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Progress towards the European 2010 biodiversity target

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European Environment Agency

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The EEA Technical report documenting the SEBI 2010 indicators, published in October 2007, emphasised the importance of the work of all experts and reviewers involved. This network of experts, together with the SEBI 2010 Coordination Team, has been equally valuable for the production and review of the present report.

Foreword

In the recent past the scientific and environment community have had to work hard to raise awareness and understanding about the reality of biodiversity loss and the dangers of climate change. Today, as the enormity of the challenge we face sinks in, biodiversity has been rising to the top of policy agendas.

Much has been done. The European Natura 2000 network is second to none in the development of protected areas, and the European target of halting the loss of biodiversity by 2010 — established by Heads of Government back in 2002 — is a significant agreement. However, although it is almost universally accepted that biodiversity and healthy ecosystems are essential for the existence of societies and our economies, we are all still failing to protect them adequately.

Our current consumption and production patterns may well result in our material wealth but they are also responsible for many negative — sometimes irreversible — impacts on the environment. And in today's setting, where consumption and production patterns are served by ecosystems around the world, different types of policy affect the resilience of ecosystems and biodiversity worldwide.

In this context, the European Environment Agency's role is the provision of timely, targeted, relevant and reliable information to support policy-making. Essential to this are the Streamlining European 2010 Biodiversity Indicators (SEBI 2010) which help to reveal complex biodiversity phenomena and trends. This pan-European process ensures that Europe's governments, business and citizens know the status of our biodiversity, and thus have a baseline to take sound decisions.

Our indicator-based assessment illustrates that European biodiversity remains under serious pressure and our policy responses have been insufficient to halt its general decline.

It is disappointing that we have to conclude that the European 2010 target will not be met. This report is an important help for us to consider our European target and allow us an insight into what we need to do better — or quicker — to halt the loss of biodiversity.

The pressures on biodiversity are not uniform, or held in place by geographical designations, and we must not focus all our efforts on preserving islands of biodiversity, while losing nature everywhere else. In this regard sector policies — agriculture, fisheries and forestry — play a significant role and need to be addressed at many scales: local, regional, national, European and global. Other policies such as the cohesion policy and the structural funds, as well as the territorial policies should be further addressed in the future in regards to its impacts on biodiversity.

Our societies obtain many services from nature including food, clean air, water and recreation. The way the resilience of our nature and our society is maintained will to a large extent be determined by how we manage the maintenance of ecosystem functions and their distribution. In order to do this, we must include the real value of using our natural capital in what we consume. This requires sound ecosystem accounting — with the ultimate purpose of measuring the gap between the reality of ecosystem integrity and the objectives stated in national and European laws.

For both countries and companies, such calculations lead to measuring a full cost of commodities, including market prices and the cost of their footprint on the ecosystems and biodiversity loss. Clear figures, as quoted in the Stern report on climate change, may help make the case for biodiversity, but providing clear and unambiguous measurements and indicators plays and equally important role. Such information needs to include traditional and local knowledge and findings from indigenous peoples, not only standard Western scientific measurements.

The recent meeting of G8 environment ministers, held in Syracuse on 22–24 April 2009, acknowledged that extinction rates may still be increasing despite

the global commitment to reduce the rate of loss by 2010, committed to investments in biodiversity and proposed 'a common path toward the post-2010 framework on biodiversity' which emphasises sector integration.

These points were also emphasised in the 'message from Athens', the outcome of a high level conference on priorities and options for future EU Policy, held at the end of April 2009. The message confirms at the highest political European level what the indicators tell us: a better understanding and sector integration are key, as are the links to the global biodiversity crisis. The SEBI 2010 indicators provide a key tool to help Europe as we set new targets post 2010.

All this represents a significant challenge, but with concerted effort, we can ensure that a post 2010 agreement really makes a difference.

Jacqueline McGlade
Executive Director
European Environment Agency

Executive summary

The 2010 target and beyond — where does Europe stand?

As the first indicator-based assessment of progress towards the European target of halting biodiversity loss by 2010, this report serves two purposes. First, it takes stock of the state of biodiversity and its loss in Europe based on the most recent data available. Second, it functions as a bridge to a comprehensive assessment of the 2010 target to be done in 2010. As such, the indicators in this report do not only show what is currently known. They also show where information is missing and what more needs to be measured and examined to enable a comprehensive assessment in 2010.

The target of halting biodiversity loss in Europe by 2010 will not be achieved. The assessment shows that European biodiversity continues to be under serious pressure and that the policy response, although successful in some areas, is not yet adequate to halt the general decline. Progress has been made in reducing some pressures through specific legislation on atmospheric emissions, freshwater quality and waste water treatment. Pressures from the agricultural sector have been addressed directly by reducing nitrogen losses and indirectly by increasing organic farming, with varying success. Fisheries, however, remains a problematic sector needing wider recognition of sustainability issues.

The impacts of current climate change on biodiversity are just emerging, but the wider ecosystem implications have not yet been fully recognised. Many ecosystems have been degraded thereby reducing their capacity to respond to future shocks such as the effects of climate change.

Halting biodiversity loss requires policy action in many areas and behavioural changes in homes and industry to make positive impacts.

The next major assessment on the basis of the indicators will be prepared for publication late in 2010. It will contain updated data for all indicators where they are available and will, in addition, explore the following issues in more detail:

- the state of biodiversity;
- the marine environment;
- target values and baselines for each indicator;
- responses — what has worked and what has not;
- the global impact of Europe and its biodiversity policies.

The next assessment on the basis of the SEBI 2010 indicators will be the final assessment of progress towards the current '2010 target' Discussions on a new policy target post 2010 are already under way.

The new target(s) should aim to be specific, measurable, ambitious, realistic, time-bound and developed on the basis of robust scientific evidence. They will also most likely take a more broad overall perspective, recognising the importance of biodiversity for our green infrastructure and the value of ecosystem services to society.

Summary findings of the indicator assessment

For the first time, progress towards the 2010 target has been assessed against a set of 26 internationally agreed indicators. These indicators were selected within the pan-European Streamlining European 2010 Biodiversity Indicators (SEBI 2010) process and have subsequently been adopted at EU and pan-European levels.

Analysis of the indicators suggests that with respect to the *status and trends in biodiversity* some progress has been made towards halting biodiversity loss in Europe. Overall, however, the status of most species and habitats still gives rise to concern. The overall risk of extinction of wildlife has probably increased and livestock genetic diversity also remains at

risk. Nevertheless progress has been made in protecting habitats with up to 17 % of EU land area now included in the Natura 2000 network and 16 % protected under national instruments across 39 countries. At the same time, 40–85 % of habitats and 40–70 % of species of European interest have an unfavourable conservation status. Linked to this is the progressive decline in grasslands and wetlands across Europe and rises in urban, woodland and open water habitats.

Progress has been made at the European Environment Agency with the development of water accounts. This approach allows for quantitative estimates in this area that is key for biodiversity and ecosystem functioning. This ecosystem accounts approach will be applied to other ecosystems more widely to provide a quantitative basis of information to guide policy makers.

In assessing the *threats to biodiversity* it is clear that some have decreased. Acidification and eutrophication from excessive nitrogen accumulation are declining and nitrogen balances on farmlands are decreasing although still too high. Invasive alien species remain a threat, increasingly so in marine systems. While invasive alien species are recognised as a major driver of biodiversity loss, in the future the issue needs to be considered more broadly in the context of climate change, particularly adaptation.

Water quality has generally improved in fresh waters and is stable in the seas, but overexploitation of marine fisheries remains a threat to the ecosystem. On land, urban sprawl and abandonment of agricultural land are putting pressure on natural and semi-natural areas. The impact of climate change is becoming visible; a new indicator shows that more species of birds are negatively impacted by climate change than are positively affected (92 to 30).

The indicators of *ecosystem integrity and services* suggest that in line with the changes in threats, the state of freshwater systems is improving and the marine environment is stable. On land, forest cover is still slightly increasing in Europe. Nevertheless, forests have become more fragmented locally in certain places.

With regard to *sustainable use*, timber harvest from European forests generally is sustainable in terms of wood volume harvested but a stronger biodiversity focus is needed. Agriculture still exerts a high pressure on the environment despite agricultural mitigation measures and increasing organic farming. In marine systems many fishery resources are still not being used sustainably with some 45 % of assessed European stocks falling outside safe biological limits. Open water stocks such as herring and mackerel are fairing better than the bottom-dwelling species such as cod, plaice and sole.

It is apparent that Europe cannot sustainably meet its consumption demands from within its own borders. The Ecological Footprint indicator shows that demand exceeds the total capacity for biological production and absorption of waste. Moreover this gap between demand and biocapacity has been growing progressively since 1960. In addition, pressures that occur outside European territory but have an impact in Europe (e.g. on migratory bird species) also need to be addressed.

The *access and benefits sharing* and *transfer and use of resources* focal areas relate to the value that society places on biodiversity. One measure of the potential value is that derived of patent applications, particularly for the use of genetic resources. Currently about 9 % of European patent activity relates to biodiversity (16 % if the full spectrum of pharmaceutical activity is included). Estimates of EU spending on biodiversity is currently confined to expenditure on the LIFE programme, which amounts to less than 0.1% of the EU budget in any one year. This, however, is not a comprehensive picture of total spending across the Member States.

Much depends upon *public support and awareness* to promote and fund biodiversity conservation. In this respect an opinion poll across the EU in 2007 showed that two-thirds of citizens did not understand the word 'biodiversity' or the main threats.

Scope of the report: assessing progress towards the 2010 target using the SEBI 2010 indicators

This report presents a first indicator-based assessment of Europe's progress towards its target of halting biodiversity loss by 2010. The Streamlining European 2010 Biodiversity Indicators (SEBI 2010) process was set up to streamline national, regional and global indicators and, crucially, to develop a simple and workable set of indicators to measure progress and help reach the 2010 target.

The report serves two purposes. First, it takes stock of the state of biodiversity and its loss in Europe based on the most recent data available. For the first time, this stocktaking is based on an internationally agreed set of indicators.

Second, the report functions as a bridge to a comprehensive assessment of the 2010 target to be done in 2010. The indicators do not only show what is currently known. They also show where information is missing on trends, causal links and target values, thus clarifying what needs to be measured and examined to enable a comprehensive assessment in 2010.

The report is divided into three parts. The first sets the scene and discusses the origins of the 2010 target and the SEBI 2010 indicator set.

The second part, the core of the report, assesses progress towards the 2010 target. Assessments are provided under the focal areas identified in the Convention on Biological Diversity (except for the status of traditional knowledge, innovations and practices, which was not included as a focal area in Europe). These assessments should be read in conjunction with the detailed factsheets for individual indicators that can be found in EEA Technical report No 5/2009 (EEA, 2009).

A third and final part of the report discusses policy implications and further work towards 2010 and beyond.

1 Biodiversity, the 2010 target and measuring progress

Biological diversity or biodiversity is the variety of life on earth, within species, between species and across ecosystems. It's certainly beautiful but much more than good television documentary material. In fact, it establishes the conditions for our well-being and survival. Food and fibre, clean water and air, fertile soils, climate regulation, provision of medicines, fuel, recreation and inspiration are a few of the vital ecosystem goods and services that the variety of life underpins.

Nonetheless, we still build cities and roads, drain wetlands, dam rivers, clear forests, overharvest the seas and practice intensive agriculture, often at the expense of natural ecosystems. On top of that we burn fossil fuels and emit chemicals into water, soil and air. The natural environment is very flexible but only up to a point. These pressures are clearly causing biodiversity decline and disrupting ecosystem processes and the services they provide.

Following a prolonged worldwide decline of biodiversity, the United Nations Convention on Biodiversity (CBD) was adopted in 1992 with three overall goals: 'the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources'. In 1995 Europe responded to the CBD with more than 50 countries endorsing the Pan-European Biological and Landscape Diversity Strategy (PEBLDS). The European Community, as a contracting party to the CBD, responded comprehensively with the adoption of a Biodiversity Strategy in 1998.

Within this policy framework and the wider sustainable development agenda, it was agreed at the global level in 2002 to 'achieve by 2010 a significant reduction of the current rate of biodiversity loss at global, regional and national level' and in Europe to stop the decline by 2010. The EU target now represents a political beacon, a waypoint in the process towards sustainable use of natural resources and a healthy environment. Indeed, at national level, a growing number of European countries have included the 2010 target as part of their national biodiversity strategies.

SEBI 2010

Having set such a target, however, it becomes necessary to measure progress towards its achievement (EEA, 2006). For instance, we need to know whether international and national policies that govern land use and management are providing the correct response to the biodiversity decline. We must answer questions about the current status of biodiversity and the key pressures that are likely to affect it now and in the future. Much thought has therefore been given to the development of a common set of coherent indicators that, like the instruments on the dashboard of a car, inform us simply and reliably where we are along the journey and how we are doing.

To this end, in 2004 the parties to the CBD adopted a global framework for evaluating progress, including a first set of indicators grouped into focal areas such as 'status and trends' or 'threats'. These were taken up within the European Union later that year and were subsequently adopted at pan-European level in 2005.

Across Europe work has been under way to identify and evaluate indicators which, together, allow an assessment of progress towards the 2010 target. The European Community's 2006 Biodiversity Communication and Action Plan provided a detailed strategic response to accelerate progress towards the 2010 targets at Community and Member State level. Building on the conceptual framework provided by the CBD, the European Union and the Pan-European Biological and Landscape Diversity Strategy agreed a set of headline indicators within the CBD focal areas.

The CBD focal areas are:

- status and trends of the components of biological diversity (where we are now and where we may be heading);
- threats to biodiversity (the main pressures that need to be countered through policy measures and action);

- ecosystem integrity and ecosystem goods and services (functioning of ecosystems in terms of their ability to provide goods and services);
- sustainable use (specifically in relation to forestry, agriculture and fisheries);
- status of traditional knowledge, innovations and practices (this focal area was not included at the European level);
- status of access and benefit-sharing (the sharing of benefits derived from biodiversity, particularly from genetic resources);
- status of resource transfers (the extent to which society is willing to invest in biodiversity conservation (by providing financial resources).

At European level, 'public awareness and participation' was included as an additional focal area in line with the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus Convention). This United Nations Economic Commission for Europe (UNECE) convention established a number of rights of the public (individuals and their associations) with regard to the environment.

While SEBI 2010 is pan-European in scope, some of the indicators specifically link to the community policy framework that exists for EU Member States.

Headline indicators are clustered under each of the focal areas and for each headline indicator one or more specific indicators were selected on the basis of rigorous criteria. The SEBI 2010 process and indicator set provides the best coverage possible with existing information and resources in Europe. However, data coverage needs to be improved.

Where existing indicators group countries according to some geographical or biophysical criterion, this report has maintained such grouping. At the same time, it should be noted that different groupings of countries could in many cases be justified and this will be considered in updates of the indicators.

The indicators can be used both individually and in combination to provide a consistent and coherent framework for assessment. They can also be used in association with socio-economic indicators to build up a broader picture of the extent to which sustainable development is being achieved.

Several indicators in the SEBI 2010 set are also used in other policy-relevant indicator sets such as the EEA Core Set of Indicators; the Environment Policy Review to monitor progress in implementation of the EU Sixth Environment Action Programme; structural indicators to monitor the implementation of the Lisbon Strategy; or the Sustainable Development Indicators. The European Commission has used the SEBI 2010 indicator set to support its assessment of progress in implementing the Biodiversity Action Plan. Finally, SEBI 2010 closely cooperates with the 2010 Biodiversity Indicators Partnership, the global effort to provide indicators for a reliable assessment of the global target to significantly reduce the rate of biodiversity loss by 2010.

Table 1.1 SEBI 2010 indicators within CBD focal areas and headline indicators

CBD focal area	Headline indicator	SEBI 2010 specific indicator
Status and trends of the components of biological diversity	Trends in the abundance and distribution of selected species	1. Abundance and distribution of selected species a. Birds b. Butterflies
	Change in status of threatened and/or protected species	2. Red List Index for European species
		3. Species of European interest
	Trends in extent of selected biomes, ecosystems and habitats	4. Ecosystem coverage
		5. Habitats of European interest
	Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socioeconomic importance	6. Livestock genetic diversity
	Coverage of protected areas	7. Nationally designated protected areas
		8. Sites designated under the EU Habitats and Birds Directives
Threats to biodiversity	Nitrogen deposition	9. Critical load exceedance for nitrogen
	Trends in invasive alien species (numbers and costs of invasive alien species)	10. Invasive alien species in Europe
	Impact of climate change on biodiversity	11. Impact of climatic change on bird populations
Ecosystem integrity and ecosystem goods and services	Marine Trophic Index	12. Marine Trophic Index of European seas
	Connectivity/ fragmentation of ecosystems	13. Fragmentation of natural and semi-natural areas
		14. Fragmentation of river systems
	Water quality in aquatic ecosystems	15. Nutrients in transitional, coastal and marine waters
		16. Freshwater quality
Sustainable use	Area of forest, agricultural, fishery and aquaculture ecosystems under sustainable management	17. Forest: growing stock, increment and fellings
		18. Forest: deadwood
		19. Agriculture: nitrogen balance
		20. Agriculture: area under management practices potentially supporting biodiversity
		21. Fisheries: European commercial fish stocks
		22. Aquaculture: effluent water quality from finfish farms
	Ecological Footprint of European countries	23. Ecological Footprint of European countries
Status of access and benefits sharing	Percentage of European patent applications for inventions based on genetic resources	24. Patent applications based on genetic resources
Status of resource transfers	Funding to biodiversity	25. Financing biodiversity management
Public opinion (additional EU focal area)	Public awareness and participation	26. Public awareness

Source: EEA, 2007a.

What do the SEBI 2010 biodiversity indicators tell us and what do they not? (Figures 1.1 and 1.2, and Map 1.1)

It is impossible to measure all components of biodiversity (we have not even identified the majority of species on Earth), let alone monitor their trends (Balmford *et al.*, 2005) or unravel their role in ecosystems or the goods and services they provide. Some indicators provide specific measurements and trends on genetic, species and ecosystem/landscape diversity, but many have a more indirect link to biodiversity. Very few were established specifically to assess biodiversity. The status indicators on species only cover birds and butterflies, since these are the only species groups for which harmonized European monitoring data are available. The inclusion of butterflies is valuable to meet the concern that species with a narrow distribution range should be represented (Fontaine *et al.*, 2007), but wider coverage of taxa should be developed in the future.

