

Biodiversity Indicators

2007

State of Nature in Flanders (Belgium)



Colophon

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State of Nature in Flanders

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Executive summary

Flanders has endorsed the European objective to halt the loss of biodiversity by 2010. This report evaluates the present state of nature in Flanders by reporting on 22 biodiversity indicators which give the closest interpretation of the 26 European biodiversity indicators proposed by the European Environment Agency (EEA 2007).

Components of biodiversity and integrity of ecosystems

Very specific habitats degrade to more common, usually nutrient-rich habitats. As a consequence, many rare species, restricted to these specific habitats, are declining. Examples are the species mentioned in the Annexes of the Habitats Directive. Many farmland species (e.g. Skylark) are also suffering from habitat change. On the other hand, a number of common species such as Magpie and some alien species such as Black Cherry, are increasing. As a result, variation in biodiversity decreases. Freshwater biodiversity (e.g. fish, water plants) declined sharply during the last century, although a significant improvement has been noticed during the last decade (e.g. fish, dragonflies). Woodland birds have also fared better in recent times (e.g. woodpeckers).

Protected areas and sustainable management

The Flemish government deploys a series of instruments for the conservation and sustainable use of biodiversity. Nature reserves, forest management plans and agri-environmental schemes exist, but it is difficult to meet surface area targets. Flanders has designated 7.5 % of its territory as Sites of Community Interest under the EU Habitats Directive. This is less than the European average, but more than the surrounding economic top regions. Defragmentation of water courses is in progress, but not fast enough to achieve the Benelux target of free fish migration by 2010.

Biodiversity threats

Protected areas are small and fragmented. Flemish agriculture is amongst the most productive in Europe, but it scores badly in terms of biodiversity. Sprawling urbanisation and intensifying agriculture exacerbate the negative impact of habitat fragmentation. Nitrogen residues on arable land, atmospheric nitrogen deposition, and phosphorus concentrations in rivers are amongst the highest in Europe. Thanks to policy efforts, the problems caused by spreading farm manure have decreased, although the decline in the practice has slowed in recent years. Meanwhile, there are indications that climate change is starting to affect nature in Flanders and the number of alien species in Flanders increases by 25 species a year. As these two new threats are on a global scale, they are difficult to manage.

Footprint and public support

The consumption footprint of an average Flemish inhabitant is beyond that which our planet can offer everyone. Membership of nature related clubs and societies is on the increase, although the number of actual visits to forests and nature areas is declining slightly.

The 22 reported biodiversity indicators that are monitored suggest that without extra interventions it will not be possible to halt the loss of biodiversity in Flanders. It is important to tackle the various negative influences more thoroughly (such as detrimental land use, nitrogen, phosphorus and greenhouse gas emissions and the import and export of species). Sufficiently large nature areas should be managed to achieve clear nature targets, while outside the nature areas, a basic quality of nature should be maintained. The latter allows, amongst other things, for the dispersal of populations when habitats become unsuitable.

Introduction

In 2001 the European Union committed itself to halting the loss of biodiversity within its territory by 2010. In 2003 this target was accepted on a pan-European scale. In May 2006, the European Union reconfirmed this commitment (European Commission, 2006). The Flemish region adopted it as a long-term biodiversity objective in its third Environmental Policy Plan (2003-2007-2010). During the United Nations environmental summit in Johannesburg (Rio+10, 2002), the participating countries agreed to significantly reduce the loss of biodiversity on a global scale by 2010.

In 2004, SEBI 2010 ('Streamlining European Biodiversity Indicators') was established to monitor progress towards the 2010 biodiversity objective. For that purpose, 16 'headline indicators' were developed. In 2007, a provisional set of 26 European biodiversity indicators was proposed by the European Environment Agency.

This report evaluates the status of biodiversity in Flanders by means of 22 biodiversity indicators, which are closely linked to the aforementioned 26 European biodiversity indicators. The set of 22 biodiversity indicators is used to evaluate the Flemish progress towards the 2010-target. Each page describes one indicator, the relevant policy targets, an evaluation of status and trends and, when data are available, an international comparison.

The 22 Flemish biodiversity indicators were originally described in the Nature Report 2007 (www.inbo.be), on the biodiversity indicators website (INBO, www.biodiversityindicators.be) and the environment indicators website (VMM, www.milieurapport.be). The original data sources are included in the back of the report, and where currently available Flemish data for the proposed 26 European 2010 indicators is also presented.

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(*) *Flemish Biodiversity indicator is tuned to proposed European indicator.*

Flanders at a glance

Ongoing state reforms over the last 35 years have transformed Belgium into a Federal State, giving its three regions increasing responsibilities. Flanders, Wallonia and Brussels have their own governments, parliaments and administrations. Nature conservation and forest management have been a regional responsibility since 1988. Major milestones have been the Decree on Forests in 1991 and the Decree on Nature Conservation in 1997. These objectives were further developed during the 1997-2001 and 2002-2007(-2010) environmental policy plans.

Flanders is a densely populated and economically very active region. Nearly a quarter of the area is urbanised and about half of its surface is occupied by intensive agriculture. The Flemish landscape is the most fragmented in Europe.

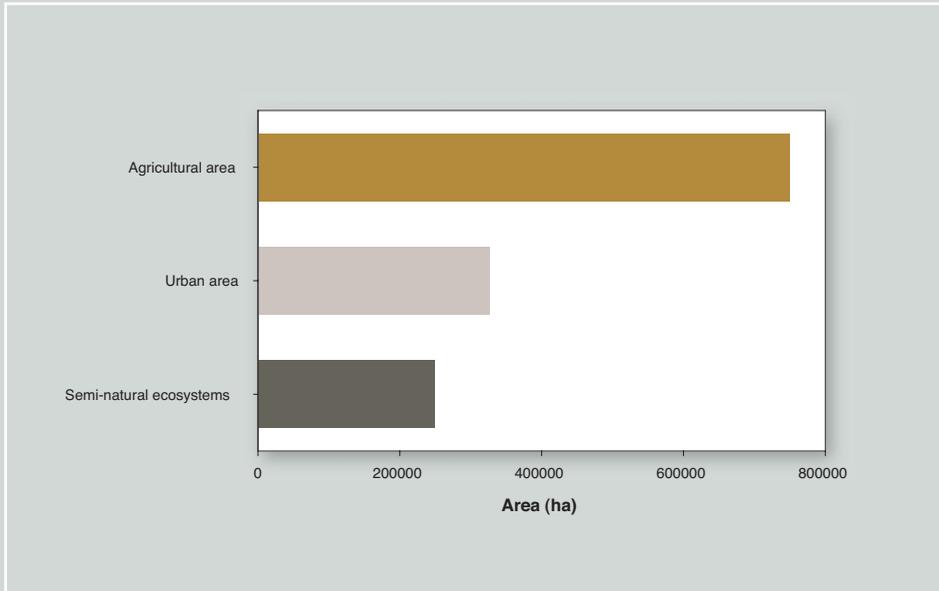
Basic statistics of
Flanders, Belgium
and Europe
(EU-15)

	Flanders	Belgium	Europe
Area (km²)	13 522	32 545	3 246 462
Population (inhabitants)	6 016 000	10 396 000	380 000 000
Population density (inhabitants/km²)	445	341	120

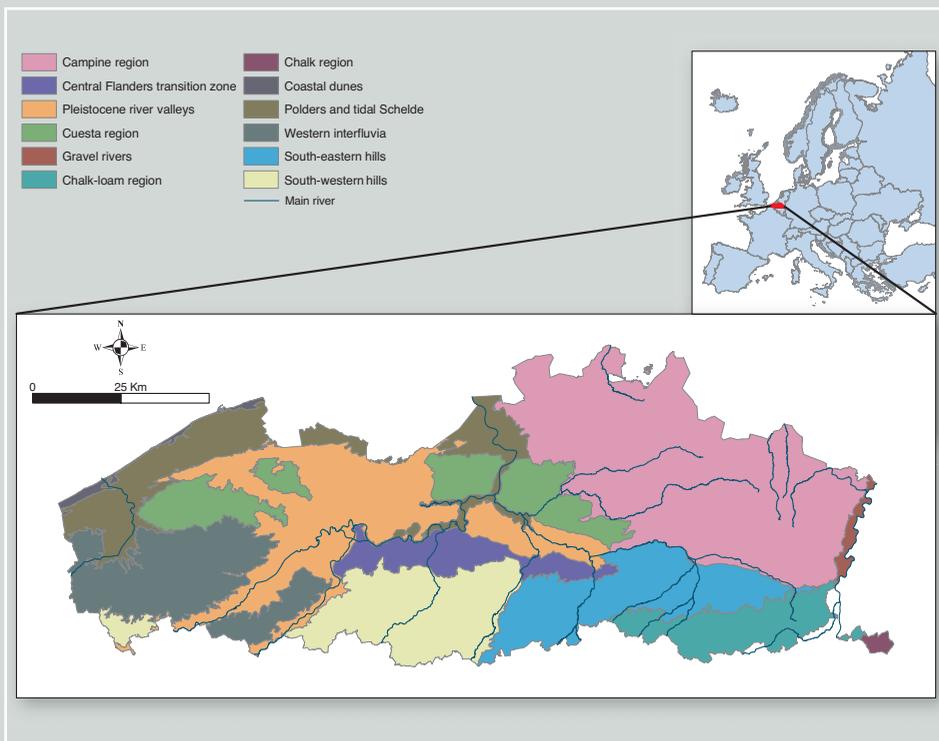
Flanders is located in the Western European lowlands and belongs almost entirely to the Atlantic biogeographic region. The only exception is the far eastern area of Flanders, which belongs to the continental biogeographic region. Flanders has 65 kms of seashore and coastal dunes, alluvial clay soils in the coastal Polders and along the Sea Scheldt, and sandy soils upstream in the Pleistocene river valleys and in the Campine region in the east. In the south of Flanders, the landscape is undulating and the soils are loamy and increasingly calcareous towards the south east. The altitude ranges from a few meters above sea-level in the Polders to 288 m above sea-level in the south eastern enclave. The Scheldt basin covers the major part of Flanders. The Meuse is a gravel river in the east.

Approximately 40 000 indigenous plant and animal species are found in Flanders, of which 1 % are vertebrates, 75 % invertebrates, 8 % vascular plants, mosses and lichens, and 16 % fungi.

