

SWEDEN'S ENVIRONMENTAL

objectives

- in an interdependent world

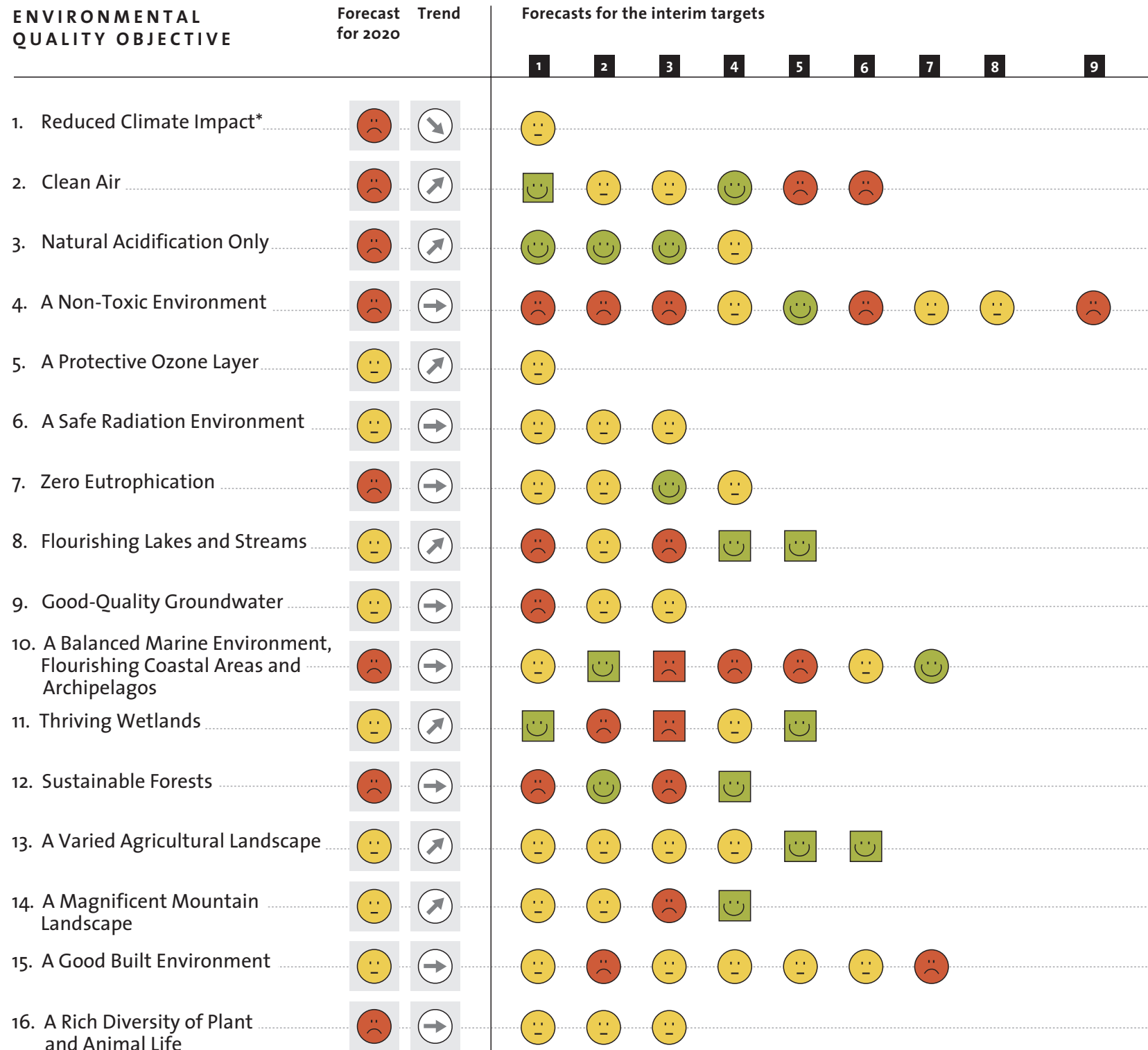


A PROGRESS REPORT FROM THE SWEDISH ENVIRONMENTAL OBJECTIVES COUNCIL

de Facto

2007

Will the environmental quality objectives and interim targets be achieved?



* target year 2050, as a first step

How to read this diagram

Each year, the Environmental Objectives Council submits a report to the Swedish Government on how efforts to achieve the country's 16 environmental quality objectives and the 72 interim targets associated with them are progressing. The Council's forecasts for these different goals, i.e. of the prospects of reaching them within the defined time frames, are illustrated by happy and sad faces (smileys), the colours and shapes of which are explained below. For each environmental quality objective a trend arrow is also given. This indicates the current trend in the state of the environment and whether it represents a change in the right direction, regardless of whether it will result in the objective being met by 2020. The grounds for the assessments

reached and the trend arrows chosen are set out in the main body of the report, in the chapters on the different objectives. The number of interim targets under each objective varies, from one to as many as nine, as indicated by the numbering under the heading 'Forecasts for the interim targets'. Overall assessments of the prospects of achieving the environmental quality objectives take into account not only progress towards the interim targets, but other factors as well.

Diagrams similar to this one have been included in previous editions of *de Facto*. It should be noted, though, that the diagrams from different years are not always directly comparable, partly owing to revisions of some of the interim targets between reports.

Symbols used

- The assessment is that the objective/target can be achieved within the defined time frame.
- The objective/target can be achieved within the defined time frame, provided that further measures are adopted/implemented.
- The objective/target will be very difficult to achieve within the defined time frame, even if further measures are adopted/implemented.
- The target year has passed. The interim target was achieved by that date.
- The target year has passed. The interim target was not achieved by that date.
- The trend in the state of the environment is positive.
- No clear trend in the state of the environment can be seen.
- The trend in the state of the environment is negative.

Words marked with an asterisk (*) in the text are explained in the glossary on pages 85–87.

Preface



Sweden's Parliament – the Riksdag – has set the goal of handing over to the next generation a society in which all of the country's major environmental problems have been solved. To guide efforts towards that goal, a number of environmental quality objectives have been adopted, describing the quality and state of the Swedish environment which the Riksdag judges to be sustainable in the long term. These objectives affect, and require the involvement of, every part of our society – from central and local government and the business sector to organizations and individual citizens.

In its endeavour to achieve the national environmental quality objectives adopted, Sweden is also dependent on the actions of other countries around the world. And we in turn, through our lifestyle and our policies, affect the environments of other nations. This year, the Environmental Objectives Council has chosen to focus on precisely that: the links between the Swedish objectives and international efforts to safeguard the environment, within the European Union and at the global level.

This report describes progress towards the 16 environmental quality objectives and the 72 interim targets associated with them. Colour-coded happy

and sad faces (smileys) are used to show whether or not these goals are expected to be achieved within the time frames laid down for them. In addition, arrow symbols indicate whether the current trend in the environment is positive or negative, regardless of whether the objective in question is judged to be attainable within one generation. While several of the objectives and targets may be difficult to meet within the defined time frames, in many cases the environment is changing in the right direction, though not always quickly enough.

Efforts to achieve these environmental objectives have been under way for almost seven years now, and they have become an increasingly self-evident part of Swedish action in the environmental sphere, at every level and in every sector of society. It is particularly gratifying that the country's county administrative boards are now, for the first time, presenting the results of their monitoring of the wide-ranging work being done at the regional level on the Council's Environmental Objectives Portal, www.miljomal.nu.

In 2008 the Environmental Objectives Council will be presenting an in-depth evaluation of the objectives and progress towards them.

Bengt K. Å. Johansson
Chairman, Environmental Objectives Council



Overall assessment by the Environmental Objectives Council

Sweden's environmental objectives are the focus of active efforts at both the national and the regional and local levels. There is much that is encouraging in this process: effective measures have been introduced, and several of the interim targets have been met. Like those of previous years, however, this year's review of progress towards the objectives shows that the pace of the work being undertaken is not sufficient. Several of the environmental quality objectives will be very difficult to attain within the time frame laid down for them. In last year's *de Facto*, the Environmental Objectives Council pointed out that we all, in our role as consumers, have a part to play in working towards the objectives. Of course, our own actions in this country are not the only thing that counts. We are also dependent on the rest of the world. How environmental efforts develop internationally, and how individuals, companies, organizations and countries beyond Sweden's borders act, have a major influence on our prospects of achieving the environmental quality objectives. That is why this year's edition of *de Facto* has an international focus.

Will the environmental quality objectives be achieved?

SUMMARY OF NATIONAL ASSESSMENTS 2007

Although the overall picture regarding the prospects of attaining the environmental quality objectives on time makes it clear that major challenges remain, we

also see that, for several of these goals, things are moving in the right direction. This is indicated by the trend arrows introduced in this year's report.

The latest assessments of progress towards the national environmental quality objectives are largely the same as in previous years, with just one exception: one more objective – A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos – is now judged to be very difficult to achieve. The new overall assessment for this objective is a result of revised appraisals regarding two of the interim targets. Of the three targets that carry most weight, on protection of marine environments, bycatch and sustainable fisheries, the last two are now considered very difficult to meet on time, while the target concerning protection of marine environments is, as before, considered capable of being achieved if further action is taken.

Eight out of a total of 16 environmental quality objectives are thus judged very difficult to attain by the target date. The objectives in question are Reduced Climate Impact, Clean Air, Natural Acidification Only, A Non-Toxic Environment, Zero Eutrophication, A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos, Sustainable Forests, and A Rich Diversity of Plant and Animal Life. The other objectives are considered to be within reach, provided that further measures are introduced.

Of the total of 72 interim targets, 18 have been assigned a green, happy face, 34 an amber, neutral face, and 20 a red, sad face. Most of the targets whose target years have passed have been achieved.

Of the interim targets for which appraisals have been revised since the last report, eight have been given a less favourable assessment and only four a more favourable one. Two of the targets had 2006 as their target year. Of these, interim target 5 regarding action programmes for threatened species, under A Varied Agricultural Landscape, has been met, but target 3 on forest roads, under Thriving Wetlands, has not.

The trend arrows new to this year's report express our assessments of trends in the state of the environment with respect to each of the environmental quality objectives. For just under half the objectives, the trend is pointing in the right direction, showing that the measures introduced are having a beneficial effect. For eight of the objectives, the state of the environment is considered to show little change, and only in one case, Reduced Climate Impact, is it judged to be clearly deteriorating.

It is encouraging to note that for two of the objectives regarded as very difficult to achieve – Clean Air and Natural Acidification Only – the state of the environment is nevertheless improving. That the objectives are, despite this, considered very hard to deliver within the defined time frame is due among other things to the slow pace of recovery in the environment, and to the fact that additional and more vigorous action will be needed, nationally and internationally, to attain them by the target date.

Proposals for new interim targets and measures to achieve the environmental quality objectives will be presented in the report to be submitted by the Environmental Objectives Council in the spring of 2008 as a basis for the Government's in-depth evaluation of the objectives.

SUMMARY OF REGIONAL ASSESSMENTS 2007

All the county administrative boards and the Swedish Forest Agency have carried out regional assessments of progress towards the environmental quality objectives and the regional objectives adopted. These county-level assessments largely agree with the national ones, though they also reflect the differing

conditions in different parts of the country. The Council notes that, in general, the boards of the more sparsely populated counties are somewhat more optimistic about the prospects of achieving the environmental quality objectives in their regions.

The objectives on which most county administrative boards arrive at assessments differing from the national one are Clean Air and Natural Acidification Only. Nine boards, most of them responsible for counties with large urban centres and significant transport impacts, judge the objective Clean Air to be very difficult to meet, in line with the assessment reached at the national level. The others consider this goal to be attainable, subject to further action being taken. The regional appraisals also reflect the varying severity of the problem of acidification. For Gotland with its calcareous bedrock, counties in eastern Sweden and several counties in the north, verdicts on the prospects of achieving the objective Natural Acidification Only are relatively upbeat. For other counties, more exposed to atmospheric transport of pollutants and with soil conditions that entail slower recovery, they are less optimistic.

The county administrative boards of Stockholm and Västra Götaland, with their major conurbations, and those of two other counties anticipate significant difficulties in attaining the objective A Good Built Environment.

The boards of counties along the south and west coasts, together with those of Stockholm, Gotland and Gävleborg, see major obstacles to delivering the environmental quality objective A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos. Boards responsible for other coastal counties make the assessment that this goal can be achieved, provided further measures are introduced.

The most favourable view of the prospects of meeting the objective Zero Eutrophication is to be found in the counties of northern Sweden.

What trends support and obstruct progress towards the goals?

TRENDS SUPPORTING PROGRESS

The development of new technologies and methods enhances the prospects of achieving several of the national environmental quality objectives. Off-road vehicles with quieter engines, new, more efficient mobile machinery to replace older equipment, and alternative fishing methods that provide better protection from seals, while reducing bycatch of marine mammals and birds, are a few examples. One objective for which advances in technology have been important is Natural Acidification Only: here, constant efficiency and other improvements in the energy and transport sectors have led to lower levels of acidifying emissions. Improved methods of farming have reduced leaching of nutrients to lakes and streams, creating a better basis for securing the goal of Zero Eutrophication.

Large areas of land, as well as a number of bodies of water, are given special protection every year. This, combined with good conservation practice in the wider countryside and protection and management of ecosystems and their habitat types, is crucial to success in achieving several of the objectives with a bearing on biodiversity, such as A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos, Thriving Wetlands, Sustainable Forests, and A Rich Diversity of Plant and Animal Life.

Consumption of energy in residential and commercial buildings per unit area heated is falling, and the share of the total supplied from fossil fuels has been almost halved over the period 1995–2005. This trend favours progress towards objectives such as Reduced Climate Impact and A Good Built Environment.

TRENDS OBSTRUCTING PROGRESS

The growing volume of road transport is making several of the environmental quality objectives more difficult to achieve. A milestone target for the transport sector calls for carbon dioxide emissions from

this sector to be stabilized at 1990 levels by 2010. In 2005, however, emissions from road transport were some 1.9 million tonnes higher than in 1990, a rise of 11%. The bulk of the increase is attributable to heavy goods vehicle traffic. Trends in transport affect progress towards several of the environmental objectives, but perhaps that of Reduced Climate Impact in particular. In urban areas, transport is a factor behind high levels of nitrogen dioxide and particulates, affecting goals such as Clean Air, and gives rise to noise, affecting A Good Built Environment. The use of high-sulphur fuels in the shipping industry is an obstacle to reaching certain objectives, above all Natural Acidification Only. Sulphur emissions from international shipping refuelling in Swedish ports are more than twice as high as the country's total emissions from all sectors.

For several of the environmental objectives, joint decisions within the European Union are crucial to success. To achieve strong and effective decisions in that context, it is first of all necessary for a large number of member states to be agreed on what the problems are and how they can best be tackled. After that, there needs to be a common will to live up to the decisions reached. In some cases, a lack of consensus about the nature of the problems results in *decisions* that are insufficiently rigorous to promote progress towards Sweden's environmental goals. In others, inadequate *implementation* of the decisions has the same result.

Our own consumption has implications for many of the environmental quality objectives. This issue was discussed in more detail in last year's *de Facto*. Besides transport, domestic energy use and food choices were highlighted as factors with major impacts on the environment. What products we consume is also of significance, as is what we do with our waste.

Changes in the natural environment are often slow. Soil and water take a long time to recover from the effects of acidifying pollutants, and the biological processes in forests that give rise to new habitats are also slow. That means that, even if an environmentally

undesirable trend is halted or reversed, there is a delay in the response of the natural environment which often makes it difficult, all the same, to bring about the state envisaged by an environmental quality objective within the intended time frame.

Looking beyond Sweden's borders

The environmental objectives have to be seen in an international context. Many of today's environmental challenges are truly global and require that the action taken be designed accordingly. To attain its objectives, Sweden needs to act in international arenas with those objectives in mind, but it is also important to realize that our involvement in international environmental efforts is not just about achieving our national goals. Today, international environmental policy is also a matter of security policy and development policy.

In the autumn of 2006, environmental issues, in particular the climate issue, attracted enormous media attention. A British economist, Sir Nicholas Stern, published a widely noted review explaining the economics of climate change. Al Gore's Oscar-winning film *An Inconvenient Truth*, likewise focusing on climate, also drew considerable attention. When climate issues are presented to and understood by a wider audience in this way, it creates a basis for achieving several of the environmental objectives. But to bring about an improvement in the quality of the environment, that understanding has to be translated into action. In many cases, what needs to be improved is the basic framework which society provides for an environmentally sounder lifestyle. This is a challenge, as it is to sustain an awareness in society of the importance of a healthy environment, so that efforts to secure that goal are no one-day wonder. Moving towards the environmental objectives is a long-term undertaking, requiring an ongoing commitment.

Within the EU, much was achieved in the environmental field in 2006. The most important step forward perhaps was the adoption, at the end of a

protracted process, of the EU's chemicals legislation REACH*. Efforts to control chemicals also gathered momentum in a broader international context, through the global chemicals strategy SAICM*. EU agreement on REACH forms a good basis for further progress in the SAICM framework. Another important advance in EU environmental policy is that all seven thematic strategies forming part of the Sixth Environment Action Programme have now been presented. These strategies relate to protection and conservation of the marine environment, sustainable use of natural resources, air pollution, prevention and recycling of waste, the urban environment, soil protection, and sustainable use of pesticides. They set out the direction of EU environment policy for the years ahead and reflect an endeavour to think in more holistic terms than before.

During the second half of 2009, Sweden will hold the Presidency of the European Union. In a report on the country's environmental priorities in the EU for 2007–9 (Report 5619), the Swedish Environmental Protection Agency writes that it expects three main issues to dominate during this three-year period: climate/energy, biodiversity and sustainable development. In the area of climate, the emphasis will be on international negotiations to reach a new agreement going beyond the end of the first period of the Kyoto Protocol* in 2012. Regarding biodiversity, the '2010 target', adopted in Johannesburg in 2002, will acquire growing urgency as the year 2010 approaches. As for sustainable development, the EU will be undertaking an initial review of its strategy in this area as early as the autumn of 2007, with a second one in autumn 2009. Sweden's EU Presidency will provide an excellent opportunity to carry this work forward, as well as to give prominence to several other issues where Sweden is heavily dependent on other countries for success in achieving its environmental quality objectives. It will also be an opportunity to raise important new questions that can help to attain those objectives.

The Council's conclusions

In the light of the fact that several of Sweden's environmental quality objectives are judged to be difficult to achieve and that further action will be required, and also that the theme of this year's *de Facto* is the objectives in an interdependent world, the Environmental Objectives Council in particular

Emphasizes the need to continue to integrate environmental efforts into every sector of society. Sectoral responsibility for the environment is a key factor, as many environmental problems have to be addressed in the specific sectors concerned, such as agriculture and forestry, fisheries, transport and energy. Sweden needs to continue to pursue this approach, in the EU and globally.

Underlines the importance of joint EU decisions for progress towards several of the environmental quality objectives. Sweden needs to work to ensure that the EU develops decisions, policy instruments and tools that will help to achieve these objectives. It is even more important for Sweden to give a lead in the context of global conventions, where many decisions are neither clear, sufficiently stringent nor binding on the countries concerned.

Calls attention to the need to continue to use the environmental quality objectives as a basis for Sweden's international efforts in the environmental field. They

should also form an important element in other international cooperation relevant to the prospects of attaining the objectives.

Makes clear the importance of Sweden giving a lead, within the EU and internationally, by providing good examples of how measures to achieve the environmental quality objectives can go hand in hand with economic growth. This requires a willingness on Sweden's part to be a step ahead of the EU on key environmental issues.

Points out that effective national coordination based on the environmental quality objectives can secure greater success for Sweden in international environmental negotiations, not least prior to and during its EU Presidency in 2009.

Underscores the importance of continued international efforts in achieving the objective Reduced Climate Impact. Progress towards many of the other environmental quality objectives is clearly affected by the prospects of attaining this one.

Highlights the importance of continuing to promote, through closer dialogue, greater efforts to achieve the environmental objectives on the part of local authorities and the business sector, as well as the importance of encouraging and turning to good account commitment and initiatives to that end on the part of environmental NGOs.



The environmental
objectives in an
interdependent world



The environmental objectives in an interdependent world

Over the ten years Sweden has been developing its environmental quality objectives and monitoring progress towards them, the world in which we live has changed. Globalization of trade and exchanges of information between countries have grown rapidly, as has Sweden's dependence on the environmental policies of other countries for success in achieving the objectives it has set itself.

The debate of the last year about climate change and energy supply has put energy firmly on the agendas of both EU and global summit meetings. Discussions about climate received a good deal of space in the media during the autumn of 2006, and the environment has attracted growing attention within the EU, after previously ranking quite low on its agenda.

Two issues that have come into increasingly sharp focus globally, alongside energy and climate, are the security policy implications of environmental problems – for example, the risk of conflicts over water resources and raw materials – and the economic benefits of sustainable ecosystems.

In 2007, a number of major compilations of facts will become available as a basis for global and European environment policy. These include the new assessment of future trends in climate from the UN's Intergovernmental Panel on Climate Change (IPCC); an analysis of environmental trends in Europe from the European Environment Agency (EEA), which will also take in developments in Central Asia; and a description of the state of and outlook for the global environment, from the United Nations Environment

Programme (UNEP). Trends to date indicate that we still have a long way to go to the global goal of ensuring environmentally sustainable development and reversing the loss of environmental resources by 2015.¹

Global goals have influenced Swedish objectives

Many of today's environmental problems are global, which means that several of the environmental quality objectives adopted are impossible for Sweden to achieve on its own. Often, we are very much dependent on other countries also taking action. This is particularly true of six of the objectives: Reduced Climate Impact, Clean Air, Natural Acidification Only, A Protective Ozone Layer, A Non-Toxic Environment and Zero Eutrophication. Air pollutants can be transported thousands of kilometres, and we cannot control every emission reaching the seas around our coasts.

Some of the Swedish objectives have their origins in international goals. A clear example of this is in the context of the objective A Rich Diversity of Plant and Animal Life. In 2001 the EU set itself the goal of *halting* the loss of biodiversity by 2010. The following year a global target was adopted in the same area, but with a somewhat 'softer' wording, calling for biodiversity loss to be *significantly reduced* by the year 2010. Subsequently, in 2005, the Riksdag decided that one of the interim targets under A Rich Diversity of Plant and Animal Life should be to *halt* the loss of biological diversity in Sweden by 2010.