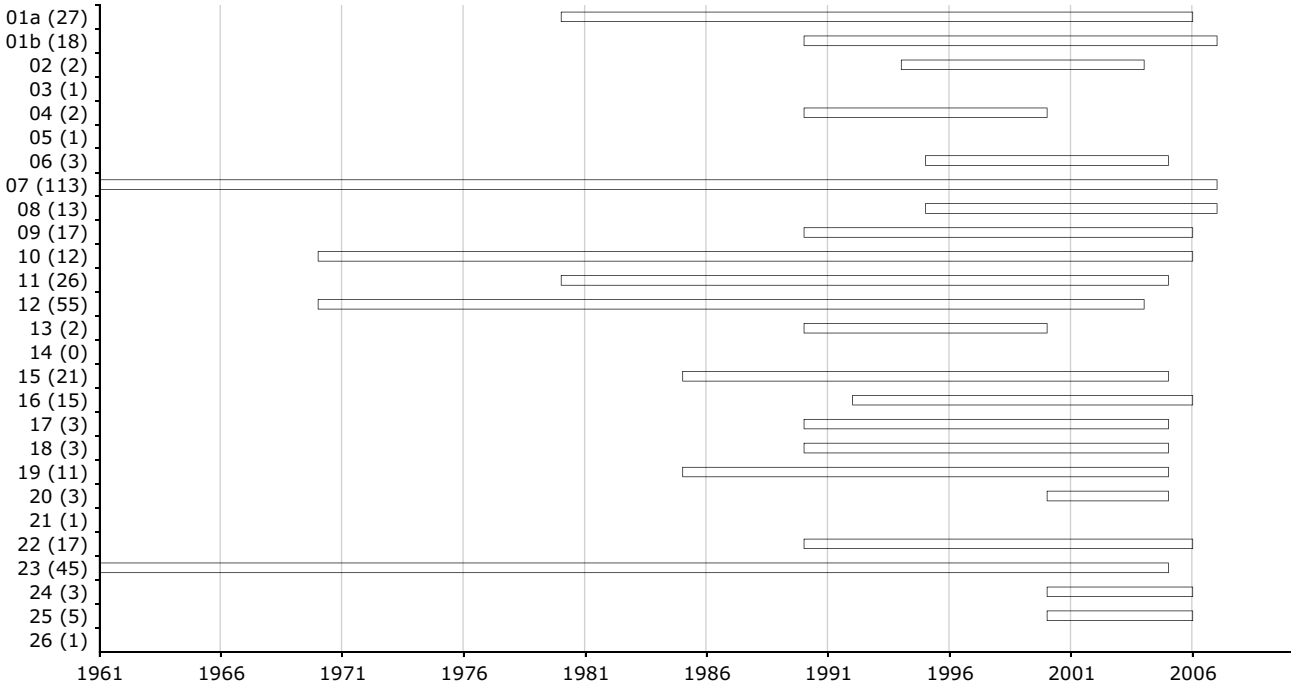
Coverage of the components of biological diversity (especially genetic diversity) needs to be improved and the focal areas of access and benefit-sharing and sustainable use need to be strengthened. In addition, the indicator set needs to be used in conjunction with other indicators and information, for instance improving sustainability assessment in the area of forestry and agriculture, or in the field of sustainable consumption and production where more drivers of biodiversity loss need to be identified.

Although the picture emerging from the indicators is quite clear, the causal links between policy responses, such as agricultural management, and actual trends in biodiversity, such as the stabilisation of the status of farmland birds, are often not straightforward. Response indicators do show effort but confirming causal links to drivers, pressures and state (where the response occurs) are also needed (Mace and Baillie, 2007). Modelling exercises have included available knowledge and made predictions on the state of biodiversity in the next 30–50 years (see Box 1.1).

The SEBI 2010 process aims to improve the indicators further, to update the data regularly, to fill major gaps in the indicator set and to enhance the indicators' biological, temporal and geographic coverage (see Figures 1.1 and 1.2). In addition, the assessment methodology will be improved.

An urgent priority, also in the context of discussions on policy targets beyond 2010, is research into target

Figure 1.1 Time series for each SEBI 2010 indicator, January 2009



Note: Figures in brackets indicate the total number of data points covered by each indicator.

Source: ETC/BD, 2009.

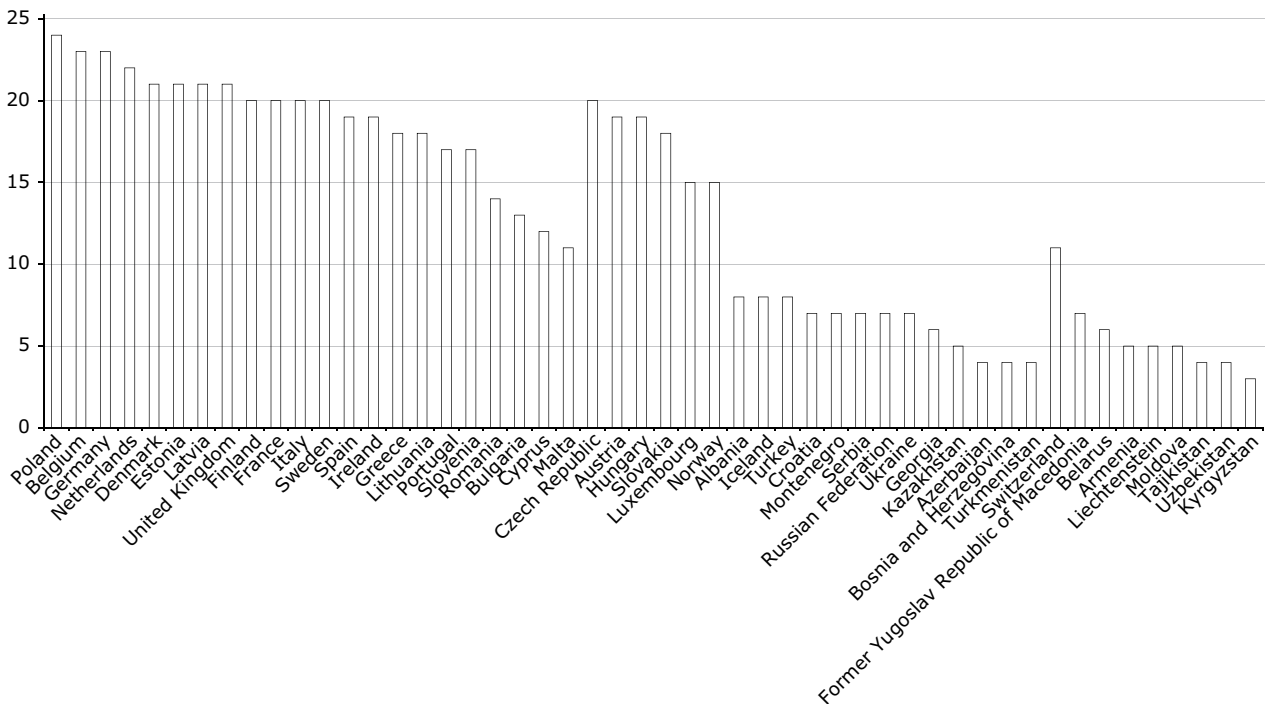
values for several of the indicators. For example, indicators show quantities of deadwood in forests but do not tell what quantity would be good for biodiversity; similarly, concentrations of pollutants in coastal waters may be known but it is necessary to also investigate at what concentration impacts on biodiversity are significant. Within the framework of SEBI 2010, a study is under way to compile information on target values for the indicators where possible.

Finally, given the SEBI 2010 mandate, this report mainly provides a European picture, which may hide some regional or national particularities. Such finer detail can be provided by indicators at the national level and many countries have indicator sets similar to the SEBI 2010 set (see Annex 1). In addition, the impact of Europe on global biodiversity, represented in the present set by the Ecological Footprint, is being discussed within global processes such as the global Biodiversity Indicator Partnership (2010 BIP) and Global Biodiversity Outlook (GBO3) currently being developed by the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC).

Within the SEBI 2010 indicator set, the specific indicators on the components of biodiversity are most developed for species diversity and less developed for genetic and ecosystem diversity. The set is also strongest on compositional aspects (type, number, extent) and less well developed on structural and functional aspects (Groom *et al.*, 2005). Further research is needed on these relatively weaker aspects. Work is also under way on developing indicators that better capture ecosystem services.

Individually and collectively the indicators give some clear policy-relevant signals. The aim is to give a clear and succinct impression of recent progress and the current status and to provide a basis for informed debate on future action.

Figure 1.2 Representation of countries in the SEBI 2010 indicator set, January 2009

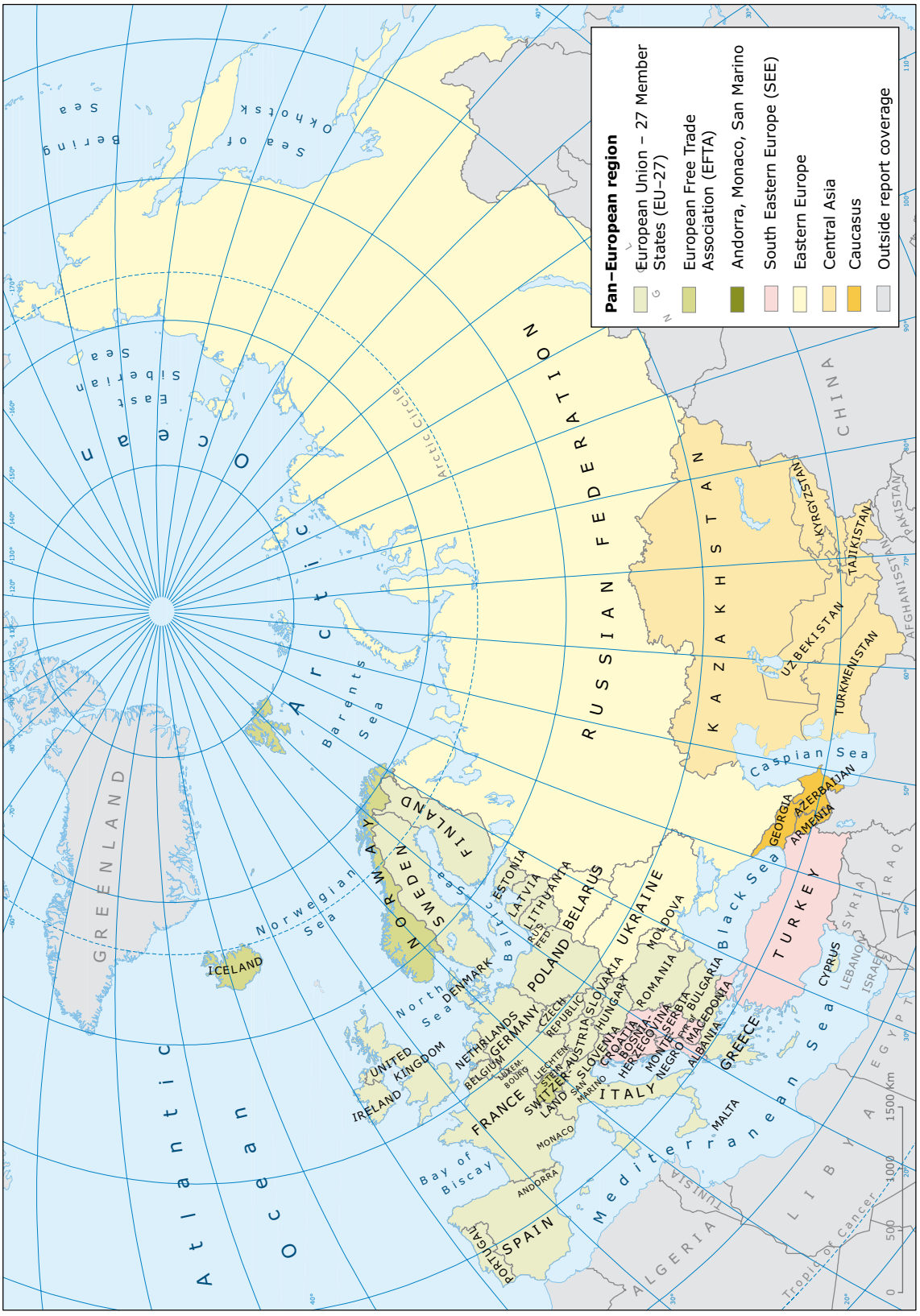


Note: How to read the graph: for 24 of the SEBI 2010 indicators, data are included for Poland, and for 15 indicators, data are included for Luxembourg.
Data for indicator 14 are not yet available; this indicator was therefore not considered for this figure. Data used for SEBI 2010 indicators are collected through EU, pan-European or international processes. National datasets relevant for the SEBI 2010 set but not collected by EEA or by any other European processes are not taken into consideration here.

Blue indicates EU Member States.
Purple indicates non-coastal EU Member States (for whom only 23 indicators are relevant).
Green indicates non-EU countries (for whom only 21 indicators are relevant because EU policies cannot be considered there).
Yellow indicates non-EU and non-coastal countries (for whom only 18 indicators are relevant).

Source: ETC/BD, 2009.

Map 1.1 Country groupings in Europe



Note: Some of the indicators show data for country groupings. It has not always been possible to combine countries into groups that are meaningful from a geo-political and biogeographical point of view. For reasons of transparency, where country groupings are used the composition of the groups is spelled out.

Source: EEA, 2009.

Box 1.1 Modelling trends in biodiversity

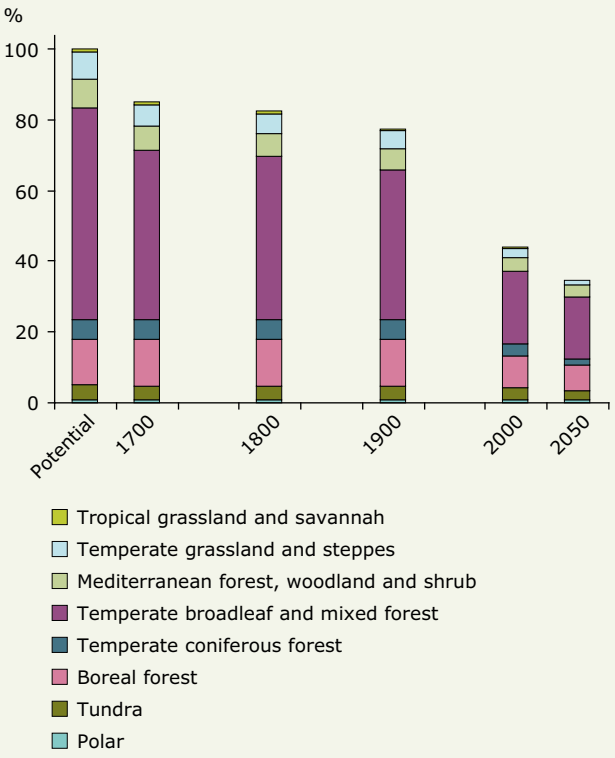
In addition to monitoring, information on biodiversity in Europe can be obtained from diverse modelling exercises, such as the second Global Biodiversity Outlook (CBD, 2007), the fourth Global Environment Outlook (UNEP, 2007) and the OECD Environmental Outlook to 2030 (OECD, 2008a).

These assessments calculate the biodiversity status and trends resulting from changes in agriculture, forestry, built up land, infrastructure, climate, ecosystem fragmentation and nitrogen deposition in the past, present and future (Alkemade *et al.*, 2009). They show a highly coherent picture of biodiversity in 2000, 2030 and 2050. In a variety of socio-economic scenarios used, Europe's biodiversity is expected to decrease from about 45 % of the full potential in 2000 to between 42 and 34 % in 2050. The large range is determined by differences in behaviours and policies. The rate of biodiversity loss can be reduced by:

- more efficient food production;
- timber plantations (albeit in the longer term);
- lower meat consumption;
- mitigating climate change though higher energy efficiency and savings;
- lowering nitrogen deposition;
- reducing ecosystem fragmentation and infrastructure development;
- increasing protected areas.

The rate of biodiversity loss would be increased by the opposite of the above factors and policies. It will also increase if biofuels are introduced to mitigate climate change. Agreement on liberalising global agricultural trade, as proposed in the Doha Agenda of the WTO negotiations (WTO, 2001) would significantly reduce the rate of biodiversity loss in Europe. Lifting trade regulations implies that agriculture will partly shift from Europe to South America and sub-Saharan Africa in particular. The abandoned land would, according to the model, slowly return to a more natural state. However, the biodiversity gains in Europe would be offset by greater losses elsewhere.

Figure 1.3 Development of biodiversity in Europe (1700–2050) in the baseline scenario of the OECD Environmental Outlook to 2030



Note: Country coverage: Albania, Andorra, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Faroe Islands, Finland, France, Germany, Gibraltar, Greece, Holy See (Vatican City State), Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, the former Yugoslav Republic of Macedonia, Malta, Monaco, Montenegro, the Netherlands, Norway, Poland, Portugal, Romania, San Marino, Serbia, Slovakia, Slovenia, Spain, Svalbard and Jan Mayen, Sweden, Switzerland, and the United Kingdom.

Source: MNP and OECD, 2008; OECD, 2008a.

2 Focal area: status and trends of the components of biodiversity

- **Some progress has been made towards halting the loss of biodiversity within Europe (some common birds are no longer in decline) but overall the status and trends of most species and habitats give rise to concern, while genetic diversity in livestock remains at risk. Overall extinction risk for birds in Europe has further increased.**
- **Much progress has been made in designating protected areas and priority should now be given to their management. The conservation status of the species and habitats covered by EU legislation, however, remains unsatisfactory with 40–85 % of habitats and 40–70 % of species of European interest in the terrestrial biogeographical regions remaining in an unfavourable conservation status.**
- **Data availability for ecosystems is limited. Land cover data show a further decline in the extent of grasslands and wetlands with an increase in urban, woodland and open water habitats.**

Introduction

The status and trends indicators use data on species, threatened species, livestock breeds and land cover (the latter serving as a proxy for habitats). In addition, the focal area includes indicators tracking trends in protected areas, which are often sites set aside and managed with biodiversity conservation in mind.