Major land uses in Flanders (year 2000).



Ecoregions and main rivers in Flanders



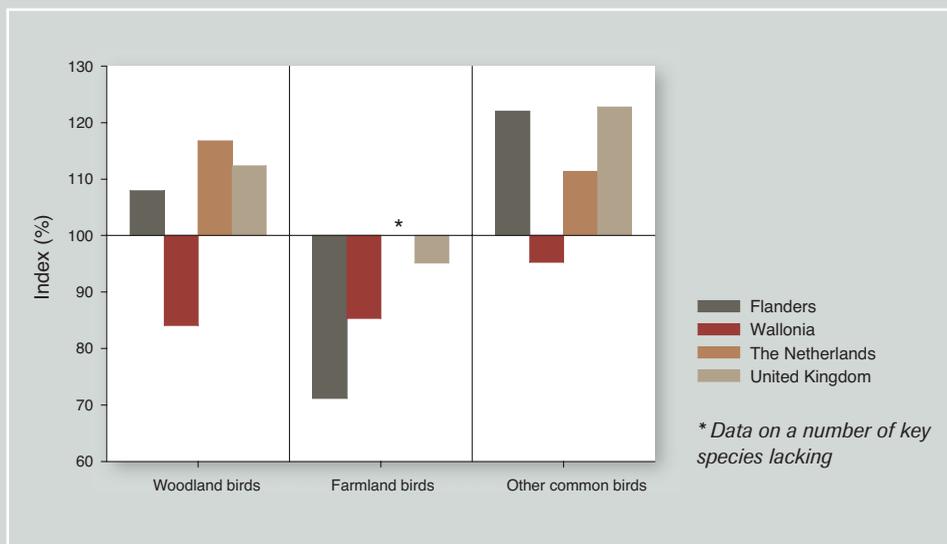
1 European common breeding bird index in Flanders

The European common breeding bird index describes the trend for a selection of European common breeding birds based on monitoring in the member states. There are three subcategories: farmland birds, woodland birds and other common birds, usually generalist species.

Farmland birds in Flanders declined markedly during the last decade (e.g. Skylark, Barn Swallow) due to intensification and scale consolidation of agriculture, while **the state of woodland birds improved** (e.g. woodpeckers). The latter might be explained by several factors, such as increased afforestation, a more natural composition and structure of woodlands and forests, and the maturing of trees. **Other common birds, usually generalists, have also shown an overall increase** (e.g. Magpie and Carrion Crow).

However, farmland birds declined to a greater degree in Flanders than in the surrounding countries and woodland birds increased to a lesser extent than in The Netherlands and the United Kingdom, although still by more than in Wallonia. There, woodland birds have declined. Common bird species fared better in Flanders and the United Kingdom than in The Netherlands and Wallonia.

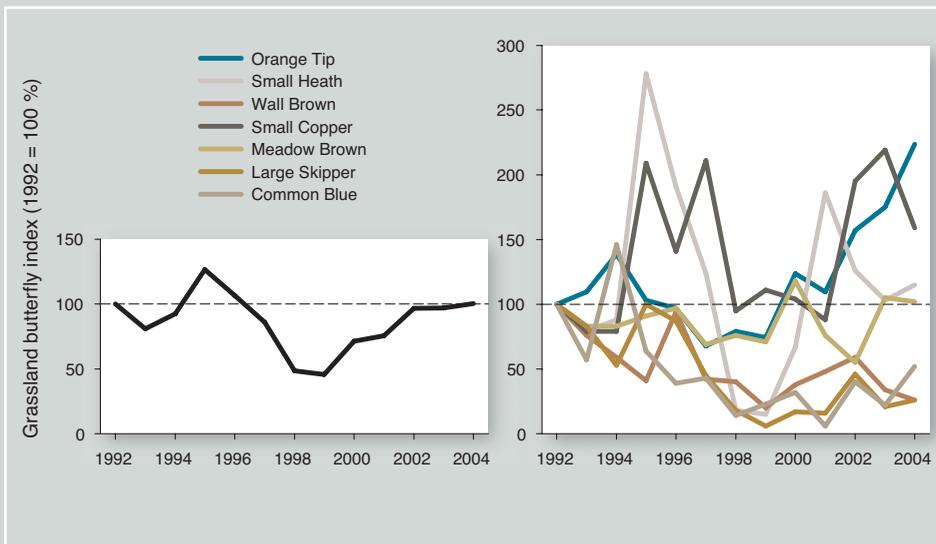
Trends in the abundance of woodland, farmland and other common birds in Flanders (1990 - 2000-2002), Wallonia (1994 - 2005), The Netherlands (1990 - 2004) and the United Kingdom (1994 - 2005).



2 European butterfly index (grassland) in Flanders

The European butterfly index describes a number of butterfly populations in several European countries based on a standardised monitoring system.

The Flemish data show a fluctuating pattern. In 2004, the index reached the same level as during 1992, the initial year of recording. Some species such as Small Heath and Small Copper show strong fluctuations. Small Copper and Orange Tip show an increasing trend, while Small Heath and Meadow Brown have remained more or less stable. Large Skipper, Common Blue and Wall Brown all declined, especially during the period 1992 to 1999 (-70 %), but subsequently they have stabilised (slight improvement for Common Blue).



Abundance of grassland butterflies. Left: aggregated. Right: individual species.

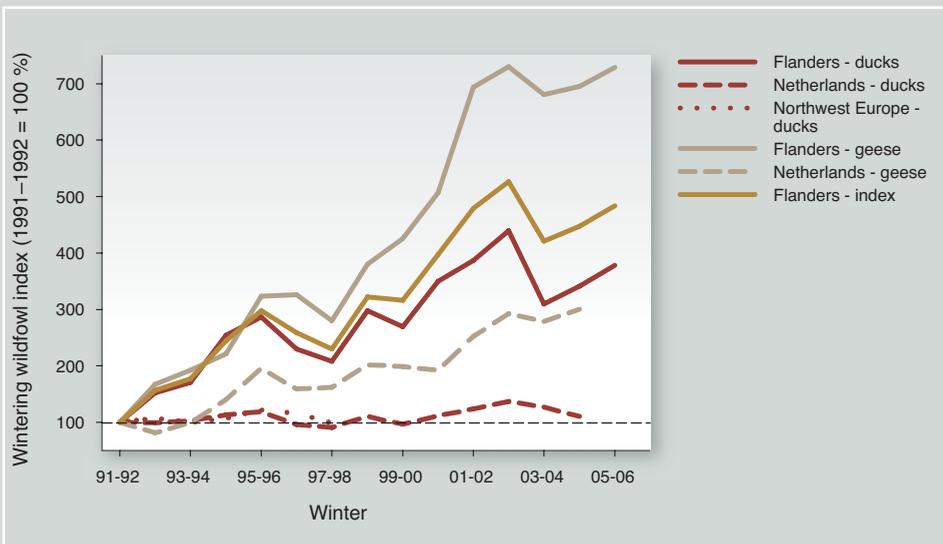
3 Overwintering water bird index

The overwintering water bird index describes the number of overwintering water birds based on 6 mid-monthly surveys.

The abundance of water birds increased fivefold between the winter of 1991-1992 and the winter of 2002-2003. This spectacular increase took place all over north-western Europe. Possible causes are better protection of the species (reduced hunting) and their habitat (protection of wetlands), an increased food availability (as a result of eutrophication), but also a north-western shift of south-eastern populations. Dragonfly and fish species which are adapted to moderate water quality also showed an increase.

The increase in overwintering water birds has been greater in Flanders than in north-western Europe in general. Species that remained stable or declined in Europe (e.g. Pintail) increased in Flanders. However, the area of wetlands in as small a territory as Flanders is limited. Therefore, changes on a relatively small scale affect the entire population (e.g. improvement of water quality in the Rupel and Sea Scheldt, or improved management in 'Bourgoyen-Ossemeersen' and 'Uitkerkse polder').

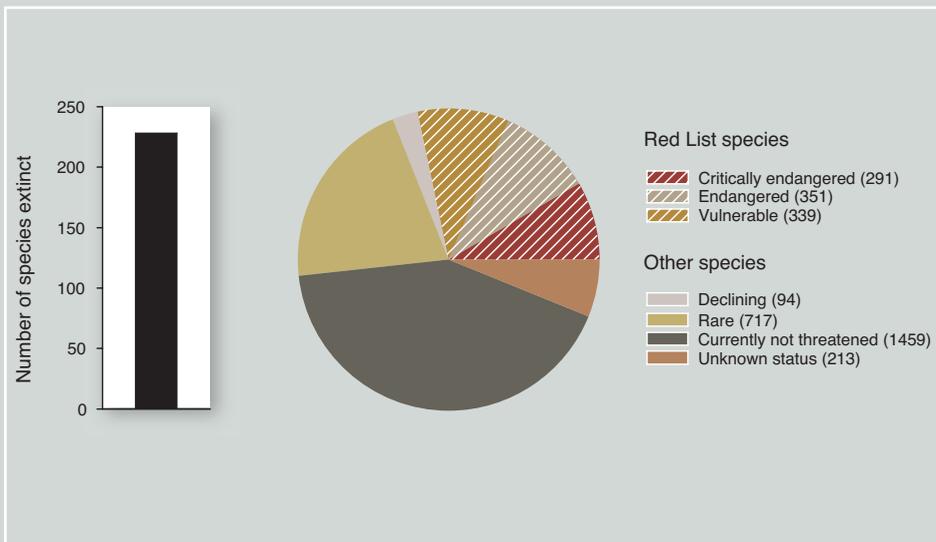
Abundance of overwintering water birds in Flanders (FL), The Netherlands (NL) and north-western Europe (NW).



4 Species status

The status of a species is based on the categories defined by the International Union for the Conservation of Nature (IUCN). Red List species belong to the categories 'Critically Endangered', 'Endangered' and 'Vulnerable'. Knowledge of the status of species in Flanders is strongly biased towards vertebrates and vascular plants, and the status is known for 100 % and 58-70 % of the species respectively. Fungi (10 %) and invertebrates (5-6 %) are hardly documented. The present Flemish indicator is based on the Red Lists of Mammals, Breeding Birds, Reptiles, Amphibians, Fish, Spiders, Butterflies, Dragonflies, Carabids, Grasshoppers, Crickets and Locusts, Water Bugs, Ants, Dolichopodids, Empidids, Vascular Plants and Macrofungi.