A similar link can be seen in the area of climate. The Kyoto Protocol*, adopted under the UN Framework

Convention on Climate Change, requires many of the developed countries to achieve an initial reduction of their greenhouse gas emissions to a stated level by 2008–12. The EU uses the same target period for its own goals in this area, and this time limit also applies to the interim target set under the Swedish objective Reduced Climate Impact.

We can influence international goals

This is not a one-way street, however, with Sweden simply influenced by and adopting international targets. In some cases, Swedish objectives and initiatives have helped to shape European and global goals.

Since the early 1990s, Sweden has been pursuing chemicals management issues at the international level, for example in conjunction with the UN Conference on Environment and Development in Rio de Janeiro in 1992. At the World Summit in Johannesburg, ten years after the Rio Conference, agreement was reached on a ‘generational goal’ resting on the same basis as the Swedish objective A Non-Toxic Environment: by 2020, chemicals are to be used and produced in ways that minimize significant adverse effects on human health and the environment. This goal is also fundamental to the global chemicals strategy SAICM*, adopted in February 2006, which in addition includes objectives relating to risk reduction and knowledge and information about chemicals.

Within the EU, work on new chemicals legislation began following discussions with and pressure from certain member states, including Sweden. In December 2006, after several years of negotiations, a new regulation on chemicals, REACH*, was adopted by the Environment Council and the European Parliament. Despite compromises, the result is a major step forward.

Sectoral attention to environment of growing importance

The objective A Non-Toxic Environment clearly shows that the prospects of achieving environmental goals are dependent on decisions in many different

areas of society. With the single EU market, all the member states have the same rules regulating chemicals and banning the use of certain substances in particular categories of products. In addition, there are for example EC directives on permitted discharges into lakes and rivers, limits on concentrations of pollutants in different environments, and rules prohibiting hazardous substances in electronic equipment. The EU’s Common Agricultural Policy (CAP) also affects progress towards A Non-Toxic Environment, as it has implications for the use of pesticides in farming.

At the wider international level, a global chemicals strategy and environmental conventions are not enough. The rules on world trade adopted within the WTO*, for instance, are also of great significance. An importing country, together with other EU member states, can influence what substances are to be prohibited in a food or other product, but it cannot impose legal requirements, for example, concerning how a kilo of apples or a toy is to be produced. Contamination of the farmland concerned, or pollution from the factory, is not regulated by existing trade rules, even though dangerous pollutants may eventually accumulate in animals and plants thousands of kilometres from where they originate. The companies importing such products, on the other hand, are able to set environmental standards for their production.

Global trade rules and EU agricultural policy are also of major importance for progress towards the objectives Zero Eutrophication and A Varied Agricultural Landscape. Similarly, EU transport and energy policies have implications for Reduced Climate Impact, Clean Air, Natural Acidification Only, A Good Built Environment and several other environmental objectives. Increasingly, efforts to safeguard the environment are dependent on developments in other policy areas. In practice, environmental policy integration has been strengthened, but even now EU strategies for different sectors of society often fail to include tangible environmental goals.

Greater interest in the marine environment

The Swedish objective A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos states, among other things, that the North Sea and the Baltic Sea are to have a sustainable productive capacity, and that biological diversity is to be preserved. One of the associated interim targets is that, as early as 2008, catches of fish are not to exceed levels commensurate with preserving the functions of the ecosystem – a target that is judged to be very difficult to meet.

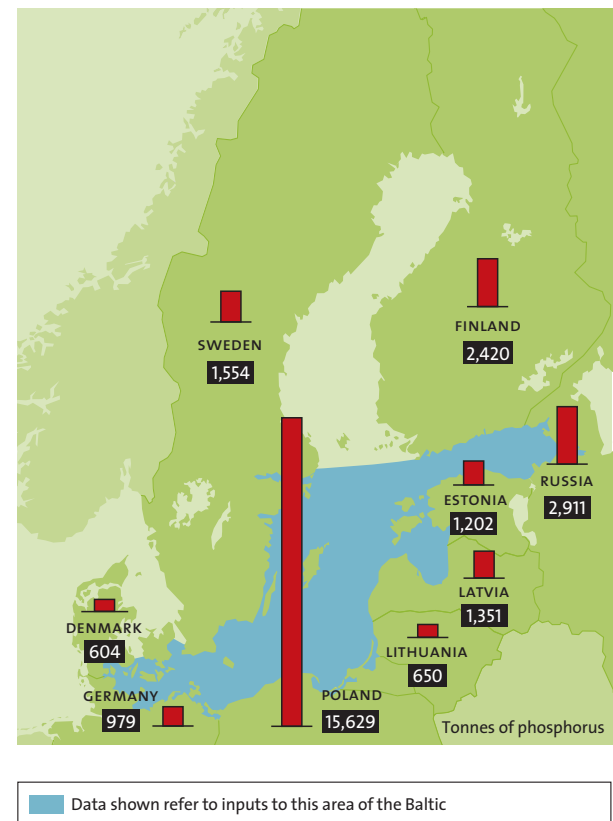
In the framework of the Common Fisheries Policy of the EU, a process is under way to adjust fishing effort to the carrying capacity of fish stocks, based on recommendations from the International Council for the Exploration of the Sea (ICES). Progress is slow, however, and several stocks, particularly of cod, are being fished unsustainably.

Success in safeguarding the marine environment is dependent on many other countries, and cooperation is taking place in a number of forums, including HELCOM* in the case of the Baltic Sea and OSPAR* as regards the North-East Atlantic.

Only in recent years has the EU become more involved in marine environment issues. Decisions reached under international conventions in this area are rarely binding on signatory countries, as EU rules are, but in general the conventions involve a larger number of parties. Russia, for example, is a member of HELCOM, but not of the EU.

Both the new Marine Strategy of the EU and the plans for a common maritime policy have major implications for the Balanced Marine Environment objective. An initial draft of a maritime policy was presented in the summer of 2006, covering shipping, fisheries and coastal planning. Under the Marine Strategy and the new Marine Strategy Directive², the marine regions of the EU are to have achieved ‘good environmental status’ no later than 2021. The Nordic countries suggested that it ought to be possible to implement the directive more rapidly in certain sea areas, such as the Baltic, a view that was endorsed by EU environment ministers.

FIG. A.1 Inputs of phosphorus to Baltic Sea in 2000



Note: HELCOM's next pollution load compilation, covering inputs in 2006, will be presented in 2009.

SOURCE: HELCOM, FOURTH POLLUTION LOAD COMPILATION (PLC4)

Eutrophication of the Baltic Sea is a clear example of an environmental problem that can only be solved by international cooperation. This diagram shows phosphorus inputs from the nine coastal states of the Baltic, arising from sewage treatment plants, factories, single-household sewage systems, storm sewers and leaching from farm and forest land. The figures refer to inputs to the blue area on the map. It should be noted that they represent total inputs; per capita, the countries' relative contributions present a different pattern.

Baltic to have an action plan of its own

The low and fluctuating salinity of the Baltic Sea means that the species to be found there are few in number and particularly sensitive to disturbance. HELCOM is intended to play a key role in imple-

menting the EU's Marine Strategy in this area. One element in this process could be the Baltic Sea Action Plan which HELCOM will be presenting in 2007.

In relative terms, the environmental impacts of sea-based transport are growing. Unless vigorous action is taken, shipping in EU sea areas will, by 2020, emit more sulphur and nitrogen oxides than are emitted on land within the Union. Measures to curb air pollution from ships represent one of the most cost-effective means of securing progress towards the objective Natural Acidification Only. The EU can give a lead here, but to achieve greater effect decisions within the International Maritime Organization (IMO) will be needed.

The Water Framework Directive of the EU has brought about significant changes in the way Sweden manages its water resources. Efforts to secure the good water quality required by the directive are essential in attaining the objective Flourishing Lakes and Streams, and also the marine environment objective. With regard to A Non-Toxic Environment, Zero Eutrophication and Good-Quality Groundwater, too, the Water Framework Directive has emerged as a tool with great potential.

Greenhouse gas emissions need to be halved

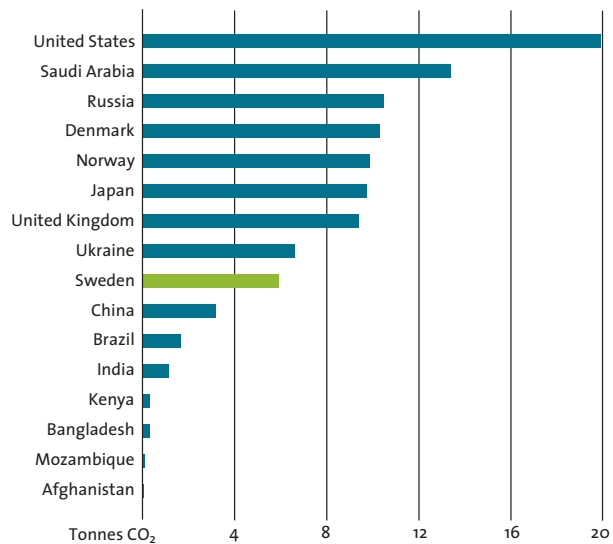
The EU, with support from Sweden and other member states, is giving a lead in the international negotiations on climate change. In that context, preparations for a second phase of the Kyoto Protocol* are under way. The present commitment period ends in 2012.

The EU and other industrialized countries have to demonstrate that they are capable of reducing their emissions of greenhouse gases in line with earlier agreed targets. At its summit in March 2007, the EU adopted a climate policy involving a reduction of member states' greenhouse gas emissions by at least 20% by 2020, from 1990 levels; provided that developed nations outside the EU follow suit, a target reduction of 30% will apply. Renewable sources are to account for 20% of EU energy consumption and biofuels for at least 10% of motor fuel consumption

by 2020. The member states are also to make every effort to improve energy efficiency and to achieve a 20% reduction in energy consumption.

The international climate talks are expected to enter a decisive phase in the autumn of 2009, when Sweden holds the EU Presidency. To meet the global objective of limiting the future rise in temperature to no more than 2°C, world emissions of greenhouse gases need to be cut by 50% by 2050, compared with 1990. For the developed countries, the reduction needs to be of the order of 60–80%, according to the energy policy proposed by the European Commission. Emissions from strongly growing economies are rising sharply, and these countries, too, will have to make commitments. China's emissions are currently roughly

FIG. A.2 Per capita emissions of carbon dioxide from fossil fuels in 2003



Note: Latest available and comparable data for selected countries.

SOURCE: OAK RIDGE NATIONAL LABORATORY, USA

Emissions of carbon dioxide, calculated per head of population, differ widely between countries. The high rate of growth of some developing countries is now beginning to be reflected in the emission statistics. China is a case in point: its CO₂ emissions are rising sharply, and in total they are roughly as high as those of Europe. Per capita, however, European emissions are several times higher.

as high as those of Europe, although on a per capita basis European emissions are three times higher.

Action on climate change often means cleaner air

Some of the measures being introduced to achieve the Swedish objective Reduced Climate Impact are also beneficial in terms of the goals Clean Air and Natural Acidification Only. Initiatives to promote wind power and energy-efficient vehicles or reduce oil consumption for domestic heating, for example, curb emissions not only of carbon dioxide, but also of sulphur and nitrogen compounds and particles hazardous to health. The European Commission estimates that cutting carbon dioxide emissions by 10% by 2020 will also secure a reduction in harmful air pollution that will save member states in the region of €8–27 billion, as a result of a lower incidence of disease and generally better health.

Air quality can be given a helping hand by action on climate change, but it has to be remembered that measures to curb greenhouse gas emissions do not always result in cleaner air at the local level. Biofuels do not add to net emissions of carbon dioxide, but can give rise to troublesome air pollutants if they are not burned in the correct manner. Increased use of forest-based fuels may also lead to an impoverishment of forest soils, if steps are not taken to avoid it. In our concern to reduce emissions of greenhouse gases, it is important not to lose sight of other impacts on health and the environment.

The negotiations on further air pollutant reductions within the EU, like those on climate, may reach a conclusion under the Swedish Presidency in the autumn of 2009. The strategy on air pollution which the EU has adopted is not far-reaching enough to achieve the objectives Clean Air and Natural Acidification Only. Under the strategy, the current rules on emission ceilings for the individual member states are to be revised. The pollutants in question are sulphur dioxide, nitrogen oxides, volatile organic compounds and possibly also particulate matter.

BRUNDTLAND REPORT A PLATFORM FOR ENVIRONMENTAL QUALITY OBJECTIVES

The development of international goals and targets for environmental quality gathered momentum in the wake of the Brundtland Commission's report *Our Common Future*. Twenty years ago, the Brundtland Commission defined sustainable development as development that meets the needs of the present without jeopardizing the ability of future generations to meet their own needs. The meaning of the concept was subsequently fleshed out at the UN Earth Summit in Rio in 1992.

During the 1990s, a succession of new international environmental conventions were adopted, lending further substance to the concept of sustainable development. More and more countries also began to develop environmental objectives with a focus on what they wished to achieve – environmental quality – and not just goals expressed in terms of threats to be averted.

Sweden's environmental objectives and its efforts to attain them can be said to represent the environmental dimension of sustainable development. It is difficult to find other examples of countries where such goals are being used to guide and evaluate environmental policy. Monitoring of progress towards the objectives at both the national and the regional level makes for a more efficient process and increases the chances of wider access to the results.

The EU's Sixth Environment Action Programme, from 2002, sets out qualitative objectives in four areas: climate change, biodiversity, health, and natural resources and waste. On the basis of this programme, seven thematic strategies have subsequently been developed, containing a range of actions to be undertaken.

A new directive on ambient air quality already calls for a reduction of particulate levels in urban air. Emissions of these substances are also limited by

the Convention on Long-Range Transboundary Air Pollution (CLRTAP), and in that context, too, earlier agreements are to be reviewed.

Progress in reducing atmospheric emissions will depend not only on cleaner shipping and more efficient energy use, as noted earlier, but also on emission standards for cars, buses and lorries. Over a period of many years, these standards have been made increasingly stringent. The EU is in addition discussing binding standards to improve fuel efficiency, following the vehicle industry's failure to reduce fuel consumption sufficiently on a voluntary basis.

Action in Sweden can affect environment elsewhere

Measures to achieve Sweden's national environmental objectives may affect the environment in other countries. Such links are complex, and can often only be clarified by an analysis of the carrying capacity of entire ecosystems. A couple of simplified examples may be mentioned here, relating to the objectives for the marine environment and forests. Restrictions on fishing in the Baltic Sea, Kattegat and Skagerrak could result in increased imports of fish from other sea areas, creating a risk of overfishing there. Likewise, national limits on harvesting of biomass for energy purposes could lead to higher imports and depletion of the forests of other nations.

Action in pursuit of our own environmental goals, however, can also promote environmental improvements in other parts of the world. Technologies and policy instruments developed to achieve Swedish objectives could be of use in other countries' environmental efforts. Examples include selective fishing gear designed to reduce bycatch, and economic instruments, such as energy and carbon dioxide taxes, aimed at reducing consumption of fossil fuels.

Swedish initiatives to curb the use of toxic chemicals, through national legislation and international negotiations, can help to reduce both releases to the

environment and occupational exposure in other corners of the globe. Similarly, measures to limit the introduction of alien species to Sweden can benefit other countries' endeavours to achieve biodiversity goals.

Objectives an asset in negotiations

Sweden is best able to influence international organizations, with a view to bringing about more effective global environmental rules, if it is actively involved in joint EU preparations for negotiations. A united EU carries more weight in global talks than any one country on its own, although such a united approach presupposes compromises on the part of the individual member states. Even when the EU is not formally a negotiating party, for example within UNEP*, its members coordinate their positions.

Sweden's efforts to integrate responsibility for the environment in all sectors of society, and ten years' experience of developing tangible environmental objectives, often attract the interest of other countries and international organizations. This in turn strengthens our hand in international negotiations. The long-term goals Sweden has adopted put us in a better position to pursue a consistent approach and to give a lead on different issues, both those that will promote progress towards our national environmental objectives and those that will improve the environment for the poorest people around the world.

One advantage of the Swedish system is that the objectives enjoy broad political support. Responsibility for developing and achieving them, moreover, is shared by government agencies responsible for different sectors, and not limited to environmental authorities. Having a large number of agencies working towards the same environmental goals within different EU groups and in different international arenas increases the chances of a relatively small country gaining a hearing for its proposals.

ENVIRONMENTAL GOALS IN OTHER COUNTRIES

Of the EU member states, it is perhaps the Netherlands that has made most progress in developing overall national environmental goals. Its most recent National Environmental Policy Plan, adopted in 2006, contains a mix of quality objectives and action-related targets, with the broader objectives to be achieved by 2030. Unlike Sweden, the Netherlands has also set a number of international environmental goals, for example that global agreements on sustainable fisheries should be reached no later than 2015.

In the United Kingdom and Germany, a number of environmental objectives are set out in the countries' sustainable development strategies, which cover economic, social and environmental aspects of development. The UK has also defined targets for its efforts in pursuit of 20 international priorities for sustainable development. Both the UK and Germany are using a wide range of indicators to track progress towards these goals. Sweden's strategy for sustainable development has less tangible objectives, and at

present sustainability indicators are mainly confined to the energy and environmental sectors.

In the United States, the federal Environmental Protection Agency has set environmental goals that are more reminiscent of the Swedish ones, such as Clean Air, Clean and Safe Water, and Healthy Communities and Ecosystems. These aims were first drafted as early as 1996, when there were twelve in all. The climate issue was not included until 2003. Gradually, the number of overall, long-term goals has been reduced to five, with measurable sub-objectives and targets for each of them.³ A report on progress towards these goals is submitted each year to Congress.

Vietnam is an example of a country with widespread poverty, but which has set itself ambitious environmental objectives. In 2003 a National Strategy for Environmental Protection was adopted, with tangible goals to be met by 2010, but also a vision for 2020.

-
1. UN Millennium Development Goal 7.
 2. EU procedures for the adoption of the Marine Strategy Directive are not yet completed.
 3. US Environmental Protection Agency, 2006–2011 Strategic Plan, <http://www.epa.gov/ocfo/plan/plan.htm>.



The **16** national
environmental
quality objectives



ENVIRONMENTAL QUALITY OBJECTIVE ONE

Reduced Climate Impact

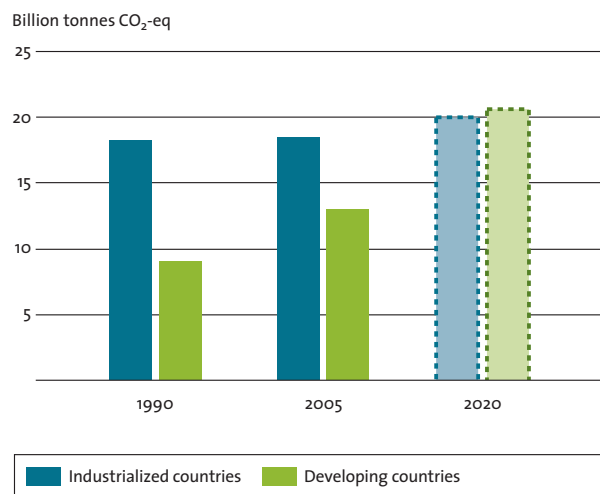
The UN Framework Convention on Climate Change provides for the stabilization of concentrations of greenhouse gases in the atmosphere at levels which ensure that human activities do not have a harmful impact on the climate system. This goal must be achieved in such a way and at such a pace that biological diversity is preserved, food production is assured and other goals of sustainable development are not jeopardized. Sweden, together with other countries, must assume responsibility for achieving this global objective.

Will the objective be achieved?

☹️📉 Total global emissions of greenhouse gases continue to rise, widening the gap to achieving the objective Reduced Climate Impact. In 2006, however, Sweden was one of the few developed countries reporting a downward trend in national emissions to the Climate Change Secretariat. Further measures will be needed, though, to prevent an increase in emissions from Swedish sources in the years to come.

Within the EU and in international forums, Sweden must seek to ensure that the direction of global action

FIG. 1.1 Greenhouse gas emissions in industrialized and developing countries



Note: Excluding land use, land use change and forestry (LULUCF).

SOURCE: JOINT RESEARCH CENTRE – INSTITUTE FOR PROSPECTIVE TECHNOLOGICAL STUDIES

Projections suggest that by 2020, if no further action is taken, the developing countries' emissions of greenhouse gases will exceed those of the industrial nations. Emissions are given here as carbon dioxide equivalents*, i.e. in terms of the amounts of carbon dioxide that would have the same impact on climate.

is such as to enable this objective to be met. Deep cuts in emissions are required, above all in the industrial nations, but also in fast-growing developing countries. The European Commission's assessment is that developed country emissions need to be reduced by 30% by 2020.

Through a new climate policy decision reached in 2006, Sweden embraced the EU's joint long-term goal of limiting the rise in the global average temperature to 2°C above its pre-industrial level. The national long-term climate target remains unchanged: a reduction of Swedish greenhouse gas emissions from the present level of just over 7 tonnes to no more than 4.5 tonnes of carbon dioxide equivalent* per capita per year by 2050. This target is based on the premise that, in the long run, emissions should be evenly distributed among the earth's population. Internationally, it is currently being discussed whether this long-term guide figure of 4.5 tonnes per capita will be low enough. Certain studies suggests that as low a level as 3 tonnes per capita or less will be required on a global basis.