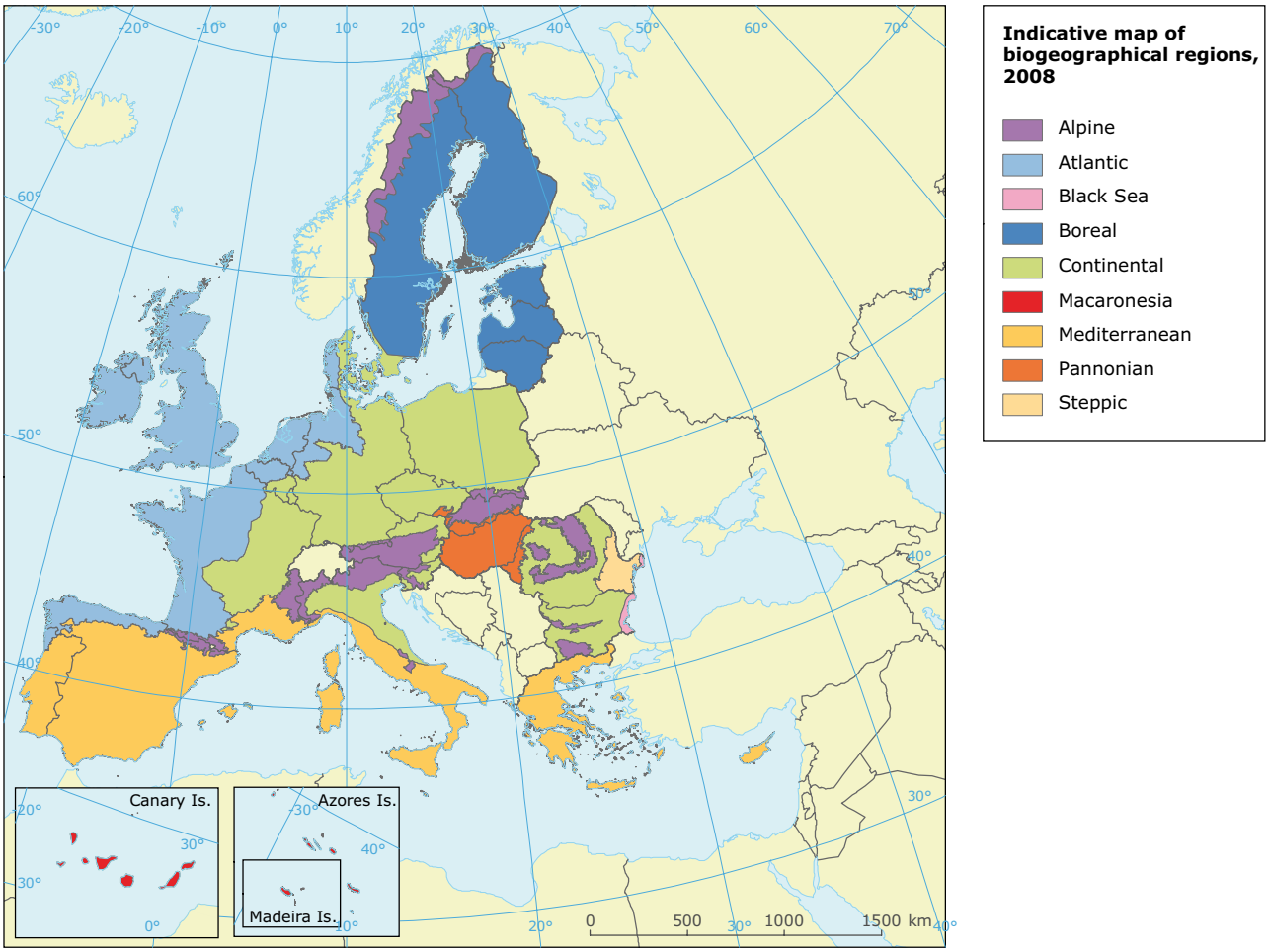
Grasslands and wetlands decrease, while forest cover increases (Figure 2.1)

Extensive agricultural land, pastures and wetlands have given way to urban areas, more intensive farmland and forest. Between 1990 and 2000, an area of grassland equivalent in size to Luxembourg has disappeared, while forests have increased by double that area. Urban habitats have increased by an area four times the size of Luxembourg. In general, data availability for ecosystems is limited. The European Environment Agency has made progress with the development of water accounts. This approach facilitates quantitative estimates in this key area for biodiversity and ecosystem functioning. This ecosystem accounts approach will be applied to other ecosystems more widely to provide a quantitative information base to guide policy-makers.

Box 2.1 Facts and figures for Europe

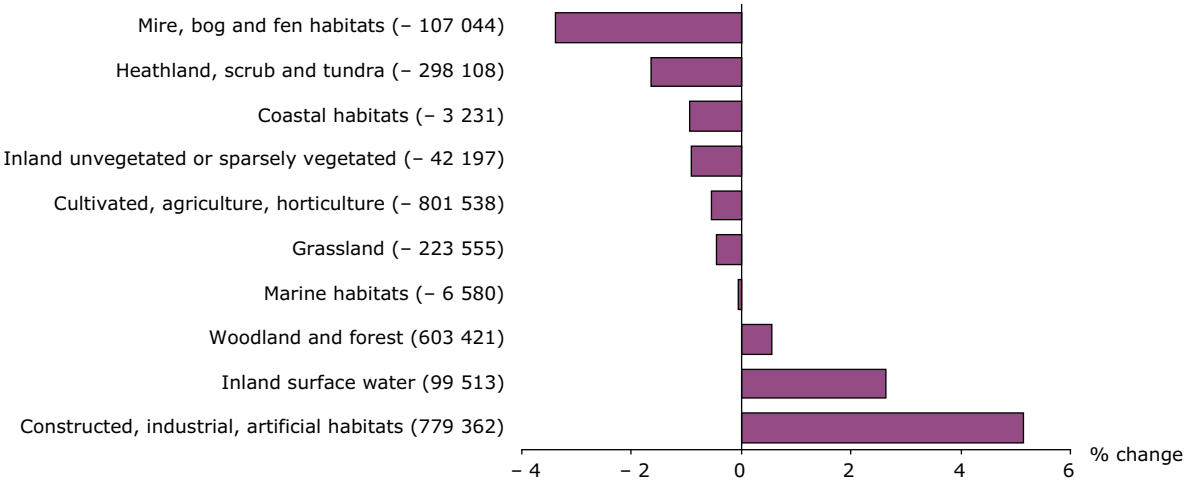
- The main ecosystems in the EU-25 plus Norway and Switzerland are croplands (33 %), forests (30 %), pastures (16 %) and urban land (2 %) (EEA, 2007e).
- Species diversity in Europe is considerable, comprising 250 mammal species, 500 fish, 700 birds, 150 reptiles, 70 amphibians and 90 000 insects, including 10 000 butterflies and moths, and 30 000 beetles (Fontaine, 2008). For vascular plants, there are around 31 000 plants in Europe and the countries of the eastern and southern Mediterranean — Syria, Lebanon, Israel, Jordan, Egypt, Libya, Tunisia, Algeria, Morocco (Kell *et al.*, 2008).
- Nearly 3 000 domesticated animal breeds are registered in Europe, excluding the countries of Central Asia (de Vries and Hiemstra, 2007).
- Europe is an important centre for wild plants closely related to crop plants, with more than 25 000 taxa found across the region and the countries of the eastern and southern Mediterranean (Kell *et al.*, 2008).

Map 2.1 Biogeographical regions in Europe



Source: EEA, 2008.

Figure 2.1 Land cover change between 1990 and 2000 — area change for major habitat classes



Note: The number in brackets indicates the total area change in hectares.
How to read the graph: From 1990 to 2000, urban (constructed, industrial and artificial) areas increased by more than 5 %, whereas some wetlands (mires, bogs and ferns) decreased by nearly 4 %.

Source: EEA, 2007d.

The declines of some common birds appear to have slowly levelled off, but many species are heavily depleted (Figure 2.2) and the overall extinction risk of European birds has increased (Figure 2.3). European grassland butterflies continue to decline dramatically (Figure 2.4)

Species trends reflect changes in land use and ecosystems.

Since 1980, populations of European common birds have declined by 10 %. Among them, farmland birds have declined by around 50 %. While the indicator takes 1980 as a starting point, it needs to be borne in mind that significant losses had already happened by that time. Changing agricultural methods, especially increased specialisation and intensification, have driven the decline of farmland birds. The decrease in farmland bird populations levelled off in the mid 1990s, partly reflecting the introduction of set-aside areas in the EU-15, but many species remain heavily depleted. The decline of common forest birds also appears to have eased in recent years, but their numbers now are still lower than at almost any other time since 1980.

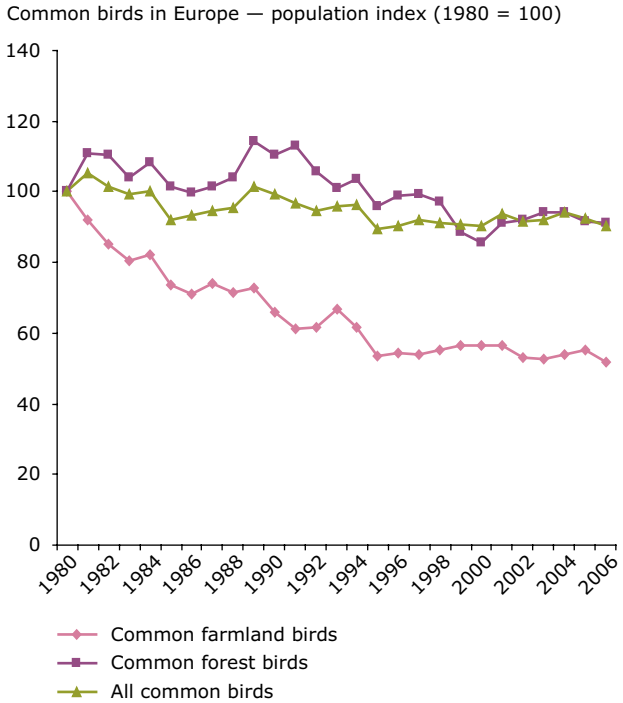
Of course, stability in the average trends does not mean all bird populations are stable — many individual farmland and forest birds remain in steep decline.

A significant proportion of the species used to calculate this indicator are migratory (37 %). Declines in their populations may be addressed by tackling pressures on their breeding grounds in Europe as well as on their migration routes and wintering grounds, which are mostly in Africa. More work is required to establish the links between these population trends and data in other indicators such as agri-environment schemes, organic farming, High Nature Value farmland and protected areas.

Conservation measures adopted under the EU Birds Directive (79/409/EEC) have proven effective in assisting the recovery of threatened bird populations (Donald *et al.*, 2007) but not in the case of the more widespread bird species, where different recovery mechanisms are now required. Well-designed agri-environment measures have been shown to reverse bird declines at local levels (Bradbury *et al.*, 2004 and 2008; O'Brien *et al.*, 2006). The recent loss of set-aside areas under agricultural policy may result in greater pressures on many farmland bird species.

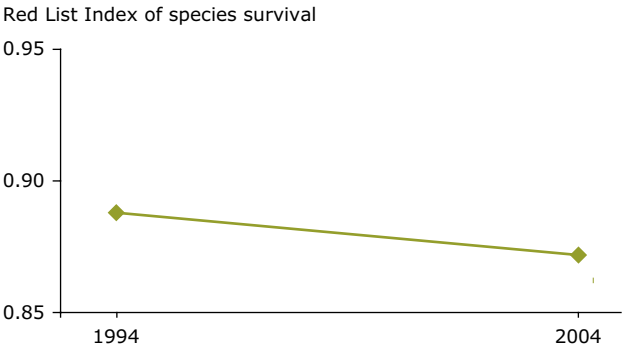
Extinction risk for birds overall in Europe (as measured by the Red List Index) has increased.

Figure 2.2 Common birds in Europe — population index (1980 = 100)



Source: EBCC/RSPB/BirdLife International/Statistics Netherlands, 2008.

Figure 2.3 Red List Index (RLI) for European birds based on pan-European extinction risk 1994–2004

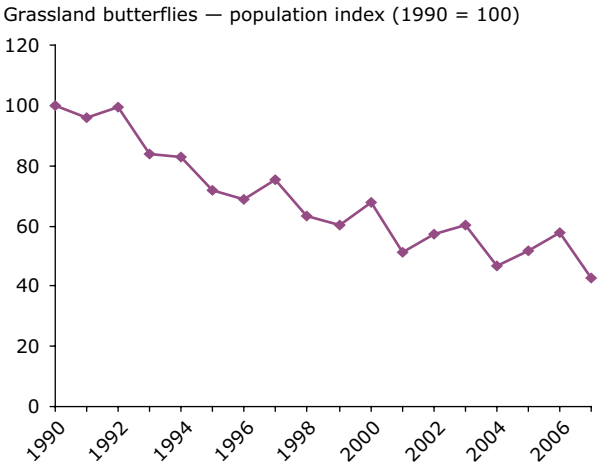


Note: How to read the graph: The smaller the RLI is, the greater the number of European bird species with an increased extinction risk.

n = 522 species

Source: BirdLife International, 2008.

Figure 2.4 Grassland butterflies — population index (1990 = 100)



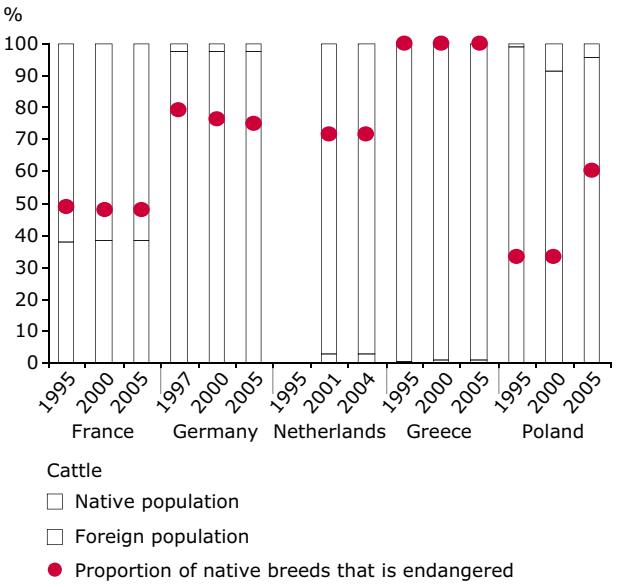
Source: De Vlinderstichting/Butterfly Conservation Europe/ Statistics Netherlands, 2008.

Grassland butterflies are declining severely; their populations have fallen by 60 % since 1990 and there is no sign of levelling off. The main driver behind the decline of grassland butterflies is thought to be changes in rural land use through intensification and abandonment. As the majority of grasslands in Europe require active management by humans or their livestock, butterflies also depend on the continuation of these activities. Intensification is the most important threat to butterflies over the relatively flat areas of western Europe, ranging from the eastern half of the United Kingdom over the north of France, Belgium, Netherlands, northern Germany and Denmark, as well as in flat areas in the other parts of Europe. In contrast, abandonment and lack of sustainable grazing is the chief threat in southern and eastern Europe, particularly in mountainous areas or regions with relatively poor soils.

Livestock genetic diversity is threatened by high production needs (Figures 2.5 and 2.6)

In several countries, populations of native, well adapted breeds have largely been replaced by a few highly productive breeds specially introduced for the purpose. Therefore, many native breeds with limited populations are in danger of extinction, which would add to biodiversity loss.

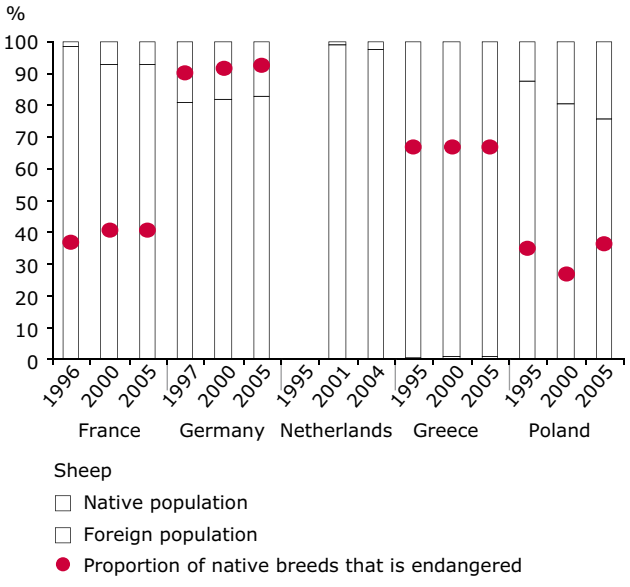
Figure 2.5 Evolution of native population sizes and endangered breeds in selected European countries (cattle)



Note: How to read the graph: In France in 2005, around 40 % of the cattle population was native and 50 % of native cattle breeds were endangered.

Source: ETC/BD and BRG Paris (Bureau des Ressources Génétiques), 2009.

Figure 2.6 Evolution of native population sizes and endangered breeds in selected European countries (sheep)



Note: How to read the graph: In France in 2005, around 90 % of the sheep population was native and 40 % of native sheep breeds were endangered.

Source: ETC/BD and BRG Paris (Bureau des Ressources Génétiques), 2009.

Natura 2000 implementation is progressing well but much effort will still be needed to establish favourable conservation status (Figures 2.7 and 2.8 and Maps 2.2 and 2.3)

Up to 17 % of EU-27 territory is designated as protected under Natura 2000 and 16 % of land area is designated by national instruments within 39 countries across Europe as a whole. Although overlap exists between these different schemes, they reinforce each other to help protect biodiversity. The process of designating marine areas is still ongoing and should be completed as soon as possible.

The first assessment of the implementation of the EU Habitats Directive (92/43/EEC) shows that the conservation status is 'unfavourable' for 40–85 % of terrestrial habitats of European interest (listed in Annex I of the Habitats Directive). For example:

- active raised bogs have a 'bad' status in five regions and 'inadequate' in two regions;
- alluvial forests with Alnus have a 'bad' status in all six regions where they are present;
- western taiga has a 'bad' status in both regions where it is present;
- siliceous scree of the montane to snow levels has a 'favourable' status in four regions and 'inadequate' in one.

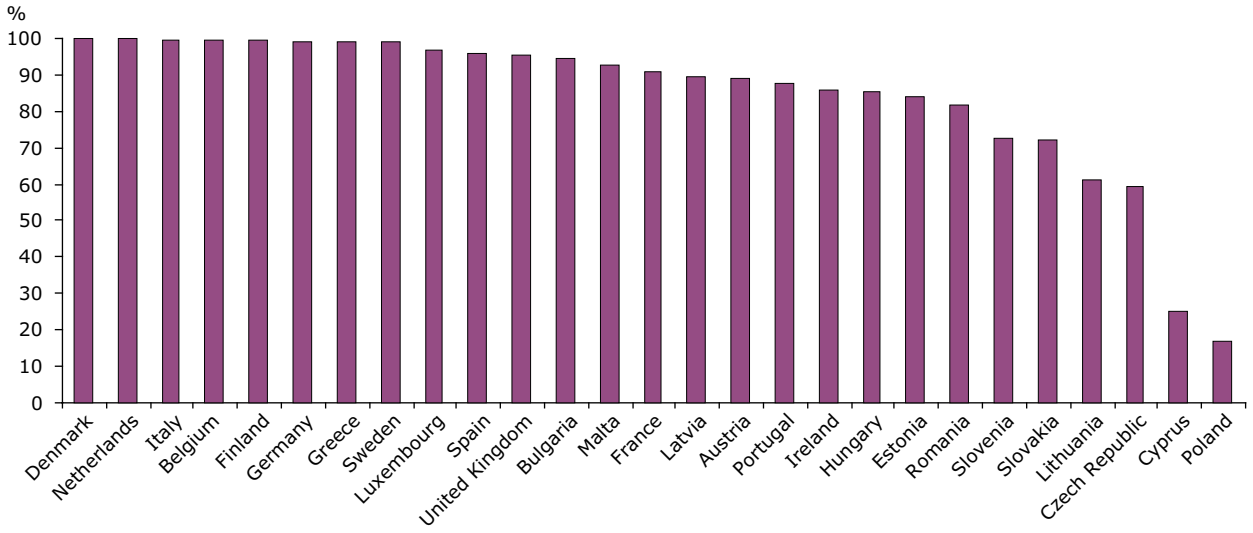
Between 40 and 70 % of terrestrial and freshwater species of European interest (listed in Annexes II, IV and V of the Habitats Directive) have an unfavourable conservation status. For example:

- the European beaver (*Castor fiber*) has a 'favourable' status in four regions but an 'inadequate' status in the Atlantic and Continental regions;
- the Southern damselfly (*Coenagrion mercuriale*) has a 'bad' status in the four regions where it is present;
- the Lady's slipper orchid (*Cypripedium calceolus*) has a 'favourable' status in the Alpine region, 'bad' status in the Atlantic region and 'inadequate' status in four other regions.