Of the 3479 documented species, 228 became locally extinct during the last century. **A total of 981 species (28 %) are on the Red List and are vulnerable to extinction if necessary measures are not taken.** These species are generally dependent on specific, often nutrient poor habitats. Species associated with farmland are increasingly appearing on the Red List.



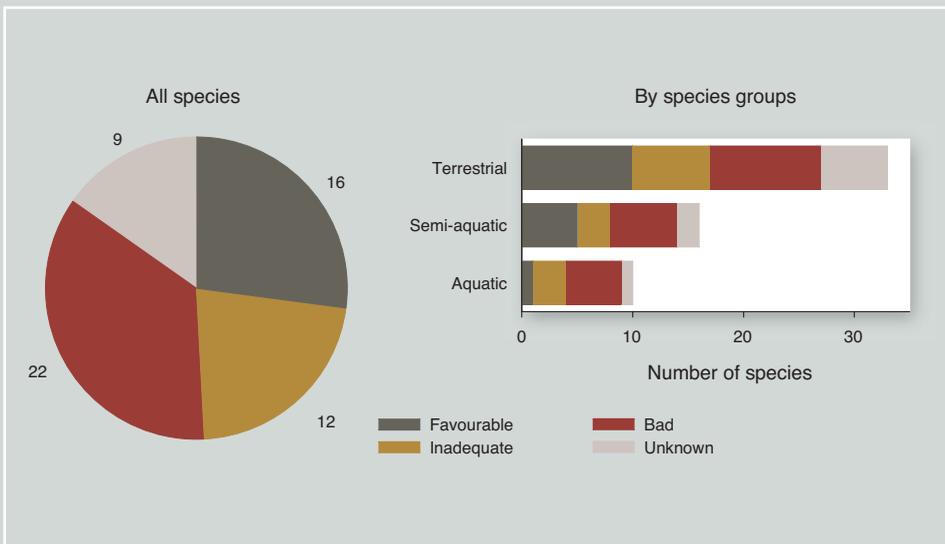
Status of all examined species groups in Flanders (2007).

5 Conservation status of species of European interest

The main goal of the Habitats Directive is to maintain a 'favourable' conservation status of selected species. These species are assumed to be endangered and Europe should play an important role in their conservation. Generally these are species living in specific habitats. The evaluation of the conservation status is based on four criteria set down by Europe. These are the population of the species, its distribution, the state of its habitat and its future prospects.

Slightly more than one quarter of the species (16 species, 27 %) have a favourable conservation status. For 12 species (20 %) the conservation status is inadequate and for 22 species (37 %) the status is poor. For nine species there was insufficient data to evaluate the status. The status of aquatic species gives the greatest cause for concern, with only one of the 10 species being considered as having a favourable status. Water pollution and eutrophication are the main threats reported for most species.

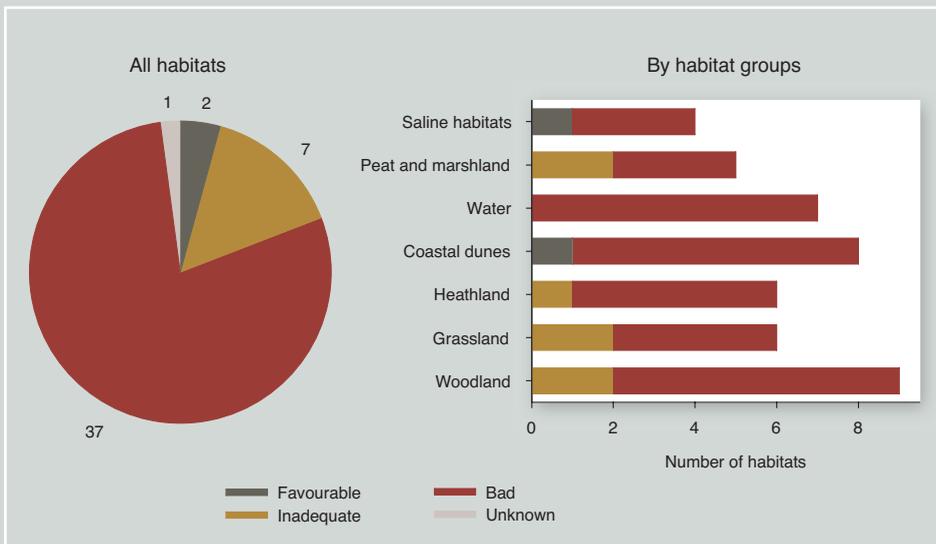
Conservation status of species of the Habitats Directive. Left: aggregated. Right: per species group (2007).



6 Conservation status of habitats of European interest

The main goal of the Habitats Directive is to maintain a 'favourable' conservation status of selected habitats. These habitats are assumed to be endangered and Europe should play an important role in their conservation. Generally they are very specific habitats. The evaluation of the conservation status is based on four criteria set down by Europe. These are the area of the habitat, its distribution, its quality and its future prospects.

Three-quarters of the habitats (37 habitats) are of poor conservation status and 15 % (7 habitats) have an inadequate conservation status. The latter comprise two peat and marshland habitats, one heathland, two grassland and two woodland habitats. Consequently, only two habitats have a favourable conservation status, these being one saline habitat (Mudflats and sandflats not covered by seawater at low tide) and one coastal dune habitat (Dunes with Sea Buckthorn). All aquatic habitats are of a poor conservation status. Water and air pollution pose the most serious threats for most habitats.



Conservation status of the habitats of the Habitats Directive. Left: aggregated. Right: per habitat group (2007).

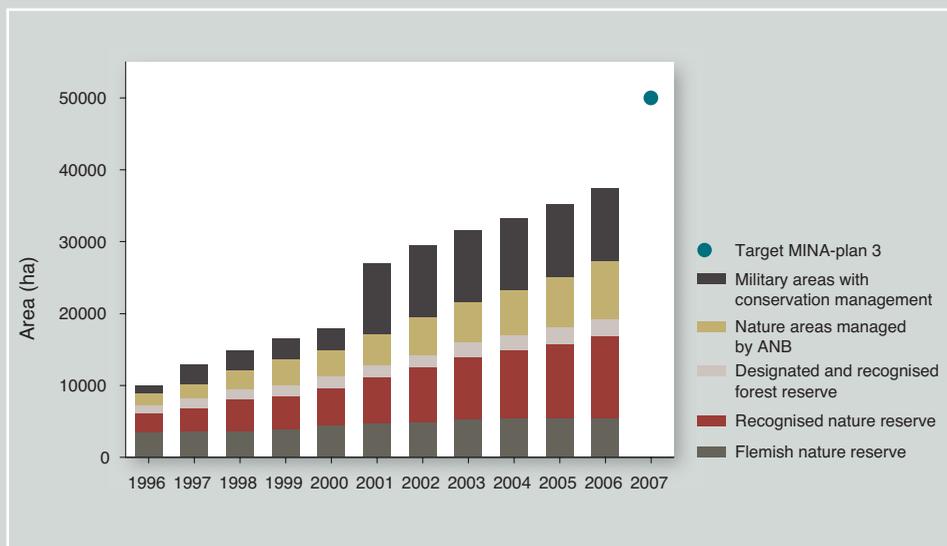
7 Area with conservation management

The third Environmental Policy Plan (2003-2007-2010) targeted 50 000 ha with active conservation management by 2007. These areas include the officially recognised nature and forest reserves managed by non-governmental organisations, local authorities or private owners as well as nature and forest reserves managed by the Flemish government and military sites managed mainly for conservation. The tool to survey the effectiveness of this conservation management is still under development. It is clear that biodiversity within these areas is much higher than outside of them.

At the start of the planning period (end 2002) the area with conservation management covered 29 480 ha, or 59 % of the target. By the end of 2006, 37 348 ha, or 74 % of the target has been achieved. **If the present trend continues, the target will not be achieved in time.** The areas with conservation management in Flanders are usually small and fragmented.

At the end of 2006, 5 491 ha had been designated by the Flemish government as Flemish nature reserve and was managed by the Agency for Nature and Forest. A further 11 378 ha was officially recognised as nature reserve and managed by non-governmental organisations. In addition, there are 2 423 ha of forest reserves, 2 174 ha of which are owned by the Agency for Nature and Forest (designated as forest reserves) and 249 ha are owned by local authorities and private owners (officially recognised forest reserves). The Agency for Nature and Forest also manages about 10 000 ha of military land, with a nature protocol agreed with the federal government. Both the Agency for Nature and Forest and non-governmental organisations own and/or manage natural areas which are not officially recognised as nature reserves but are managed in the same way.

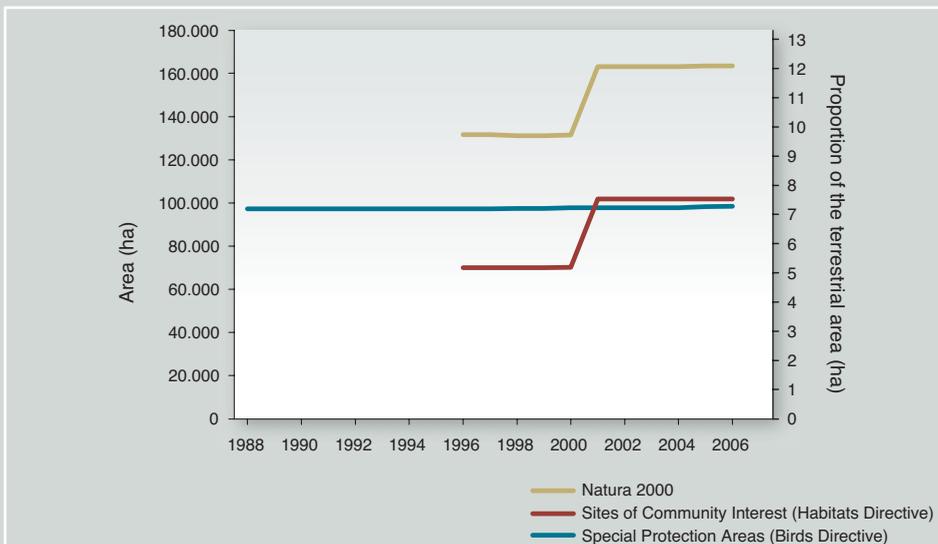
Area with conservation management.



