Mens en Natuur* four times a year.

6.4.2 Royal Dutch Society for Natural History (KNNV)

The KNNV is a society aiming at active participation in and with nature through natural history studies, by enjoying nature and through nature conservation. The main topics of the society are the study, experience and conservation of nature.

Members receive the magazine *Natura*, which contains articles on natural history subjects, nature conservation, book reviews and recent KNNV news. The KNNV is for everybody “who wants to know more about nature, for the naturalist who wants to pursue his interesting profession in his leisure hours, for the nature-lover who wants help the conservation of nature in the Netherlands, for the amateur who enjoys hearing about the natural world.”

6.5 Websites

A selection of websites that provide information for forest and nature owners, or for people interested in nature is listed below.

- [Compendium voor de Leefomgeving](#) - The goal of the Compendium is providing facts and numbers that are scientifically based, to support discussions and choices in the field of environment, nature and space, in society. It is a website from Statistics Netherlands (CBS), Netherlands Environmental Assessment Agency (PBL) and Wageningen UR.
- [De Natuurkalender](#) - De Natuurkalender is an observation program that wants to survey ecological changes. Timing of nature in relation to climate is one of the main topics. People can register to submit their observations. Currently, 7.500 observers participate.
- [Natuurbeheer.nu](#) - This website provides information for managers of forest and nature areas, on topics like legislation, management, and advisory services. It is maintained by the Unie van Bosgroepen.

7 Certification

Certification of forests shows an increasing trend. Although it is voluntary for owners to certify their forests or not, more and more companies, municipalities, housing cooperatives and consumers demand paper and wooden products from sustainable managed forest.

During the certification process, an independent third party inspects whether the forest management suffices certain standards. At this moment, the two largest certification systems in the world are PEFC (Programme for the Endorsement of Forest Certification) and FSC (Forest Stewardship Council). Both are international, non-profit organizations and promote good forest management, which is environmentally appropriate, socially beneficial and economically viable. FSC was established in 1993 by nature organizations like WWF, Friends of the Earth and Greenpeace, to stimulate responsible forest management. PEFC was established in 1999 by private forest owners, which wanted to prove that they manage their forest in a sustainable way.

Although neighboring countries mainly have PEFC-certified forests, in the Netherlands only FSC-certified forests exist right now. They cover around 44% of the forest area (Table 4).

Table 4: Forest area certified under FSC in the Netherlands (Probos, 2011)

Owner	Area (ha)
Staatsbosbeheer	93.895
Natuurmonumenten	14.158
Municipalities / private owners	41.228
Other	9.406
Total	158.687

The data in the table are from November 2011. The most recent information is that Face the Future with ca. 1300 hectares has resigned its FSC certification. Their forests were still quite young, not producing wood so far and the certificate was quite expensive. (Jan Oldenburger & Annemieke Winterink, Probos Foundation, personal communication, October 10 & 11, 2012)

The Union of Forest Associations developed a group certification system for FSC. This has been done because of two reasons (i) the costs are lower for small forest owners, as monitoring- and control measures can be executed by the organization itself, and (ii) some standards can be better met by the group than by an individual, for example the share of indigenous tree species and the share of mixed forest. On July 1, 2012, 122 members were certified via the FSC group, with a total forest area of 41.344 ha.

In the future, the forest area under FSC will continue to rise in the future. Besides, the Dutch PEFC Standard has been approved recently, so also PEFC-certified

forests may arise. The Dutch PEFC Standard is not very different from the Dutch FSC Standard, except that the PEFC Standard is very concise and has less criteria, which are described in less detail compared to FSC. Interpretation is thus left to the certifier. Further, both standards state that (i) a forest owner has to respect the relevant legislation, (ii) there must be a management plan, and (iii) monitoring must take place. But, differences exist, for example in the amount of dead wood available, which must be twice as high under PEFC. The same is true for the share of mixed forests. On the other hand, the share of indigenous tree species is allowed to be lower than under FSC. But, not allowed under PEFC is the removal of branches and tops, except on very mineral soils. Group certificates are possible, but unlike under FSC, all members have to fulfill the criteria individually. (DeBosgroep, 2011)