These results, which vary across biogeographic regions, generally show that biodiversity is at risk of being lost widely across Europe and that much effort will be needed to establish a more favourable conservation status in all regions.

It must be noted that this is the first assessment of conservation status under the Habitats Directive. While the results show that a lot more work and resources are required, they also partly reflect the fact that these species and habitats were listed in the annexes of the Directive precisely because there was concern about them. More detailed findings can be found in the European Commission's report on the status of protected species and habitats, based on reporting under Article 17 of the Habitats Directive.

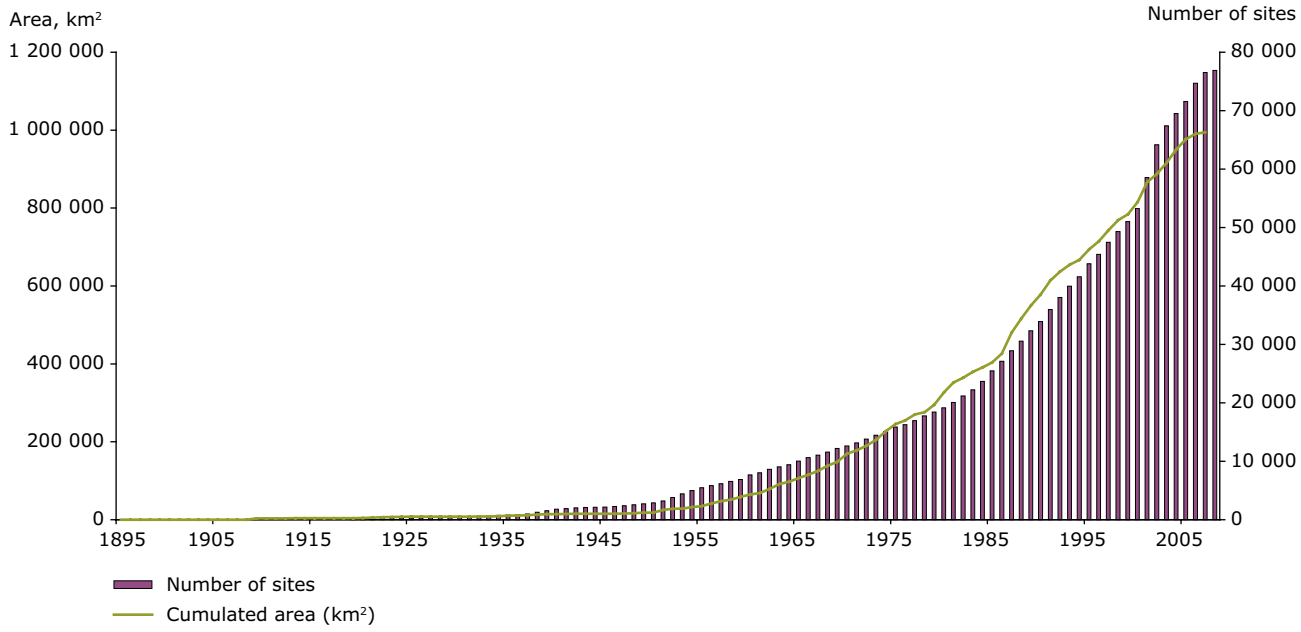
Figure 2.7 State of progress by Member States in designating sufficient protected areas to provide for Habitats Directive (92/43/EEC) Annex I habitats and Annex II species



Note: Marine areas are excluded.
How to read the graph: Sites proposed by Denmark are sufficient to cover all the habitats and species listed in the Habitats Directive and present in Denmark. Sites proposed by the Czech Republic cover 60 % of the species and habitats from the directive that are present in the Czech Republic.

Source: DG Environment, 2008.

Figure 2.8 Growth of nationally designated protected areas in 39 European countries

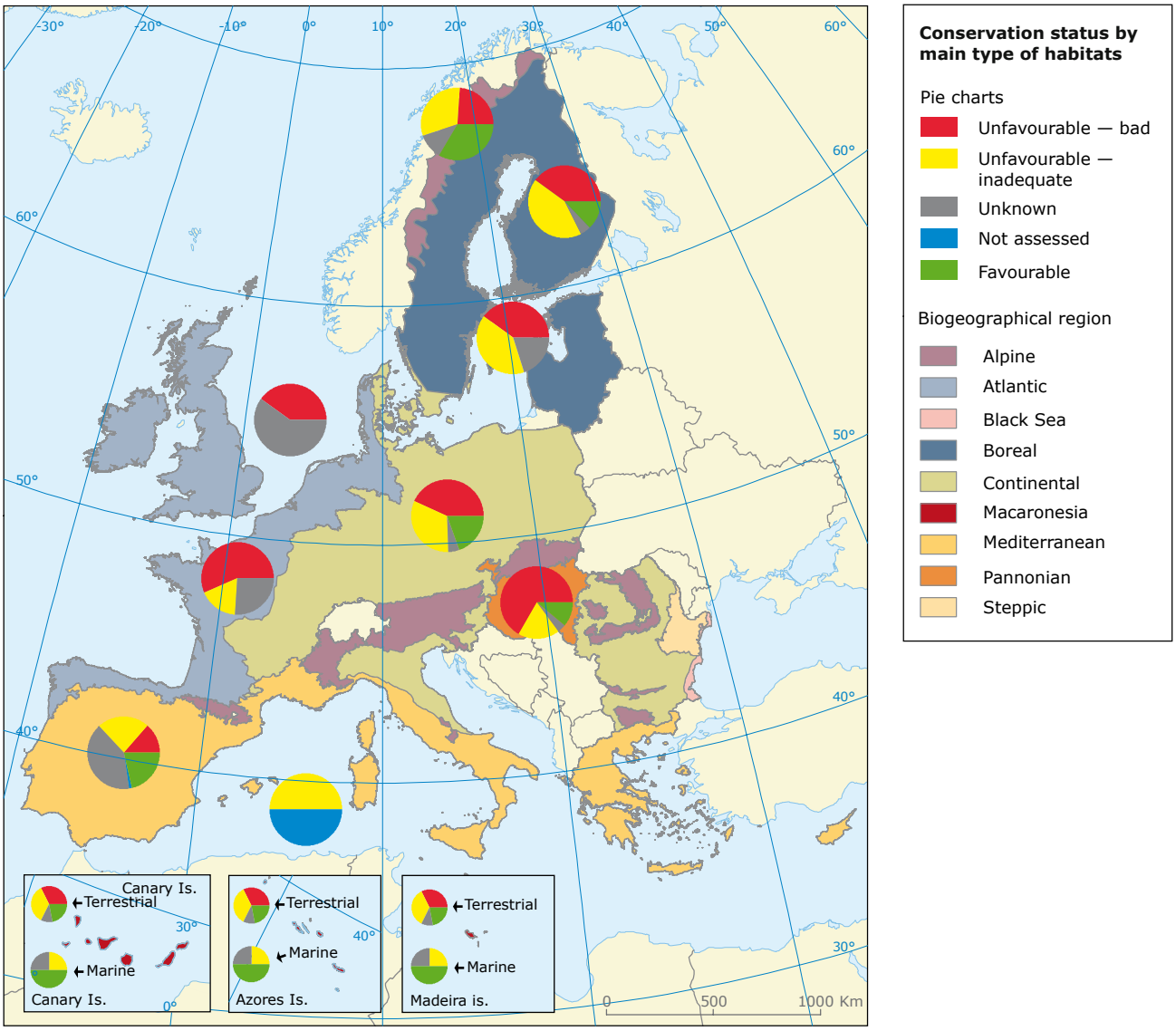


Note: How to read the graph: in 2007, the total number of sites for 39 European countries in the Common Database on Designated Areas (CDDA) was 76 876, with a combined surface of 994 550 square kilometres.

Country coverage: Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Montenegro, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom.

Source: CDDA (Common Database on Designated Areas) version 7, 2007.

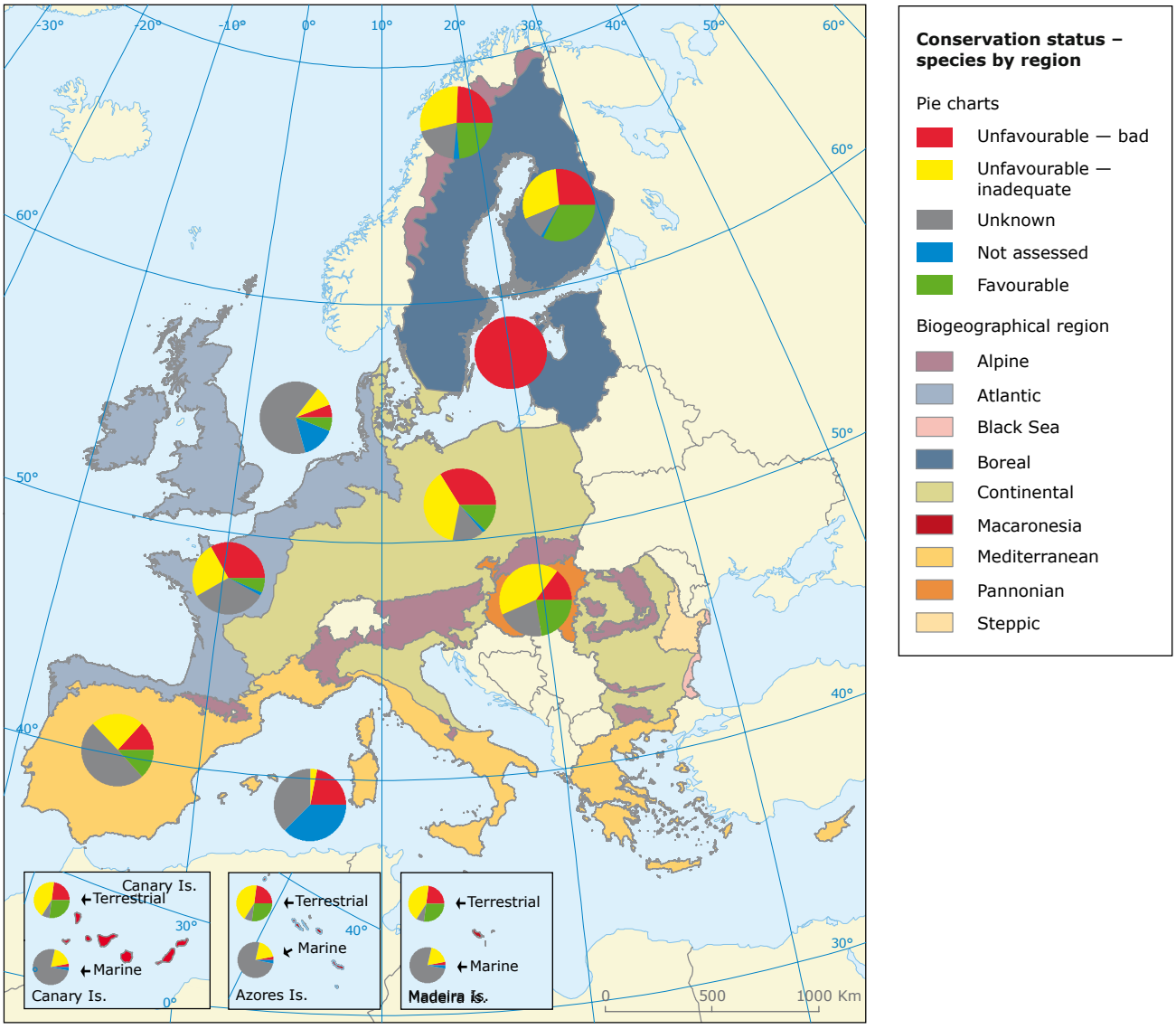
Map 2.2 Habitats of European interest — conservation status by biogeographical region



Note: How to read the map: in the Mediterranean biogeographical region, about 21 % of habitats are in favourable conservation status, but 37 % are in unfavourable (bad plus inadequate) status.

Source: DG Environment and ETC/BD, based on data provided by 25 EU Member States (Bulgaria and Romania will be included in the next reporting phase in 2013) through their reports under Article 17 of the Habitats Directive (2008).

Map 2.3 Species of European interest — conservation status by biogeographical region



Note: How to read the map: In the Alpine region, more than 20 % of species have a 'favourable' status and more than 20 % have an 'unfavourable' or 'bad' status.

Source: DG Environment and ETC/BD, based on data provided by 25 EU Member States (Bulgaria and Romania will be included in the next reporting phase in 2013) through their reports under Article 17 of the Habitats Directive, 2008.

3 Focal area: threats to biodiversity

- **Some threats to biodiversity have decreased significantly, whereas others have not.**
- **Acidification and eutrophication caused by excess nitrogen are declining but invasive alien species and climate change appear to have increasingly negative impacts.**
- **Natural and semi-natural land is under pressure, especially from urban sprawl and abandonment of agricultural land. Fragmentation is a threat to forest areas.**
- **Water quality is improving in freshwater environments and largely unchanged in transitional, coastal and marine waters. Overexploitation of marine fisheries is a major threat to marine ecosystems.**
- **Nitrogen balances on farmland are decreasing, though they are still high.**

Introduction

Most anthropogenic biodiversity loss is ultimately driven by human consumption and production. The main direct causes are habitat loss, invasive alien species, pollution, overexploitation and climate change. Several indicators relevant for this focal area are shown elsewhere in the report, specifically the conservation status of habitats, and land cover as a proxy for habitat loss (shown in the 'Status and trends' focal area); water quality (shown in the 'Ecosystem integrity' focal area); nitrogen balance and status of commercial fish stocks (shown in the 'Sustainable use' focal area).

There is increasing recognition of the impact of climate change on biodiversity (at both the species and ecosystem level) and of the potential for biodiversity to help mitigate climate change through a range of ecosystem services. Nevertheless it has proven difficult to find an indicator of climate change impact on biodiversity with broad enough European coverage for inclusion in the European set. The indicator selected has been developed in time for this report and addresses climate change impact on bird populations (Gregory *et al*., 2009). The development and inclusion of additional indicators addressing the impact of climate change (or greenhouse gases) at the ecosystem level, for example on peatlands or the oceans that may have major consequences for our future well-being, will need to addressed by the research and monitoring communities.

Box 3.1 Facts and figures for Europe

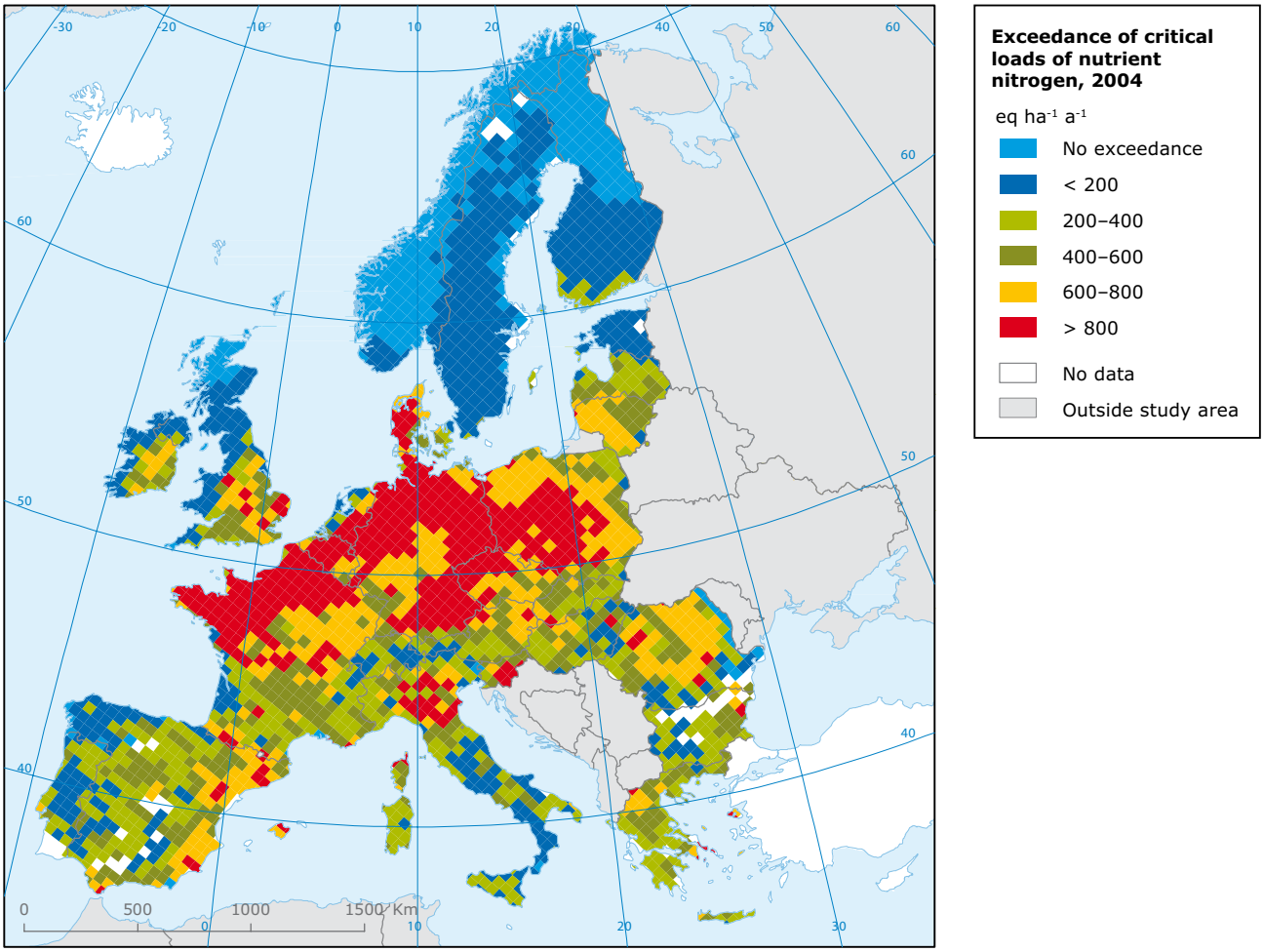
- In Europe, 44 % of substances causing eutrophication come from agriculture and 22 % from road transport; 45 % of acidifying substances derive from industry and 27 % from agriculture (EEA, 2007b).
- More than 90 % of alien species are introduced unintentionally by transport (Source: Daisie project).
- Greenhouse gas emissions in the EU-27 account for approximately 10 % of global greenhouse gas emissions (EEA, 2008b).