During 2006, decisions were reached on a number of policy instrument changes relevant to the climate objective:

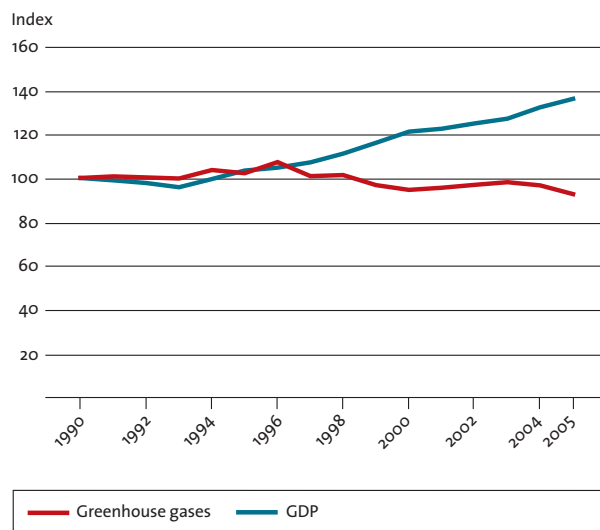
- An extension and expansion of the Climate Investment Programme* over the period 2006–8, with new funding for climate information initiatives, investments in the transport sector, and support for action on climate change by small local authorities.
- Energy efficiency criteria to be introduced in public procurement.
- An expansion and extension to 2030 of the green energy certificates scheme, to increase electricity generation from renewable sources by 12 TWh between 2007 and 2016.
- An extension of tax exemption for biofuels for vehicle use beyond 2008.
- An increase in the percentage of rape methyl ester (RME) blended with diesel fuel, from 2% to 5%.
- A carbon dioxide labelling scheme for vehicles, to be developed by the Swedish Consumer Agency in collaboration with the Swedish Environmental Protection Agency and the Swedish Road Administration.

RISK OF STEEP RISE IN EMISSIONS

The concentration of greenhouse gases in the atmosphere is rising, and with it the global average temperature. The concentration is now over 30% higher than at the beginning of the industrial era in the mid-19th century, and could show a substantial further increase in the years to come. In November 2006 the International Energy Agency (IEA) warned that world carbon dioxide emissions could rise by 55% by 2030 if current trends continue.

The international community faces some very major challenges in terms of working together to reduce greenhouse gas emissions, while ensuring global economic development. In particular, economic growth needs to be promoted in the poorer parts of the world, in line with the Millennium Development Goals, the Climate Change Convention etc., but in such a way as to minimize emissions of greenhouse gases.

FIG. 1.2 Swedish GDP and greenhouse gas emissions, 1990–2005



SOURCE: SWEDISH ENVIRONMENTAL PROTECTION AGENCY

Sweden has managed to decouple economic growth and emissions of greenhouse gases. Between 1990 and 2005, GDP rose by around 30%. Over the same period, emissions fell by some 5 million tonnes, or 7.2%.

CLIMATE CHANGE IN FOCUS

2006 will go down in history as the year the scientists' warnings about the effects of climate change really made an impression on public debate. In large part, this was due to a succession of extreme weather events and unusually mild weather. Early in 2006 it was confirmed that 2005 had been one of the warmest years since temperature records began in the 1890s. In Sweden, too, it was warm: 1.6°C above normal, according to the Swedish Meteorological and Hydrological Institute. The year ended in the same way, with reports of the warmest autumn in Europe for 500 years.

Climate change will, among other things, threaten water supplies and accelerate the spread of deserts. Tropical regions and developing countries are particularly at risk, but Sweden will also be affected. The Government has set up an inquiry to study the impacts of climate change and ways of reducing the vulnerability of Swedish society. An interim report presented in November 2006 identified, among other things, a substantial future risk of flooding around Lakes Mälaren and Vänern, as well as threats to key functions in our society.

Will the interim target be achieved?

GREENHOUSE GAS EMISSIONS

INTERIM TARGET, 2008–2012

☺ *As an average for the period 2008–12, Swedish emissions of greenhouse gases will be at least 4% lower than in 1990. Emissions are to be calculated as carbon dioxide equivalents and are to include the six greenhouse gases listed in the Kyoto Protocol and defined by the IPCC. In assessing progress towards the target, no allowance is to be made for uptake by carbon sinks or for flexible mechanisms.*

The assessment is that this target can be met, provided that further measures are implemented. The latest emission forecasts for 2010 suggest a fall of 3–4% from 1990 levels, representing significant progress towards the national interim target.

In 2005, Swedish greenhouse gas emissions, calculated as carbon dioxide equivalents*, totalled 67 million tonnes (excluding land use, land use change and forestry, LULUCF). This represented a decrease of around 5 million tonnes, or 7.2%, compared with 1990. Between 2004 and 2005, emissions fell by some 2.7 million tonnes, mainly owing to reduced emissions from energy use in homes and premises and from the waste sector.

GLOBAL EMISSION REDUCTIONS CRUCIAL

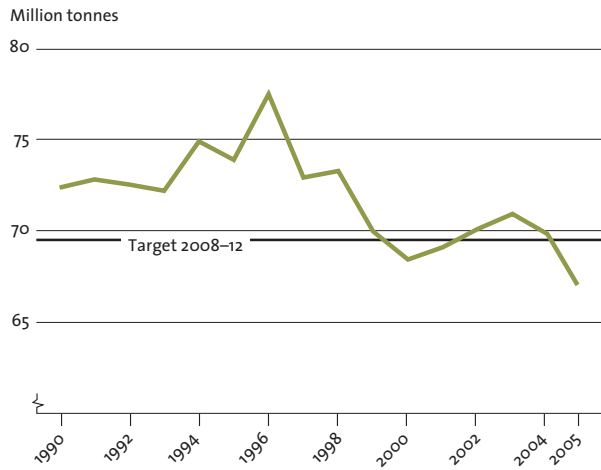
The developed countries that have signed the Kyoto Protocol¹⁸ have together undertaken to reduce their greenhouse gas emissions by just over 5% by 2012. Through two mechanisms under the Protocol – the Clean Development Mechanism (CDM)¹⁹ and Joint Implementation (JI)²⁰ – the industrialized countries are able to promote development in and technology transfer to poorer countries, while reducing emissions.

To stabilize greenhouse gas levels in line with the goal of a maximum temperature rise of 2°C, it will probably be necessary to reduce developed country emissions by

60–80% by 2050 and to introduce a range of measures in the fastest-growing developing countries. Intense efforts are under way in many forums, including in Sweden, to ensure that a new global climate regime is in place when the first commitment period of the Kyoto Protocol ends in 2012.

The Swedish Government supports the long-term targets for cutting greenhouse gas emissions adopted by the European Commission, i.e. a reduction of 20% by 2020 (compared with 1990) as a European undertaking, and 30% as part of a wider international commitment.

FIG. 1.3 Total greenhouse gas emissions in Sweden, 1990–2005



Note: Figures are not climate corrected.

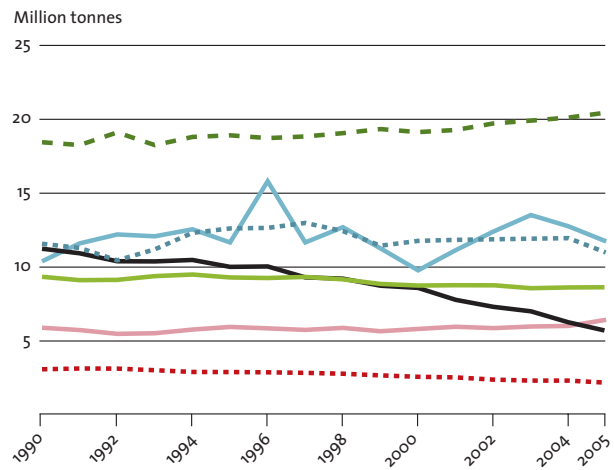
SOURCE: SWEDISH ENVIRONMENTAL PROTECTION AGENCY

Swedish emissions of greenhouse gases vary from year to year, largely owing to differences in temperature and precipitation. Between 2004 and 2005 emissions fell by around 2.7 million tonnes.

Sweden's GDP declined in the early 1990s, but since 1994 it has grown by an average of 3% a year. Aggregate releases of greenhouse gases have not risen at the same rate, pointing to a decoupling of growth and emissions. Per capita, total emissions had fallen to 7.4 tonnes by 2005, from 8.4 tonnes in 1990.

In 2006 Sweden submitted its fourth national communication under the UN Framework Convention on Climate Change. The report included a wide-ranging presentation and analysis of Swedish emission data. Its

FIG. 1.4 Greenhouse gas emissions in Sweden by sector, 1990–2005



Note: Figures are not climate corrected.

SOURCE: SWEDISH ENVIRONMENTAL PROTECTION AGENCY

Trends in greenhouse gas emissions differ from one sector to another. Emissions in the transport sector are continuing to rise, while those from energy use in homes and premises and from the waste sector are falling.

purpose was to describe historical emission trends in the country and to present projections of emissions of the greenhouse gases covered by the Kyoto Protocol*.



ENVIRONMENTAL QUALITY OBJECTIVE TWO

Clean Air

The air must be clean enough not to represent a risk to human health or to animals, plants or cultural assets.

20

CLEAN AIR

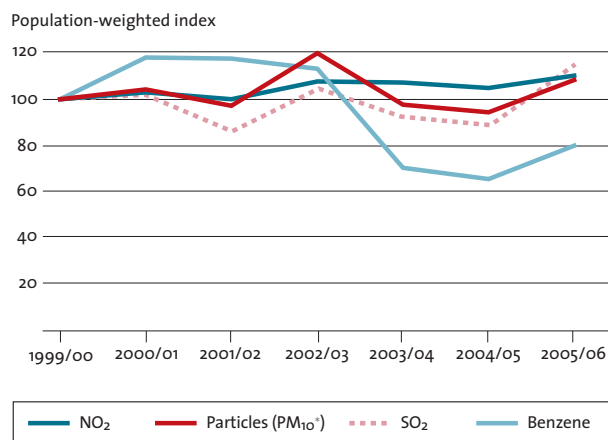
Will the objective be achieved?

☹️🔗 The assessment made in 2006, that it will be very difficult to achieve this objective, remains unchanged. In the longer term, however, planned and agreed measures in Europe as a whole may be expected to promote progress towards it.

Air pollutants damage health, natural ecosystems, materials and cultural heritage. In Sweden, exposure to air pollution measured as particulate matter and nitrogen dioxide is estimated to result in over 5,000 premature deaths every year. Owing to emissions of ozone precursors across Europe, concentrations of ground-level ozone are expected to exceed the Government's target for levels to be achieved within one generation. In other words, in 2020 ground-level ozone will still be causing damage to forests and agricultural crops. In addition, there will be the impacts of ozone on health, in terms of morbidity and premature mortality.

The earlier trend towards an improvement in air quality in Sweden's towns and cities has levelled off. The measures now decided on, however, are expected to produce further improvements in the years ahead, and the trend for this environmental objective is

FIG. 2.1 Air quality trends in Swedish towns and cities in winter months (October–March) 1999/2000–2005/06



Note: Based on weighted averages of concentrations in some 30 local authority areas. Figures for 1999/2000: NO₂ 17.7 µg/m³, SO₂ 2.4 µg/m³, benzene 2.1 µg/m³, and PM₁₀ 17.1 µg/m³.

SOURCE: SWEDISH ENVIRONMENTAL MONITORING PROGRAMME

Air quality in urban areas of Sweden has not improved since the beginning of the 21st century. Only levels of benzene have fallen. For the other pollutants, trends are unclear.

therefore judged to be positive. The EU's Thematic Strategy on Air Pollution describes anticipated impacts on health and the environment in 2020.

The projections made indicate that it will be very difficult to achieve the objective as a whole within the defined time frame. More ambitious action is called for, both in Sweden and across the EU.

Will the interim targets be achieved?

SULPHUR DIOXIDE

INTERIM TARGET 1, 2005

😊 A level of sulphur dioxide of $5 \mu\text{g}/\text{m}^3$ as an annual mean will have been achieved in all municipalities by 2005.

This target is now met across the whole of Sweden, though only by a small margin in coastal towns affected by significant emissions from shipping.

NITROGEN DIOXIDE

INTERIM TARGET 2, 2010

😞 A level of nitrogen dioxide of $60 \mu\text{g}/\text{m}^3$ as an hourly mean and of $20 \mu\text{g}/\text{m}^3$ as an annual mean will largely not be exceeded by 2010. The hourly mean may not be exceeded for more than 175 hours per year.

This target can be achieved if further action is taken. Excessive levels of nitrogen dioxide remain a problem in towns throughout Sweden. Both the hourly and the annual mean concentration stated in the target are exceeded in many local authority areas. The earlier decline in nitrogen dioxide levels in Sweden came to a halt around 2000, and the present trend is unclear. If the slight increase that can be made out continues, it could be difficult to meet the target on time.

In urban air, nitrogen dioxide co-occurs with other pollutants, making it a marker for air pollution, particularly from traffic. Improvements in child health have for example been noted when air has become less polluted and concentrations of this gas have fallen.

Environmental quality standards for nitrogen dioxide, based on the EU's air quality directives, are an important tool in achieving this target.

GROUND-LEVEL OZONE

INTERIM TARGET 3, 2010

😞 By 2010 concentrations of ground-level ozone will not exceed $120 \mu\text{g}/\text{m}^3$ as an 8-hour mean.

Current concentrations of ground-level ozone are one of the obstacles to achieving the objective Clean Air. At present, the target concentration is exceeded

FIG. 2.2 Nitrogen dioxide in air in 2005 (annual mean concentrations)

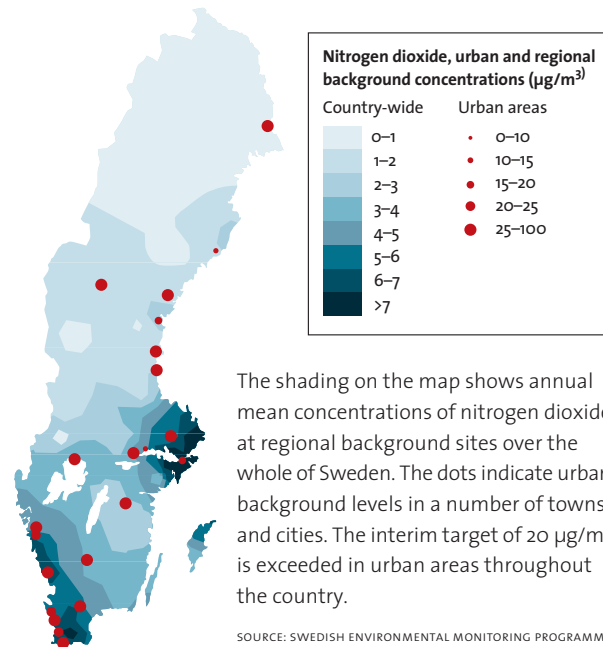
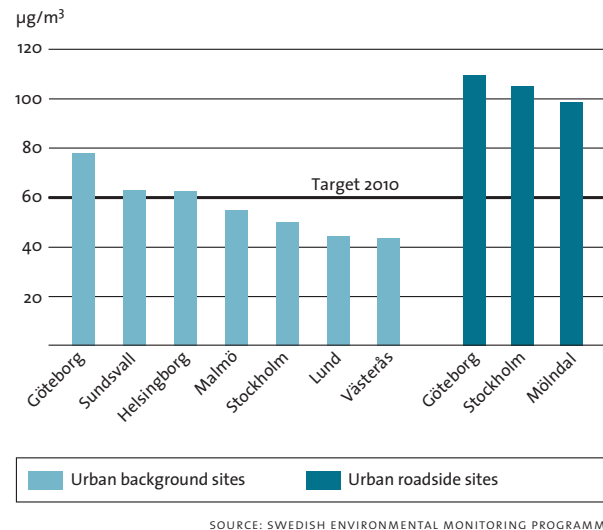


FIG. 2.3 Nitrogen dioxide in urban areas in 2005 (hourly mean concentrations)



Owing to local sources such as road traffic, mobile machinery and equipment, the interim target for hourly mean concentrations of nitrogen dioxide is exceeded in several Swedish towns and cities.

LONG-RANGE POLLUTANT TRANSPORT REQUIRES INTERNATIONAL RESPONSE

To achieve the objective Clean Air, international cooperation is essential, as many air pollutants travel long distances and across national frontiers.

The EU has adopted several directives setting maximum concentrations of different pollutants, to safeguard the environment and human health. In addition, there are binding limits on emissions of key substances. EU-wide requirements for vehicles are another weapon in the fight against emissions.

In 2007 the EU will be adopting a new directive on ambient air quality. To improve the air pollution situation in Sweden, forthcoming emission reduction requirements at the EU and international levels will need to be sufficiently stringent. Standards to reduce particulate emissions are also important.

across the whole of Sweden, chiefly in rural areas, but also in some towns. The trend in relation to the target, however, is favourable.

Ozone irritates the respiratory tract, impairs lung function and is linked to increased mortality. It is estimated that exposure to ozone, at current levels, could result in over 2,000 premature deaths per year in the country as a whole. Ground-level ozone also causes costly damage to crops and forests.

Ozone and its precursors can travel long distances and therefore reach Sweden from more densely populated parts of the continent. International efforts to curb emissions of nitrogen oxides and volatile organic compounds, which give rise to ozone, are therefore crucial in meeting this target.

VOLATILE ORGANIC COMPOUNDS

INTERIM TARGET 4, 2010

☺ *By 2010 emissions in Sweden of volatile organic compounds (VOCs), excluding methane, will have been reduced to 241,000 tonnes.*

Emissions of VOCs in Sweden have fallen, to 198,000 tonnes in 2005. Estimates have been revised, and previously reported data from 1990 onwards updated. New measurements of releases from different sources have provided a more reliable assessment of overall emissions, resulting in a significant downward revision of the earlier figures. The main factor here is that emissions from wood-fuelled heating are now considered to be lower than was previously assumed. The estimated share of emissions attributable to poor combustion is smaller than in the earlier assessment.

The largest source of emissions now turns out to be the use of solvents and chemicals. Road transport and snowmobiles also cause significant releases. In the case of snowmobiles and other small mobile machinery, considerable potential for emission reductions exists. Releases from road transport have fallen appreciably.

Although this interim target is expected to be met, further emission cuts are important, as VOCs help form ground-level ozone. The target for ozone is currently difficult to achieve (see interim target 3).

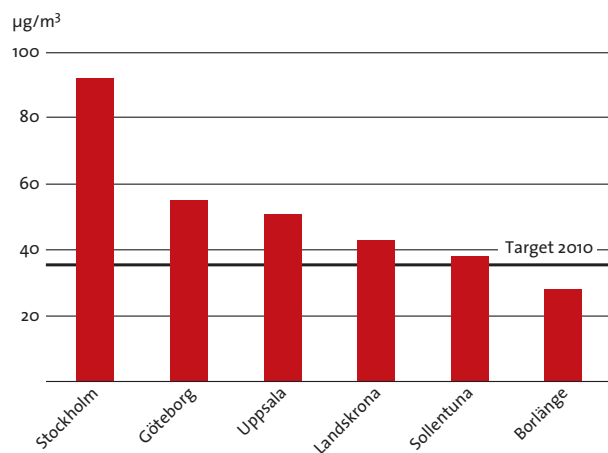
PARTICLES

INTERIM TARGET 5, 2010

☹ *A level of particles (PM_{10}) of $35 \mu\text{g}/\text{m}^3$ as a daily mean and of $20 \mu\text{g}/\text{m}^3$ as an annual mean will not be exceeded by 2010. The daily mean may not be exceeded for more than 37 days per year. A level of particles ($PM_{2.5}$) of $20 \mu\text{g}/\text{m}^3$ as a daily mean and of $12 \mu\text{g}/\text{m}^3$ as an annual mean will not be exceeded by 2010. The daily mean may not be exceeded for more than 37 days per year.*

This target will be very difficult to meet. Of the various air pollutants, inhalable particles are judged to be the biggest cause of health problems in Swedish towns and cities. In addition to their effects on health, particles accelerate soiling of buildings and heritage objects. Action to reduce releases is therefore important, along with continuous monitoring of concentrations to assess the effects of the measures taken.

FIG. 2.4 Particles (PM₁₀) in urban air in 2005 (daily mean concentrations at roadside sites)



SOURCE: SWEDISH ENVIRONMENTAL MONITORING PROGRAMME

The interim target for particles (PM₁₀), expressed as a daily mean, is exceeded at roadside sites in many of Sweden's towns and cities. Abrasion of road surfaces by studded snow tyres is an important factor behind the high levels recorded.

PM₁₀* is a good indicator for particles arising from road abrasion and resuspension of dust, while the smaller size fraction PM_{2.5}* is somewhat better as an indicator of those from vehicle exhausts.

PM_{2.5} data, available for only a few locations, show that the interim target levels are exceeded at roadside sites in Sweden's major cities. Monitoring of this parameter needs to be extended to more sites. Projections indicate that, in 2020, exposure to PM_{2.5} will shorten life expectancy by about two months. The contribution from long-range atmospheric transport is considerable.

The target for PM₁₀ will not be met without additional action. In several towns, in both the north and the south of Sweden, target levels are exceeded or almost exceeded at urban background sites. The principal reasons for this are, besides long-range transport, resuspension of road dust and releases of particles due to abrasion of road surfaces by studded snow tyres.

BENZO[A]PYRENE

INTERIM TARGET 6, 2015

☹️ A level of benzo[a]pyrene of 0.3 ng/m³ as an annual mean will largely not be exceeded by 2015.

Modelling and measurements show that this target will be hard to meet by 2015 in urban areas with widespread use of wood for heating and unfavourable meteorological conditions. The limited scale of monitoring, and measurements performed over different periods, make it difficult to assess progress towards the target.

Compared with past levels, concentrations of this pollutant are now low. Benzo[a]pyrene is a carcinogen, giving rise to an estimated 1–5 cases of lung cancer in Sweden every year. Transport used to be a major source of emissions, but today releases from small-scale burning of wood are a bigger problem.

An environmental quality standard for benzo[a]pyrene is to be adopted in 2007. The measures decided on so far to reduce emissions from small-scale wood burning will not be sufficient to meet the interim target.

AIR POLLUTANTS MONITORED IN DIFFERENT LOCATIONS

Regional background: Measurements made in rural areas or similar locations far from known sources such as traffic and industry, giving an overall picture of air quality in the region as a whole. Long-range transport of pollutants is often a significant factor.

Urban background: Measurements made in parks or similar locations a certain distance from known sources such as road traffic. Urban background levels of pollutants give an overall picture of air quality in towns and of human exposure to pollution. At urban roadside (traffic) sites, concentrations are often twice as high.