8 Monitoring and planning tools

8.1 National Forest Inventory

The first national forest inventory (NFI) was accomplished between 1938 and 1942, and the results were presented in 1946 in *De Nederlandsche Boschstatistiek*. In this inventory all(!) forests and non-forested nature areas were measured, as in the second (1952-1963) and third inventory (1964-1968). In the fourth inventory (1980-1985), only forested areas were measured. As too detailed measurements are priceless nowadays, and the emphasis in Dutch forests has shifted from wood production towards recreation, nature and environment, a monitoring network (called *Meetnet Functievervulling*) has been developed that exists of 3.622 plots (selected from a digital forest map). In this way, information on forest area, forest type and forest functions can be gathered on a statistical justified way. (Oldenburger, 2005) This has been done from 2001-2005 and results were published in Dirkse et al. (2007). In 2012, measurements for the 6th Dutch NFI have started, and results are expected in 2014.

8.2 Monitoring

Monitoring, recording the progress of certain measures, is necessary to assess the results of the implementation of a certain policy. Besides the *Meetnet Functievervulling*, the Birds and Habitats Directives resulted in the establishment of the Network Ecological Monitoring (Netwerk Ecologische Monitoring; NEM). The NEM is a collaboration between the Ministry of EL&I, the Ministry of Infrastructure and the Environment (IenM) and its executive body Rijkswaterstaat (RWS), provinces, Netherlands Environmental Assessment Agency (PBL), and Statistics Netherlands (CBS).

The National Authority for Data concerning Nature (GaN) is delegated by the Ministry of EL&I to coordinate the NEM-monitoring. The monitoring networks are accomplished by the PGO's (section 6.3.1). CBS processes the information into nature statistics.

The monitoring networks are useful for noticing trends for numerous plant and animal species, tracking Red List species, analyzing effects of fragmentation, desiccation and eutrophication or the effects of climate change.

8.3 Forest planning

According to Oldenburger & van den Ham (2010), 62% of the Dutch forests has a management plan (Table 3). A management plan is not compulsory for every forest owner. But several organizations, e.g. the Forest Associations, offer the formulation of a management plan, as it:

- improves the quality of the management
- will be easier to transfer the property to the next generation

- gives more insight in revenues of the management
- is compulsory when one wants to certify the forest

Regarding this last point, if one wants to certify forest under FSC or PEFC, the management plan must meet the Dutch FSC or PEFC Standard, respectively. The independent third party that comes to check the papers and management plan, will also go into the forest to see whether one sticks to the plan. Therefore, the management plan includes indicators, which can be measured to see whether management is done properly and goals have been achieved.

Further, based on the Nature Conservation Act, it is compulsory that all Nature 2000 areas have a management plan. These must contain an inventory (a.o. characterization of the area, characterization of habitats), outlook (a.o. goals on medium to long term), and a management plan (strategies, financial matters, monitoring, education).

Typically, forest management is organized in forest management units that count hundreds to thousands of hectares, but are not necessarily connected. The whole unit is managed according to one perspective, often with one regional manager. To have a coherent management also in regions with many small forests from private owners, for example the Forest Associations try to stimulate all kinds of cooperation. (Muys et al., 2010)

9 Discussion

This Chapter provides a discussion on forest and nature policy in the Netherlands and to what extent it contributes to the protection and preservation of biodiversity. First, the complexity of rules and the effects of decentralization will be discussed. Second, results of evaluations of nature policy will be reviewed.

9.1 Implementation of nature protection policies

Through the increase of actors, levels (internationalization and decentralization at the same time), and rules, policy has become complex (Willems et al., 2007). Besides policy at the national level, the Dutch government also has to implement more and more directives adopted on a European level. Beunen et al. (2009), have studied the implementation and integration of European environmental directives in the Netherlands. The Birds and Habitats Directives have been elaborated in the Nature Conservation Act and the Flora and Fauna Act. Unfortunately, the effect on land use and biodiversity is limited compared to the effect on decision-making procedures. Reports are necessary to sustain decisions, and over time more conflicts have arisen between actors making decision-making more bureaucratic and legalistic (Beunen et al., 2009). Legal procedures became more important than spatial planning and decision-making (Beunen et al., 2013). Further, different stakeholders criticized the stage at which they were involved in the process of site selection. Many found it too late (Bouwma et al., 2008).