Half of European ecosystems are still exposed to eutrophication (Map 3.1)

Aggregated emissions of the acidifying pollutants nitrogen oxides (NO_x), sulphur dioxide (SO_2) and ammonia (NH_3) decreased in most EEA member countries between 1990 and 2006. Excess nitrogen deposition can cause eutrophication in ecosystems. In 2004, half of the geographical range of natural and semi-natural habitats across the EU-25 was still exposed to atmospheric nitrogen depositions above the critical load, the level above which harmful effects in ecosystem structure and function may occur, according to present knowledge. Also chronic low level nitrogen deposition has been shown to significantly reduce plant species numbers (Clark and Tilman, 2008).

The National Emission Ceiling Directive (2001/81/EC), one of the main EU instruments for reducing nitrogen and sulphur emissions, binds EU Member States to respect emission ceilings by 2010. The current proposal for revision of the Directive includes provisions on monitoring the effects on aquatic and terrestrial ecosystems within all types of Natura 2000 sites.

Map 3.1 Exceedance of the critical loads for eutrophication in Europe (as average accumulated exceedances), 2004



Note: How to read the map: for Norway, exceedances of the critical load for nutrient nitrogen are in general not a major problem. Exceedances can only be found in southern Norway. For the Northern part of Belgium, the critical load for nutrient nitrogen is exceeded by more than 800 equivalents nitrogen per hectare and year ('nitrogen' is the sum of airborne nitrate-N and ammonium-N deposited).

Source: Critical loads by Coordination Centre for Effects and deposition data by European Monitoring and Evaluation Programme — Meteorological Synthesizing Centre-West.

The number of alien species in Europe continues to rise, which poses an increasing risk for biodiversity (Map 3.2)

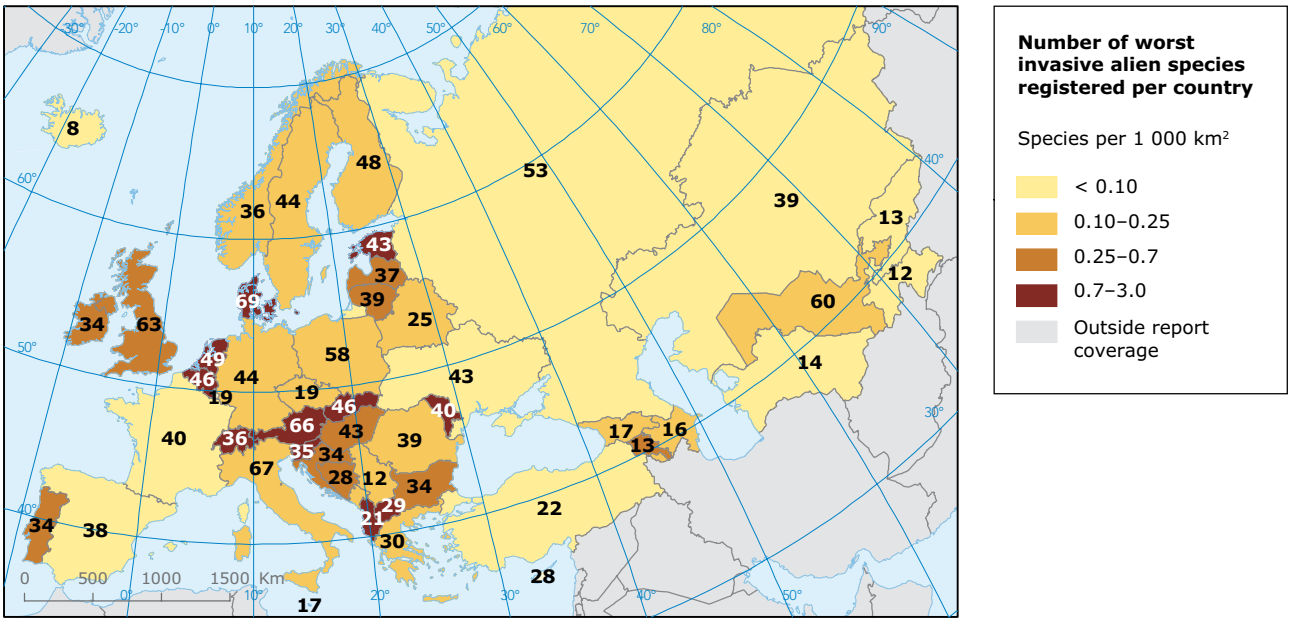
The number of alien species is steadily growing in Europe's marine and estuarine systems. However, the rate of establishment of alien species in terrestrial and freshwater systems has levelled off (EEA, 2009). An increase in the number of established alien species implies a growing potential risk of species turning invasive and causing damage to native biodiversity.

Based on opinion in the SEBI 2010 expert group on invasive alien species, 163 species out of a total of 10 000 established alien species, have been classified as 'worst invasives' because they have proven to be highly invasive and damaging to native biodiversity in at least part of their European range. While the number of invasive species is relatively low, their impacts can be severe through competition with other species, health effects on human populations or damage to economic activities.

While invasive alien species are recognised as a major driver of biodiversity loss, the issue of 'alien species' may in the future need to be considered in the context of climate change and particularly adaptation. For example, as agricultural food production adapts to a changing climate, farmers may welcome the arrival of pollinator species that match the new plant varieties that are used. Indeed, the movement of plant and animal species together may be necessary to facilitate adaptation.

Policy actions on this issue are quite recent. At the pan-European level, a 'European Strategy on Invasive Alien Species' was adopted under the Bern Convention in 2003. In December 2008, the European Commission adopted a Communication presenting policy options for an EU Strategy on Invasive Species to be adopted by 2010 (COM(2008) 789 final).

Map 3.2 Number of the listed 'worst' terrestrial and freshwater invasive alien species threatening biodiversity in Europe



Note: How to read the map: of the list of 163 'worst invasive alien species', 34 are present in Portugal.

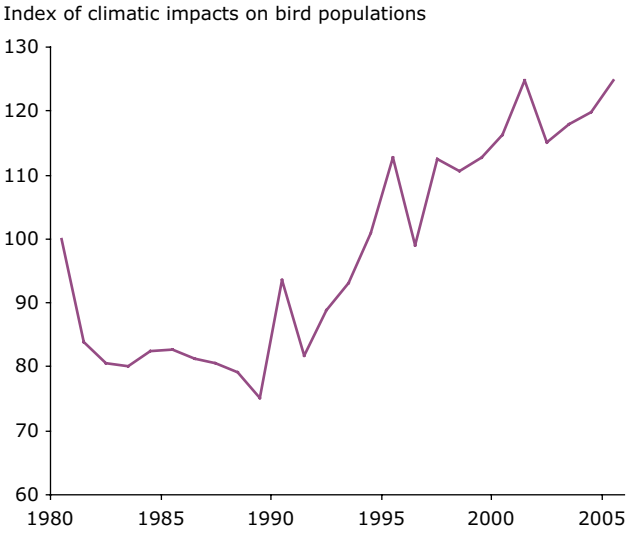
Source: EEA/SEBI2010, Expert Group on trends in invasive alien species, 2006.

Three times more bird species are negatively affected by climate change than are positively affected (Figures 3.1, 3.2 and 3.3)

Climate change is having a detectable effect on bird populations at a European scale, with evidence of both negative and positive effects.

In an assessment of 122 widespread European bird species, 92 were observed to be negatively impacted by climate warming while 30 were observed to be positively affected. This indicator shows that huge changes in biodiversity and ecosystems can be expected in Europe due to climate change. Also, the critical importance of healthy ecosystems to adapt to and mitigate climate change should be recognised. The effects of climate change for some migratory bird species may be most severe outside their European range and a comprehensive response would need to be effective beyond European territory. The EU White Paper on adapting to climate change (COM(2009) 147 final) is a key opportunity to strengthen the link between the climate change and biodiversity agendas.

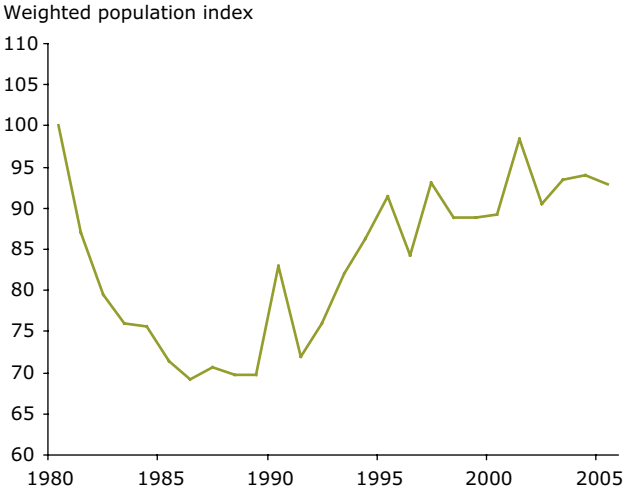
Figure 3.1 Climate change impact indicator for European birds



Note: How to read the graph: The indicator demonstrates the impact of climate change on widespread bird populations has increased strongly in the past twenty years.

Source: Gregory *et al.*,2009.

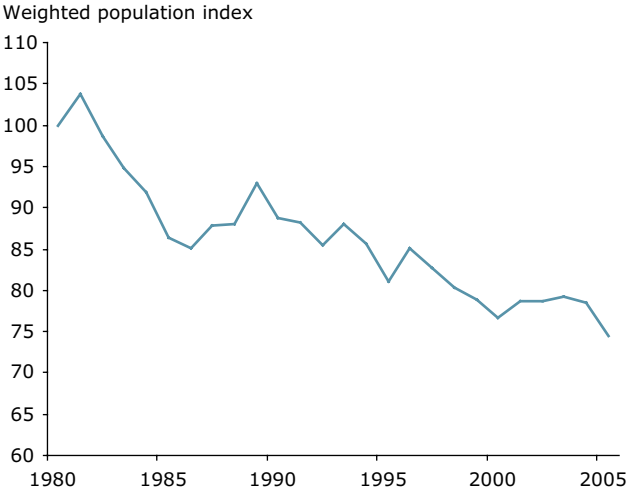
Figure 3.2 Weighted population index of species predicted to gain range in response to climatic change (30 species)



Note: How to read the graph: The weighted population index of species expected to gain in range due to climatic change has increased by over 30 % since 1989.

Source: Gregory *et al.*,2009.

Figure 3.3 Weighted population trend of species predicted to lose range in response to climatic change (92 species)



Note: How to read the graph: The weighted population index of species expected to lose in range due to climatic change has decreased by 20% since 1989.

Source: Gregory *et al.*,2009.

4 Focal area: ecosystem integrity and ecosystem services

- **Water quality in freshwater systems is improving.**
- **In the marine environment, pollution levels are relatively constant and the state of marine fauna is worrying due to unsustainable fishing practices.**
- **On land, habitat fragmentation and loss of habitat connectivity are a major concern.**

Introduction

Ecosystems generally show a fair amount of resilience — a capacity to cope with exploitation and disturbance without losing structural characteristics, vital processes and the ability to deliver services to human society. Beyond certain thresholds, however, ecosystems may collapse and transform into distinctly different states, potentially with considerable impacts on human society.

Assessing the integrity of ecosystems is complex, with many measures possible. The SEBI 2010 indicator set includes in this focal area indicators of the health of freshwater ecosystems (nutrients); transitional, coastal and marine waters (nutrients); marine ecosystem (Marine Trophic Index); and terrestrial ecosystems (fragmentation). An indicator on river fragmentation is under development. These indicators should be considered jointly with indicators from the focal areas on state (e.g.unfavourable conservation status of habitats provides an indication of reduced integrity) and threats (e.g. invasive alien species; pollution).

Box 4.1 Facts and figures for Europe

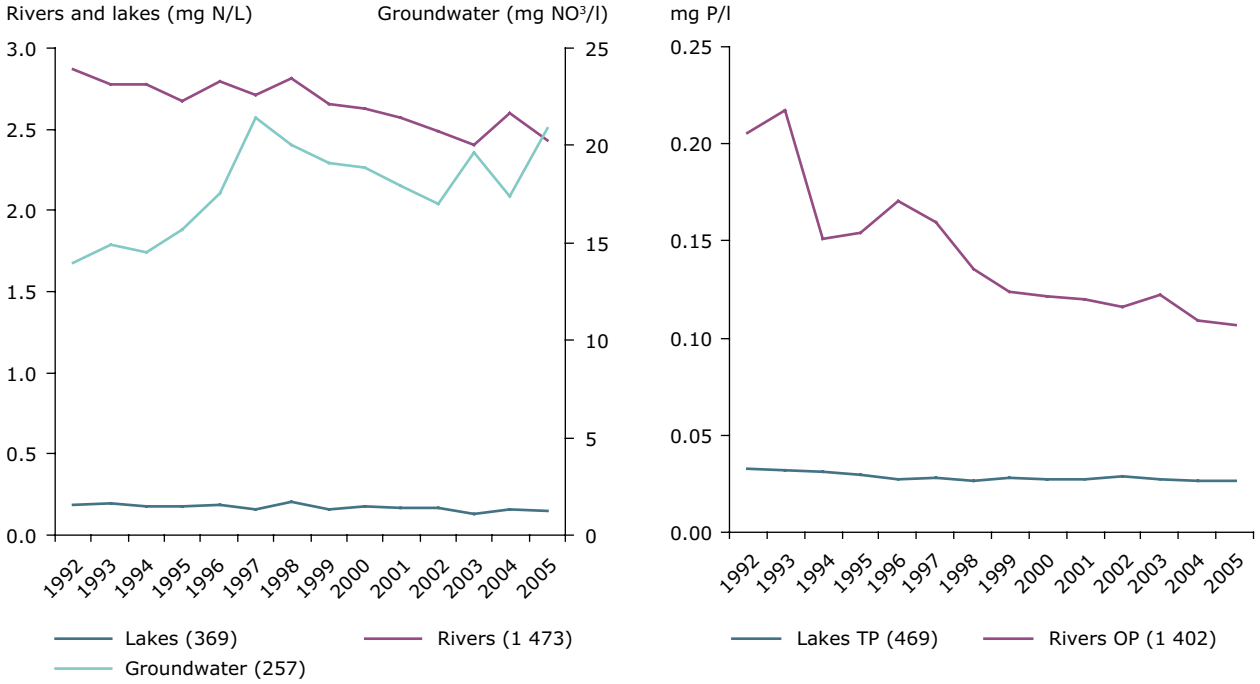
- In 2004, EU fishing production had an estimated value of EUR 5 billion (Marine Institute, 2005).
- Recent floods in western and central Europe are estimated to have cost EUR 5–18 billion (EEA, 2008c).
- Some wetlands have been found to reduce the concentration of nitrate by more than 80 % (MA, 2005).
- The total length of motorways in 31 EEA countries increased by almost 15 000 km (41 %) between 1990 and 2003 (EEA, 2005).

Water quality in freshwater ecosystems has consistently improved in recent years (Figure 4.1)

Freshwater pollution (as Biochemical Oxygen Demand (BOD) and ammonium in rivers, and nitrate and phosphate in rivers and lakes) has been decreasing (in most cases rather slowly).

This has reduced stress on freshwater biodiversity and improved the ecological status of freshwater systems. Measures that have contributed include improving wastewater treatment, reducing industrial effluents and agricultural run-off (e.g. due to implementation of the EU Nitrates Directive (91/676/EEC)), lowering the phosphate content of detergents, and reducing atmospheric emissions.

Figure 4.1 Concentrations of nitrate (left, NO_3) and phosphorus (right, OP (orthophosphate) or TP (total phosphorus)) in European freshwater bodies in the period 1992–2005



Note: Total number of stations in parenthesis. Concentrations are expressed as annual mean concentrations for groundwater and station weighted means of annual mean concentrations for rivers and lakes. Only stations with time series consisting of a minimum of seven years are included.

Country coverage (the number of stations included per country is given in parenthesis):
Nitrate in groundwater: Austria (14), Belgium (25), Bulgaria (63), Denmark (3), Estonia (5), Finland (38), Germany (9), Great Britain (29), Hungary (18), Ireland (3), Latvia (2), Liechtenstein (1), Lithuania (7), Netherlands (9), Norway (1), Poland (3), Portugal (3), Slovenia (5), Slovakia (10), Spain (1), Sweden (3).

Nitrate in rivers (countries with an asterisk reported total oxidised nitrogen): Austria (145), Belgium (23), Bulgaria (82), Czech Republic (70), Denmark* (39), Estonia (53), Finland* (131), France (287), Germany (125), Great Britain* (139), Hungary (98), Lithuania (64), Luxembourg (3), Latvia (47), Netherlands* (9), Norway (10), Poland (104), Slovenia (24), Slovakia (52), Sweden* (113).

Nitrate in lakes (countries with an asterisk reported total oxidised nitrogen): Estonia (5), Finland (21), Germany (6), Great Britain (21), Hungary (16), Lithuania (8), Latvia (8), Netherlands* (7) Norway (92), Slovenia (4), Sweden* (181).

Orthophosphate in rivers: Austria (134), Belgium (26), Bulgaria (64), Czech Republic (65), Denmark (40), Estonia (53), Finland (116), France (241), Germany (133), Great Britain (69), Hungary (98), Latvia (47), Lithuania (64), Norway (10), Poland (100), Slovenia (23), Slovakia (6), Sweden (113).

Total phosphorus in lakes: Austria (5), Denmark (23), Estonia (5), Finland (207), Germany (7), Great Britain (18), Hungary (10), Ireland (7), Latvia (8), Lithuania (7), Netherlands (7), Sweden (165).

Source: Waterbase (version 6).

Nutrient concentrations in transitional, coastal and marine waters are relatively constant — more work is required on assessing the long-term effects of existing concentrations (Figure 4.2)

Water quality is monitored in the Atlantic, the Baltic Sea, the Greater North Sea, the Skagerrak and part of the Mediterranean. Pollution with nitrogen (N) and phosphorus (P) can have devastating consequences for marine ecosystems through excessive growth of planktonic algae (eutrophication) and oxygen depletion. The large majority of stations report unchanged loads of nitrogen and phosphorus (85 and 82 %, respectively). More than half of the remaining stations report decreasing pollution levels. Implications of the relationship between concentrations and their precise impact on the ecosystem need to be explored further.