ENVIRONMENTAL QUALITY OBJECTIVE THREE

Natural Acidification Only

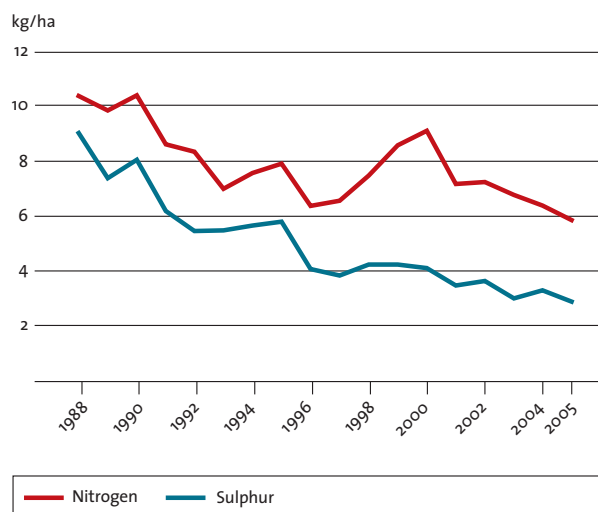
The acidifying effects of deposition and land use must not exceed the limits that can be tolerated by soil and water. In addition, deposition of acidifying substances must not increase the rate of corrosion of technical materials or cultural artefacts and buildings.

Will the objective be achieved?

🔴📈 Despite substantial emission reductions, this environmental quality objective will not be achieved by 2020. Atmospheric deposition of acidifying sulphur and nitrogen has fallen appreciably, and acidification of both soil and water has been significantly reduced (fig. 3.1). Between 1989–91 and 2003–5, sulphur deposition decreased by 57%. Over the same period, deposition of nitrogen fell by 29%, although here year-to-year variation is high and the trend is therefore uncertain.

The measures decided on to date will not be enough, however, to reduce acid deposition to levels which soil and water are able to tolerate. There is thus a risk of a long-term decline in the resistance of soils to acidification, and of a rise in leaching of acidifying nitrogen into lakes and streams from the surrounding land. Even if the actions decided on are implemented, the assessment is that, in 2020, critical loads will still be exceeded for 13% of the area of lakes in Sweden.

FIG. 3.1 Deposition of sulphur and nitrogen in southern Sweden, 1988–2005



SOURCE: SWEDISH ENVIRONMENTAL MONITORING PROGRAMME, PRECIPITATION CHEMISTRY NETWORK, IVL

Atmospheric deposition of acidifying sulphur and nitrogen has fallen very significantly since 1990, but not enough to achieve the objective Natural Acidification Only.

Acidification of soils has appreciably accelerated corrosion of archaeological remains. The National Heritage Board is in the process of developing new indicators to monitor whether current emission reductions are sufficient to ensure that rates of corrosion are not increased as a result of soil acidification.

Will the interim targets be achieved?

ACIDIFICATION OF LAKES AND STREAMS

INTERIM TARGET 1, 2010

😊 *By 2010 not more than 5% of all lakes and 15% of the total length of running waters in the country will be affected by anthropogenic acidification.*

This interim target has been achieved. Recovery from acidification has continued, and in 2005 only 4% of lakes with an area of more than 4 ha were acidified (fig. 3.2). Running waters have also recovered, but here monitoring is more complex – an issue that will be addressed in the in-depth evaluation. Although the target for lakes has been met for the country as a whole, at a regional level some problems remain.

With expected levels of acid deposition, there is a risk of an increase in acidification in the longer term.

Acidification status has been assessed on the basis of new data from a survey of some 2,000 lakes carried out in the autumn of 2005. This survey, unlike earlier ones, also covered lakes between 1 and 4 ha in size. To a certain extent, small lakes are more affected by acidification than larger ones. The interim target only applies to lakes larger than 4 ha, but even if smaller ones were to be included, the assessment is that it would still be met by 2010.

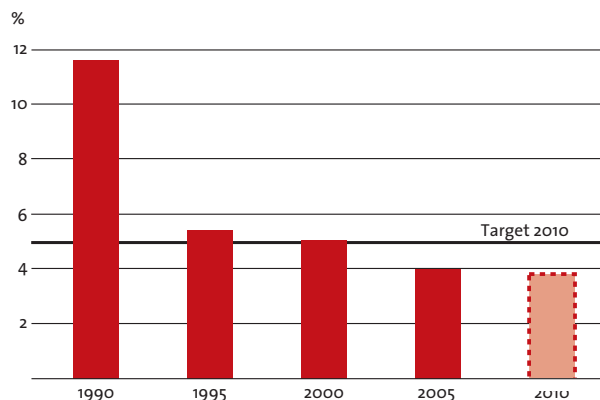
ACIDIFICATION OF FOREST SOILS

INTERIM TARGET 2, BEFORE 2010

😊 *By 2010 the trend towards increased acidification of forest soils will have been reversed in areas that have been acidified by human activities, and a recovery will be under way.*

This target has been met. There is no evidence of continuing acidification of forest soils; on the contrary, significant recovery has occurred throughout the country (fig. 3.3). The most marked improvement has been seen in the south-west: there, the proportion of the forest area with soil of high or very high acidity (classes 4 and 5) decreased from 48% during the period 1985–87 to 21% in 1999–2003. Harvesting of

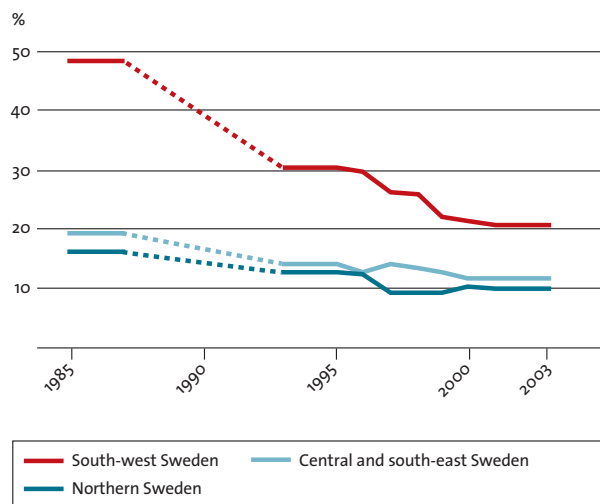
FIG. 3.2 Percentage of unlimed lakes larger than 4 ha affected by acidification



SOURCE: SWEDISH ENVIRONMENTAL MONITORING PROGRAMME, NATIONAL LAKE SURVEY, DEPT. OF ENVIRONMENTAL ASSESSMENT, SLU

The proportion of Swedish lakes that are acidified has decreased over the last 15 years. The interim target, which is that no more than 5% of all lakes in the country should be acidified, has been met.

FIG. 3.3 Percentage of forest area with high or very high soil acidity in different parts of Sweden, 1985–2003



SOURCE: SWEDISH ENVIRONMENTAL MONITORING PROGRAMME, SWEDISH FOREST SOIL INVENTORY

The proportion of forest land with soil of high or very high acidity (acidity classes 4 and 5) has decreased in recent decades, particularly in the south-west of the country, which is hardest hit by acidification. No data are available for 1987–93.

larger quantities of biomass from forests in the future, for example for energy use, could involve a risk of acidification increasing again in the longer term.

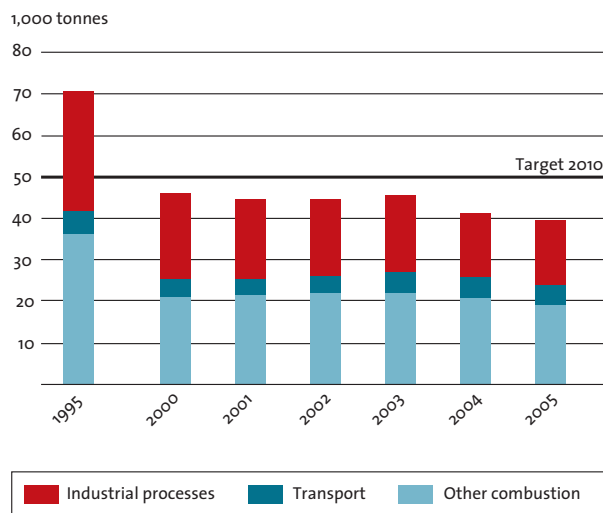
SULPHUR DIOXIDE EMISSIONS

INTERIM TARGET 3, 2010

😊 By 2010 emissions of sulphur dioxide to air in Sweden will have been reduced to 50,000 tonnes.

This interim target has been met. In 2005, emissions of sulphur dioxide totalled 40,000 tonnes. New estimates have resulted in a downward revision of earlier emission figures by around 15% (fig. 3.4, which shows revised estimates for all years). In particular, refinery emissions were previously overestimated, as were releases from single-family houses.

FIG. 3.4 Swedish emissions of sulphur dioxide to air, 1995–2005 (excluding emissions from international shipping and aviation)



SOURCE: SWEDISH ENVIRONMENTAL PROTECTION AGENCY, SWEDISH REPORTING UNDER UNFCCC

The interim target for sulphur dioxide emissions has already been met. In 2005, only 8% of the deposition occurring in Sweden came from emissions inside the country's borders.

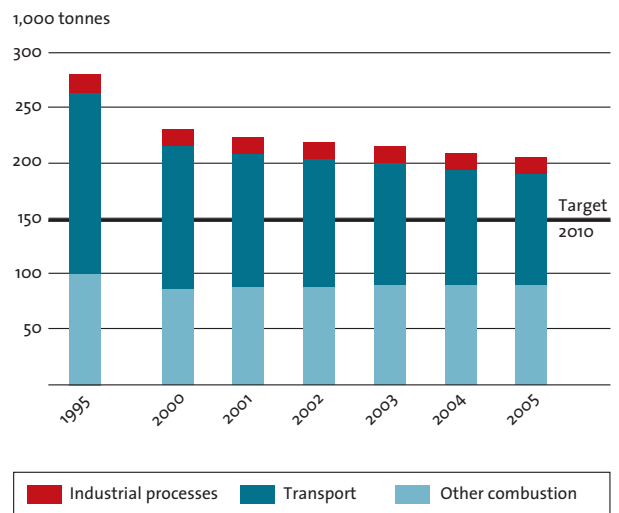
NITROGEN OXIDE EMISSIONS

INTERIM TARGET 4, 2010

😞 By 2010 emissions of nitrogen oxides to air in Sweden will have been reduced to 148,000 tonnes.

This target can be achieved if further action is taken. According to the most recent estimates, emissions of nitrogen oxides in 2005 totalled 205,000 tonnes. Now, however, new data suggest that emissions from mobile machinery and equipment have probably been overestimated, and that overall emissions could be revised downwards by 20,000 tonnes. This improves the chances of reaching the interim target. If the target is not achieved, Sweden will also fail to meet its commitment under the EU's National Emission Ceilings Directive*, which is set at the same level.

FIG. 3.5 Swedish emissions of nitrogen oxides to air, 1995–2005 (excluding emissions from international shipping and aviation)



SOURCE: SWEDISH ENVIRONMENTAL PROTECTION AGENCY, SWEDISH REPORTING UNDER UNFCCC

Further vigorous action to reduce nitrogen oxide emissions will be needed if the interim target of 148,000 tonnes is to be met.



INTERNATIONAL EMISSIONS CRITICAL

Efforts to reduce emissions of acidifying pollutants within Sweden have been successful, especially in the case of sulphur. In 2003, only 8% of sulphur deposition and 9% of nitrogen deposition in the country was of domestic origin (EMEP⁸ data). To reduce deposition to levels below the critical loads which the environment is able to tolerate in the long term, further cuts in acidifying emissions in other countries in Sweden's vicinity – in particular Poland, the UK, Germany and Russia – are absolutely essential. Emissions from international shipping also account for a large share of deposition. Sulphur emissions from international shipping refuelling

in Swedish ports are more than twice the total for Sweden as a whole.

Further measures beyond those already decided on are in the pipeline. The European Commission is expected to propose a new directive on emission ceilings for 2020 at the end of 2007. An evaluation of the EU's Thematic Strategy on Air Pollution may be expected in 2010–12. And a review of the Gothenburg Protocol⁹ is under way, although it is unclear whether, and if so when, a revision of the Protocol can be achieved. An important issue in that context is how to involve the non-EU states of eastern Europe in the process.



ENVIRONMENTAL QUALITY OBJECTIVE FOUR

A Non-Toxic Environment

The environment must be free from man-made or extracted compounds and metals that represent a threat to human health or biological diversity.

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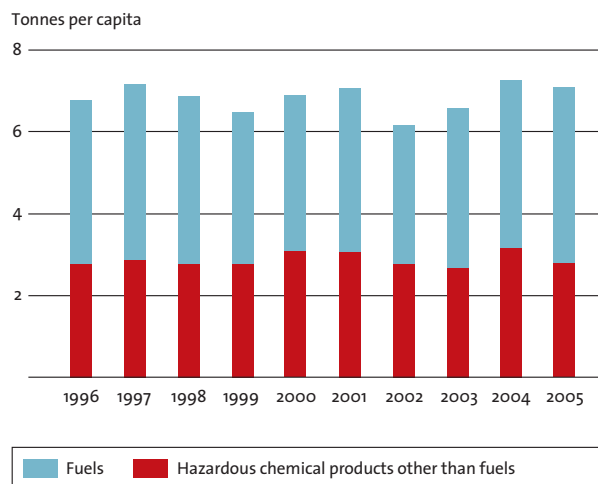
Will the objective be achieved?

🚫 ➡️ As far as halting the introduction of new hazardous substances is concerned, the prospects of achieving this environmental quality objective have improved. With additional measures, such substances can be controlled, but dangerous, persistent compounds already present in fixed structures and the environment will continue to spread.

Trends in levels of different substances in the environment vary, and consequently an unequivocal assessment of progress in terms of the state of the environment is not possible. Several toxic pollutants for which long runs of data are available have fallen to low levels, but no longer show any appreciable decline. For other substances, varying trends can be observed. And for many others, produced intentionally or unintentionally, major gaps still remain in our understanding of where they occur and what effects they have, precluding monitoring of their levels in the environment.

The EU Council and the European Parliament reached agreement at the end of 2006 on new EU legislation on chemicals, known as REACH*. As a

FIG. 4.1 Quantities of chemical products hazardous to health, manufactured in or imported to Sweden per capita per year, 1996–2005



SOURCE: SWEDISH CHEMICALS AGENCY

The annual per capita turnover in Sweden of chemical products classified as hazardous to health has shown little change in recent years. The effects on human health depend both on what products contain and how they are handled.

result, on 1 June 2007 the world's most far-reaching body of law in this field will come into effect. Compared with existing legislation, REACH significantly strengthens protection of human health and the environment. The new legislation is not far-reaching enough, however, to secure the achievement of this objective. Shortcomings still remain in several areas. For example, information requirements for

substances manufactured or imported in small quantities need to be made more stringent. And stricter rules on pesticides, which are the subject of separate legislation, would also be of great value.

Will the interim targets be achieved?

DATA ON HEALTH AND ENVIRONMENTAL PROPERTIES OF CHEMICAL SUBSTANCES

INTERIM TARGET 1, BEFORE 2010/2020

☹️ *By 2010 data will be available on the properties of all deliberately manufactured or extracted chemical substances handled on the market. For substances handled in larger volumes and for other substances which, for example after initial general tests, are assessed as being particularly dangerous, information on their properties will be available earlier than 2010. The same information requirements will apply to both new and existing substances. In addition, by 2020 data will be available on the properties of the most important unintentionally formed and extracted chemical substances.*

The assessment for this target is that it will not be achieved on time. REACH* introduces new rules that represent significant steps towards it, but these will mainly have an impact after the target year 2010. In the case of chemical substances manufactured or imported in quantities of over ten tonnes per company per year, information is to be made available on the health and environmental hazards associated with the substances, roughly corresponding to the requirements of the interim target. For chemicals produced or imported in smaller quantities, however, only limited testing of the health and environmental hazards of certain priority substances will be required. Implementation of the new EU Biocides Directive will also help to generate new data. To achieve the interim target, though, more information will need to be produced than is required under the REACH legislation, particularly for low-volume substances*. What is more, the new rules only apply to deliberately manufactured substances.

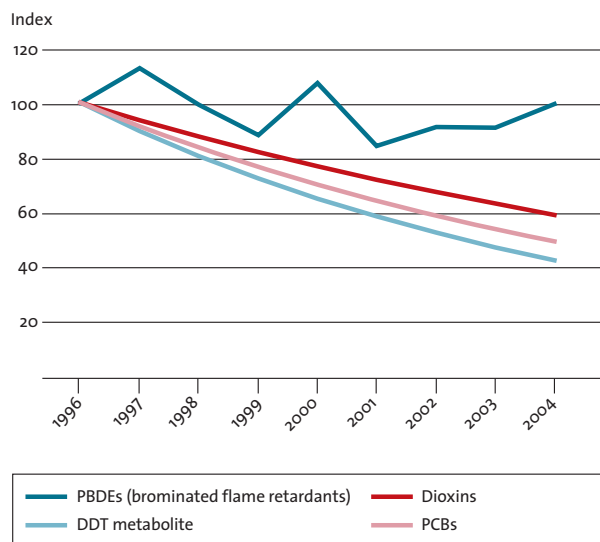
INFORMATION ON ALL PRODUCTS

INTERIM TARGET 2, 2010

☹️ *By 2010 finished products will carry health and environmental information on any dangerous substances they contain.*

This target is not expected to be met on time. The introduction of REACH has admittedly created a better basis for achieving it, but the information requirements relating to dangerous substances need to be further developed. Under the new rules, companies are required to inform downstream (i.e. professional) users about any substances of very high concern which their products may contain. Consumers are also entitled to this information, but only on request.

FIG. 4.2 Environmental contaminants in breast milk, 1996–2004



SOURCE: NATIONAL FOOD ADMINISTRATION

PCBs, DDT residues, dioxins and PBDEs (brominated flame retardants) can still be detected in human breast milk in Sweden. This diagram shows how concentrations in breast milk from first-time mothers in the Uppsala region have changed, compared with 1996 levels. Concentrations of dioxins have fallen steadily since 1996, at a rate of around 6–8% per year. PCB and DDT levels have also abated, by 4–10% annually. In the case of PBDEs, no clear trend can be seen. The goal is that there should be no persistent organic pollutants at all in breast milk.

PHASE-OUT OF SUBSTANCES OF VERY HIGH CONCERN

INTERIM TARGET 3, 2007/2010

⊗ Regarding the phase-out of substances of very high concern, the following shall apply.

Newly manufactured finished products will as far as possible be free from:

- new organic substances that are persistent and bioaccumulating, new substances that are carcinogenic, mutagenic and reprotoxic, and mercury, as soon as possible, but no later than 2007;
- other carcinogenic, mutagenic and reprotoxic substances, and endocrine disrupting substances or highly allergenic substances, by 2010, if the products that contain them are intended to be used in such a way that they will enter natural cycles;
- other organic substances that are persistent and bioaccumulating, and cadmium and lead, by 2010.

Nor will these substances be used in production processes unless the company can prove that human health and the environment will not be harmed.

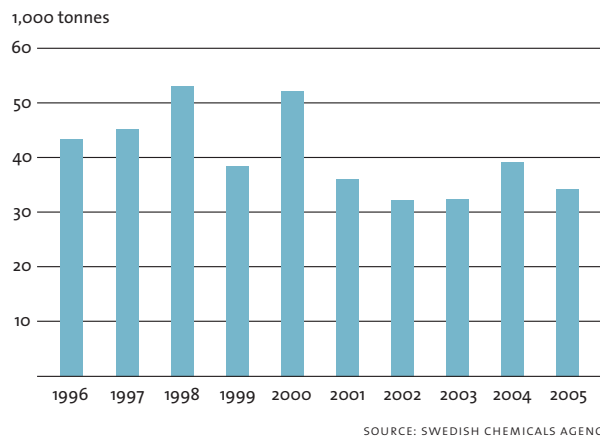
Already available finished products containing substances with the properties listed above, or mercury, cadmium or lead, will be handled in such a way that the substances in question are not released to the environment.

The spread to Sweden by air or water of substances covered by this interim target will decrease continuously.

This interim target applies to substances that are man-made or extracted from the natural environment. It also applies to substances giving rise to substances with the above properties, including those formed unintentionally.

REACH* introduces a system of time-limited authorizations for substances of very high concern. All uses other than those stated in the authorization will be prohibited. The authorization system will increase pressure on companies to replace substances of very high concern with less dangerous alternatives. Nevertheless, this interim target is not expected to be achieved within the defined time frame.

FIG. 4.3 Quantities of CMRs in finished products manufactured in Sweden, 1996–2005



For the years shown, no clear trend can be made out in the use of CMRs (substances that are carcinogenic, mutagenic and/or toxic for reproduction) in finished products. Products manufactured in Sweden in 2005 contained around 34,000 tonnes of such substances (imported products are not included). The data have been corrected retroactively, compared with those presented in previous years. Products containing CMRs are used throughout society.

There were a number of other developments during the year relevant to the target:

- The European Commission proposed a new thematic strategy and a framework directive on sustainable use of pesticides, together with a new regulation on plant protection products. In the latter, which is intended to replace the existing directive in this field, it is proposed that active substances with particularly hazardous properties should not be approved for use in plant protection products. The proposed regulation will also facilitate the introduction of substitutes for products containing substances posing greater risks.
- Following negotiations in the EU Council, two substances of very high concern, vinclozolin and azinphosmethyl, are no longer permitted to be included in plant protection products. However, the Commission decided to permit continued use

of six other substances of high concern in such products, albeit subject to significant restrictions.

- The RoHS Directive*, banning the use of lead, mercury, cadmium, hexavalent chromium and PBB and PBDE flame retardants in electronic equipment, came into effect.
- Sweden notified the European Commission and the World Trade Organization (WTO*) of its intention to introduce a general national ban on mercury. If the ban is put into effect, the country will have done all it can, on the basis of national legislation, to reduce the supply of new mercury in products and to limit the use of this substance.
- Sweden proposed that mercury and the herbicide paraquat* should be listed under the Rotterdam Convention*.

CONTINUOUS REDUCTION OF HEALTH AND ENVIRONMENTAL RISKS OF CHEMICALS

INTERIM TARGET 4, 2010

☺ Health and environmental risks associated with the manufacture and use of chemical substances will be reduced continuously up to 2010, as measured by indicators and ratios to be established by the competent authorities. Over the same period, the occurrence and use of chemical substances which impede recycling of materials will decrease. This target applies to substances not covered by interim target 3.