Although the state is responsible for the realization of international agreements, the implementation is often dedicated to the provinces (cf. Beunen et al., 2009). For example, on September 21, 2011, the state made an agreement with the provinces that they will take care of the implementation of nature policy. One important consequence was that the national ecological network (EHS) would become smaller than originally foreseen (see also section 4.3.1). The Netherlands Environmental Assessment Agency evaluated the agreement (PBL, 2011). It was concluded that nature quality is decreasing already and will not be stopped by the agreement. Nevertheless, from an ecological point of view the current quality is an improvement compared to the situation in 2010. However, the realization of international conventions (e.g. Birds and Habitats Directives / Natura 2000) would be harder, as the measures in the agreement would delay the protection of plants, animals and habitats. (PBL, 2011)

9.2 Evaluation of nature policy and realization of protection goals

From 1998 until 2009, the national nature policy has been evaluated by PBL. Results were published in the so-called Nature balance (Natuurbalans). Since 2010, it is called the Balance of the environment (Balans van de leefomgeving) and includes beside nature, also environment and space. The Balance assesses to what extent the policy goals for environment, nature and space have been achieved. In 2010, the focus was on biodiversity, as in the Convention on

Biological Diversity it was agreed that we would try to slow down the decrease of biodiversity by 2010. The European Union then decided not only to slow down, but stop the decrease. This goal was not achieved by the Netherlands. However, through the spatial separation of agriculture, nature and urbanization, the loss of biodiversity could be slowed down. Besides, less demanding plants and animals display a stable trend or are doing better. The decline of forests and swamps/bogs has been stopped, mainly because of the expansion of the national ecological network and nature-directed management. But high demanding plants and animals are still declining, for example by a lack of suitable habitats, desiccation, eutrophication, acidification and fragmentation. (PBL, 2010)

Since 2010 the situation has not improved. Climate change and biodiversity are still two problems, and no policy trend change is visible. Climate change causes a high uncertainty in decision-making, as it is not clear how the climate will change exactly and what the consequences will be, amongst others on forest and nature. Biodiversity loss has decreased, but not stopped. Outside the nature areas it decreases strongly. The economical crisis could have a positive effect on nature and environment in the short term, as less is built, produced and consumed. But as also investments in more efficient and cleaner technologies reduce, the positive short-term effect may be (partly) nullified in the long run again. (PBL, 2012)

The Nature Outlook from PBL (section 4.3.5), presented four nature perspectives that each fit a certain policy task and societal need (PBL, 2011b). The Outlook has been subject to a multicriteria-cost-benefit analysis, which shows that the perspectives differ in financial costs and benefits, but also in their effects on biodiversity (Sijtsma et al., 2011). Financial costs comprise costs for nature and agriculture, financial benefits are for example residential benefits. Non-financial effects on biodiversity concern the number of sustainable protected target species and how people experience nature. The perspective Vital Nature would mean an improvement of sustainable protected species of almost 80%. Functional Nature scores best regarding people's experience. When the perspective Experiential Nature would be pursued, the lack of green areas around cities would be dissolved, but the quality of people's experience on the national level would stay behind. Tailored Nature scores high on economical aspects. Supplementary analyses show that Vital Nature brings most nature per spent euro. By combining societal challenges and linking nature policy with enjoyment of living and recreation, it will be possible to increase both cost effectiveness and biodiversity. (Sijtsma et al., 2011)

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- Interprovinciaal overleg: <http://www.ipo.nl>
- Ministry of Economic Affairs, Agriculture and Innovation (EL&I) - previously LNV: <http://www.rijksoverheid.nl/ministeries/eleni>
- Ministry of Infrastructure and the Environment (IenM): <http://www.rijksoverheid.nl/ministeries/ienm>
- Statistics Netherlands (CBS): <http://www.cbs.nl>
- Subsidy system Nature and Landscape management (SNL): <http://www.portaalnatuurenlanschap.nl/snl>

International agreements and treaties

- Birds and Habitats Directive: http://ec.europa.eu/environment/nature/legislation/index_en.htm
- Convention on Biological Diversity: <http://www.cbd.int>
- FOREST EUROPE: <http://www.foresteuropa.org>
- Forest Principles: <http://www.un.org/documents/ga/conf151/aconf15126-3annex3.htm>
- Ramsar Convention: http://www.ramsar.org/cda/en/ramsar-home/main/ramsar/1_4000_0