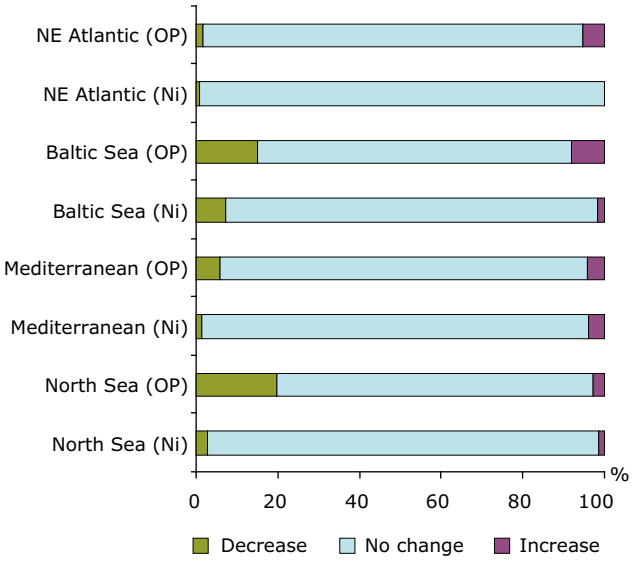
For the EU, the Water Framework Directive (2000/60/EC) will bring in better information on the ecological status of transitional and coastal waters at watershed level, but not before 2010.

Commercial fisheries have damaged the integrity of the marine ecosystem in most European seas (Figure 4.3)

Intensified fishing has led to fewer large fish, which are high up in the food chain, leaving the system increasingly dominated by species lower in the food chain (such as small fish (often not commercially relevant) and invertebrates). As a consequence, the mean trophic level (i.e. the mean position of the catch in the food chain) of fisheries landings goes down. The Marine Trophic Index (MTI) (Pauly and Watson, 2005) thus describes a major aspect of the complex interactions between fisheries and marine ecosystems.

The MTI declined in 11 seas since the mid 1950s, indicating the unsustainability of fisheries in those waters.

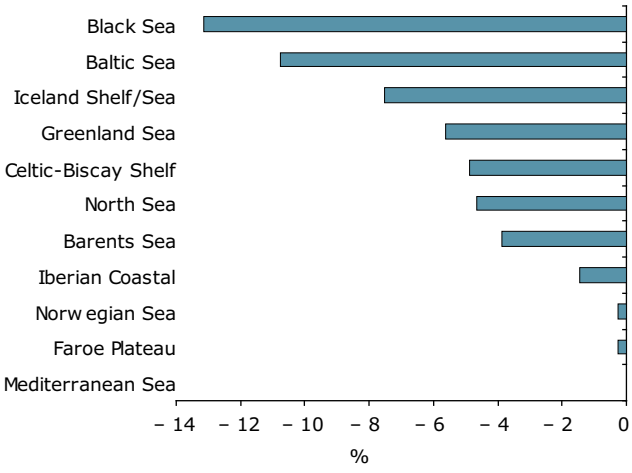
Figure 4.2 Trends in nutrient concentrations in transitional, coastal and marine waters, 1985–2005



Note: How to read the graph: About 1 % of stations in the NE Atlantic reported a significant decrease of oxidized nitrogen concentrations between 1985–2005, the remainder reported no change.
For some countries the data include stations with observations made in 2005, for some only up to 2004.
The full data set is available via http://themes.eea.europa.eu/IMS/ISpecs/ISpecification20041007132008/IAssessment1204714151163/view_content.

Source: EEA Waterbase/Core set indicator 21.

Figure 4.3 Marine Trophic Index percentage change between 1950 and 2004



Note: How to read the graph: The MTI for the Black Sea was about 13 % lower in 2004 than it was in 1950.

Source: Sea Around Us Project, www.seaaroundus.org.

Fragmentation has a major impact on the integrity of terrestrial ecosystems (Map 4.1)

European ecosystems are literally cut to pieces by urban sprawl and a rapidly expanding transport network. The increase in mixed natural landscape patterns due to the spread of artificial habitats and agricultural practices into previously more natural or semi-natural areas is a general trend across Europe. The importance of maintaining healthy and resilient ecosystems and increasing green infrastructure in Europe is critical in the context of climate change.

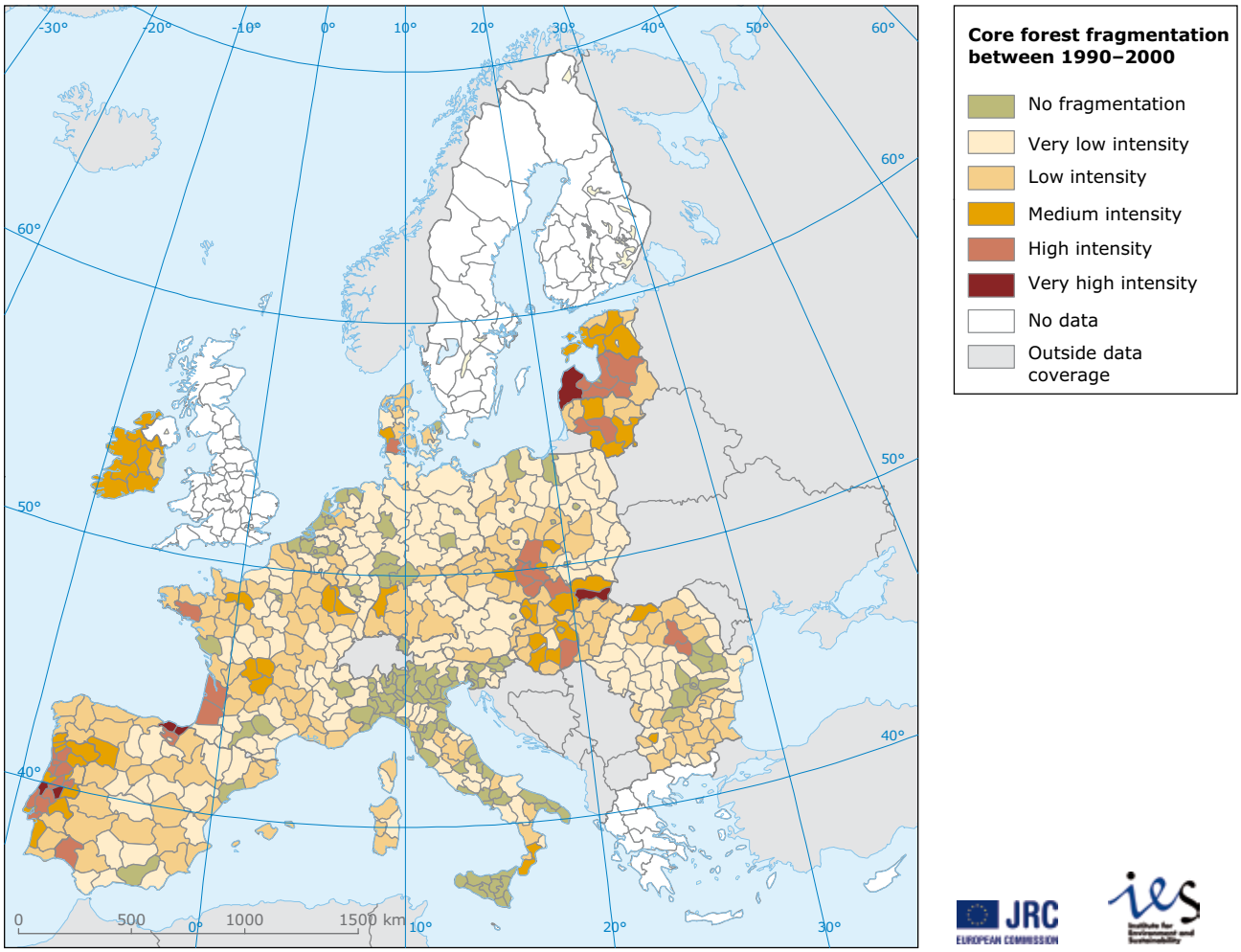
The commonly reported increase in net forest area is not uniformly distributed across Europe. When looking at local changes in spatial forest pattern, forest losses occur, resulting in local fragmentation of forest cover and connectivity loss. These processes are likely to have ecological effects. The indicator shows that across Europe core forest areas have become fragmented (in the sense that forest parcels break into smaller parcels) between 1990 and 2000, most severely in north, central-eastern and south-western Europe.

Fragmentation is in many places caused by forest harvesting and has a very dynamic and cyclic nature that may be beneficial to some species but highly detrimental to others (land mechanically disturbed after clear cut may be replanted or left to natural regeneration). In south-western Europe, fragmentation due to land development with artificial infrastructures is more frequent.

Fragmentation, particularly when due to infrastructure development, reduces the opportunities for organisms to disperse and affects their ecological needs (e.g. access to specific habitats, sufficient area for food and breeding). Connectivity for forest species was stable for about half of the continent (calculated at NUTS 3 level) and decreased in a quarter of Europe's territory (see EEA, 2009; Estreguil and Mouton, 2009).

Dam construction, canalisation and drainage can have similar effects in freshwater systems and have a strong impact on migratory fish. A SEBI 2010 indicator on river fragmentation is under development.

Map 4.1 Core forest fragmentation between 1990 and 2000



Note: Data from Corine Land Cover (CLC) for years 1990 and 2000, hence with same geographical coverage and forest definition as CLC; mathematical morphology based software GUIDOS (Soille and Vogt, 2009) and GIS analysis; results aggregated at provincial units (NUTS level 2/3).

Source: Estreguil and Mouton, 2009; JRC EFDAC (European Forest Data Centre) at http://efdac.jrc.ec.europa.eu/.

5 Focal area: sustainable use

- **Forestry is generally sustainable in terms of wood volume harvested but a stronger biodiversity focus is needed.**
- **Agriculture still exerts a high pressure on the environment, despite agri-environmental measures and increasing organic production.**
- **Commercial fisheries appear unsustainable, with as much as 45 % of assessed stocks overexploited.**
- **Overall, Europe uses more resources and produces more waste than it can sustainably produce and absorb respectively.**

Introduction

While the intrinsic value of biodiversity is recognised, much of its value is identified with the provision of goods and services for humans. Similarly, most of the pressure on biodiversity is linked to human use of natural resources.

The indicators in this focal area assess whether the three main sectors that directly use biodiversity (forestry, agriculture and fisheries) are managed sustainably. The indicator 'Ecological Footprint of Europe' puts Europe's resource use and generation of waste in a global perspective. However, our understanding of the impact of EU consumption of food and non-food commodities (e.g. meat, soy beans, palm oil, metal ores) on biodiversity needs to be enhanced and environmental assessments (SEA/EIA) should be systematically carried out in relation to environmentally sensitive trade and aid operations.

Assessing the sustainability of any sector, including agriculture, forestry and fisheries, is a very complex matter that requires more information than can be provided by the few related indicators in the SEBI 2010 set. Article 2 of the CBD defines 'sustainable use' as 'the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations'. While the social, economic and environmental aspects of these sectors need to be considered to assess sustainability, the focus of the indicators in this set is on the environmental aspects. The indicators in the set therefore do not pretend to give a complete picture of sustainability. Rather, they try to capture 'necessary conditions' for a sector to be sustainable from a biodiversity point of view, even if the conditions are not sufficient to guarantee the sustainability of the sector as such. For example, when fellings are less than increments in forestry, this does not guarantee that forestry is sustainable or that biodiversity is maintained. On the other hand, if fellings exceed increments, most other indicators for sustainability are likely to be negative.

Box 5.1 Facts and figures for Europe

- In 2005, the forestry sector's gross value added was estimated at more than EUR 100 billion from forestry, wood and paper industries (EEA, 2008a).
- In the EU-27, 80 % of biomass energy consumption comes from wood (EEA, 2008d).
- In order to produce environmentally compatible bioenergy, the share of 'environmentally-orientated farming' in the utilised agricultural area (UAA) would need to be 30 % by 2030 (EEA, 2007c).
- In the north-eastern Atlantic waters, overall discards are estimated to be at least 30 % of the total fish catch by weight (EEA, 2007d).
- It normally takes around 4 kg of wild fish to grow 1 kg of farmed salmon (UNEP, 2004).

Wood harvest in European forests is sustainable in terms of the amount of timber harvested but biodiversity can be enhanced (Map 5.1 and Figure 5.1)

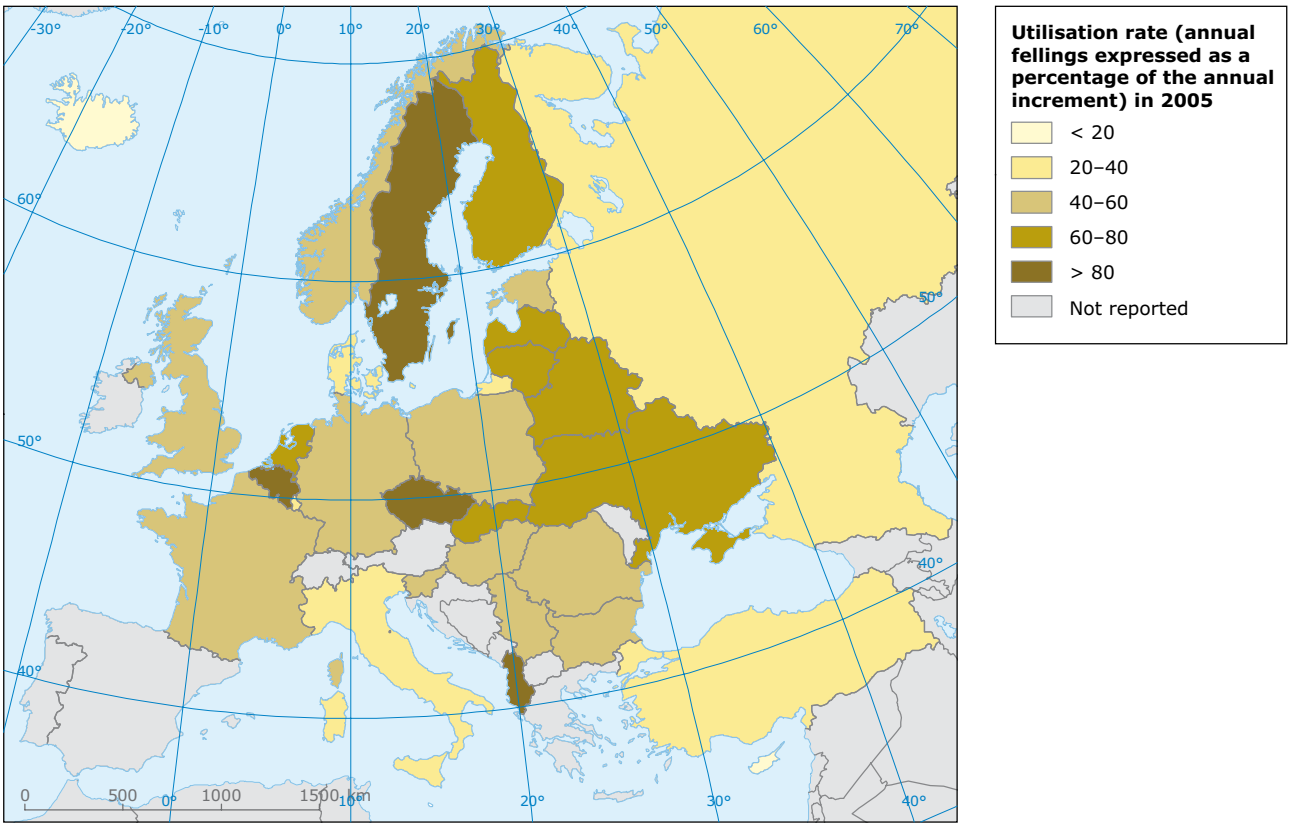
Because less wood is harvested than is added to the stock every year, forest area and volume on average increases in Europe. In this sense, timber harvest is sustainable in Europe. Throughout the continent, the ratio of fellings to increment is relatively stable at around 60 %, allowing for a continuous build-up of the forest growing stock. However this utilisation percentage is forecast to increase to between 70 % and 80 % by 2010 (Schelhaas *et al.*, 2006).

The growing stock in Europe is increasing from a low level after large-scale felling for agriculture and charcoal production in recent centuries. A more in-depth analysis of the forest utilisation rate, specifically addressing the share of older age-classes, would provide a better perspective on long-term sustainability. In addition, measuring the balance of felling and incremental growth does not capture whether the increment is from forestry that is being managed in a biodiversity friendly way. For example, it does not show whether the increment is due to increased use of fertiliser or the planting of fast-growing alien species, both of which can have a negative impact on biodiversity. Finally, while growing stock and area may increase slightly, fragmentation of forest areas remains a threat.

On the positive side, forest bird population trends have recovered somewhat after suffering severe declines.

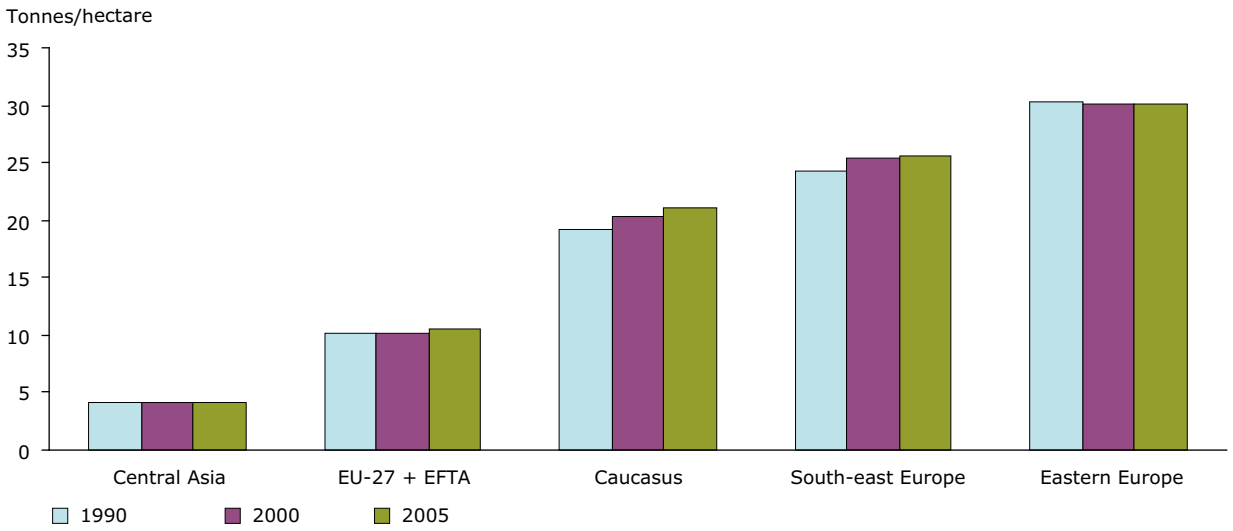
Of course, the ratio of fellings and increment addresses just one aspect of forest sector sustainability. While maintaining fellings below increment is a necessary condition for sustainability, it is not sufficient on its own. For a more comprehensive assessment, a complete set of forestry sector indicators is needed, such as the 35 indicators within six criteria used for reporting

Map 5.1 **Forest utilisation rate in 2005 (annual increment in growing stock as a percentage of annual felling) for countries in the Ministerial Conference on the Protection of Forests in Europe (MCPFE)**



Source: Based on UNECE/FAO, 2007; MCPFE (www.mcpfe.org).

Figure 5.1 Deadwood in European forests, 1990–2005



Note: Central Asia comprises Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

EU-27 + EFTA comprises Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, the United Kingdom; Iceland, Liechtenstein, Norway and Switzerland.