This target can be achieved, provided that further action is taken. REACH* introduces more stringent requirements in terms of companies' own controls on chemicals, enhancing the prospects of meeting the interim target. Downstream users will be provided with better information on risks and on safety precautions for products and for the workplace (see interim targets 1 and 2). The aims of reducing risks and dependence on chemicals, set out in the proposed framework directive on pesticides, are not reflected, however, in the proposal for a new regulation on plant protection products.

The Swedish Environmental Protection Agency and county administrative boards are seeking to introduce stricter conditions regarding chemicals in conjunction with the licensing of environmentally hazardous activities.

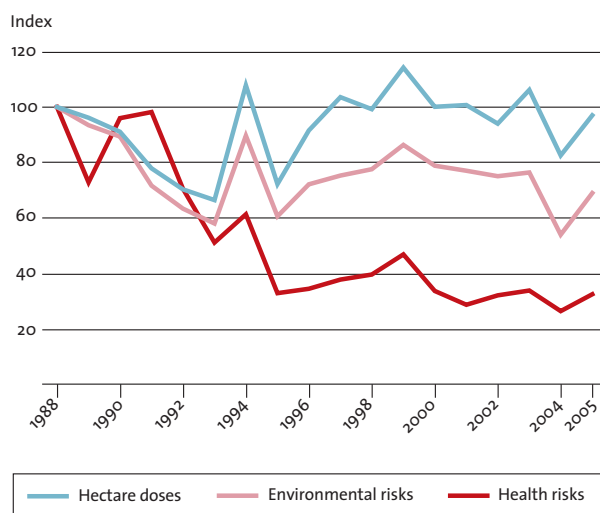
GUIDELINE VALUES FOR ENVIRONMENTAL QUALITY

INTERIM TARGET 5, 2010

☺ By 2010 guideline values will be established by the competent authorities for at least 100 selected chemical substances not covered by interim target 3.

This interim target has been met.

FIG. 4.4 Risk indicators for plant protection products used in Swedish agriculture and horticulture, 1988–2005



Note: Risk indicators compared with total number of hectare doses. Index for 1988 = 100.

SOURCE: SWEDISH CHEMICALS AGENCY

The estimated health and environmental risks associated with professional use of plant protection products have decreased by 68% and 31%, respectively, since 1988. The health risk index appears to have levelled out in the early years of the 21st century, while the environmental risk index has fallen over the same period. One explanation for the lower levels of risk is that plant protection products with less hazardous properties are now more widely used, at the expense of more hazardous agents.

REMEDICATION OF CONTAMINATED SITES

INTERIM TARGET 6, 2010

☹️ *Studies will have been carried out and, where necessary, appropriate action will have been taken by the end of 2010 at all contaminated sites that pose an acute risk on direct exposure, and at contaminated sites that threaten important water sources or valuable natural environments, today or in the near future.*

The assessment for this target has been revised: it is not now expected to be achieved on time. The number of sites currently posing *acute* risks to health and the environment is estimated at around 30. Although most of these sites are known, and a majority of them will probably be undergoing remediation or at least have been temporarily remediated by 2010, there will not be time to deal with all of them. Furthermore, additional new sites in this risk category will be identified as inventory work continues.

REMEDICATION OF CONTAMINATED SITES

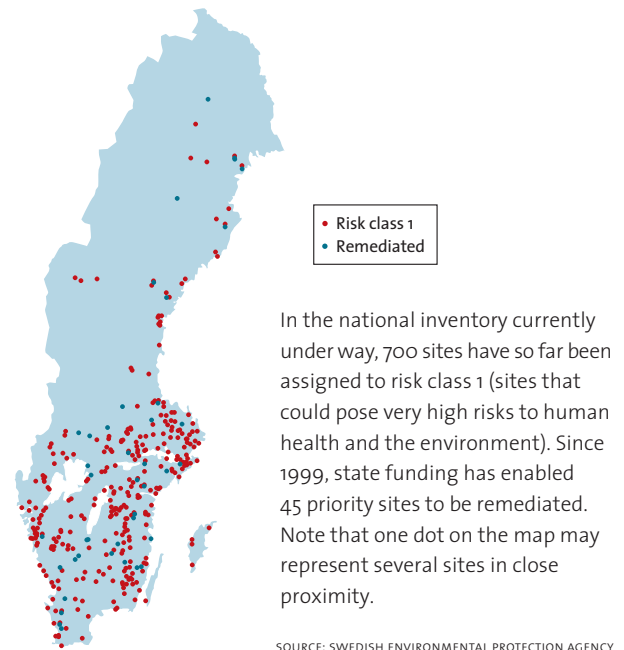
INTERIM TARGET 7, 2005–2010/2050

😊 *Between 2005 and 2010, measures will be implemented at a sufficiently large portion of the prioritized contaminated sites to ensure that the environmental problem as a whole can be solved by 2050 at the latest.*

The assessment for this interim target has been revised compared with last year, and it is now considered possible to achieve it. If the pace of remediation is stepped up, and conditions generally remain favourable, the sites posing the greatest risks will have been remediated by 2050.

There are an estimated 1,500 sites in Sweden that could pose *very high* risks to human health and the environment, and around 15,000 that could represent *high* risks. Roughly half of these have now been assigned a risk classification in the framework of the national inventory currently being undertaken. This classification provides a good basis for deciding priorities in terms of which sites should be investigated first and, where necessary, remediated.

FIG. 4.5 Sites posing very high risks to health and the environment in 2006



Of the roughly 1,500 potentially contaminated sites that could pose a *very high* risk to human health or the environment, over half are assumed to require state funding to enable remediation to take place. Grant-funded site investigations are in progress at 330 priority sites, and at 23 of these remediation work funded by the state is under way. Since 1999, remediation of 22 sites has been completed with public funding, i.e. both remediation and post-remediation monitoring have been carried out. Another 23 have been remediated, but have still to be monitored.

Regulatory supervision by county administrative boards and local authorities is important in achieving this target. Over 700 sites around Sweden are currently being investigated as a result of such supervision and on the initiative of responsible operators, property owners etc. In 2006, action was taken at 5 sites posing *very high* risks and almost 100 posing *high* risks to health and the environment.

DIOXINS IN FOOD

INTERIM TARGET 8, 2010

☺ *By 2010 clear action programmes will have been established to bring about a continuous decrease in levels in food of dioxins harmful to humans.*

The assessment for this target is that it can be achieved by the target date. However, to be able to identify effective additional measures, more needs to be known about the contributions of different sources to the levels of dioxins found in food. Sweden must also continue to contribute to the work in progress under the Stockholm Convention* and the Convention on Long-Range Transboundary Air Pollution (CLRTAP).

In 2006, the EU's system of maximum limits for dioxins in foods was extended to include dioxin-like PCBs. These limits could help to reduce human intake via farm animals that are fed controlled feeds.

During the year, the Swedish Chemicals Agency and the Swedish Environmental Protection Agency drew up a national implementation plan for the Stockholm Convention on Persistent Organic Pollutants, which include dioxins.

CADMIUM

INTERIM TARGET 9, 2015

☹ *By 2015 the dietary and occupational exposure of the population to cadmium will be at a level that is safe from a long-term public health point of view.*

The assessment made is that this target will not be met. Concentrations in food and in arable soils are admittedly expected to fall, but there is considerable uncertainty about what constitutes a safe level of exposure, and what measures are required to achieve such a level.



GLOBAL TRADE PROMOTES SPREAD OF HAZARDOUS SUBSTANCES

International action is crucial in achieving the environmental objective A Non-Toxic Environment. Chemicals are transferred across national borders, both intentionally, in chemical and other products, and unintentionally, as pollutants in air and water.

A growing proportion of manufacturing now takes place in countries outside the EU. Sweden therefore needs to be active in promoting and implementing global conventions and agreements to prevent the spread of hazardous chemical substances around the world, directly or indirectly via other products.

A global chemicals strategy, SAICM*, was adopted in Dubai in February 2006. It provides a good platform for further efforts to promote chemical safety in both developed and developing countries. The strategy's aim is that, by 2020, chemicals will be produced and used in ways that minimize adverse effects on human health and the environment, and it incorporates the key elements of the interim targets under A Non-Toxic Environment. Sweden has given a lead in the elaboration of SAICM, among other things by chairing much of the preparatory process.



ENVIRONMENTAL QUALITY OBJECTIVE FIVE

A Protective Ozone Layer

The ozone layer must be replenished so as to provide long-term protection against harmful UV radiation.

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Will the objective be achieved?

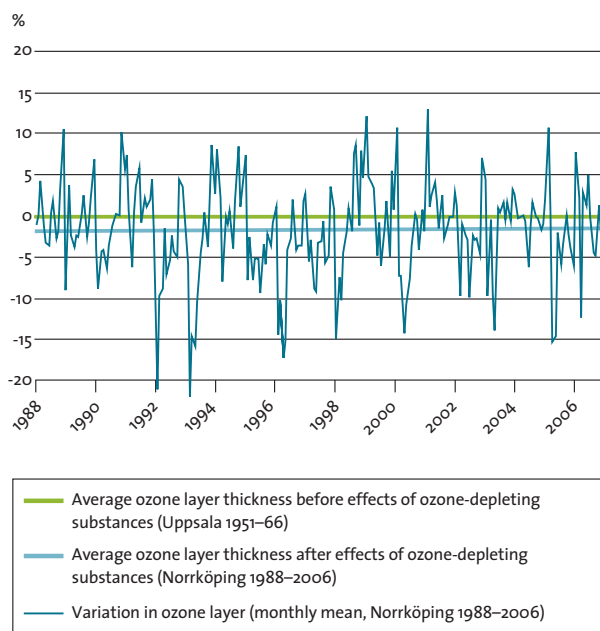
☹️ 📈 Thanks to action taken in Sweden and other countries, adverse pressure on the ozone layer is now easing. It should therefore be possible to achieve this environmental quality objective, but as yet no recovery of the ozone layer can be observed. Provided that all the parties comply with the Montreal Protocol* and the amendments to it, recovery may be expected, at the earliest, at some point beyond 2050.

The latest assessment by scientists within the WMO*/UNEP* is that the Montreal Protocol has had an effect on trends in the levels of ozone-depleting gases in the atmosphere. Most of these substances, in particular chlorofluorocarbons (CFCs), show a global decline in abundance in the lower atmosphere. Levels of hydrochlorofluorocarbons (HCFCs) are still rising, but there are indications that the rate of increase is beginning to slow down. The assessment is, therefore, that the overall ozone-depleting capacity of the atmosphere is now decreasing.

LARGE NATURAL VARIATIONS

Owing to large natural variations in the ozone layer, it is not yet possible to detect any trend towards a recovery. These natural variations are due to a number

FIG. 5.1 Ozone layer before and after effects of ozone-depleting substances



SOURCE: SWEDISH ENVIRONMENTAL MONITORING PROGRAMME

This diagram shows a comparison of the thickness of the ozone layer before and after the effects of ozone-depleting substances made themselves felt. The ozone layer varies widely in thickness, but is on average thinner now than it was before ozone-depleting chemicals were introduced. Although the adverse impact of these substances is now abating, there is no visible trend yet in terms of recovery of the ozone layer.

of factors, including changes in ozone transport in the atmosphere, variations linked to solar activity and the effects of volcanic eruptions. Changes in temperature

also affect ozone chemistry. The sum total of these processes has a much greater impact on the thickness of the ozone layer than the small decrease in ozone-depleting substances has had to date, and therefore masks any ozone recovery that may be occurring. The measures implemented under the Montreal Protocol* will have an effect, but we may have to wait another decade to see definite evidence of it. Because of the influence human activities have had on the system, however, it is uncertain whether there will be a return to pre-1980 conditions.

2006 provided a clear demonstration of the variability of the ozone layer, with both periods when it became thicker and periods of marked thinning. During the year, as in 2005, an extremely large ozone hole developed over the Antarctic. The considerable natural variability of the ozone layer is mostly due to meteorological factors, and it is difficult to determine how much of its variation is of anthropogenic origin.

INTERACTION WITH GLOBAL WARMING

A factor that gives cause for concern is the complex interaction between climate change and changes in the ozone layer. Enhancement of the greenhouse effect is causing warming near the earth's surface, but cooling at higher altitudes. This in turn could delay ozone recovery, since ozone destruction processes at the poles are favoured by low temperatures in the upper atmosphere.

Conversely, levels of ozone-depleting substances in the atmosphere influence the greenhouse effect, as several of them are also greenhouse gases.

Will the interim target be achieved?

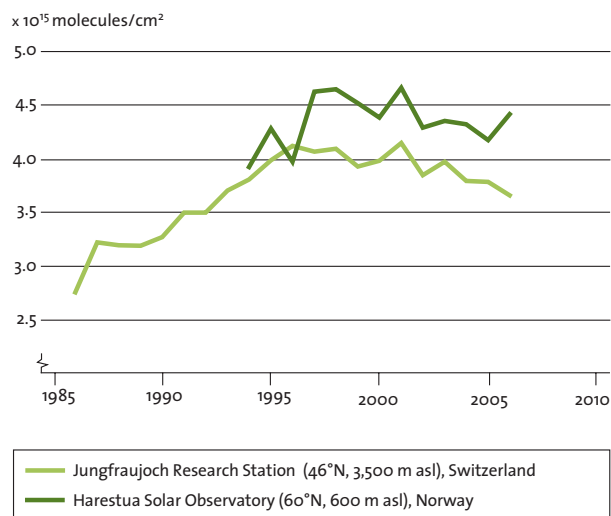
EMISSIONS OF OZONE-DEPLETING SUBSTANCES

INTERIM TARGET, 2010

☺ *By 2010 the great majority of emissions of ozone-depleting substances will have ceased.*

Given compliance with existing regulations, combined with further measures relating to the use and handling

FIG. 5.2 Annual mean levels of hydrogen chloride, 1986–2006



SOURCE: NETWORK FOR THE DETECTION OF ATMOSPHERIC COMPOSITION CHANGE

Chlorine is one of the substances with the greatest impact on the ozone layer, a major source of it being chlorofluorocarbons (CFCs). Most of the chlorine present in the atmosphere is in the form of hydrogen chloride (HCl). The diagram shows that the abundance of chlorine peaked at the end of the 1990s and is now falling. Levels are generally higher at monitoring sites closer to the North Pole.

of ozone-depleting chemicals, there is a good chance of moving towards this target.

Since the late 1980s, national emissions of ozone-depleting substances have been markedly reduced. The largest source of CFC emissions today is leakage from products containing these chemicals, either as refrigerants or in insulating materials. Large quantities of CFCs and HCFCs are stored in insulating materials in buildings, pipes and the ground. How soon insulated products containing ozone-depleting chemicals can be replaced with environment-friendlier alternatives will depend on the rate at which old buildings and other structures are renovated or demolished.

No further proposals for action were put forward by the Swedish Environmental Protection Agency in 2006. An earlier proposal for a ban on the use of HCFCs is still considered relevant.



THE MONTREAL PROTOCOL – AN INTERNATIONAL AGREEMENT THAT IS WORKING

Under the Montreal Protocol*, adopted in 1987, countries have agreed to a relatively far-reaching plan to phase out the production and use of ozone-depleting substances. This plan involves both industrialized and developing countries.

In the framework of the Protocol, a Multilateral Fund has been established, financed by the industrial nations, to meet the costs incurred by developing countries in phasing out ozone-depleting chemicals. Set up in 1992, the fund has so far distributed almost US\$ 2 billion to 139 developing countries to help them comply with the Protocol.

Action at the international level is of very great importance in achieving this national environmental quality

objective. One of the key challenges is to secure the phase-out of CFCs without encouraging a switch to HCFCs. There is a danger of developing countries becoming dependent on HCFCs, and therefore the parties to the Montreal Protocol must, as a matter of urgency, accelerate phase-out of the production of these substances as well.

It is also important that the Kyoto* and Montreal Protocols interact in such a way that the rules governing the Kyoto Protocol's Clean Development Mechanism (CDM)* do not promote an expansion of production facilities for HCFCs. Other problem areas requiring international decisions are illegal production of CFCs, illegal trade in ozone-depleting substances, and existing exemptions for certain types of use.

A Safe Radiation Environment



Human health and biological diversity must be protected against the harmful effects of radiation in the external environment.

Will the objective be achieved?

☹️ ➡️ Basic conditions for achieving this environmental quality objective exist, but new or intensified efforts will need to be made by all concerned, in particular to reduce the incidence of skin cancer. In addition, further work needs to be done to assess the impacts of ionizing radiation* on the environment, including developing radiological protection criteria. The question of the final disposal of the various forms of radioactive waste also needs to be addressed.

Electromagnetic fields* are finding increasingly wide applications in society, especially in the radio frequency range (e.g. wireless broadband and mobile telephony). Despite this, the general public's exposure to them is very low compared with existing reference levels.

Will the interim targets be achieved?

RADIOACTIVE SUBSTANCES

INTERIM TARGET 1, 2010

☹️ *By 2010 environmental concentrations of radioactive substances emitted from all human activities will be so low as not to represent a threat to human health or biological diver-*

sity. The additional individual dose to members of the public will be lower than 0.01 mSv per person per year from each individual operation.

This interim target is judged to be within reach. As a first step in the construction of a permanent repository for spent nuclear fuel, an application for the necessary permits for an encapsulation plant in the municipality of Oskarshamn was submitted in 2006. The licensing process for the repository will take many years. The permits issued must be framed in such a way as to

INTERNATIONAL COOPERATION FOR A SAFE RADIATION ENVIRONMENT

Under the auspices of the EU and the International Commission on Radiological Protection (ICRP), various projects have been under way for several years to develop tools to estimate the effects of radioactive substances on the natural environment. Within the EU, this work is now continuing through the PROTECT project (Protection of the Environment from Ionizing Radiation in a Regulatory Context), one aim of which is to develop criteria for protection of the environment.

In 2005 the Nordic radiation protection agencies issued a joint statement, advising against the use of sunbeds for cosmetic purposes. As a result of this statement, a reappraisal of existing standards for the design of sunbeds in the EU is now in progress.

meet the requirements of this target. To achieve the target in other respects, it is important to avoid any increase in emissions of radioactive substances from other existing sources.

It is also important to develop arrangements for the management of non-nuclear radioactive waste. In 2006 the Government presented a bill entitled ‘Nuclear Safety and Radiation Protection’, which among other things proposed producer responsibility for radioactive product waste and a clearer allocation of responsibility for other radioactive wastes, regardless of the activities giving rise to them. During the year the Swedish Radiation Protection Authority (SSI) began work on the remediation of historical radioactive wastes without obvious owners in society.

In 2005 and 2006, operations at the Ringhals and Oskarshamn nuclear power stations were considered for licensing purposes by the environmental courts. As a result of this process, it has for the first time been clarified what ‘best available techniques’ can entail in terms of reducing radioactive emissions. The application of the concept arrived at refers to both changes to the technical systems designed to reduce emissions, and the day-to-day operation of those systems.

In the course of the year, SSI studied whether operations in which naturally occurring radioactive substances are enriched or used in products could expose employees or the public to significant radiation doses. Areas in which measures need to be introduced have been identified, including the handling of peat ash.

2006 marked the 20th anniversary of the Chernobyl accident. Since Chernobyl, Sweden’s preparedness for radioactive accidents has been strengthened and broadened to include a larger number of scenarios.

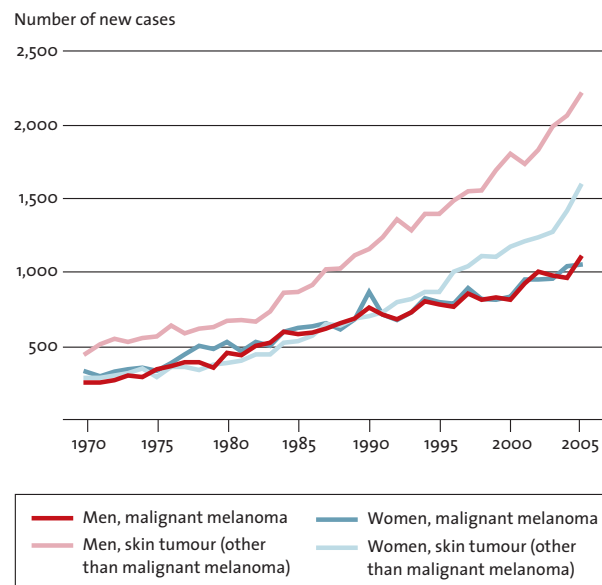
SKIN CANCER

INTERIM TARGET 2, 2020

☺ *By 2020 the annual incidence of skin cancer caused by ultraviolet radiation will not be greater than it was in 2000.*

The number of new cases of skin cancer continues to rise. The assessment for this interim target – that it is

FIG. 6.1 Trends in skin cancer incidence in Sweden, 1970–2005



SOURCE: CENTRE FOR EPIDEMIOLOGY, NATIONAL BOARD OF HEALTH AND WELFARE

The incidence of skin cancer continues to rise. The main reason it is proving difficult to reverse the trend is that changing attitudes and behaviour in terms of exposure to the sun takes time. What is more, owing to the long latency period of skin cancer, it will take decades for any effects of behavioural changes to feed through into the cancer statistics.

In addition to the forms of skin cancer included in the diagram, new, previously unavailable statistics show that in 2005 over 37,000 cases of basal cell carcinoma (a less serious form of the disease) were diagnosed.

possible, but will be difficult, to attain it – remains the same. The biggest difficulty is that changing attitudes and behaviour takes time.

The main cause of skin cancer is exposure to ultraviolet radiation. Since 2005 an annual survey has been conducted of people’s behaviour in the sun. It shows, among other things, that 99% of the population are aware that the sun’s rays can cause skin cancer. SSI is seeking to secure the involvement of other agencies and organizations that could help to achieve this interim target. Children are a priority target group for prevention efforts. In 2006,

a children's book about the sun and how to protect oneself was distributed to 8,000 pre-schools. During the year SSI also launched a joint project with the Swedish Life Saving Society, in which information about the sun is being included in swimming instruction programmes. This collaboration is to be developed further.