Landowners and nature protection organizations

- De 12Landschappen: <http://www.de12landschappen.nl>
- Natuurmonumenten: <http://www.natuurmonumenten.nl>
- Staatsbosbeheer: <http://www.staatsbosbeheer.nl>

Associations

- Bosschap: <http://www.bosschap.nl>
- Dutch Federation for Private Landownership (FPG): <http://www.grondbezit.nl>
- Dutch heathland cooperation (KNHM): <http://www.knhm.nl>
- Dutch National Fund for Rural Areas: <http://www.nationaalgroenfonds.nl>
- Forest Associations: <http://www.bosgroepen.nl>
- IVN: <http://ivn.nl>
- KNNV: <http://www.knnv.nl>
- Landschapsbeheer Nederland: <http://www.landschapsbeheer.nl>
- Lifewatch: <http://www.lifewatch.eu>
- Milieudefensie: <http://www.milieudefensie.nl>
- Royal Dutch Forestry Society (KNBV): <http://www.knbv.nl>
- Royal Netherlands Shooting Association (KNJV): <http://www.knjv.nl>
- SBNL: <http://www.sbnl.nl>

PGO's and their monitoring networks

- ANEMOON: <http://www.anemoon.org>
- BWLG: <http://www.blwg.nl>
- EIS-NL: <http://www.eis-nederland.nl>

- FLORON: <http://www.floron.nl>
- National Authority for Data concerning Nature (GaN): <http://www.gegevensautoriteitnatuur.nl>
- Natuurloket: <http://www.natuurloket.nl>
- Netwerk Ecological Monitoring (NEM): <http://www.netwerkecologischemonitoring.nl>
- NMV: <http://www.mycologen.nl>
- RAVON: <http://www.ravon.nl>
- Soortenbescherming Nederland: <http://www.soortenbescherming.nl>
- SOVON: <http://www.sovon.nl>
- Stichting Veldonderzoek Flora and Fauna (VOFF): <http://www.voff.nl>
- TINEA: <http://www.kleinevlinders.nl>
- Vlinderstichting: <http://www.vlinderstichting.nl>
- Vogelbescherming Nederland: <http://www.vogelbescherming.nl>
- Zoogdiervereniging VZZ: <http://www.zoogdiervereniging.nl>

Education and training

- AOC de Groene Welle: <http://www.degroenewelle.nl>
- AOC Terra: <http://www.aoc-terra.nl>
- Boscursus: <http://www.boscursus.nl>
- Helicon: <http://www.helicon.nl>
- InHolland: <http://www.inholland.nl>
- IPC Groene Ruimte BV: <http://www.ipcgroen.nl>
- Leiden University: <http://www.leidenuniv.nl>
- University of Groningen: <http://www.rug.nl>
- University Nijmegen: <http://www.ru.nl>
- Utrecht University: <http://www.uu.nl>
- UVA (Amsterdam): <http://www.uva.nl>
- Van Hall Larenstein: <http://www.vanhall-larenstein.nl>
- VU Amsterdam: <http://www.vu.nl>
- Wageningen University: <http://www.wageningenur.nl>
- Wellant College: <http://www.wellant.nl>

Selected national parks

- De Hoge Veluwe: <http://www.hogeveluwe.nl>
- Veluwezoom: <http://www.natuurmonumenten.nl/natuurgebieden/nationaal-park-veluwezoom>
- Zuid-Kennemerland: <http://www.np-zuidkennemerland.nl>

Informative websites

- Compendium voor de Leefomgeving: <http://www.compendiumvoordeleefomgeving.nl>
- De Natuurkalender: <http://www.natuurkalender.nl>
- Natuurbeheer.nu: <http://www.natuurbeheer.nu>

Certification programs

- Forest Stewardship Council (FSC) Netherlands: <http://www.fsc.nl/www.fsc.nl>
- Programme for the Endorsement of Forest Certification (PEFC) Netherlands: <http://www.pefcnederland.nl/www.pefcnederland.nl>

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Appendix

Description of international agreements, conventions and treaties in which the Netherlands is involved, listed in alphabetical order. Information is taken from the official websites, which are listed under Sources.