Caucasus comprises Armenia, Azerbaijan and Georgia.

South-east Europe (SEE) comprises Albania, Bosnia and Herzegovina, Croatia, the Former Yugoslav Republic of Macedonia, Serbia and Montenegro and Turkey.

Eastern Europe (EE) comprises Belarus, the Republic of Moldova, Russian Federation and Ukraine.

Source: FAO, 2005.

to the Ministerial Conference on the Protection of Forests in Europe (MCPFE) ([1]).

Deadwood (coarse woody debris) is a proxy for invertebrate biodiversity, since it provides a habitat for a wide array of organisms. Quantities of deadwood in Europe decreased rapidly between the middle of the nineteenth century and latter part of the twentieth century. Data for the period 1990–2005 show that the amount of deadwood is increasing slowly.

In many European countries, initiatives have been taken to increase the amount of deadwood in forests, though not all increases are the result of biodiversity considerations.

In some areas the accumulation of deadwood may not be desirable, for example, where the risk of insect pests (such as invasions of bark beetles) or forest fires is considered unacceptable, or in Mediterranean coniferous plantations where deadwood must be removed because of the risk of fire. Overall, deadwood in most European countries remains well below optimal levels from a biodiversity perspective. Further work will be required to understand trade-offs between these concerns.

Notwithstanding agri-environmental measures and increasing organic production, agriculture still exerts a high pressure on biodiversity (Figures 5.2 and 5.3)

Agriculture is the main land use in Europe: 34 % of the European terrestrial area is used for crop production and 14 % for grassland (Verburg *et al.*, 2006). Impacts on biodiversity are significant, with ecosystem quality lowest in intensively used lowland areas and irrigated systems. Reidsma *et al.* (2006) estimate that ecosystem quality is on average 10 % of its original pristine value in cropping and permanent cropping systems in the EU-25.

([1]) Criterion 4 is entitled 'Maintenance, conservation and appropriate enhancement of biological diversity in forest ecosystems'. Nine indicators are defined within this criterion: tree species composition; regeneration; naturalness; introduced tree species; deadwood; genetic resources; landscape pattern; threatened forest species; and protected forests.

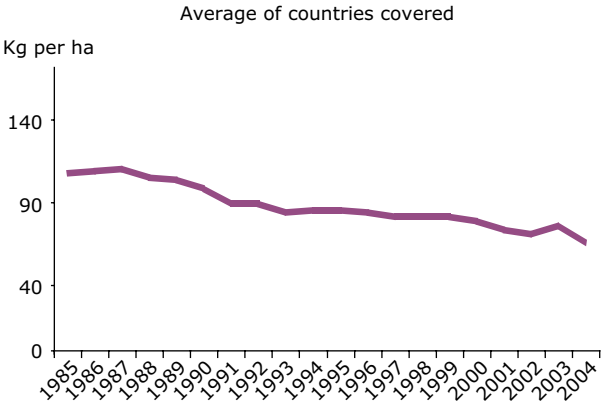
Europe has significant areas of High Nature Value (HNV) farmland, which supports biodiversity by providing a habitat for a wide range of species. These areas are under threat from intensification and land abandonment. The mere presence of HNV farmland is of course not proof of sustainable management but promoting conservation and sustainable farming practices in these areas is crucial for biodiversity.

Nitrogen surpluses (the difference between all nitrogen inputs and outputs on agricultural land) are declining but generally remain high, particularly in lowland western Europe, indicating high productivity and pressure on biodiversity. Adopting nutrient management plans and environmental farm plans has had a key role in this reduction.

Throughout Europe, measures are being introduced to reduce the environmental impact of agriculture. Agri-environment schemes are a widely used tool to make agriculture more sustainable in the EU. Only one category of these schemes explicitly targets biodiversity and further analysis is required to assess their effectiveness.

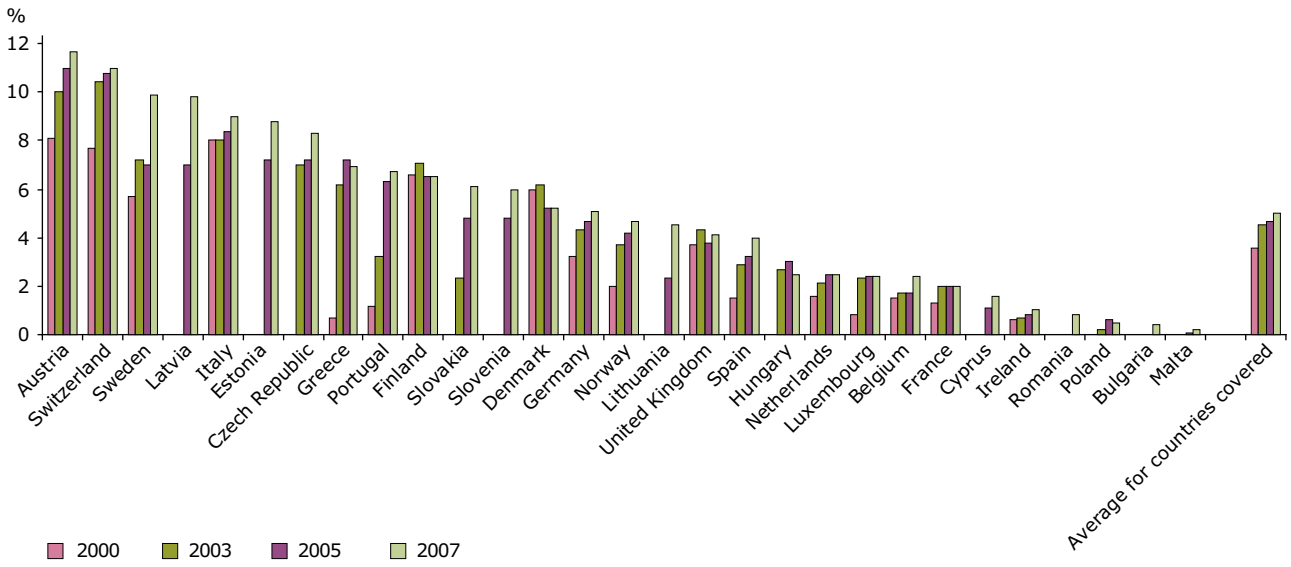
Organic agriculture continues to develop and currently covers 6.5 million ha in Europe. While it is difficult to assess organic agriculture's impact on biodiversity, it is generally assumed that this type of farming puts less strain on ecosystems and provides a wider range of niches for farmland species than conventional farming. At the same time, 'conventional' farming is not the same in all the subregions of Europe covered by this report. For example, non-organic areas outside western Europe may still be much less intensively farmed than conventional areas in the west. It should also be noted that organic farming tends to be less intensive and therefore may require a larger area of land to produce the same amount of food as intensive conventional agriculture, which may add to the pressure on natural habitats.

Figure 5.2 Nitrogen balance per hectare of agricultural land in OECD countries



Source: Based on OECD, 2008b.

Figure 5.3 Share of total utilised agricultural area (UAA) occupied by organic farming



Note: Area covers existing organically-farmed areas and areas in process of conversion. The values for the following are estimates: France 2000, Luxembourg 2005, Poland 2005, Denmark 2007, Luxembourg 2007, Malta 2007, Poland 2007, Romania 2007.

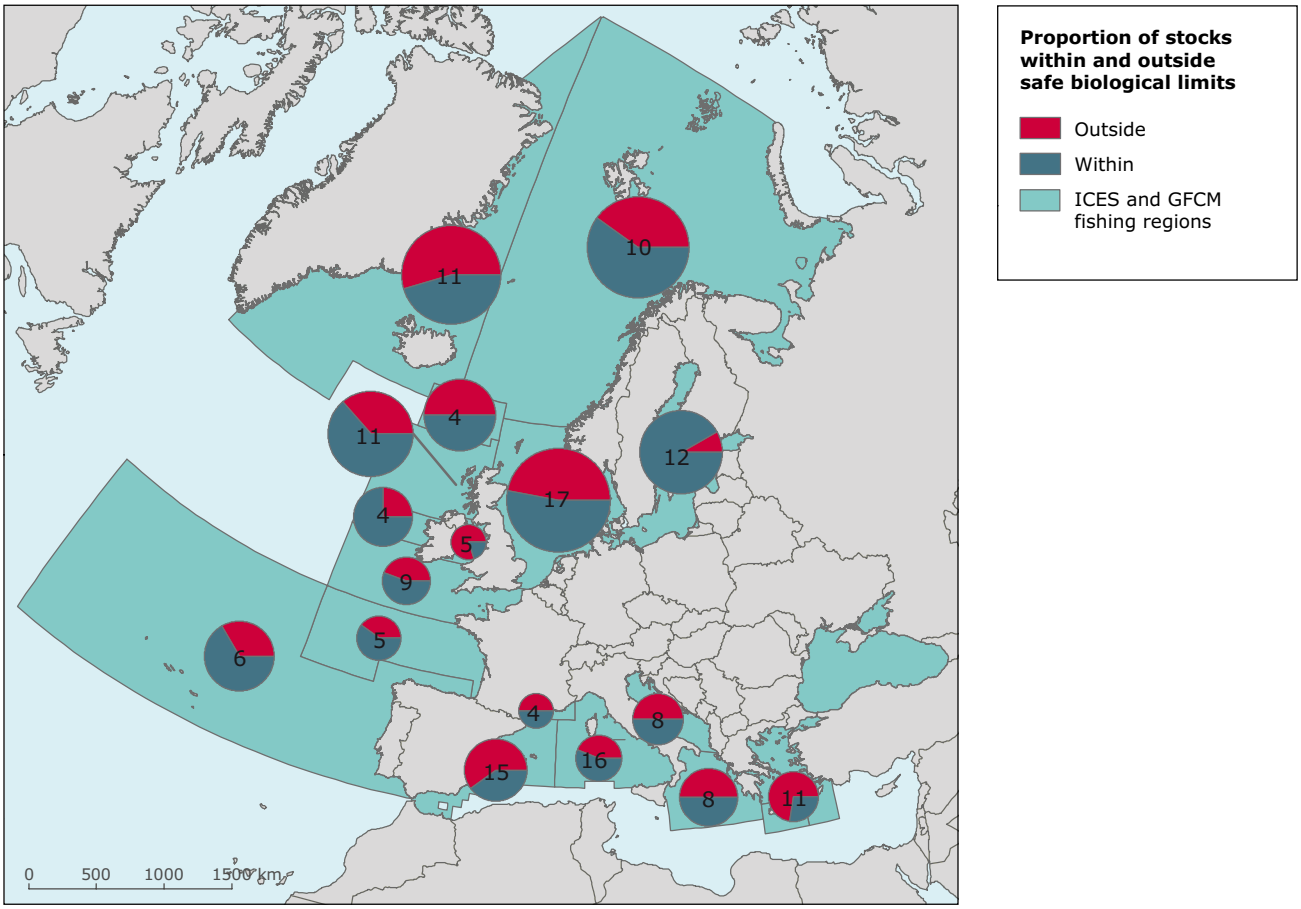
Source: Based on Eurostat, 2009; data for Switzerland: Biodiversity Monitoring Switzerland, 2009.

Marine resources are still overexploited (Map 5.2 and Figure 5.4)

Commercial fisheries are unsustainable with about 45 % of assessed European stocks outside safe biological limits ([2]). Pelagic stocks such as herring and mackerel are doing better in general than demersal stocks such as cod, plaice and sole ([3]). Measures are being applied to address this unsustainable situation. They include recovery plans for specific stocks, fishing bans, reducing illegal landings and a wide range of other regulations to lessen fishing pressure. The species structure of the marine ecosystem has suffered from this overexploitation as the Marine Trophic Index also shows.

Aquaculture provides an alternative source of fish protein. Production in Europe has increased since 1990, levelling off slightly since 2000. While this

Map 5.2 Status of fish stocks in the International Council for the Exploration of the Sea (ICES) and General Fisheries Commission for the Mediterranean (GFCM) fishing regions of Europe, 2006



Note: The chart shows the proportion of assessed stocks that are overfished (red) and stocks within safe biological limits (blue). The numbers in the circles indicate the number of stocks assessed within the given region. The size of the circles is proportional to the magnitude of the regional catch.

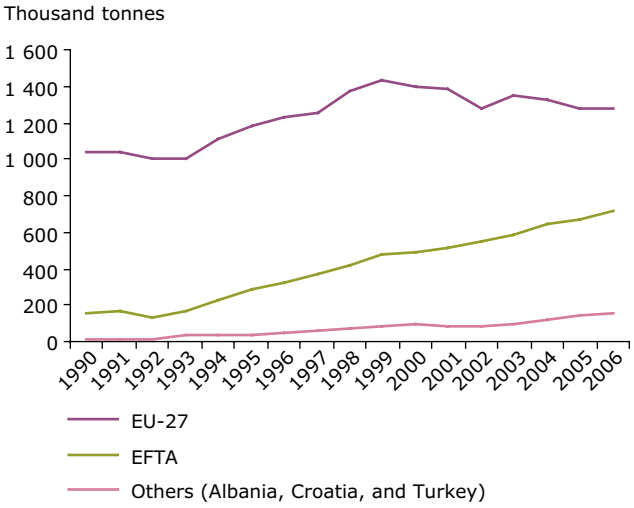
Source: GFCM and ICES, 2006.

([2]) A stock is considered to be outside 'Safe Biological Limits' (SBL) when the Spawning Stock Biomass (SSB) (the mature part of a stock) is below a biomass precautionary approach reference point (Bpa), or when fishing mortality (F) (an expression of the proportion of a stock that is removed by fishing activities in a year) exceeds a fishing mortality precautionary approach reference point (Fpa).

([3]) Pelagic fish live in the water column well above the sea bottom and sometimes close to the sea surface. Demersal fish live close to the sea floor.

increase implies a rise in pressure on ecosystems, more efficient feed and nutrient use and better environmental management have mitigated this pressure. Annual production in the current version of the indicator is a proxy for the environmental impacts of aquaculture. Work is underway to develop a more advanced indicator to assess the sustainability of aquaculture.

Figure 5.4 Annual aquaculture production by major area



Note: How to read the graph: In EFTA, between 1990 and 2006 the annual aquaculture production increased from 150 000 to 720 000 tonnes.

EFTA comprises Iceland and Norway.

Source: FAO Fishstat Plus.

Europe in the wider world (Figure 5.5)

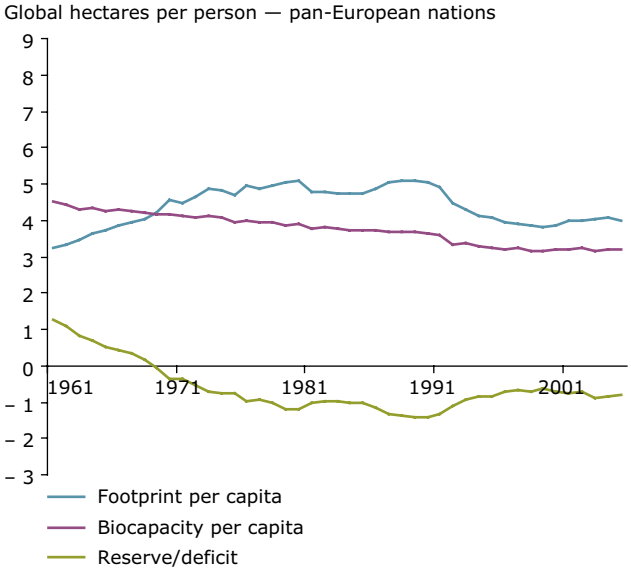
Natural resource use and waste generation within Europe is more than two times greater than the natural capacity of the continent to provide these resources and absorb these wastes. This ecological deficit means that Europe cannot sustainably meet its consumption demands from within its own borders.

The Ecological Footprint measures how much bioproductive land and water area is required to produce the resources a population consumes and absorb its wastes, using prevailing technology. This demand on ecological services can be compared with the available biocapacity — nature's ability to provide these services ([4]).

The EU-27 on its own has a Footprint of 4.7 global hectares per person, twice the size of its biocapacity. For pan Europe — as shown in Figure 5.5 — the deficit per person is significantly smaller. While the Footprint does not measure biodiversity, it correlates with the main biodiversity threats.

Further work should examine in more detail the linkages between the Ecological Footprint and biodiversity. Additionally, the impact of Europe on trade in wild species needs further investigation.

Figure 5.5 European Ecological Footprint and biocapacity, 1961–2005



Source: Global Footprint Network, National Footprint Accounts 2008 Edition.

([4]) The Footprint can be measured at any scale from humanity down to one person or product, biocapacity from the planet down to the hectare. To make human demand and ecological supply comparable worldwide, both biocapacity and Footprint are expressed in global hectares — bioproductive hectares with world average regeneration rates.

6 Focal areas: status of access and benefits sharing, status of resource transfers, and public opinion

- **A significant proportion of patent applications are based on genetic resources and additional work is required to link the data with wider economic and geographical information.**
- **Spending on biodiversity is only a small part of the EU budget and more information on funding from other sources is needed.**
- **Public awareness of biodiversity is low and urgently needs attention.**

Introduction

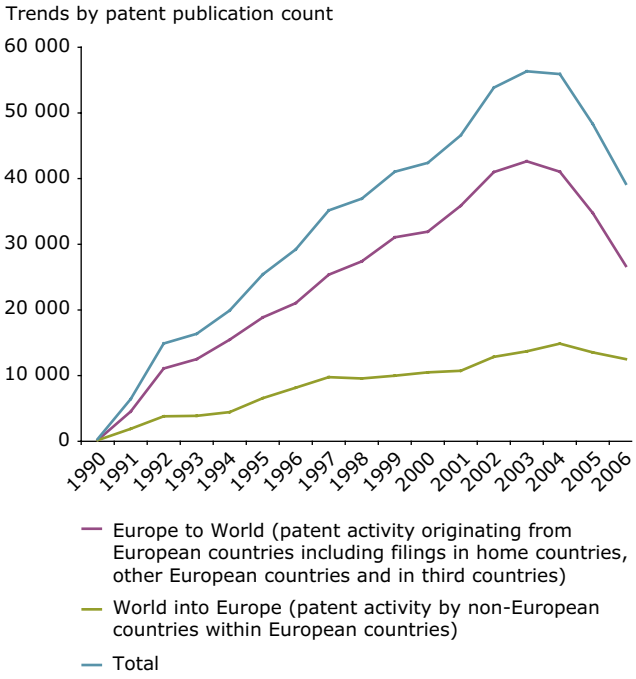
The indicators within these focal areas relate to the value society places on biodiversity. The indicators assess the importance of biodiversity as a resource for innovation, the extent to which public funds are committed to biodiversity and public awareness of the biodiversity crisis.