8 Sites designated under the EU Habitats and Birds Directives

The goal of the Birds and Habitats Directives is to protect a number of species and habitats which are threatened and for which Europe has an important role. To achieve this goal, the European ecological network 'Natura 2000' is being delineated. It consists of areas designated according to the Birds Directive (Special Protection Areas) and the Habitats Directive (Sites of Community Interest). The Sites of Community Interest still have to be designated as Special Areas of Conservation.

In Flanders, 24 Special Protection Areas have been designated with a total area of 98 423 ha, or 7.3 % of the Flemish territory. There were 38 sites designated and put on the list of Sites of Community Interest by the European Commission. The Sites of Community Interest have a total area of 101 891 ha, or 7.5 % of the Flemish territory. The total Natura 2000 area comprises 163 499 ha (12.1 % of the Flemish terrestrial area). Marine areas are not included, as they are under the jurisdiction of the Belgian federal government.



Special Protection Areas, Sites of Community Interest and Natura 2000 in Flanders.

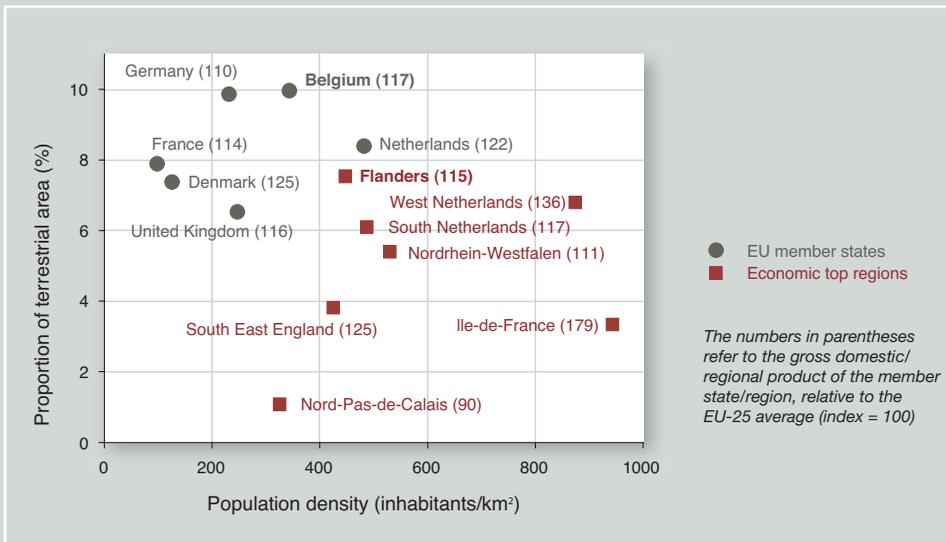
Sites of Community Interest – International comparison

Compared to the EU 25-average (12.2 %), Flanders (7.5 %) and Belgium (10 %) have designated a rather limited proportion of their terrestrial area as Sites of Community Interest. However, compared to its West European neighbours, Belgium has a relatively high percentage of designated area. Only Luxembourg (14.8 %), with its high GDP-index (215) and lower population density (175 inhabitants/km²) has designated a higher percentage. Germany (9.9 %) with a lower population density has designated a similar percentage to Belgium. The relatively high value for Belgium is a result of the high percentages in Wallonia (11.9 %) and the Brussels Capital Region (14.7 %).

Compared to the more densely populated economic top regions and neighbouring countries, both Flanders and Belgium score very highly in terms of relative designated area.

Flanders has designated a higher percentage of its terrestrial surface than densely populated and economically strong regions in the Netherlands, the United Kingdom and Germany. Only the Netherlands as a whole (8.4 %) obtains a better score.

Sites of Community Interest as a percentage of the terrestrial surface in Flanders, Belgium and neighbouring economic top regions and EU-countries (end 2006).

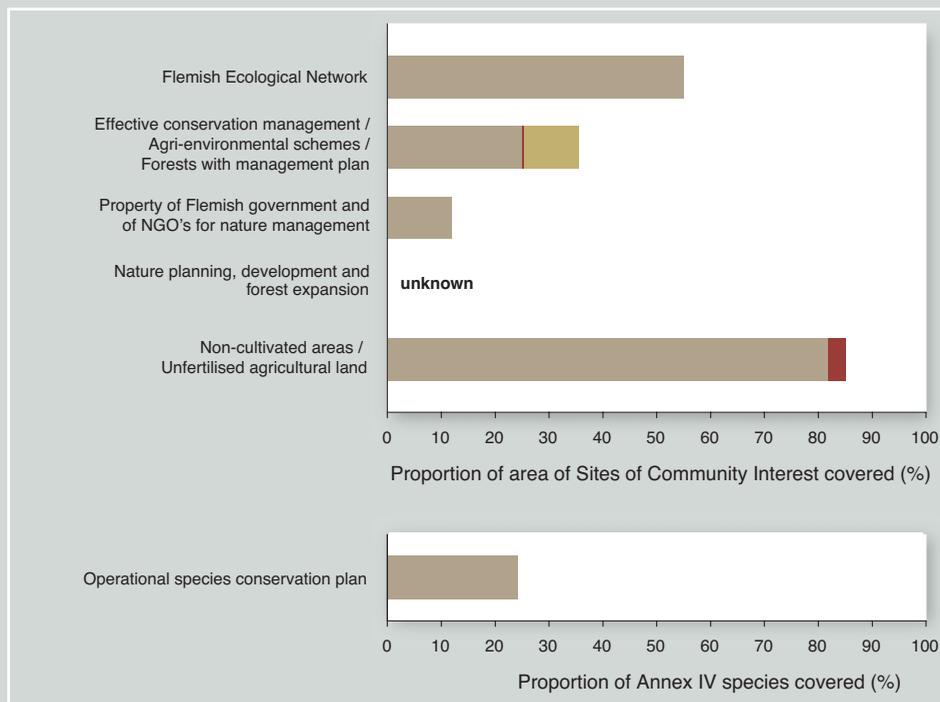


9 Contribution of the Flemish nature and forest policy to the implementation of the Habitats Directive

Within the Sites of Community Interest the EU-member states have to take necessary measures to conserve the species and habitats for which these areas were designated. This indicator shows the geographic overlap of a number of Flemish policy measures within the designated Sites of Community Interest.

By the end of 2006, 25 % of the Sites of Community Interest belonged to an area with conservation management (see 7). In less than 0.5 %, agri-environmental measures were taken to support biodiversity (see 18) and about 10 % was forest with a management plan according to the criteria for sustainable forest management (see 15). **Overall, in about one third of the Sites of Community Interest, the management was directly or partly financed by the Flemish government.** About 12 % of the Sites of Community Interest was owned by the Flemish government and non-governmental conservation organisations. About 20 000 ha of Sites of Community Interest are agricultural land and of these, 3 300 have been legally protected against the application of fertiliser in order to preserve their biodiversity. Species protection plans have been implemented for 9 of the 36 annex IV species in Flanders.

By comparison, the Netherlands has about two thirds of its Natura 2000 area covered by some form of conservation management funded by the government. The government ('Rijkswaterstaat' and Defence excluded) and non-governmental organisations together own about 50 % of the terrestrial Sites of Community Interest.



Contribution of Flemish policy instruments to the conservation of Sites of Community Interest and the protection of Annex IV species (end 2006).

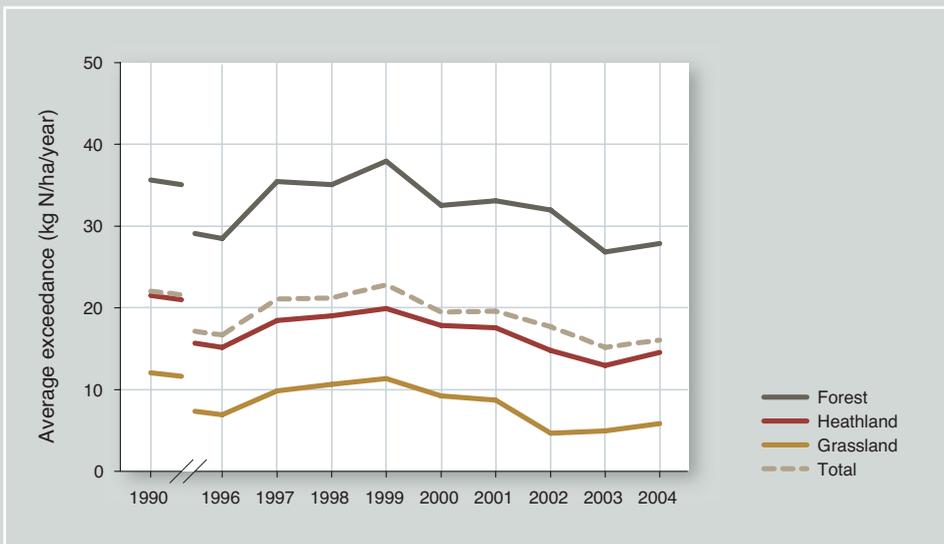
10 Critical load exceedance for nitrogen

Eutrophication has been one of the most important factors influencing biodiversity during the last century. The critical load exceedance for nitrogen indicates the potential disturbance by atmospheric nitrogen deposition. The critical load is the maximum deposition level that, based on present knowledge, does not adversely affect biodiversity in the long term. Ecosystems which are sensitive to nitrogen such as forests, heathland and species rich grasslands are characterised by a low critical load. The third Environmental Policy Plan (2003-2007-2010) aims to reduce nitrogen deposition to levels below the critical load by 2030. This is a prerequisite for conserving nitrogen sensitive ecosystems. Nitrogen deposition should be monitored in conjunction with the state of the nitrogen sensitive biodiversity.