ELECTROMAGNETIC FIELDS

INTERIM TARGET 3

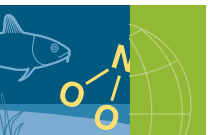
☹️ *Risks associated with electromagnetic fields will be studied on an ongoing basis and necessary action will be taken as any such risks are identified.*

Electromagnetic fields* are finding increasingly wide applications in society, especially in the radio frequency range (e.g. wireless broadband and mobile telephony). Despite this, the general public's exposure to them is very low compared with existing reference levels. To permit a more confident assessment of the risks, however, further research needs to be carried out into the effects and possible health risks of long-term exposure to weak fields. SSI's assessment is that

the precautionary principle should apply in the case of exposure to low-frequency electric and magnetic fields, and to the use of mobile phones.

We still lack an overall picture of levels of exposure to electromagnetic fields. Further surveys of public exposure and exposure of the natural environment are therefore important. SSI has studied the public's exposure to magnetic fields from security gates, as used for example at shop exits. In certain cases, SSI reference levels were exceeded, and more detailed investigations are now to be carried out. The development of wireless broadband systems has caused concern among some sections of the public. Measurements of such systems, however, show that exposure levels are well below those associated with mobile phone base stations and radio and television transmitters.


In December SSI's Independent Expert Group on Electromagnetic Fields presented its report on the current state of research in this area. No new research results prompting changes in risk assessments had emerged during the year.



Zero Eutrophication

Nutrient levels in soil and water must not be such that they adversely affect human health, the conditions for biological diversity or the possibility of varied use of land and water.

Will the objective be achieved?

 The assessment is that this objective will not be achieved on time. Emissions to both air and water are admittedly continuing to fall, but the state of the environment is not improving to the same degree.

In the sea, eutrophication remains a serious concern. The summer of 2006 saw the most intense bloom of cyanobacteria in the Baltic for ten years. Unlike the previous year, the east coast of Sweden and the northern Baltic proper escaped relatively lightly, and it was the southern parts of the Baltic and the country's south coast that were affected. Oxygen/hydrogen sulphide conditions in the northern and western Gotland Basin were the worst ever recorded.

In 2006 the Swedish Environmental Protection Agency followed up the assessment of the eutrophication situation in Sweden's marine environment carried out by an international group of experts in 2005. In a report published in June 2006, the Agency recommended among other things that:

- More ambitious reductions of phosphorus inputs to the Baltic Sea should be pursued. In particular,

both international and national efforts to tackle diffuse inputs, especially from agriculture, need to be stepped up without delay. Understanding of the cycling of phosphorus is inadequate, however, necessitating more research on this subject.

- Inputs of nitrogen to the Baltic should also be curbed, but not to the same extent as those of phosphorus. Care must be taken to ensure that the reduction achieved does not exacerbate the problem of cyanobacterial blooms.
- For the waters off the west coast of Sweden, the situation is basically the reverse. Here, sights need to be set higher in terms of cutting inputs of nitrogen. Phosphorus inputs also need to be reduced, but not as much.

AGRICULTURAL MEASURES STARTING TO HAVE AN EFFECT

Data from the national environmental monitoring programme show that, in rivers in areas of Skåne dominated by agriculture, levels of nitrogen are declining. Total nitrogen concentrations at river mouths have abated since 1985, particularly in the case of rivers draining into the Kattegat and Skagerrak. Phosphorus levels, too, have fallen. In rivers draining farming areas at least, the decrease for phosphorus appears to be linked to measures implemented in agriculture. The lower nitrogen levels, too, can be partly attributed to such measures. Natural variations

MAJOR EMISSIONS FROM INTERNATIONAL SHIPPING

To tackle eutrophication of the Baltic, it is important to step up international efforts to develop effective measures. Implementation of EC directives, such as the Water Framework and Urban Waste Water Treatment Directives, will be of major significance. In addition, HELCOM* and the EU are currently studying a proposal to ban phosphates in detergents.

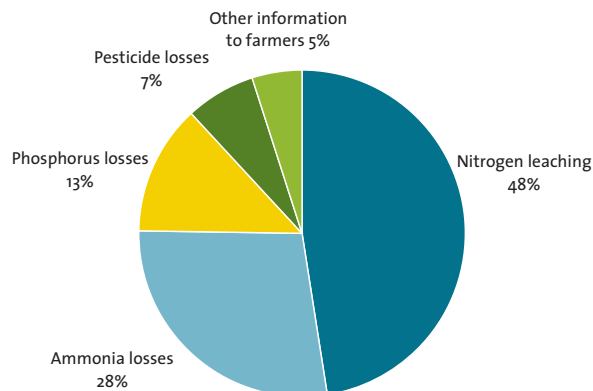
Another important area that should be addressed internationally is measures aimed at shipping. Emissions of nitrogen oxides from international shipping in the Baltic, Kattegat and Skagerrak exceed Sweden's total emissions of these gases, and action to control them will be pursued within the EU.

in climate are presumably another explanation, and the decrease in atmospheric deposition of nitrogen may possibly also have had an impact.

In a corresponding analysis of rivers in agricultural areas across southern and central Sweden, five out of twelve rivers studied showed a fall in nitrogen concentrations over the period 1993–2004, at a rate of 2–4% per year. Reasons for this decrease may include a decline in numbers of cattle in the surrounding areas over the same period, as well as direct measures to reduce nutrient leaching in the areas concerned. Phosphorus levels, too, had fallen, by 3–8% a year in five rivers. Here there was something of a link with the establishment of streamside buffer zones to reduce phosphorus leaching. These results are encouraging, as it has not previously been possible to demonstrate any effects of agricultural measures in Swedish rivers.

Regarding phosphorus, environmental monitoring data show that, in general, conditions in Swedish lakes are good. For around 75% of lakes, levels of this nutrient can be described as low or moderately

FIG. 7.1 Advice given under Focus on Nutrients project, 2001–2006



SOURCE: FOCUS ON NUTRIENTS

The aim of the Focus on Nutrients project is to reduce leaching of nitrogen and phosphorus from farmland by providing information and advice. Since it was set up in 2001, some 24,700 advisory visits have been carried out. Almost 50% of project resources have been devoted to advice on reducing nitrogen leaching and 30% to advice relating to releases of ammonia. Follow-up of the farms involved shows that, to a large extent, the measures highlighted as important by advisers have been implemented.

high. Only around 5% had very or extremely high concentrations, i.e. over 50 µg/l. By contrast, data from the national lake surveys of 1995, 2000 and 2005 suggest that levels have risen over the last ten years. This could be due to changes in the weather, such as increased precipitation, resulting in higher levels of humic substances in the water.

At the end of 2006, the advice and information project Focus on Nutrients* had 5,770 members. The project, which has its basis in the national environmental objectives, aims to reduce losses of nitrogen and phosphorus from agriculture. In Gotland, Kalmar, Blekinge, Skåne, Halland and Västra Götaland counties, taken together, project members farm 40% of the arable area, and in Skåne as much as 63%.

Will the interim targets be achieved?

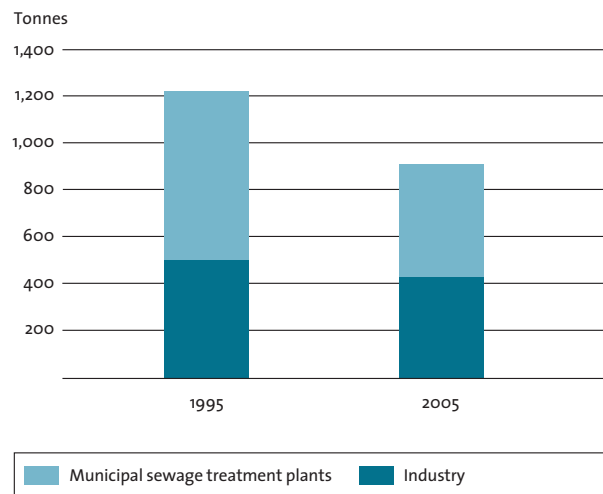
PHOSPHORUS EMISSIONS

INTERIM TARGET 1, 2010

☺ By 2010 Swedish waterborne anthropogenic emissions of phosphorus compounds into lakes, streams and coastal waters will have decreased by at least 20% from 1995 levels. The largest reductions will be achieved in the most sensitive areas.

This target is judged to be possible to achieve, provided that further action is taken. Discharges of phosphorus from municipal sewage treatment plants continue to decrease. Over the period 1995–2005 emissions from that source fell by 33%, and the reduction prior to 1995 was considerably larger. Industry, too, reduced its discharges between 1995 and 2005, by 14%. Between them, wastewater treatment plants and factories now account for some 20%

FIG. 7.2 Phosphorus emissions from municipal sewage treatment plants and industry, 1995–2005



SOURCE: SWEDISH ENVIRONMENTAL PROTECTION AGENCY

Emissions of phosphorus from municipal sewage treatment plants and from industry are continuing to fall. Since 1950, municipal sewage works in Sweden are estimated to have cut their emissions by almost 7,000 tonnes – for comparison, their total discharge in 2005 was 430 tonnes. Discharges from industry, too, have been reduced.

of total phosphorus releases to water. Most of the rest comes from agriculture and single-household sewage systems. New emission figures for other sources will be presented in conjunction with the in-depth evaluation in 2007.

At the Government's request, the Swedish Chemicals Agency has studied the feasibility of banning phosphates in detergents. The Agency has proposed a ban on the use of phosphate-based detergents by households with on-site sewage systems.

In follow-up questionnaires forming part of the Focus on Nutrients* project, livestock farmers reported that they had become environmentally more aware when it came to the spreading of animal manure, that they had reduced the amount of phosphorus used in feeds, and that, in many cases, they had established buffer zones by rivers and lakes.

NITROGEN EMISSIONS

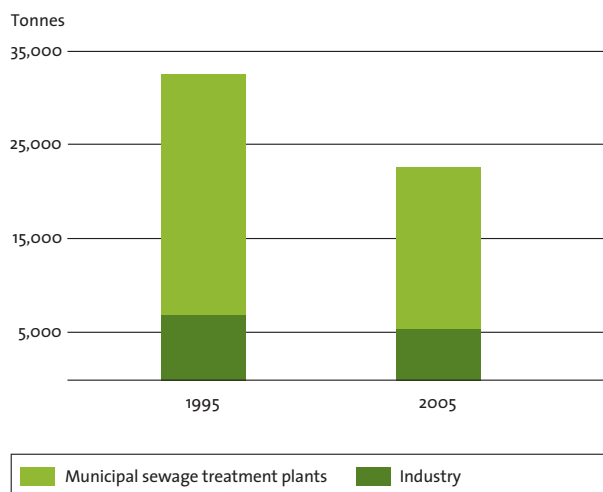
INTERIM TARGET 2, 2010

☺ By 2010 Swedish waterborne anthropogenic emissions of nitrogen compounds into sea areas south of the Åland Sea will have been reduced by at least 30% compared with 1995 levels.

This interim target is considered to be achievable, provided that additional measures are implemented. Discharges of nitrogen from municipal sewage treatment plants continue to fall, with a decrease of around 33% between 1995 and 2005. Many plants that have been required to introduce nitrogen removal processes have now done so, which may explain why the decrease in emissions has slowed in the last few years. Between 2002 and 2005, for example, discharges from treatment plants fell by only 4%. Industry, too, reduced its emissions between 1995 and 2005, by 21%. New emission figures for other sources will be presented in conjunction with the in-depth evaluation in 2007.

Under the environmental quality objective Zero Eutrophication, there is a sectoral target for agriculture,

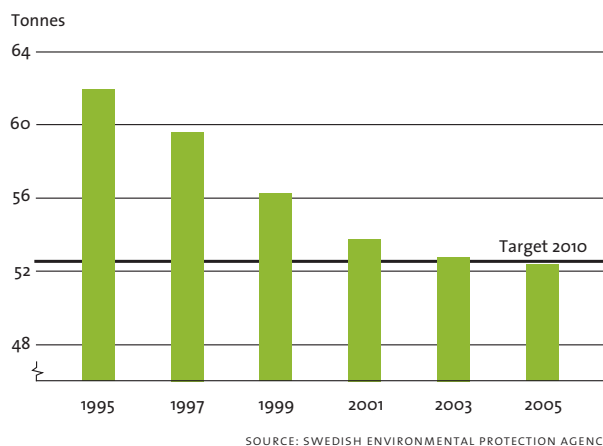
FIG. 7.3 Nitrogen emissions from municipal sewage treatment plants and industry, 1995–2005



SOURCE: SWEDISH ENVIRONMENTAL PROTECTION AGENCY

Over the period 1995–2005, nitrogen emissions from municipal sewage treatment plants fell by some 33%. Industrial discharges were also reduced.

FIG. 7.4 Ammonia emissions to air, 1995–2005



SOURCE: SWEDISH ENVIRONMENTAL PROTECTION AGENCY

Emissions of ammonia have fallen by more than 15% since 1995, which means that the interim target has been met five years ahead of the target year. The downward trend in emissions from the agricultural sector, which accounts for around 85% of total releases of ammonia, is expected to continue.

calling for root-zone leaching of nitrogen from farmland to be cut by 7,500 tonnes by 2010, from 1995 levels. According to estimates, leaching fell by around 7,000 tonnes between 1995 and 2003.

Preliminary figures from the Swedish University of Agricultural Sciences (SLU) suggest that leaching of this nutrient has been reduced by a further 2,000 tonnes as a result of a decrease in cereal production between 2004 and 2005. Overall, therefore, it looks as if the sectoral target will be met.

In the follow-up phase of Focus on Nutrients*, over three-quarters of members asked had undertaken measures to reduce leaching of nitrogen.

AMMONIA EMISSIONS

INTERIM TARGET 3, 2010

😊 *By 2010 emissions of ammonia in Sweden will have been reduced by at least 15% compared with 1995 levels.*

This target has been achieved five years ahead of schedule. According to the latest figures, from 2005, emissions of ammonia have already fallen by 15% since 1995. What is more, a further decrease is expected.

In agriculture, which accounts for the largest share of the total, emissions have abated by 18% since 1995. Measures relating to livestock husbandry, and to the storage and spreading of manure, have played an important part in curbing ammonia losses. Roughly half the reduction in emissions is due to a decrease in livestock numbers.

NITROGEN OXIDE EMISSIONS

INTERIM TARGET 4, 2010

😊 *By 2010 emissions of nitrogen oxides to air in Sweden will have been reduced to 148,000 tonnes.*

This target can be met, if additional action is taken. For further details, see the objective Natural Acidification Only, interim target 4.



ENVIRONMENTAL QUALITY OBJECTIVE EIGHT

Flourishing Lakes and Streams

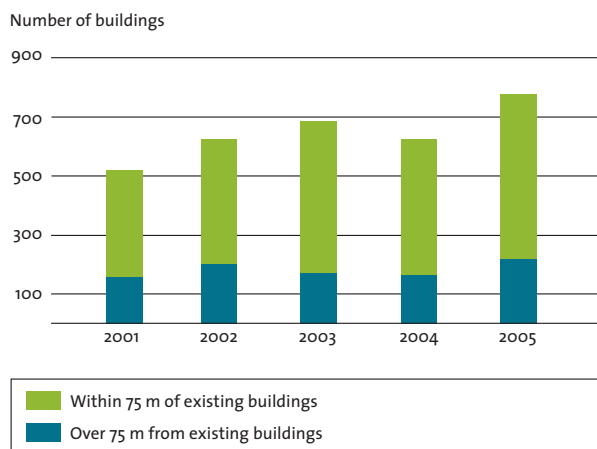
Lakes and watercourses must be ecologically sustainable and their variety of habitats must be preserved. Natural productive capacity, biological diversity, cultural heritage assets and the ecological and water-conserving function of the landscape must be preserved, at the same time as recreational assets are safeguarded.

Will the objective be achieved?

☹️📍 The prospects of achieving this objective have improved, despite the fact that two interim targets have become harder to meet since the last assessment. As from 2006, greater resources are being devoted to protecting and restoring lakes, rivers and streams. Increased funding, combined with strategies and better basic data relating to targets 1 and 2, is in the long run expected to enhance biodiversity and ensure greater attention to conserving cultural heritage.

To attain the objective, operators, developers and authorities responsible for regional development and habitat conservation all need to base their planning on a landscape approach*. During 2006, the Swedish Environmental Protection Agency, the Swedish Board of Fisheries and the National Heritage Board have compiled information on the most valuable freshwater areas in terms of nature conservation, cultural heritage and fisheries. This information will be a valuable tool in regional planning, and will be made available via the Environmental Protection Agency website.

FIG. 8.1 Construction near lake shores and river banks, 2001–2005



SOURCE: STATISTICS SWEDEN

The level of construction activity close to lake shores and river banks remains high, which could pose an obstacle to achieving this environmental quality objective. In 2005, in Sweden as a whole (urban areas excluded), 778 new buildings were constructed within 100 m of a lake, river or stream. Buildings erected more than 75 m from existing ones are assumed to take up more new land than others and hence to result in the development of previously undisturbed sites. Construction that complements existing buildings and reflects regional or local characteristics and settlement patterns can be beneficial in cultural heritage terms. The purpose of existing shore protection rules, however, is to safeguard outdoor recreation and maintain favourable conditions for animal and plant life.

Success in achieving this objective is also dependent on good conservation practice on the part of farmers, forest owners and hydroelectric companies, and on initiatives at the local level. Many rivers with

RAMSAR PROTECTS VALUABLE WATERS

The Ramsar Convention* is concerned with the conservation and wise use of wetlands, lakes, rivers and shallow marine waters. It has many points in common with both the Convention on Biological Diversity and the Water Framework Directive. Sweden is one of 154 contracting parties, and the Swedish International Development Cooperation Agency is one of the Convention's biggest sources of funding.

Parties to the Convention undertake, among other things, to take account of aquatic environments in land use planning and to designate and protect at least one site of international importance. To date, Sweden has designated 51 'Ramsar sites', from Tavvavuoma in the north to Falsterbo in the south. In 2007 new Ramsar sites in northern Sweden will be proposed, including rivers important for fish.

disused hydroelectric plants are of considerable biological interest. With small-scale hydro once again covered by the renewable energy certificates scheme, these installations may be redeveloped, which could in turn adversely affect the natural productive capacity and biodiversity of the waters concerned.

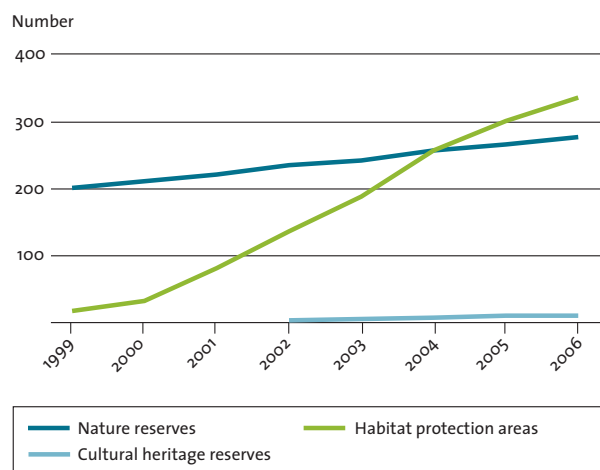
Will the interim targets be achieved?

PROTECTION OF NATURAL AND CULTURAL ENVIRONMENTS

INTERIM TARGET 1, 2005/2010

☹ *By 2005 the competent authorities will have identified and drawn up action programmes for natural and cultural environments, in or in the vicinity of lakes or streams, that are of particularly high conservation value and require long-term protection. By 2010 long-term protection will be provided for at least half of these environments, which must be evenly distributed among the five water districts. There must be at least 15 no-fishing areas in every water district.*

FIG. 8.2 Protected freshwater sites, 1999–2006



SOURCES: SWEDISH ENVIRONMENTAL PROTECTION AGENCY, SWEDISH FOREST AGENCY

This diagram shows the numbers of nature reserves, habitat protection areas* and cultural heritage reserves with freshwater interest features. County administrative boards and local authorities mainly ensure long-term conservation of sites by establishing nature reserves, while the Swedish Forest Agency uses habitat protection areas. Nature reserves offer stronger protection and are larger in extent than habitat protection areas. Progress in safeguarding freshwater sites remains slow, and the interim target for protection of valuable natural and cultural environments will not be achieved on time.

The assessment for this target has been revised. In 2006 the Environmental Protection Agency, Board of Fisheries and National Heritage Board together adopted a national strategy for the protection of lakes and streams, corresponding to the action programmes referred to in the target. This strategy describes how protection can be put in place for 50% of the lakes and running waters identified in 2005 as being of particularly high value at a national level for nature conservation, cultural heritage or fish. It forms an important basis for determining conservation priorities and, combined with increased funding for reserve designation, will step up the pace of work in this area. Despite this, the interim target is not expected to be met in its entirety by the intended date.

The target calls for long-term protection to be provided by 2010 for at least half the valuable enviro-

onments identified. Progress to that end is still too slow. In 2006, 11 new nature reserves were established to safeguard features of nature conservation interest in fresh waters. No new cultural heritage reserves were created. The Swedish Forest Agency established 35 habitat protection areas* during the year, in the categories 'riparian or floodplain forests' and 'small streams'. Many sites have still to be protected, however.

A national working group has drawn up proposals for guidelines on the establishment of no-fishing areas, which the county administrative boards have now presented to the Government.

RESTORATION OF RIVERS AND STREAMS

INTERIM TARGET 2, 2005/2010

☺ *By 2005 the competent authorities will have identified and drawn up action programmes for the restoration of Swedish rivers and streams of high conservation value or with the potential to acquire high conservation value following remediation. By 2010 at least 25% of valuable and potentially valuable rivers and streams will have been restored.*

The assessment for the target as a whole is, with some hesitation, that it can be met. A national strategy to implement it will be finalized in 2007 by the Environmental Protection Agency, the Board of Fisheries and the National Heritage Board. This strategy corresponds to the action programmes referred to in the target and will describe a plan of work to restore the nationally valuable, particularly valuable and potentially valuable rivers and streams in need of restoration that were identified by county administrative boards in 2005. The first part of the interim target, in other words, was only partly achieved by the target year 2005.

The number of freshwater sites in need of restoration has been estimated at around 700. The target calls for a quarter of these, i.e. 150–200, to be restored by 2010. The nature and extent of the measures required vary widely, however, and it is therefore uncertain whether the necessary work will be completed on time. On the other hand, there is now a better basis for success, thanks to the priority list drawn up as part

of the national strategy for target 1 and a SEK 26 million increase in funding for restoration projects from the Environmental Protection Agency in 2007.