[Birds Directive](#)

The Birds Directive (79/409/EEC, now 2009/147/EC) is the oldest nature legislation of the European Union. It was adapted by the 'old' 15 Member States in 1979. Since then, twelve countries (Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia, Slovakia, Bulgaria, and Romania) joined the EU and also adopted the Directive. Because of the different species living in these countries, the Directive has to be applied to a much larger territory than before.

The Birds Directive ensures protection for all wild birds in Europe. Member states are obliged to designate Special Protection Areas (SPAs) for 194 species and sub-species that have been identified as particularly threatened (Habitats Directive), and all migratory bird species. These areas are part of the Natura 2000 ecological network under the Habitats Directive.

Further, it is forbidden to directly threaten birds, destruct their nest and trade them alive or dead. The number of bird species that can be hunted, and the periods during which they can be hunted, are limited.

[Convention on Biological Diversity](#)

An Ad Hoc Working Group, later known as the Intergovernmental Negotiating Committee, prepared an international legal instrument for the conservation and sustainable use of biological diversity. It was approved at the Nairobi Conference for the Adoption of the Agreed Text of the Convention on Biological Diversity on May 22, 1992. The Convention has three main objectives:

- the conservation of biological diversity
- the sustainable use of the components of biological diversity
- the fair and equitable sharing of the benefits arising out of the utilization of genetic resources

The Convention was opened for signature on 5 June 1992 at the United Nations Conference on Environment and Development (UNCED, also known as Earth Summit) in Rio de Janeiro. It remained open for one year, by which time it had received 168 signatures. The Convention entered into force on December 29, 1993.

[Forest Principles](#)

In 1992, at the UNCED in Rio, a document was produced called "Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the

Management, Conservation and Sustainable Development of All Types of Forests”, or Forest Principles. As the title of the document indicates, it is a non-legally binding document that provides recommendations for conservation and sustainable development of forests.

As a result of the Forest Principles, in 1994 in Geneva, Switzerland, the Montreal Process, or “Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests”, was signed. It is a voluntary agreement on sustainable forest management. Member countries are Argentina, Australia, Canada, Chile, China, Japan, South Korea, Mexico, New Zealand, Russia, United States and Uruguay.

European forests are not included in the Montreal Process, but addressed by [FOREST EUROPE](#), or the Ministerial Conference on the Protection of Forests in Europe. This is the pan-European political process for the sustainable management of forests. It develops common strategies for its 46 member countries and the European Union on how to protect and sustainably manage forests. Since 1990, the collaboration of the ministers responsible for forests in Europe has had a great economic, environmental and social impact on the national and international level. FOREST EUROPE has led to achievements such as the guidelines, criteria and indicators for sustainable forest management.

Currently, the FOREST EUROPE signatory countries and observers participate in the Intergovernmental Negotiating Agreement (INC) to develop a legally binding agreement on forests in the pan-European region.

[Habitats Directive](#)

The Habitats Directive (92/43/EEC) was adopted in 1992, and its main objective is to promote the maintenance of biodiversity, taking account economic, social, cultural and regional requirements.

It is forbidden to degrade breeding and resting places for certain strictly protected animal species. Exceptions to the strict protection rules can be granted under very specific conditions.

Under the Habitats Directive a European-wide ecological network of protected areas has been established, Natura 2000. Together with the Birds Directive, the Habitats Directive forms the backbone of nature protection legislation of the European Union.

[Ramsar Convention](#)

The Ramsar Convention, or “The Convention on Wetlands of International Importance”, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. It was adopted in the Iranian city of Ramsar in 1971 and came into force in 1975. It is the only global environmental treaty that deals with a particular ecosystem.

The Ramsar List of Wetlands of International Importance now includes 1.950 sites, covering around 1.900.000 km². At present, there are 161 contracting parties.

[UNFF - United Nations Forum of Forests](#)

In October 2000, the Economic and Social Council of the United Nations (ECOSOC), established the United Nations Forum on Forests (UNFF), a subsidiary body with the main objective to promote "...the management, conservation and sustainable development of all types of forests and to strengthen long-term political commitment to this end..."

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