Atmospheric deposition in Flanders amounted to an average of 39.8 kg/ha in 2004, a reduction of 18 % compared to 1990. Of this, 55 % was ammonia. In 2004 deposition exceeded the critical load in 100 % of forest, 100 % of heathland and 72 % of species rich grassland. Together, this amounts to 92 % of the nitrogen sensitive areas. **The gradual decrease since 2001 of the area of grassland where the critical load was exceeded did not continue in 2004.** The same has been observed for exceedance above the critical load. The exceedance in 2004 averaged 16.0 kg N/ha. The mean exceedance is highest in forests (+27.9 kg N/ha in 2004), followed by heathlands and species rich grasslands (+14.5 and +5.8 kg N/ha respectively in 2004). The Flemish short term emission goals (by 2010) are to reduce exceedance to 17.1 kg N/ha for forests, 8.4 kg N/ha for heathland and 2.4 kg N/ha for species rich grassland.

The exceedance of the critical loads in Flanders is one of the highest in Europe.

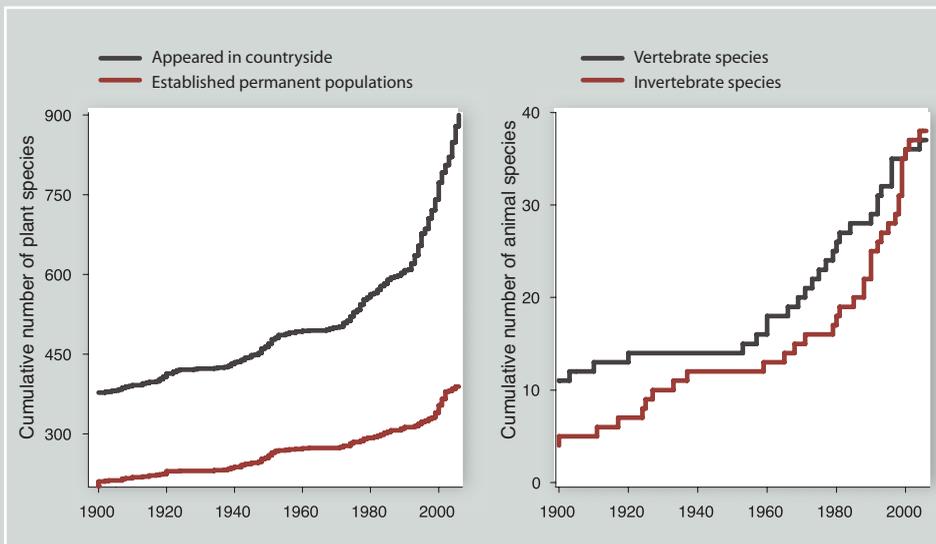
Mean critical load exceedance for nitrogen.



11 Alien species

Due to the increasing mobility of humans and goods, more and more plant and animal species are - deliberately or otherwise - imported and exported. Imported alien species can become invasive in nature and pose an increasing threat to the indigenous biodiversity. The increasing number of alien species increases the risk of problematic invasive species. An indicator for the damage caused by invasive alien species is still to be developed.

Between 1900 and 2007, about 900 alien plant species appeared in the Flemish countryside. Nearly 400 established permanent populations. The increase in the number of alien species is exponential. Whether these species will disappear or spread far beyond their place of introduction, is unknown at the moment. Between 1900 and 2007 about 80 alien animal species established permanent populations in the countryside. **During the last five years, the number of alien plant and animal species has increased by more than 25 per year in Flanders.** The cost of controlling invasive species (e.g. Black Cherry and Canada Goose) is high.



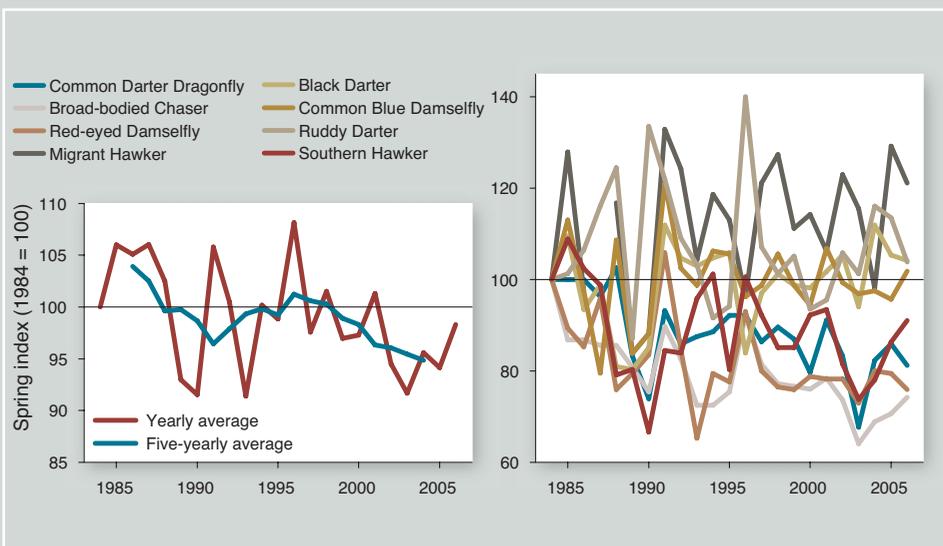
Cumulative number of alien vascular plant species (left) and vertebrate and invertebrate animal species (right).

12 Flying season of dragonflies

There is increasing evidence that climate change affects nature in Flanders. The spring-index summarises the first appearance of species in spring. Data are available for dragonflies, butterflies and migrating birds. The consequences of altered occurrence due to climate change need to be surveyed too.

The first appearance of dragonflies in spring advanced gradually between 1984 and 2006, but the degree of shift varied considerably between species. Eight of the 26 species analysed, advanced significantly. For 18 species this was not the case. Some species even tended to appear later. **During the last 20 years, the flying season of dragonflies has become extended by an average of 2 weeks.** This extension is positively correlated with the increased range of the species. Species that extend their flying season and distribution, react positively to climate change. Since some species adapt better than others, there is a risk of changes in the foodweb and/or ecological cohesion of ecosystems. This is illustrated by the Pied Flycatcher. The arrival date of this migratory species advances more slowly than the period of occurrence of the main food for its young, the caterpillars of the Winter Moth. This is a possible cause of the decline of this forest woodland bird.

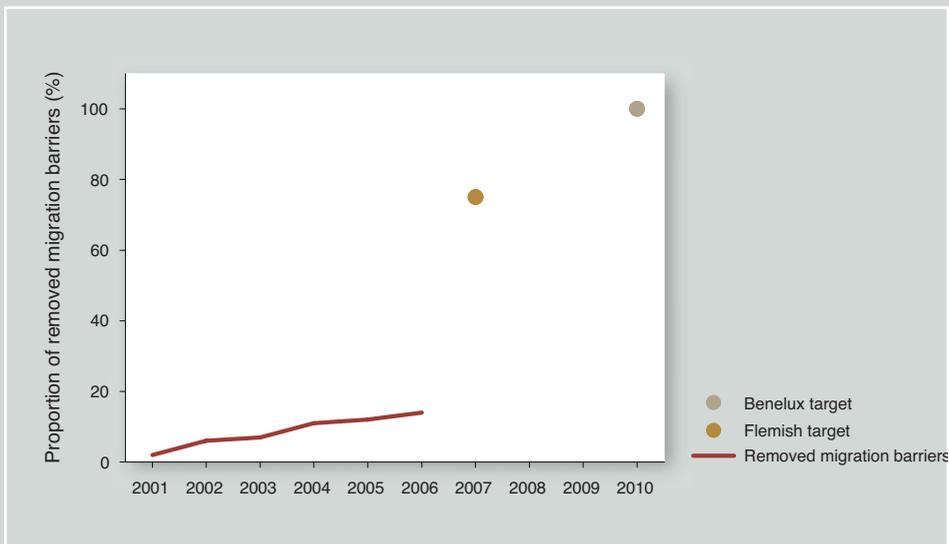
First observation (spring-index) of dragonflies, aggregated (left) and for a selection of species (right).



13 Defragmentation of rivers

Fragmentation of watercourses by weirs and sluices, together with the degradation of water and habitat quality, is an important problem for the conservation of aquatic species, in particular fish. In 1996, Benelux countries announced their intention of achieving free fish migration in all water catchments by 1 January 2010. This target was adopted in the Flemish Decree on Integrated Water Management (2003). The third Environmental Policy Plan (2003-2007-2010) added that 75 % of the barriers affecting important breeding sites and impeding migratory routes should be removed by 2007. In addition, no new barriers are to be allowed. **By the end of 2006, 110 of the 796 barriers (14 %) along the 3 000 km of river with the most important breeding sites and migratory routes had been dealt with.** The total number of barriers is variable since some might disappear naturally while other obstructions are only revealed to be barriers upon closer examination. **Achieving this target (100 % by 2010) seems a long way off** and if the present trend continues, only 20 % of the fish migration barriers will be removed by 2010.

Meanwhile, migratory fish species are recovering slightly, probably as a result of improving water quality (see 14).



Number of fish migration barriers removed in 3 000 km of the most important breeding sites and migratory routes in Flanders.

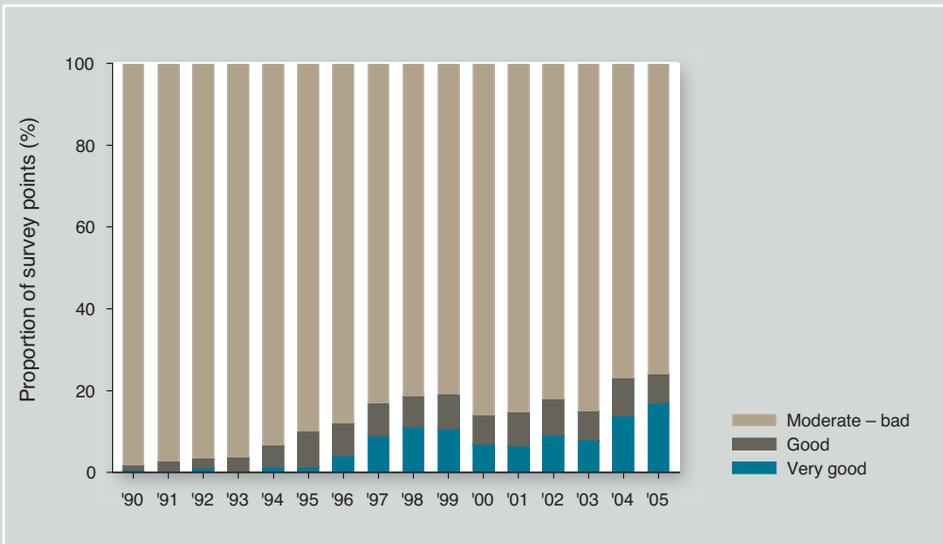
14 Phosphorus concentrations in rivers

According to the European Water Framework Directive a "good ecological status" should be achieved in all natural surface waters by 2015. Sufficiently low phosphorus concentrations are an important precondition for obtaining this status. In accordance with the Water Framework Directive, two target values for phosphorus have been set for each Flemish river type: one to obtain very good ecological conditions, and another to obtain good ecological conditions. These targets are a prerequisite for the recovery of aquatic communities.