2006 saw the publication of a synthesis of knowledge on ecological restoration of running waters based on a landscape approach*, commissioned by the Agency (Report 5565), and practical guidelines on restoration are now being prepared. The National Heritage Board, meanwhile, has developed a method to evaluate the cultural heritage implications of restoration projects undertaken for nature conservation and fisheries purposes.

Funding for restoration work often comes from fisheries conservation allocations or from funds for biological restoration in the framework of the liming programme, for threatened species covered by action plans, for management of protected natural areas, or for measures to rectify incorrectly placed road culverts. To simplify monitoring of how funds are used and where and how measures are implemented, the Board of Fisheries, Environmental Protection Agency, National Heritage Board and county administrative boards have set up a joint database of state-funded restoration measures in aquatic environments.

WATER PROTECTION AREAS

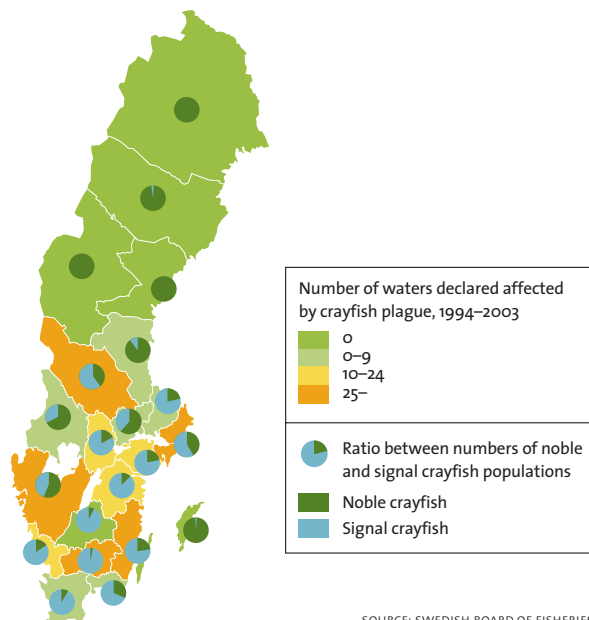
INTERIM TARGET 3, 2009

☹ *By 2009 water supply plans, including water protection areas and protection regulations, will have been adopted for all public and large private surface water sources. Large surface water sources are defined as surface waters used for the abstraction of water and serving more than 50 persons or providing more than 10 m³ a day as an average.*

The assessment for this target has been revised. The practical process of establishing protection areas for water sources is under way, but at too slow a pace to meet the target on time. Of the roughly 200 municipal surface water sources in Sweden, only some 40% are currently safeguarded by water protection areas.

During the year the Government considered around a dozen appeals relating to water protection areas. In most cases, the county administrative

FIG. 8.3 Spread of signal crayfish and crayfish plague, 1994–2003



SOURCE: SWEDISH BOARD OF FISHERIES

This diagram shows, for each county, the numbers of crayfish waters declared to be affected by crayfish plague over the ten-year period 1994–2003, and the proportions of noble (*Astacus astacus*) and signal crayfish (*Pacifastacus leniusculus*) populations. The number of new waters declared to be affected increases significantly with the proportion of signal crayfish. In Jönköping county, there were no new declarations during the period, probably because there are so few unaffected waters with noble crayfish left.

boards' decisions were upheld. This means that the approach being applied around the country, based among other things on the Environmental Protection Agency's general guidelines, can continue to be followed as far as the demarcation of areas, their division into zones, and the scope of the associated regulations are concerned.

RELEASES OF ANIMALS AND PLANTS

INTERIM TARGET 4, 2005

By 2005 releases of aquatic animals and plants will be undertaken in ways which do not adversely affect biological diversity.

This target has been met. Stocking of fish and crayfish is a common fisheries management measure, although it is not always beneficial for fish populations, their habitats or other species. To provide a national overview of licensed releases, these will be registered in the database described under interim target 2.

Illegal releases of the non-native signal crayfish are the biggest threat to the native noble crayfish. During 2006, to increase public awareness of their effects, the Board of Fisheries, working with the Environmental Protection Agency, a number of county administrative boards, interest organizations and private projects, mounted an information campaign on television and the Internet.

ACTION PROGRAMMES FOR THREATENED SPECIES

INTERIM TARGET 5, 2005

By 2005 action programmes will have been prepared and introduced for threatened species and fish stocks that are in need of targeted measures.

This target has been achieved. During 2006, action plans were also adopted for the thick-shelled river mussel (*Unio crassus*) and the otter (*Lutra lutra*). Programmes for several threatened fish species and noble crayfish are being prepared. In addition, the Board of Fisheries' 2006 resources and environment survey describes the threats facing a number of fish species and stocks, along with future scenarios for them, linked to various changes in the environment.

OTTERS feed on fish, which they catch in lakes, rivers, and coastal and archipelago waters. They have dense, water-repellent fur and webbed feet. As a result of toxic pollutants, hunting, acidification and other damage to their habitats, numbers of otters have fallen sharply. In 2006 an action programme for the species was adopted.



ILLUSTRATION: TYPOFORM



ENVIRONMENTAL QUALITY OBJECTIVE NINE

Good-Quality Groundwater

Groundwater must provide a safe and sustainable supply of drinking water and contribute to viable habitats for flora and fauna in lakes and watercourses.

Will the objective be achieved?

☹️ ➡️ The assessment made by the Geological Survey of Sweden (SGU) is that this environmental quality objective can be achieved, even if the interim target concerning protection of groundwaters is not met by 2010. This assessment is based, not on data pointing to an improvement in the state of groundwaters, but on the fact that the EU's Water Framework Directive has been transposed into Swedish law and that the programmes of measures for which it provides are required to be introduced a few years from now.

Atmospheric deposition of sulphur is abating, and this is reflected in downward trends in sulphate levels in groundwater, but no recovery can be detected in other parameters indicative of acidification. According to estimates, root-zone leaching of nitrogen from arable land has decreased. How measures to reduce the environmental impacts of agriculture and other activities are affecting groundwater, however, is largely unknown, owing to inadequate monitoring of groundwater resources. The overall

assessment, for now, is that no qualitative change is occurring in the state of the environment in this respect.

To achieve this environmental quality objective, it is essential to ensure that the water authorities' overall programmes of measures at the regional and local levels include tangible measures to reduce the impacts of farming, transport and contaminated sites. When addressing water supply, wastewater and solid waste issues, local authorities must take into account the need to protect important groundwater resources. For water supply purposes, therefore, significant bodies of groundwater should be incorporated into local authorities' comprehensive plans*.

Measures to attain the goals set for groundwater are included in action plans to achieve the environmental quality objectives Natural Acidification Only, A Non-Toxic Environment, Zero Eutrophication and A Good Built Environment. These objectives are judged to be difficult to meet, indicating that it could also prove difficult to attain the objective Good-Quality Groundwater. Encouragingly, the efforts of the water authorities in 2006 have inspired a higher level of activity and commitment regarding groundwater issues on the part of both county administrative boards and local authorities.

WATER FRAMEWORK DIRECTIVE A VALUABLE TOOL

The EU's Water Framework Directive is an effective tool for achieving the objective Good-Quality Groundwater, as is the daughter directive on the protection of groundwater against pollution and deterioration, adopted in 2006. The programmes of measures provided for in these directives are to include the measures required under others, such as the Nitrates Directive, the Plant Protection Products Directive etc.

Measures forming part of the Rural Development Programme* for Sweden for 2007–13, established to implement the EU's Common Agricultural Policy, will be of some significance in reducing leaching of nutrients into ground-

water. The number of areas in which support for such measures can be obtained will be reduced overall, but new ones are to be included, e.g. in Halland, where they are expected to have greater effect.

Agreements on emission reductions under the UN Convention on Long-Range Transboundary Air Pollution have long-term implications for groundwater quality, and hence for the contribution groundwater makes to viable habitats for flora and fauna in lakes and watercourses. This is true, for example, with regard to acidification and contamination with certain heavy metals.

Will the interim targets be achieved?

PROTECTION OF WATER-BEARING GEOLOGICAL FORMATIONS

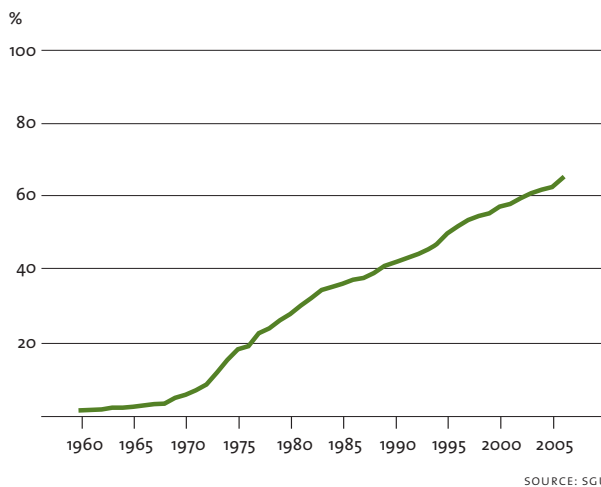
INTERIM TARGET 1, 2010

🚫 *By 2010 long-term protection from development activities that restrict water use will be provided for water-bearing geological formations of importance in meeting present and future water supply needs.*

The assessment is that this target will not be met on time. The pace at which protection is being put in place for groundwater bodies used to supply water, or which may be expected to be so used, is too slow. During 2006, according to local authorities' reports to SGU, the proportion of municipal groundwater sources with water protection areas increased from 63.4% to 64.5%.

To achieve the interim target, a better basis needs to be created for giving long-term protection to groundwaters of importance in meeting water supply needs. The Government is currently studying the possibility of safeguarding groundwater bodies as resources of national interest for this purpose, which would enhance the scope for protection. Incorporating

FIG. 9.1 Proportion of municipal groundwater sources with water protection areas, 1960–2006



The EU's Water Framework Directive requires groundwaters to be protected if they are used or are intended to be used for the abstraction of drinking water. Of the 1,428 municipal groundwater sources registered in SGU's groundwater database (DGV), over a third still lack protection. If the groundwater bodies intended for future use are added, it becomes clear that efforts to ensure protection against a deterioration of groundwater quality need to be stepped up.

Article 7 of the Water Framework Directive into the Environmental Code* would also help to achieve the target. That article requires member states to ensure the necessary protection for bodies of water used for the abstraction of water or intended for such future use. Such protection would be established for the groundwater bodies reported to the European Commission under Article 15 of the Directive, which would mean that this interim target would be met, though at a later date than 2010.

GROUNDWATER LEVELS

INTERIM TARGET 2, 2010

☹️ *By 2010 the use of land and water will not cause changes in groundwater levels that adversely affect the water supply, soil stability, or the animal and plant life of adjoining ecosystems.*

In 2006, SGU issued regulations setting out how the water authorities are to design and implement programmes to monitor groundwater levels in areas identified as suffering shortages. This will provide a better basis for assessing progress towards this interim target. During the year, a number of coastal local authorities initiated action in sensitive areas that will help to achieve the target. SGU's assessment, therefore, is that this target can by and large be met, provided that local authorities implement the measures previously proposed, i.e.

- identify areas sensitive to changes in groundwater levels and flows,
- include information on sensitive areas in comprehensive plans*, and
- place restrictions on water wells and heat pump boreholes where groundwater supplies are limited, or where quality problems could arise.

The number of certified borehole and well drillers rose during the year from 55 to 110, out of a total of

some 600 operating professionally. The certification scheme makes for safer and more reliable drilling, from the standpoint of both the environment and the customer. To ensure the effectiveness of the scheme, local authorities should make the use of certified drillers compulsory. This would encourage more operators to seek certification.

GOOD-QUALITY DRINKING WATER

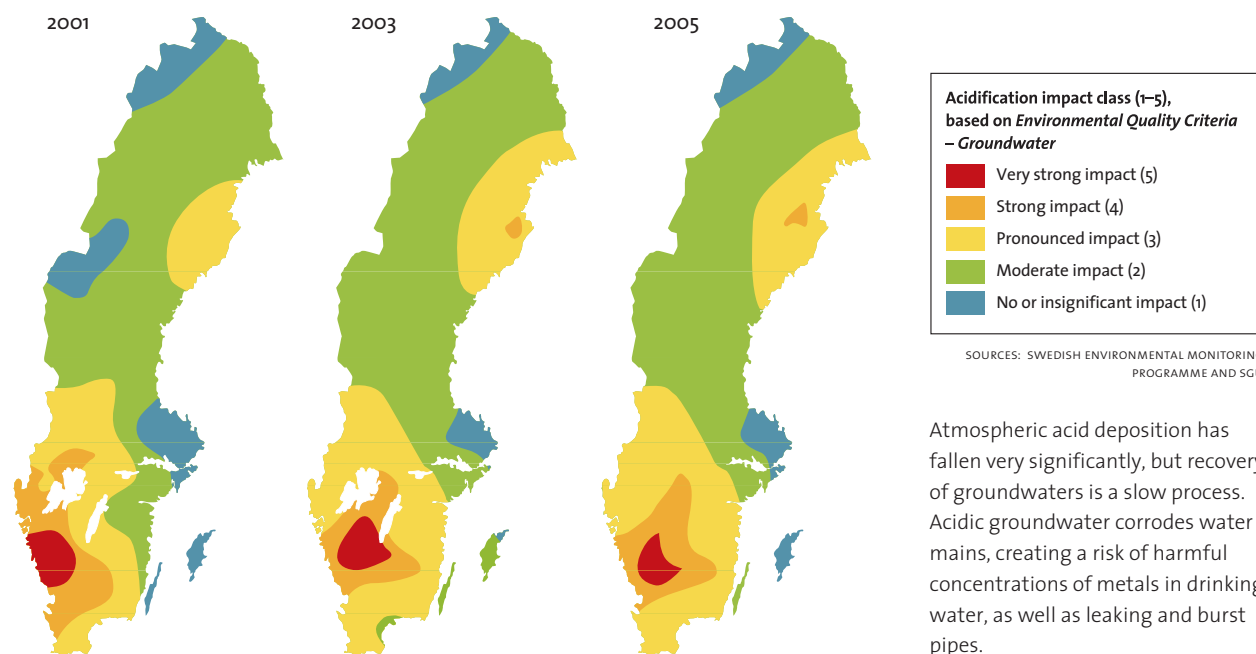
INTERIM TARGET 3, 2010

☹️ *By 2010 all bodies of water used for the abstraction of water intended for human consumption, and providing more than 10 m³ a day as an average or serving more than 50 persons, will meet the Swedish standards for good-quality drinking water with respect to anthropogenic pollution.*

SGU, with some hesitation, makes the assessment that this target can be met. Monitoring of raw (untreated) water is not subject to statutory regulation, which means there is no guarantee that the data needed both to track progress towards the interim target and to implement the Water Framework Directive will be available. Although more results from analyses of raw water from municipal groundwater sources have been supplied to SGU on a voluntary basis, they do not provide sufficient data to determine trends in terms of achieving the target.

Data from the Swedish environmental monitoring programme show no discernible recovery of groundwater pH and alkalinity, despite the fact that greatly reduced atmospheric deposition of sulphur has led to lower sulphate levels, in particular in southern and central Sweden. Analyses of raw water indicate that, over the country as a whole, just over 4% of municipal groundwater plants are abstracting water with high concentrations of nitrate (> 22.1 mg/l). In counties where agriculture has a significant impact, such as Halland, Blekinge and Skåne, the percentage is appreciably higher.

FIG 9.2 Acidification of shallow groundwaters



Atmospheric acid deposition has fallen very significantly, but recovery of groundwaters is a slow process. Acidic groundwater corrodes water mains, creating a risk of harmful concentrations of metals in drinking water, as well as leaking and burst pipes.

During the year SGU submitted proposals to the Government on ways of improving the collection and management of data on groundwater quality. In addition, it is currently studying how the EC Directive on the protection of groundwater against pollution and deterioration, adopted in 2006, should be incorporated into Swedish legislation. Under the directive, national environmental quality standards and threshold values

are to be introduced regarding the chemical status of groundwater.

Progress towards this interim target is very much dependent on measures to attain other environmental quality objectives, such as Natural Acidification Only, A Non-Toxic Environment and Zero Eutrophication.



ENVIRONMENTAL QUALITY OBJECTIVE TEN

A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos

The North Sea and the Baltic Sea must have a sustainable productive capacity, and biological diversity must be preserved. Coasts and archipelagos must be characterized by a high degree of biological diversity and a wealth of recreational, natural and cultural assets. Industry, recreation and other utilization of the seas, coasts and archipelagos must be compatible with the promotion of sustainable development. Particularly valuable areas must be protected against encroachment and other disturbance.

Will the objective be achieved?

☹️➡️ The assessment for this objective has been revised. Two of the three interim targets that carry most weight – concerning bycatch and sustainable fisheries – are now judged to be very difficult to meet. The prospects regarding the target for noise also look less promising. All in all, the conclusion is that this environmental quality objective will not be met within the time frame envisaged. To achieve the

objective, both international cooperation and further action at the national level will be needed.

Despite considerable efforts over the last 30 years, the environmental status of the Baltic Sea, Kattegat and Skagerrak is still poor. For several commercially exploited fish species the situation remains serious: the eel, for example, is now red-listed as critically endangered in Sweden. A finite resource is being exploited by too large and efficient a fishing fleet, and bycatch continues to be a problem. There are some encouraging signs as well, however, such as the progress being made in establishing nature reserves and no-take zones, and the sustained decrease in illegal discharges of oil into the Baltic. The overall state of Sweden's seas, coastal areas and archipelagos is difficult to assess, as different trends can be made out.

To lend new impetus to work in this area, in 2006 the Swedish Environmental Protection Agency was given the task of preparing a concerted plan of action for the country's marine environment, in consultation with 15 other authorities. Key measures highlighted in the plan include:

- Identifying the areas that contribute most to marine eutrophication.
- Creating the right type of wetland in the right place.
- Reviewing the classified status of water depth data.

The designation of marine nature reserves by county administrative boards is progressing. Mapping of the marine environment continues, for example through the INTERREG project BALANCE, which is developing tools for effective marine spatial planning, with a focus on areas of high conservation value. This project will continue to the end of December 2007.

To achieve this environmental quality objective, the objectives A Non-Toxic Environment and Zero Eutrophication also need to be attained. However, progress towards those goals has not been taken into account in the present assessment.

Will the interim targets be achieved?

MARINE ENVIRONMENTS OF HIGH CONSERVATION VALUE

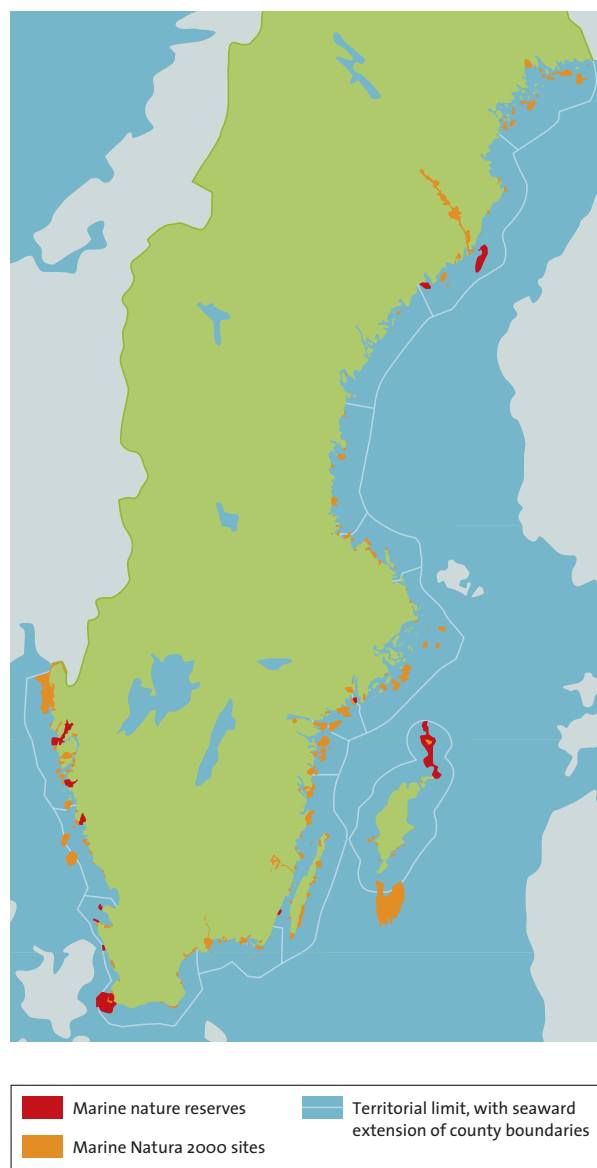
INTERIM TARGET 1, 2005/2015

☺ By 2010 long-term protection will be provided for at least 50% of marine environments of high conservation value and at least 70% of coastal and archipelago areas with significant natural and cultural assets. By 2005 another five marine areas, plus a further 14 by 2010, will be protected as nature reserves. Together, these will form a representative network of marine natural habitats.

In addition, an area in which fishing is permanently banned will be established by 2006 for evaluation by 2010. A further three coastal and open sea areas with permanent bans will be established in the Baltic Sea and the North Sea respectively by 2010 for evaluation by 2015.

This target is considered achievable, if further progress is made in designating new marine nature reserves and establishing no-take zones. Another proviso is that current survey work to enhance existing knowledge of marine habitats of high conservation value continues. The target of five new marine nature reserves by 2005 has been met, and there are now 12 reserves in all in the sea areas around Sweden. County administrative boards' efforts to establish further reserves are progressing, although no new

FIG. 10.1 Protected marine areas in Sweden in 2006



SOURCE: SWEDISH ENVIRONMENTAL PROTECTION AGENCY

At present, there are 12 nature reserves in Swedish coastal and marine areas, along with 268 Natura 2000* sites incorporating features of marine nature conservation interest. By 2010, a total of 26 marine nature reserves are to have been designated.

COORDINATED MANAGEMENT OF BALTIC SEALS

In the late 20th century and the first few years of the 21st, seal numbers in the Baltic Sea have increased, and the grey seal population now totals around 20,000. The growing herd of this species is causing serious problems for fishermen in northern parts of the Baltic, and limited hunting of grey seals to protect fish stocks has been introduced in Sweden, Finland and the Åland Islands. However, the situation differs between northern and central areas and the southern part of the Baltic, where grey seals are still rare. It is important therefore for the Baltic Sea states to coordinate their management of seal populations.