Patent applications based on genetic resources form a significant proportion of total applications (Figure 6.1)

Biodiversity has served as a major resource for patent activity across a wide range of science and technology sectors ranging from agriculture to cosmetics, functional foods, traditional medicines, pharmaceuticals, biotechnology and emerging developments such as synthetic biology. About 9 % of European patent activity relates to biodiversity, rising to 16 % if the full spectrum of pharmaceutical activity is included (Oldham and Hall, 2009). After rapid growth, patent activity for biodiversity now shows a downward trend. The decrease from 2005 seen in Figure 6.1 is due to the time lag between the filing of a patent and its publication (2 years and more). This means that for recent years, the data may not yet be in the database (see Oldham and Hall, 2009).

Additional work is required to link the data with wider economic and geographical information.

Figure 6.1 Biodiversity patent trends for European countries (publication portfolio)



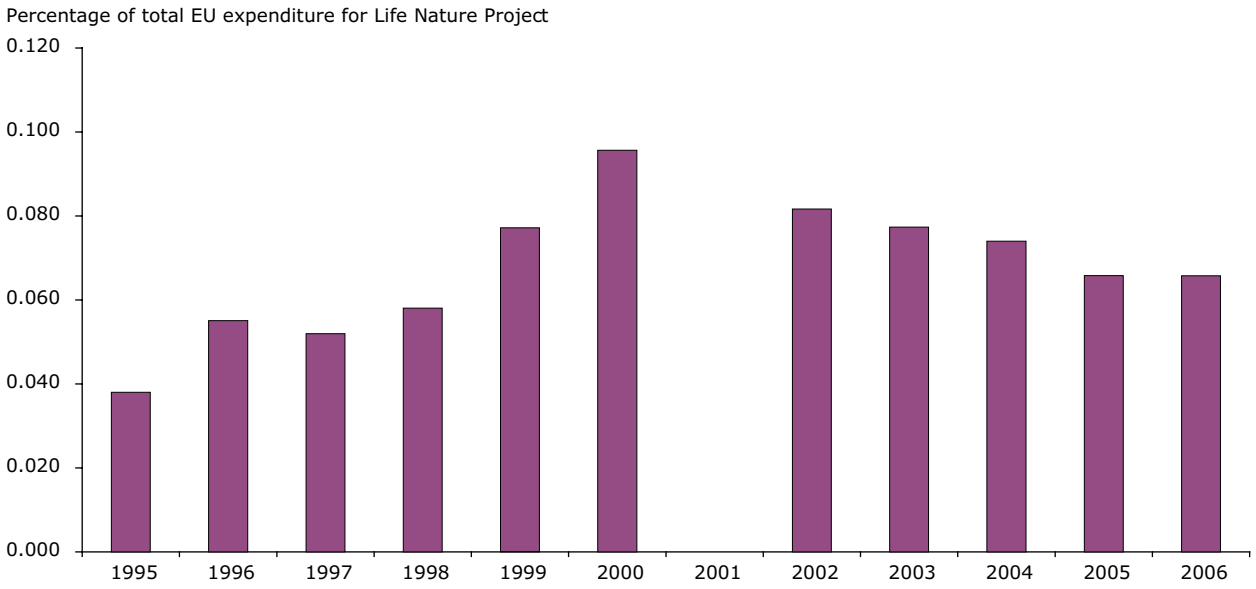
Note: Patent publication counts by publication year. 1990 is used as year zero in this figure. Counts can be conducted at different levels and in accordance with different years. Trends presented here capture applications, grants and procedural republications. Other counts such as priority filings of applications provide insights into underlying innovative activity.

Source: Oldham and Hall, 2009.

Financing biodiversity management: funds for biodiversity management constitute only a very small part of the EU budget (Figure 6.2)

Within the context of the Convention on Biological Diversity, this focal area is about providing developing nations with the resources to implement the Convention. Within Europe, this focal area considers spending on biodiversity management, e.g. are funds available for maintaining good conservation status and meeting the 2010 target in Europe?

Figure 6.2 Percentage of total EU expenditure on the Life project from 1995 to 2006



Note: How to read the graph: In 2006, EU expenditure on the Life project represented 0.066 % of the total EU budget.

Source: DG Environment, LIFE unit, 2008.

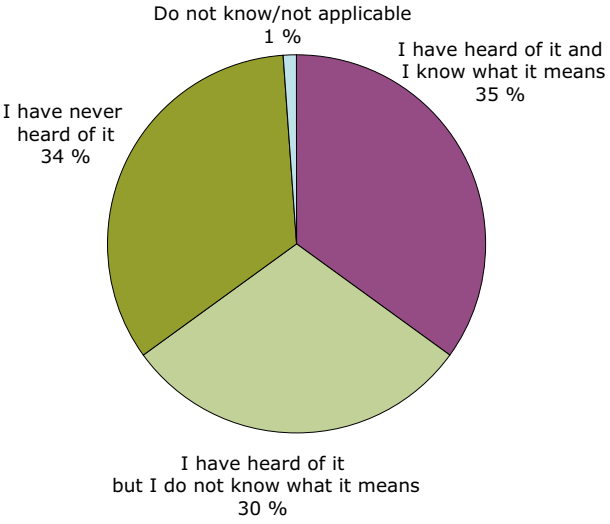
The selected indicator has limited scope and only contains information relating to EU funding. The direct allocation for biodiversity represents only a very small proportion of the total EU budget. European funding benefitting biodiversity may also be 'hidden' in budget lines within other policy areas, such as agriculture, rural development and research. More information from budgets at EU and national level, as well as information on private spending, should be collected to improve this indicator.

Public awareness is a major challenge (Figure 6.3)

A 'flash Eurobarometer' EU-wide opinion poll on biodiversity held in November 2007 (Gallup Organization, 2007) found that two-thirds of EU citizens do not know the meaning of the word 'biodiversity', or understand the main threats to biodiversity. Equally worrying, only a small proportion of EU citizens have heard of the Natura 2000 network, which is the cornerstone of EU biodiversity policy.

However, when the issue is explained to them, more than two-thirds consider the loss of biodiversity a serious problem, albeit more so at the global level. The fact that Europeans believe pollution and man-made disasters to be the main threats to biodiversity indicates that the level of understanding of the problem is still inadequate. A communication campaign on biodiversity is scheduled to take place in the EU in 2009 and 2010 to inform and engage the public in biodiversity conservation.

Figure 6.3 Familiarity with the term 'biodiversity' in the EU-27



Note: How to read the graph: 34 % of EU citizens have never heard of biodiversity.

Source: Gallup Organization, Flash Eurobarometer Series No 219, 2007.

Conclusions

The SEBI 2010 indicators provide a reference point on the way to 2010, which can serve as the basis for future assessments through and beyond 2010. In this way, the SEBI 2010 indicators answer the need for timely policy-relevant information, while emphasising the importance of establishing new monitoring systems (which are costly but necessary).

SEBI 2010 indicators are also being used at the national level and findings from such exercises will add detail to the European picture presented here. SEBI 2010 is helping strengthen independent scientific advice to European policy-making as part of the development of an intergovernmental science-policy platform on biodiversity and ecosystem services (IPBES) currently being discussed within UNEP. SEBI 2010 can also be seen as the European component of the global Biodiversity Indicator Partnership developed within CBD (2010 BIP).

In view of the available evidence and what may still be done in the next 18 months, this report finds that the target of halting biodiversity loss in Europe by 2010 will not be achieved. It has also argued that biodiversity loss can only be addressed effectively if all sectors of society and their pressures on biodiversity are targeted.

Policy implications

Compared to the threat of climate change, the biodiversity crisis presents two specific challenges. The first is identifying the causes of biodiversity loss. Unlike climate change, where a direct scientific link to emissions of a limited number of gases has been established, biodiversity loss is caused by many different aspects of human behaviour. Habitat loss, invasive species, pollution mainly through nitrogen, unsustainable production and consumption patterns, overexploitation and climate change are all major threats, and each is driven by a multitude of activities.

Addressing this complexity through policy is the second challenge. Halting biodiversity loss requires policy actions in many areas, including agriculture, forestry and fisheries. It also requires behavioural changes in homes and industry.

Trends and threats

This assessment shows that European biodiversity continues to be under pressure. The status of species and habitats is not favourable. Major threats such as habitat loss, climate change and invasive alien species appear set to continue increasing.

While climate change and its mitigation through the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol is a top policy priority in Europe, these measures fail to address climate changes in the context of wider ecosystem challenges. The potential impacts of climate change on biodiversity and the role that biodiversity and ecosystems can play to adapt to and mitigate climate change are still poorly understood and hardly being addressed. The threat of invasive alien species to biodiversity is just beginning to get wider recognition. Without an early warning system, however, the swift responses that are often key to successful control will be hard to achieve.

Responses

Policy responses, although successful in some areas, have been insufficient to halt biodiversity's general decline. In addition, there is some evidence that some of the progress within Europe has been achieved by transferring pressures to other parts of the world.

There have been some successes. Progress has been made in reducing pressures through specific legislation in areas such as atmospheric emissions, freshwater quality, wastewater treatment and sectoral measures.

Implementation of EC nature directives is also encouraging with high Member State commitment. However, the conservation status of species and habitats protected under the EU Habitats Directive is a cause for concern. The results of a first systematic

assessment across the European Union show that the status of most species and habitats of European interest is unfavourable. A lot is still unknown. Funding for biodiversity monitoring lags far behind national investments in other environmental issues. It needs to be increased significantly to allow for comprehensive future assessments.

In some instances negative trends in biodiversity have been halted but for many species and habitats a positive effect is not yet visible. Ensuring that biodiversity loss in Europe is really halted will require additional measures, not least to address those threats that are on the increase, such as land use changes, climate change and invasive alien species. Better integration of biodiversity concerns into sectoral policies affecting the wider countryside and the environment at large is needed.

Pressures from the agriculture sector have been addressed directly (reduction in nitrogen losses to the environment) and indirectly (increase in organic farming) with varying success. For some populations of European common birds, declines have levelled off. Specific measures to conserve biodiversity, for example agri-environment schemes, have been developed but need adequate financial resources as well as proper targeting and implementation. In forestry, timber harvesting appears to be economically sustainable but a long-term perspective on biodiversity conservation and delivery of forest-related ecosystem services should be developed. Fisheries remain a highly problematic sector, needing wider recognition of sustainability issues and stronger enforcement of existing policy instruments to avoid further collapse.

Finally, political authority and commitment to respond to a particular problem depend to a large extent on pressure from the public, which is contingent on public awareness. For biodiversity decline, information available indicates that this awareness is generally insufficient. The consequences of further biodiversity loss for human society are difficult to predict. The ecosystem services concept is key in this respect and needs further development in terms of proper indicators and policy responses. If the concept of biodiversity or the causes of its loss are not widely understood by the public there is little chance of necessary support and action to halt this decline.

Towards the 2010 assessment

This report is a first assessment of progress towards 2010 using the SEBI 2010 indicator set.

The next major assessment using the indicators will be done late in 2010. It will contain updated data for all indicators where available and will also explore the following issues in more detail:

- **The state of biodiversity**. More information is required to better assess trends in the components of biodiversity. The next assessment report will benefit from a new data point in the Corine Land Cover dataset, as well as from updates in species indicators and work on EU level Red Lists.

- **Target values and baselines**. Within the SEBI 2010 process and within the context of the global indicators used to assess global progress towards 2010, work is under way to determine target values and baselines for each indicator where possible. The result of this work will allow a more detailed assessment of the distance to targets in the different focal areas.

- **Responses — what has worked and what has not**. Where the current report has given a detailed assessment per focal area, the assessment in 2010 will focus more strongly on interactions, responses and integration of biodiversity concerns into sectoral policies. Examples include threats such as invasive alien species and the development of responses within the countries; the impact of policy in the field of agriculture or sustainable consumption and production on biodiversity; and the rich information from the reporting under article 17 of the Habitats Directive, which will enable better assessment of policy effectiveness.

- **The marine environment**. Marine ecosystems are under significant pressure from overexploitation and responses such as designating protected areas are not as advanced as for the terrestrial environment. As the EU is discussing reforms to the Common Fisheries Policy, addressing anthropogenic impacts on the marine environment will become a policy priority.

- **Europe's impact**. A deeper analysis will be done of the impact of Europe and its policies on biodiversity in the world. Europeans have degraded many ecosystems, reducing their capacity to respond to future shocks such as the effects of climate change. This is not only the case within Europe; through trade, European resource use and waste production are damaging ecosystems elsewhere, with negative impacts on the people depending on

them. Likewise, pressures that occur within the non-European range of migratory species will have a visible impact on the populations of the species in Europe. Addressing biodiversity loss in Europe will therefore need to address pressures outside Europe as well.

The next assessment on the basis of the SEBI 2010 indicators will also be the final assessment of progress towards the current '2010 target', and discussions on a new policy target are already under way. The lessons from the indicators, especially their interactions, causal links and uncertainties, will help in the design of new targets.

Recognising this perspective and the continuing need to address this major challenge, work on developing visions, goals and targets beyond 2010 has started at all levels.

The recent meeting of G8 environment ministers, held in Syracuse on 22–24 April 2009, acknowledged in particular that extinction rates may still be increasing despite the global commitment to reduce the rate of loss by 2010 (G8, 2009). Ministers did acknowledge the key role that biodiversity and ecosystem services play in underpinning human wellbeing and the achievement of the Millennium Development Goals (MDGs). They also emphasised the importance of addressing biodiversity as an essential part of the G8 dialogues and the need to support and strengthen the international process for the identification of an ambitious and achievable post-2010 common framework on biodiversity.

They committed themselves to investments in biodiversity and specific actions in key areas such as biodiversity and climate; biodiversity and business; management of biodiversity and ecosystems services, and science. They also proposed 'a common path toward the post-2010 framework on biodiversity' which emphasises sectoral integration (G8, 2009).

Overall, thus, the new target(s) should aim to be specific, measurable, ambitious, realistic, time-bound and developed on the basis of robust scientific evidence — a major challenge for an issue as complex as biodiversity. They will also most likely take a more broad overall perspective, recognising the importance of biodiversity for our green infrastructure and the value of ecosystem services to society. Given the time needed to establish monitoring systems and develop indicators, this work must start now.

Glossary

Accuracy

An estimate of the probable error of a measurement (especially the average of repeated measurements) compared with the 'true' value of the property being measured. The more measurements (estimates) of a value taken the more accurate the estimate (Zar, 1996).

Assessment

Comprises the analysis and review of information derived from research for the purpose of helping someone in a position of responsibility to evaluate possible actions or think about a problem. Assessment means assembling, summarising, organising, interpreting, and possibly reconciling pieces of existing knowledge and communicating them so that they are relevant and helpful to an intelligent but inexpert decision-maker (Parson, 1995).

Baseline

The starting point (a certain date or state) against which the changes in the condition of a variable or set of variables are measured (CBD, 1997).

Biodiversity loss

The long-term or permanent qualitative or quantitative reduction in components of biodiversity and their potential to provide goods and services, to be measured at global, regional and national levels (CBD, 2005).

Biomes

An ecological classification — a large, naturally occurring regional or global biotic community, such as a grassland, forest or desert. Terrestrial biomes are typically based on dominant vegetation structure. Ecosystems within a biome function in a broadly similar way, although they may have very different species composition. For example, all forests share certain properties regarding nutrient cycling, disturbance and biomass that are different from the properties of grasslands. Marine biomes are typically based on biogeochemical properties.

Biological diversity or biodiversity

The variability among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems (CBD, 1992).

Biological resources

Includes genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity.

Corine Land Cover

In 1985 the Corine (Coordination of information on the environment) programme was initiated in the European Union. The Corine databases and several of its programmes have been taken over by the EEA. One of these is an inventory of land cover in 44 classes, and presented as a cartographic product, at a scale of 1:100 000.

Ecosystem services

The benefits that people obtain from ecosystems. These include *provisioning services* such as food and water; *regulating services* such as flood and disease control; *cultural services* such as spiritual, recreational, and cultural benefits. Since people do not directly use *supporting services* such as nutrient cycling, people do not obtain 'benefits' from them and they may not strictly be part of ecosystem services defined as 'the benefits people obtain from ecosystems'. Much work is currently ongoing related to definition and classification of ecosystem services (see also Balmford *et al*., 2008). The concept 'ecosystem goods and services' is synonymous with ecosystem services.

Ecosystem

A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Ecosystem type

Categorisation of ecosystems in units that have similar, specific biotic and abiotic features.

Habitat

The place or type of site where an organism or population naturally occurs.

Irreversibility

The quality of being impossible to return to, or to restore to, a former condition. See also *resilience* and *threshold.*

Monitoring

A periodic standardized measurement of a limited and particular set of biodiversity variables in specific sample areas (CBD, 1997).

Protected area

A geographically defined area that is designated or regulated and managed to achieve specific conservation objectives.

Resilience

The ability of an ecosystem to return to its original state after being disturbed.

Species abundance

The number of individuals of a species, which may be measured in various ways such as biomass, density, total numbers, distribution or breeding pairs.

Species diversity

Biodiversity at the species level, often combining aspects of species richness, relative abundance and dissimilarity.

Target

The explicit statement of a fixed goal or objective to be achieved at a specified point in time.

Trend

A pattern of change over time, over and above short-term fluctuations.

Threshold

The minimum intensity or value of a signal that will produce a response or specified effect. Thresholds are especially useful in developing indicators that serve an 'early warning' function, i.e. provide a signal that a problem requiring policy intervention is at hand. Thresholds may be formalised within laws and regulations, or be based on scientific consensus (CBD, 1997).

Trophic level

The average level of an organism within a food web. Plants have a trophic level of 1, herbivores 2, first-order carnivores 3, and so on.

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Annex 2 SEBI 2010 Coordination Team

During the second phase of SEBI 2010 (end of 2007 until mid 2009), the composition of the SEBI 2010 Coordination Team was as follows:

- Gordon McInnes, Ivone Pereira Martins, Frederik Schutyser (European Environment Agency); and
- Anne Teller (European Commission);
- Ivonne Higuero (Joint Secretariat of the Pan-European Biological and Landscape Diversity Strategy (PEBLDS));
- Damon Stanwell-Smith/Matt Walpole (United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC));
- Jan Plesnik (the Czech Republic);
- Chairs and coordinators of the Working Groups
    - WG1 interlinkages between indicators — coordinator: Sophie Condé (MNHN), chair: Ben ten Brink (PBL);
    - WG2 climate change and biodiversity — coordinator: Dominique Richard (MNHN), chair: Snorri Baldursson (Icelandic Institute of Natural History);
    - WG3 communication — coordinator: Lawrence Jones-Walters (ECNC), chair: James Williams (JNCC).

The full list of expert members of all working groups is included in EEA Technical Report 05/2009 (www.eea.europa.eu/publications/progress-towards-the-european-2010-biodiversity-target-indicator-fact-sheets/).

The full list of experts that participated in the first phase of SEBI 2010 (2005-end of 2007) is included in EEA Technical Report 11/2007 (www.eea.europa.eu/publications/technical_report_2007_11).

All experts that have participated in the SEBI 2010 process are included in consultation processes on draft SEBI 2010 reports.

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