The indicator reports on the share of survey points where these standards are achieved. Thanks to increased efforts to use low-phosphate detergents and a large-scale water purification programme, gradually more survey points achieved the good or very good status in the 1990s. After 1998, this number fluctuated annually. The variation correlated with varying precipitation levels. In the mean time, a number of species from water courses of moderate water quality responded positively to the improved water quality (e.g. dragonflies and fish). Localities with a pristine water quality however, are still difficult to protect and very difficult to expand, e.g. due to phosphorus pressure in nutrient poor brooks. Therefore, the risk of further deterioration of vulnerable water habitats and species remains high (e.g. Floating Water-plantain). **In 2005, 25 % of the survey points reached a good ecological state. The distance to target (100 % in 2015) is still large.** At the moment, several policy instruments (construction of buffer zones, additional water purification, erosion and fertiliser control, management agreements) are implemented.

The phosphorus concentrations in Flemish rivers are among the highest in Europe.

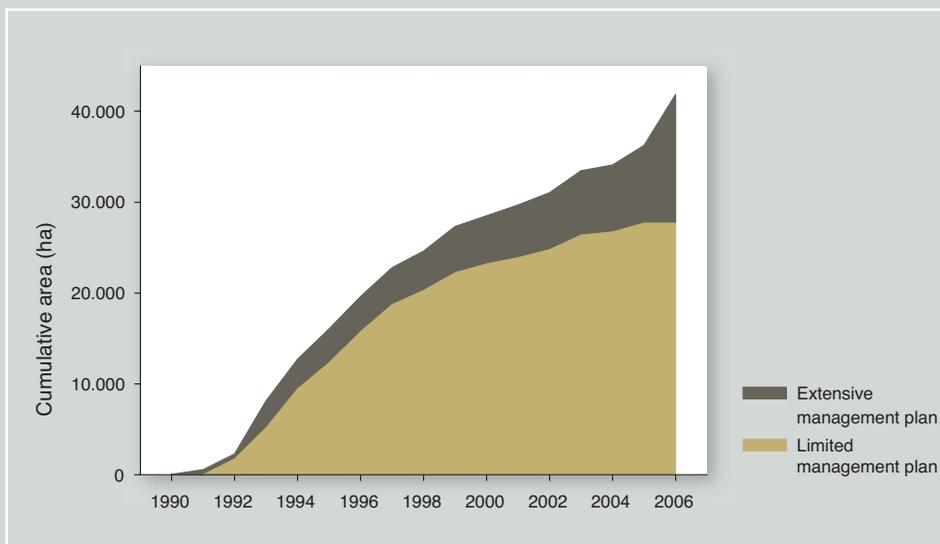
Phosphorus concentrations in rivers with regard to ecological quality.



15 Forest: area with management plan according to the criteria for sustainable forest management

According to the Forest Decree, management plans are compulsory for all forests larger than 5 ha. There are two types of forest management plan: the limited and the extensive management plan. The latter has a stronger focus on the ecological and social aspects. Its criteria are closely related to those from the Forest Stewardship Council (FSC). Private owners are offered the choice between limited and extensive management plans, whereas extensive management plans are compulsory for public forests. They are also compulsory for private forests located within certain nature oriented land use planning areas. The other private owners are encouraged to develop extensive management plans through grants and forest owner groups.

Between 1990 and 2006, 42 190 ha of forest management plans were approved (13 958 ha extensive and 28 232 ha limited). **Around 29 % of the 150 000 ha of Flemish forest area is now covered by approved management plans.** At the moment, there are no data available to evaluate the effectiveness of forest management. An analysis shows that limited forest management plans gradually increase their attention towards the ecological functions of forests.



Area of limited and extensive forest management plans.

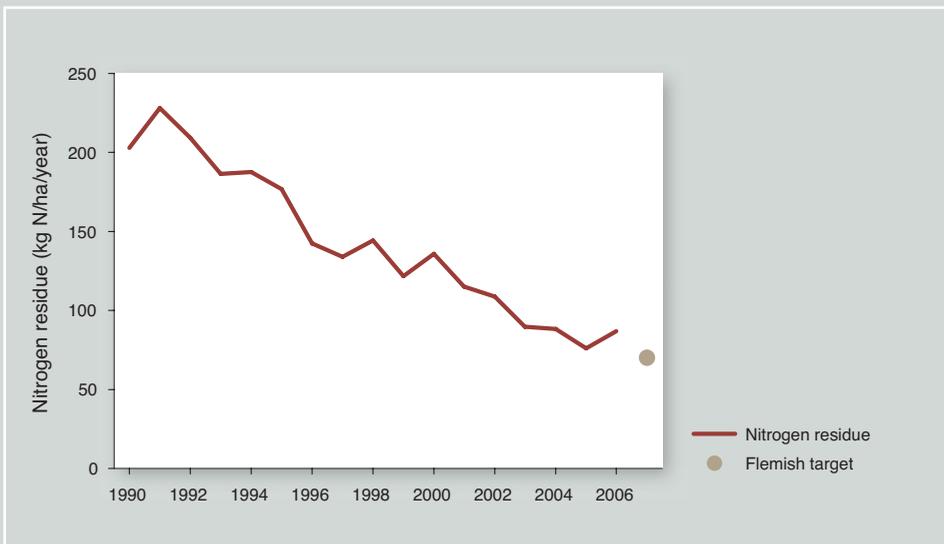
16 Agriculture: nitrogen residue in agricultural soils

The nitrogen (N) balance of agricultural soils is calculated as the difference between nitrogen input (fertilisers, atmospheric deposition, biological nitrogen fixation, seeds) and nitrogen output (plant nutrient uptake, ammonia emission from soil and fertiliser and other emissions to the environment passing through the farmland soil). The emissions through the soil (N accumulation in soil, N losses from soil to water) constitute the nitrogen residue, an indicator for the loss of nitrogen from agricultural soils to the environment. The transfer of N from soil to surface water and ground water increases with increased soil nitrogen residue. High N residues also lead to eutrophication of agricultural soils. The 2007 target in the third Environmental Policy Plan (2003-2007-2010) is 70 kg N/ha.

The nitrogen residue decreased by 57 % between 1990 and 2006 due to reduced livestock numbers, reduced chemical fertiliser use, increased processing of animal manure, increased feeding efficiency and an increased N uptake and removal associated with yield increases. In 2006 the total N residue in Flanders amounted to 54 million kg N, or 87 kg N/ha, excluding ammonia emissions. This is 11 million kg N or 17 kg N/ha short of the target. **If the measures proposed in the third Manure Action Plan (from 2007 onwards) enable the same progress, the target should be achieved by 2010.**

The current nitrogen residues in Flemish agricultural soils, as well as the ammonia emissions from agricultural land use, are among the highest in Europe.

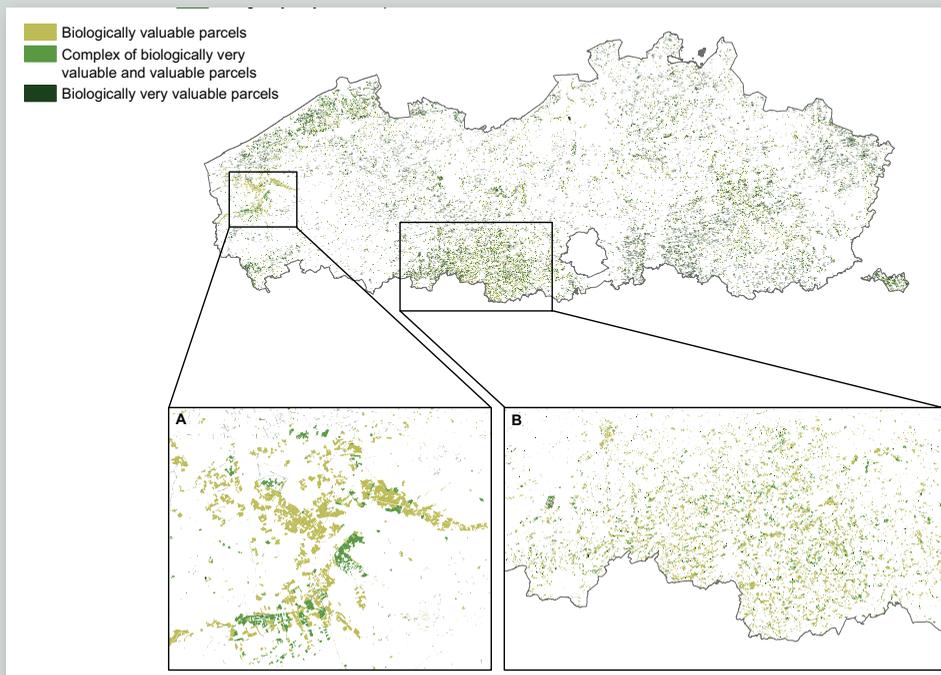
Average annual nitrogen residue in agricultural soils in Flanders.



17 Area of high nature value farmland

Extensive agricultural land use in the past has shaped a variety of our characteristic, rare or European important habitats for plants and animals. Intensification and specialisation of agricultural practices have led to habitat loss in agricultural landscapes and to the abandoning of agricultural land. In 2006 Flemish farmland (675 757 ha of registered parcels) contained 3 200 ha (0.47 %) of biologically very valuable parcels, 12 000 ha (1.8 %) comprising a mix of biologically very valuable and valuable parcels and 34 300 ha (5.1 %) of biologically valuable parcels. This farmland with high nature value is highly fragmented and spread out all over Flanders, with locally high densities in the coastal polders and in the IJzer valley. The area of biologically very valuable parcels mainly consists of small landscape elements such as hedges, ponds and tree rows (30 %), grasslands (30 %) and forests (26 %). Together these elements shape a varied, species rich, historically evolved cultural farmland landscape.

Based on the Corine geodataset, the European Environment Agency has identified about 1 % of Belgian agricultural land as high in nature value. **Belgium possesses the most nature poor farmland of all EU-15 countries.** The fact that only 0.47 % of the Flemish farmland area is biologically very valuable, is consistent with this study.



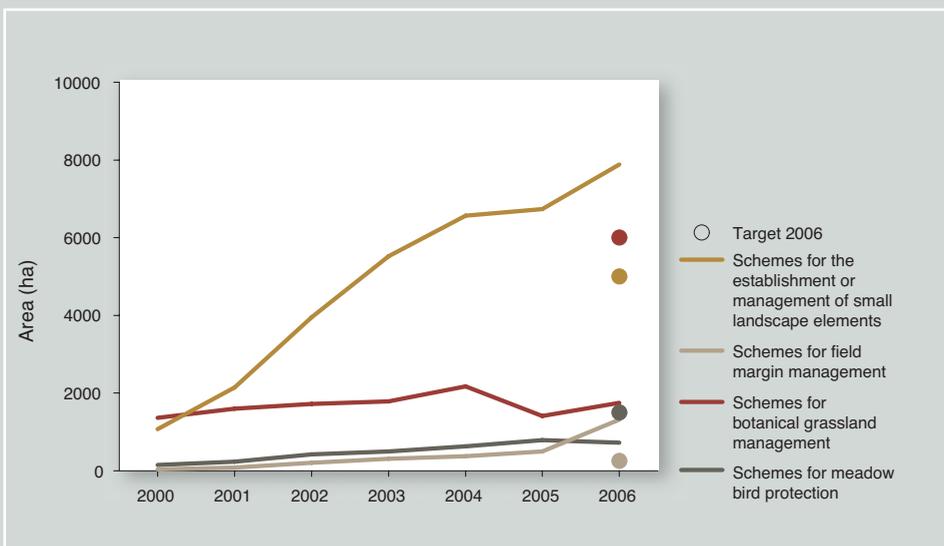
18 Area with agri-environmental measures that support biodiversity

In the framework of the first Flemish programme for rural development (2000-2006), four major types of agri-environmental schemes aimed at biodiversity management by farmers have been implemented. These schemes require farmers to commit themselves to do more for the environment, nature and the landscape than is legally required.

Schemes for field margin management and for the management of small landscape elements (pools and hedges), which both aim to strengthen the ecological 'infrastructure' in farmland areas, **have been widely adopted by farmers**. At the end of the programme period, 1 313 ha of field margins (5.3 times the target) had been installed and schemes for 98 ha of wooded banks, 237 km of hedges and 456 pools (1.6 times the target) were in place. **None of the agri-environmental schemes aimed at the development, conservation and restoration of specific farmland species and communities, has realised its area target during the 2000-2006 period.** Only 48 % of the intended 1 500 ha for meadow bird protection and 29 % of the intended 6 000 ha for botanic grassland management were realised. The first agri-environmental schemes for Common Hamster protection started in 2006 (6.2 ha - not in figure).

Information to evaluate the ecological effectiveness of the agri-environmental schemes and their management prescriptions is not available.

Area with agri-environmental measures that support biodiversity.

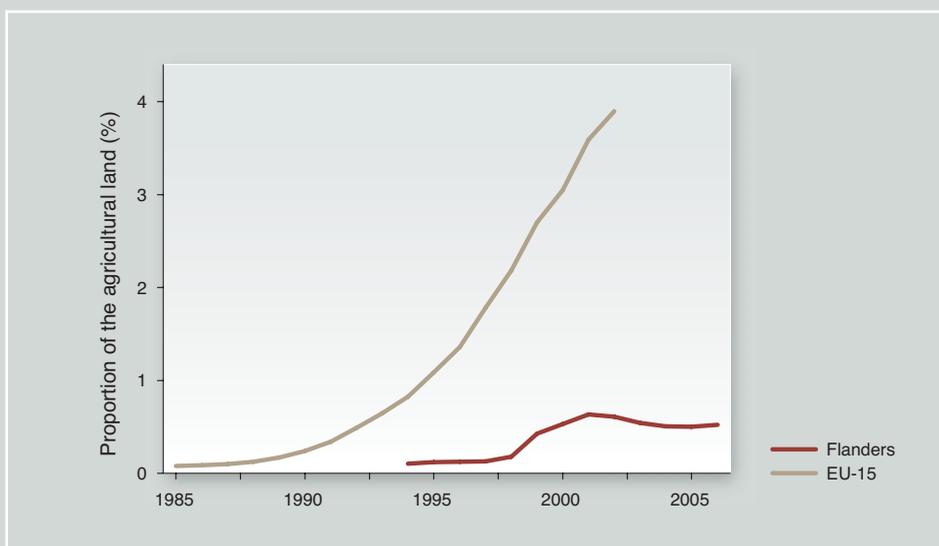


19 Area under organic farming

Organic farming focuses on renewable resources and natural systems to prevent or control pests and diseases of crops and livestock. Synthetic pesticides, chemical fertilisers, antibiotics and genetic modification are banned. Organic farming contributes to the conservation of ecosystems, usually harbours higher biodiversity and has a lower environmental impact than traditional agricultural practices.

The area under organic farming increased from 640 ha in 1994 to 4 026 ha in 2001. However, between 2002 and 2005 the total area and the number of organic farms decreased noticeably. In 2006 this trend was halted with a slight increase in the organically farmed area to 3 267 ha. This area corresponds to about 0.5 % of the total farmland area in Flanders. Several socio-economic factors underpin the stagnation since 2000. Firstly, biological farmers have experienced difficulties in marketing their products. Secondly, traditional farming organisations erroneously uphold the idea that organic farming is technically and economically less sustainable. Starting in 2008, the Flemish government is seeking to stimulate organic farming with a new action plan in order to achieve noticeable growth.

The stagnation of organic farming in Flanders since 2001 sharply contrasts with the strong increase in organically farmed area elsewhere in the EU-15, where organic farms comprised about 4 % of the total farmland area in 2005.



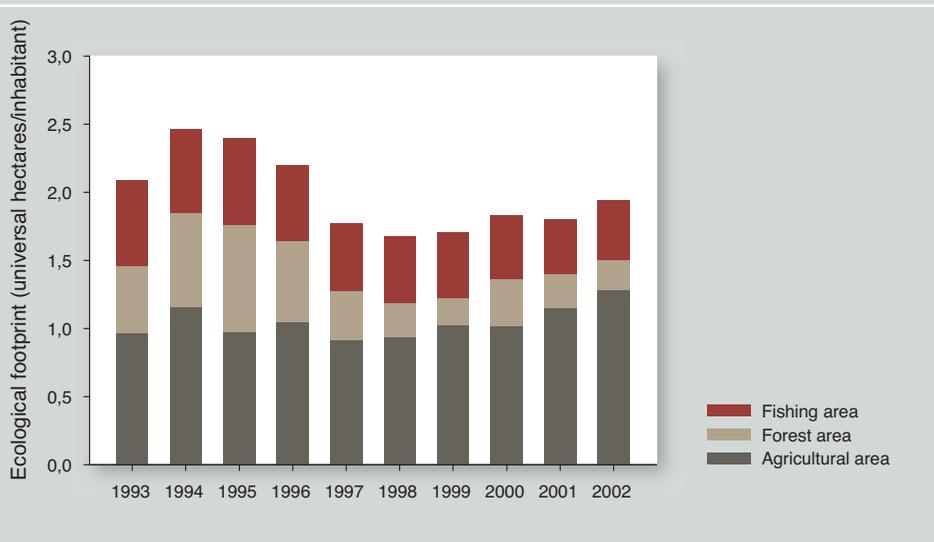
20 Ecological footprint of the consumption of renewable natural resources

In order to produce renewable natural resources, biologically productive land is required: e.g. farmland for crops and livestock, forest land for wood, and water bodies for fish. The ecological footprint of renewable natural resources consumption of a certain region is defined as the area of biologically productive land which is required to fulfil these consumption needs. The ecological footprint of renewable natural resources consumption is measured in “universal hectares”, which refers to the world average biological productivity of one hectare. On a global scale, there are 1.8 universal hectares of biologically productive land available per person (1999 data). This means that on average, the land required to produce all the renewable natural resources and energy needs for one person should not exceed 1.8 ha.

In 2002, the ecological footprint for renewable natural resources in Flanders was on average 1.94 universal hectares per person, excluding energy consumption. Since on average, only 1.8 universal hectares of biologically productive area is available per person, it is clear that **each Flemish inhabitant requires more than the average available area per person on the globe**. Under these conditions, halting the loss of biodiversity becomes a difficult task. At the moment, 59 % of the area necessary to satisfy Flemish consumption is located abroad. This applies mainly to farmland producing energy-rich feed crops for Flemish livestock. As such, the environmental pressure caused by the Flemish region is partly exported. The only change between 1993 and 2002 was a reduced pressure on forest resources thanks to an increased recycling of paper fibre.

Ecological footprint of the consumption of renewable natural resources (excluding energy consumption) in universal hectares.

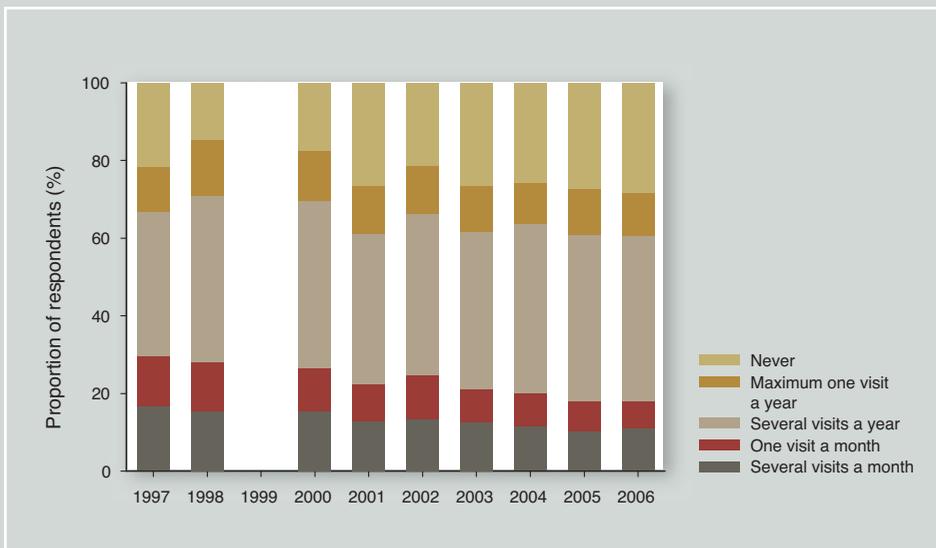
On a global scale, on average 1.8 universal hectares of biologically productive area are available per person.



21 Frequency of visits to forest and nature areas

According to the Flemish Nature policy, access to nature and forest areas is considered as a stimulating measure in order to increase public support for nature and forest. The Flemish Government Agreement (2004-2009) pleads for an increased public accessibility of nature and forest areas.

The annual survey of the Flemish Government monitors public visits in forest and nature areas (Beyst & Pickery, 2006). It shows that 63 % (of a sample of 1500 people) visit a forest or nature area at least several times a year. **The frequency of visits has decreased slightly, especially for the frequent visitors.** The proportion of people that never visit forests or nature areas is also increasing. The Flemish Government is preparing a new resolution with which to harmonise the regulations for public accessibility of forests and nature reserves. Important considerations for regulating public access to nature and forest areas, are the needs of the public and the ecological carrying capacity of the visited areas

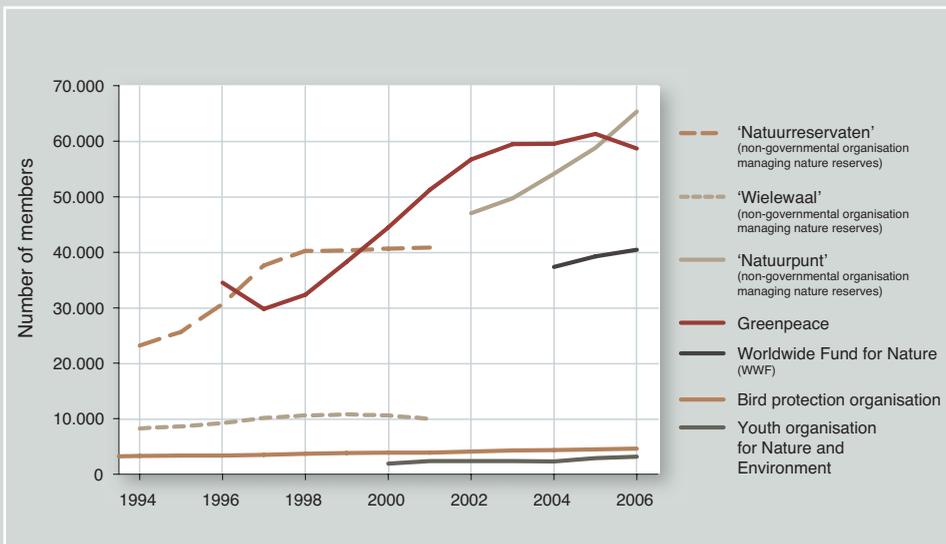


22 Membership of nature organisations

The size of membership of nature organisations is considered as a good indicator of public interest in nature and support for nature conservation in Flanders. However, this indicator is also influenced by the policy of these organisations.

'Natuurpunt' was established in 2002 when two local non-governmental organisations decided to merge ('Natuurreservaten' and 'De Wielewaal'). Since then, its membership has steadily increased and in 2006 Natuurpunt became the largest environmental NGO in Flanders with more than 65 000 members (or 2.5 % of Flemish households). **Membership of most nature organisations, which are active within Flemish territory, has increased during the last few years.** Only the membership of Greenpeace decreased during 2006.

Membership of nature organisations.



Data sources for 22 reported biodiversity indicators in Flanders

European headline indicators	22 Flemish biodiversity indicators	Data sources
1. Trends in the abundance and distribution of selected species	1. European common breeding bird index in Flanders (*)	INBO, SOVON, BTO, Vansteenwegen (2006), Vermeersch et al. (2004)
	2. European butterfly index (grassland) in Flanders (*)	INBO, butterflies working group Natuurpunt
	3. Overwintering water bird index	INBO, Wetlands International, van Roomen et al. (2006)
2. Change in status of threatened and/or protected species	4. Species status	Available Red Lists in Flanders
	5. Conservation status of species of European interest (*)	Paelinckx et al. (2007)
3. Trends in extent of selected biomes, ecosystems and habitats	6. Conservation status of habitats of European interest (*)	Paelinckx et al. (2007)
5. Coverage of protected areas	7. Area with conservation management	INBO, ANB, non-governmental organisations for nature conservation
	8-9. Sites designated under the EU Habitats and Birds Directives (*)	INBO, EEA
6. Nitrogen deposition	10. Critical load exceedance for nitrogen (*)	VMM-MIRA
7. Trends in invasive alien species	11. Alien species (*)	National Botanical Gardens Meise, Verloove (2002), INBO
8. Impact of climate change on biodiversity	12. Flying season Dragonflies	Working group on dragonflies
10. Connectivity/fragmentation of ecosystems	13. Defragmentation of rivers (*)	VMM, section Water
9. Water quality in aquatic ecosystems	14. Phosphorus concentrations in rivers (*)	VMM
12. Area of forest, farmland, fishery and aquaculture ecosystems under sustainable management	15. Forests: Area with management plan according to the criteria for sustainable forest management	Agency for Nature and Forest
	16. Agriculture: nitrogen balance (*)	VMM-MIRA

European headline indicators	22 Flemish biodiversity indicators	Data sources
12. Area of forest, farmland, fishery and aquaculture ecosystems under sustainable management	17. Agriculture: Area high nature value farmland (*)	INBO
	18. Agriculture: Area with agri-environmental measures that support biodiversity (*)	VLM
	19. Agriculture: Area under organic farming (*)	Department of Agriculture and Fisheries, section Monitoring and Studies
13. Ecological footprint of European countries	20. Ecological footprint of consumption of renewable materials (*)	VMM-MIRA
16. Public awareness and participation	21. Frequency of visits to forest and nature areas	Research Center of the Flemish Government
	22. Membership of non-governmental organisations for nature conservation	INBO, non-governmental organisations for nature conservation

(*) *Flemish Biodiversity indicator is tuned to proposed European indicator.*

Data availability for the full Flemish reporting on the 26 European biodiversity indicators (EEA 2007)

European Headline indicators	26 Proposed European indicators	Data availability in Flanders
1. Trends in the abundance and distribution of selected species	1. European common breeding bird index in Flanders (*)	Annual monitoring since 2006, INBO, Natuurpunt
	1. European butterfly index (grassland) in Flanders (*)	Annual monitoring, butterflies working group Natuurpunt
2. Change in status of threatened and/or protected species	2. Red list index for European species	No monitoring
	3. Conservation status of species of European interest (*)	Monitoring in preparation, INBO
3. Trends in extent of selected biomes, ecosystems and habitats	4. Ecosystem coverage	No monitoring, inventory (Biological Evaluation Map), INBO
	5. Conservation status of habitats of European interest (*)	Monitoring in preparation, INBO
4. Trends in genetic diversity of domesticated animals, cultivated plants, fish species and trees of major socioeconomic importance	6. Livestock genetic diversity	-
5. Coverage of protected areas	7. Nationally designated protected areas	Annual monitoring, 'Area with conservation management' to be tuned with 'Nationally designated protected areas'
	8. Sites designated under the EU Habitats and Birds Directives (*)	Annual monitoring, INBO
6. Nitrogen deposition	9. Critical load exceedance for nitrogen (*)	Annual monitoring and modelling, VMM, VITO
7. Trends in invasive alien species	10. Alien species (*)	No monitoring
	10. Trends in invasive alien species	No monitoring
8. Impact of climate change on biodiversity	11. Flying season Dragonflies	No monitoring
11. Marine Trophic Index	12. Marine Trophic Index of European Seas	-

European Headline indicators	26 Proposed European indicators	Data availability in Flanders
10. Connectivity/ fragmentation of ecosystems	14. Defragmentation of rivers (*)	Annual monitoring, VMM
	13. Connectivity/fragmentation of terrestrial ecosystems – under development	No monitoring, inventory (Biological Evaluation Map), INBO
9. Water quality in aquatic ecosystems	15. Nutrients in transitional, coastal and marine waters	-
	16. Phosphorus concentrations in rivers (*)	Annual monitoring, VMM
12. Area of forest, farmland, fishery and aquaculture ecosystems under sustainable management	17. Forests: Area with management plan according to the criteria for sustainable forest management	Agency for Nature and Forest
	19. Agriculture: nitrogen balance (*)	Annual monitoring, VMM
	20. Agriculture: Area high nature value farmland (*)	Annual monitoring, INBO
	20. Agriculture: Area with agri-environmental measures that support biodiversity (*)	Annual monitoring, INBO
	20. Agriculture: Area under organic farming (*)	Annual monitoring, L&V
	21. Fisheries: European commercial fish stocks	-
	22. Aquaculture: effluent water quality from finfish farms	-
13. Ecological footprint of European countries	23. Ecological footprint of consumption of renewable materials (*)	Partial monitoring, VMM
14. Percentage of European patent applications for inventions based on genetic resources	24. Patent applications based on genetic resources	-
15. Funding to biodiversity	25. Financing biodiversity management	<i>Under development</i> , INBO and Department LNE
16. Public awareness and participation	26. Public awareness – under development	-

(*) *Flemish Biodiversity indicator is tuned to proposed European indicator.*

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Abbreviations

ANB	Agency for Nature and Forest
BTO	British Trust for Ornithology
EEA	European Environment Agency
LNE	Department of Environment, Nature and Energy
L&V	Department of Agriculture and Fisheries
MIRA	Environment Report
SEBI	Streamlining European 2010 Biodiversity Indicators
SOVON	Bird research Netherlands
VITO	Flemish Institute for Technological Research
VLM	Flemish Land Agency
VMM	Flemish Environment Agency