Since spring 2005, Sweden has been leading efforts within HELCOM* to draft a new HELCOM recommendation on seals and to achieve coordinated management of the three species present in the Baltic (grey, harbour and ringed seals). Following tough negotiations, the new recommendation was adopted in 2006. It deals with questions of population size, distribution and health status, and establishes general management principles. HELCOM's Seal Expert Group is currently assembling data as a basis for further work in this area.

designations were made during 2006. The goal of a total of 26 marine nature reserves by 2010 will probably be attained. To support this work, guidelines on the protection of marine areas of significant nature conservation interest have been drawn up.

In 2009 the Kosterhavet area could be declared Sweden's first marine national park, as a result of work currently being undertaken by the Västra Götaland County Administrative Board in collaboration with the municipality of Strömstad. The focus in the new national park will be on the marine interest features of the area. The plan is for fishing and tourism to continue, provided that they are carried on in a sustainable manner.


To provide a better picture of the distribution of valuable marine environments and improve their management, GIS* data from the SAKU project (concerned with in-shore underwater environments) and a web application from the MARBIPP (Marine Biodiversity, Patterns and Processes) project have been presented. In 2006 a survey was completed of 20 offshore marine banks, seven of which were judged to be of very high nature conservation interest.

Following consultation with the relevant authorities and organizations, the Swedish Board of Fisheries decided to designate the waters around Gotska

Sandön as a no-take zone. The ban on fishing came into force on 1 May 2006, and an evaluation of the effects is to be carried out by the end of 2010. Regional meetings have been held to begin the process of selecting a further six no-take zones.

CULTURAL HERITAGE AND AGRICULTURAL LANDSCAPES OF COASTS AND ARCHIPELAGOS

INTERIM TARGET 2, 2005

 *By 2005 a strategy will have been adopted for the preservation and use of the cultural heritage and agricultural landscapes of coastal and archipelago areas.*

This target has been met. The National Heritage Board has developed a strategy for the preservation, enrichment and use of the cultural heritage of coastal and archipelago areas. Today, these areas hold a great attraction, and in many of them the pressure for development is intense.

The cultural heritage of coastal and archipelago areas can only be used and enhanced if people are able to live and work in the areas concerned. In addition, more information is needed about cultural heritage associated with the sea, and more stakeholders must play a part in developing that information.

THREATENED SPECIES

INTERIM TARGET 3, 2005

🚧 *By 2005 action programmes will have been prepared and introduced for threatened marine species and fish stocks that are in need of targeted measures.*

This goal had not been achieved by the target year 2005. In the Red List published in 2000, the Swedish Species Information Centre* identified 17 species associated with marine environments as being in need of special measures. At present, action programmes exist for 14 of these, and the interim target was thus not met in 2006 either. During the year, the Board of Fisheries proposed measures for 26 threatened fish species, for which fishing could be part of the threat. These measures will be introduced in stages over the period 2007–10.

Eel populations have declined very substantially throughout Europe, and recruitment is now only a few per cent of what it was 25 years ago. The Board of Fisheries has therefore drawn up a management plan involving substantial restrictions on fishing for the species, measures to allow eels to pass barriers to migration more easily, and large-scale stocking of glass eels.

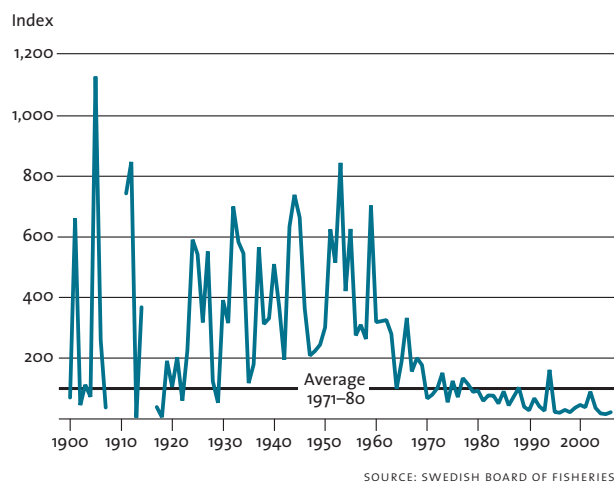
BYCATCH

INTERIM TARGET 4, 2010

🚫 *By 2010 total annual bycatches of marine mammals will not exceed 1% of each population. Bycatches of seabirds and non-target fish species will have a negligible impact on the populations concerned and on the ecosystem.*

The assessment for this target has been revised, and it is no longer expected to be achieved on time. Estimates of the numbers of marine mammals, birds and fish taken as bycatch, and also of the sizes of their populations, are uncertain. This is particularly true of the common porpoise. In 2006 an observer scheme for porpoises and dolphins was launched,

FIG. 10.2 Recruitment of eels to Sweden, 1900–2006



Eel populations have declined sharply throughout Europe. This diagram shows upstream migration of elvers (young eels) in seven Swedish rivers from 1900 onwards, compared with the average for 1971–80 (index line). Over the last ten years, recruitment has on average reached only just over a third of its level during the base period.

with the aim of monitoring 5% of pelagic trawl and gill-net fishing effort by vessels over 15 m in length.

In collaboration with the fishing industry, the Board of Fisheries has set up a monitoring programme for porpoises in the southern Baltic. With hydrophones attached to fishing gear, it is possible to detect the presence of porpoises in the vicinity. This project is continuing in 2007.

Growing seal and cormorant populations pose a significant threat to small-scale fisheries. The principal method of prevention is to develop alternative fishing methods offering better protection from interference, an approach that will also reduce bycatch of marine mammals and birds. In 2006, trials were carried out both of new designs for seal-proof fishing gear and of the use of acoustic seal deterrents to close off entire bays and inlets along the Baltic coast.

CATCHES – RECRUITMENT

INTERIM TARGET 5, 2008

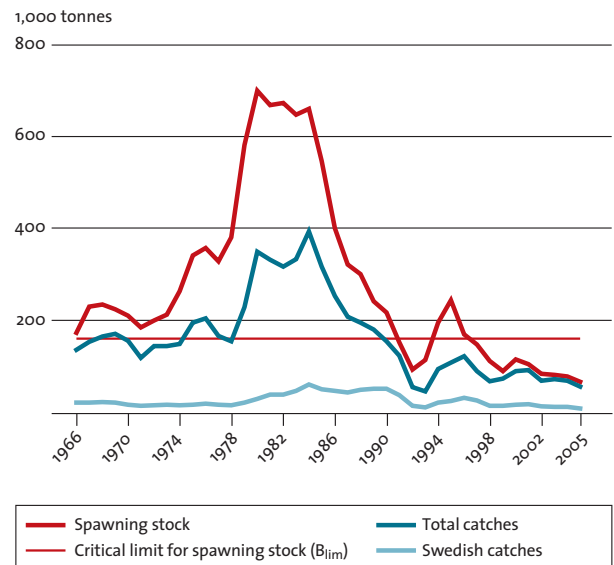
☹️ *By 2008 catches of fish, including bycatches of juveniles, will not exceed levels commensurate with maintaining fish stocks of a size and composition sufficient to ensure that the ecosystem's basic structure and functions are preserved. Populations will have been restored to levels well above biologically safe limits.*

The present assessment is that this interim target will not be met. To achieve it, the fishing fleet will have to be adapted to the size of fish resources and to the quotas available to Sweden. In addition, effective regulation will need to be put in place within the EU and through negotiations with non-EU nations. The EU's Common Fisheries Policy creates a basis for more sustainable resource management, but the policy changes decided on have yet to be translated into practical measures, such as functioning recovery plans for threatened stocks.

The North Sea Regional Advisory Council set up by the EU has proposed a trial of what is known as effort-based ('days at sea') management in the Kattegat. Under such a system, fishing mortality is limited by the number of fishing days rather than by quotas and rations, appreciably reducing the quantities of fish discarded, as all fish above minimum size limits are permitted to be landed. Although the trend for key species such as cod is negative, there are other species, such as saithe and haddock, that are at full reproductive capacity and are being harvested sustainably.

In March the Board of Fisheries reported on an initial evaluation of the decision in 2004 to move the trawling limit further out from the coast. In the inner part of Gullmarsfjorden and in Havstensfjorden there are indications of a positive trend in local stocks of cod. Only a short time has elapsed since the limit was moved, however, and it is still too early to draw any general conclusions.

FIG. 10.3 Cod and cod fishing in Baltic Sea (eastern stock), 1966–2005



SOURCE: SWEDISH BOARD OF FISHERIES

The cod population of the eastern Baltic is under serious threat. The limit reference point for spawning stock biomass (B_{lim}) set by ICES is 160,000 tonnes. The stock has been below this critical limit for the last nine years, and is now at its lowest level ever recorded.

NOISE AND OTHER DISTURBANCE

INTERIM TARGET 6, 2010

☹️ *By 2010 noise and other disturbance from boat traffic will be negligible in particularly sensitive and designated archipelago and coastal areas.*

The assessment for this target has been changed: efforts need to be stepped up if it is to be achieved on time. During the year, the county administrative boards concerned drew up an overall plan of action for the establishment of 'special consideration' zones in archipelago areas. According to this plan, at least three special consideration zones with respect to noise are to be established by 2008. On the basis of the lessons learnt from these, further zones will be designated by 2010.

DISCHARGES OF OIL AND CHEMICALS

INTERIM TARGET 7, 2010

😊 *By 2010 discharges of oil and chemicals from ships will be minimized and reduced to a negligible level by stricter legislation and increased monitoring.*

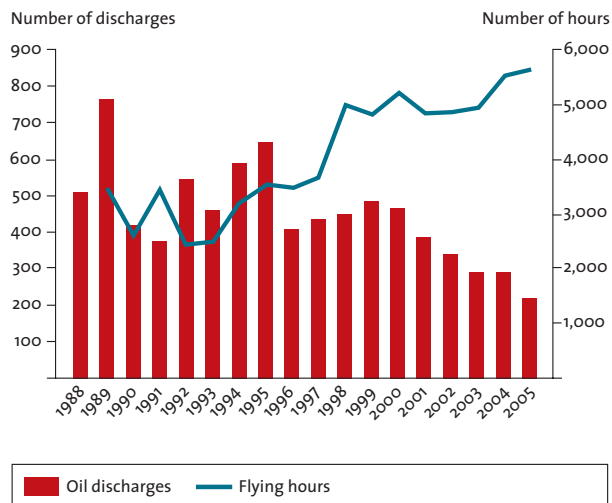
This target has been met, but growth in sea-based transport in the Baltic could increase the risk of discharges of oil and chemicals in the future.

The biggest threat from shipping to the environment of the Baltic, Kattegat and Skagerrak is the rapidly increasing volume of oil carried by large tankers from ports in Russia and the Baltic states. Currently, 160 million tonnes of oil are transported by sea every year, and the figure is expected to rise by at least 40% by 2015. Oil tankers with loads of up to 100,000 tonnes ply the Baltic on a daily basis.

A range of protective measures have been introduced by both the Helsinki Commission and the International Maritime Organization (IMO). The risk of collisions and groundings has been reduced by improved traffic management and information systems, hydrographic surveys, modern navigation instruments and greater use of pilotage.

Despite growth in the number of shipping movements and a stepping up of aerial surveillance, the number of oil discharges detected continues to fall, showing that the measures agreed in this area are having an impact. Aerial surveillance, in particular, has proved to have a deterrent effect, significantly reducing the number of illegal discharges. Surveillance is now carried out by over 20 aircraft, most of them

FIG. 10.4 Detected discharges of oil and hours of aerial surveillance in Baltic Sea, 1988–2005



SOURCE: HELCOM

The number of illegal discharges of oil detected in the Baltic is falling, despite growth in the volume of shipping and increasingly intense aerial surveillance. The measures agreed to reduce discharges are clearly having an impact. Sweden is the leading provider of surveillance among the Baltic Sea countries, with over 3,000 flying hours every year.

with advanced equipment to observe and document oil at sea. There has also been an increase in the quantities of oil residues delivered to port reception facilities, showing that more and more vessels are now opting to leave such wastes in port rather than discharging them at sea.



Thriving Wetlands

The ecological and water-conserving function of wetlands in the landscape must be maintained and valuable wetlands preserved for the future.

Will the objective be achieved?

☹️🔗 The situation as regards this environmental quality objective looks quite promising, even though the two important interim targets on mire protection and forest roads are not expected to be met on time. Together with information from the Wetlands Inventory, the regulations on land drainage provide a good basis for safeguarding the functions of wetlands in the landscape. Only in Blekinge, however, does the county administrative board judge the objective to be achievable at the regional level. The majority of other county boards take the view that additional resources will be required.

There is much to suggest that efforts to promote wetlands are gathering momentum. Natura 2000* and the revision in 2006 of the Mire Protection Plan will ensure the conservation and protection of the most valuable wetland areas. A National Strategy for Thriving Wetlands (interim target 1) was also published during the year. In 2007, work in this area will begin to be guided by the 'wetland chain' approach proposed in the strategy.

Increased funding under the new Rural Development Programme* makes for a more favourable forecast for the interim target concerning the establishment and restoration of wetlands on agricultural land. A great deal of work is also being done to restore and manage a variety of wetland habitats under the action programmes for threatened species.

For the environmental quality objective to be achieved, however, operators in different sectors need to pay due attention to the significance of wetlands and take the necessary precautions to avoid damage and adverse impacts. In forestry, for example, there is room for improved compliance with the Forestry Act's requirement that proper regard be paid to nature conservation and the preservation of cultural heritage. Advice and information in this area are important. Finding effective management methods that avoid damage to soil and water is a challenge.

Will the interim targets be achieved?

STRATEGY FOR PROTECTION AND MANAGEMENT

INTERIM TARGET 1, 2005

😊 A national strategy for the protection and management of wetlands and wet woodlands will be drawn up by 2005.

This target has been met. The Swedish Environmental Protection Agency, the Board of Agriculture, the Forest Agency and the National Heritage Board together adopted a National Strategy for Thriving

Wetlands in December 2005, which now forms the basis for their efforts to achieve the environmental quality objective.

MIRE PROTECTION PLAN

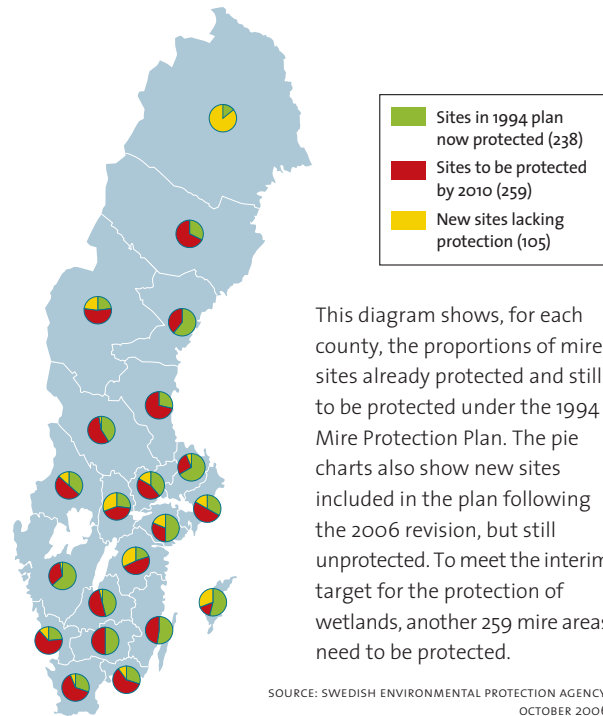
INTERIM TARGET 2, 2010

☹️ *By 2010 long-term protection will be provided for all the wetland areas listed in the Mire Protection Plan for Sweden.*

In contrast to earlier assessments, the view now is that this target cannot be achieved on time. Only in five counties will protection of the wetland areas concerned be in place by 2010. Several county administrative boards report difficulties prioritizing protection of mires in relation to long-term protection of forest land (Sustainable Forests, interim target 1). The Mire Protection Plan was revised in 2006, and county boards have drawn up timetables in support of the process of safeguarding sites. Several boards have suggested 2015 as a more realistic target year.

The revision of the plan primarily involved adjustments to the boundaries of existing areas and additional descriptions of features of cultural heritage interest. In the course of the review, it was noted that 238 of the mires listed in the plan enjoyed long-term protection, leaving another 259 sites to be protected by 2010. In addition, 119 new mire areas were included in the plan, 62 of them in Norrbotten. Of these, 105 have still to be safeguarded, although these sites are not currently covered by the target.

FIG. 11.1 Wetlands included in Mire Protection Plan for Sweden



A range of instruments may be appropriate in securing long-term protection, from reserve designation to nature conservation agreements*. The level of protection required has to be assessed on a case-by-case basis.



PEAT – A COMMODITY OF SIGNIFICANCE FOR EUROPE’S WETLANDS

Extraction of peat has significant impacts on the hydrology, water chemistry, flora and fauna of wetlands. Peat formation is a slow process, and on a human timescale peat cannot be regarded as a renewable resource.

The use of peat as a fuel is influenced by EU energy policy and international climate agreements. The Intergovernmental Panel on Climate Change treats peat

as a fossil fuel. The EU’s Directive on Greenhouse Gas Emissions Trading covers certain types of installations, including plants burning peat.

In 2005, 28% of the fuel peat used in Sweden was imported, chiefly from Estonia and Latvia, with a value of over SEK 140 million. Such imports inevitably have a very marked impact on the wetlands of the exporting countries.

FOREST ROADS

INTERIM TARGET 3, 2006

☹️ *By 2006 forest roads will not be built over wetlands with significant natural or cultural assets or in such a way as to adversely affect such wetlands.*

This target has not been met on time. With the current high levels of timber extraction, there is continuing pressure to build forest roads across wetlands. In addition, mild winters could restrict the use of temporary winter roads. The Swedish Forest Agency, however, is seeking to improve consultation procedures and to offer more advice in connection with road projects, for example on methods of transport with fewer adverse impacts. The aim is to ensure that, in future, forest roads do not damage valuable wetlands.

An analysis carried out by the Forest Agency in 2005 showed that forest roads had been built across 89 of the 7,600 wetlands studied. This analysis is to be supplemented with a study of the six counties not covered, among them Norrbotten and Jämtland. Regarding both of these large, forest-dominated counties, as well as Västerbotten, Dalarna and another four counties, the county administrative boards' assessments are that this target has not been met.

Only six county boards conclude that their regional targets have been achieved. Several counties have adopted more stringent wordings, including issues such as drainage and other forms of development. The Forest Agency's Western Region estimates that only about a third of new forest roads come to the Agency's attention. In many areas the network of forest roads is well developed, but maintenance of existing roads is expected to increase, which could put mounting pressure on wetlands.

WETLANDS ON AGRICULTURAL LAND

INTERIM TARGET 4, 2010

😊 *At least 12,000 hectares of wetlands and ponds will be established or restored on agricultural land by 2010.*

Over the period 2000–2006, 6,150 ha of wetlands have been established or restored on agricultural

land. At the present rate, some 9,500 ha will have been established or restored by 2010, which is well short of the target. The pace needs to be stepped up. Better control of the placement of wetlands and improved coordination between landowners are called for, in order to achieve large, cost-effective wetlands, appropriately located in the landscape.

New commitments of resources, however, permit a more optimistic assessment regarding this target than last year. Under the new Rural Development Programme* (RDP) for 2007–13, projects to establish and restore wetlands and wet pastures and hay meadows are covered by a scheme that allows county administrative boards to set priorities for the measures to be undertaken on the basis of regional conditions. Chiefly as a complement to the RDP, the Government has made available SEK 17 million for the re-creation of wetlands in the farmed landscape. A number of county

FIG. 11.2 Additional areas of wetlands established and restored on agricultural land each year, 2000–2006



SOURCES: SWEDISH BOARD OF AGRICULTURE, COUNTY ADMINISTRATIVE BOARDS, SWEDISH WETLANDS FUND AND WWF


The areas of wetlands being established and restored on farmland are increasing. The majority of wetland projects have been in the south of Sweden, with funding from the Rural Development Programme (RDP). The high figure for 2006 is probably due to the fact that many projects were completed that year, which was the final year of the old RDP.

administrative boards have begun to assemble planning data for wetland re-creation and restoration projects. In the years ahead outreach activities will also be needed, to attract the interest of landowners and offer assistance, for example, with planning and design and legal issues.

From 2001 to 2006, the Focus on Nutrients* campaign has offered advice on wetlands to interested farmers. The final grants under the Local Investment Programmes (LIPs) were paid out in 2002, and 2006 was the last year of the LONA (Local Nature Conservation Grants) scheme. Under both these schemes, local authorities have implemented much needed wetland projects in the agricultural landscape.

ACTION PROGRAMMES FOR THREATENED SPECIES

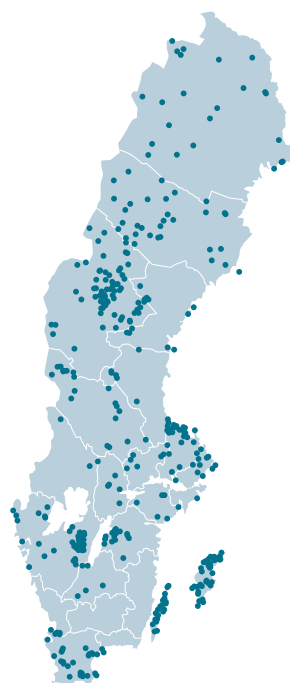
INTERIM TARGET 5, 2005

 *By 2005 action programmes will have been prepared and introduced for threatened species that are in need of targeted measures.*

Action programmes now exist for 19 species associated with wetlands and for one habitat – rich fens. Rich fens constitute Sweden’s species-richest wetlands, and have been affected up and down the country by drainage, eutrophication, cessation of traditional management and other changes. Many species only found in this habitat are threatened. The action plan for the conservation of rich fens was published in 2006 and will cost an estimated SEK 22.5 million up to 2010.

To restore habitats, drainage ditches are to be blocked in at least 80 rich fens across the country, and at least 200 ha of fens overgrown with scrub are to be cleared. Steps are to be taken to increase the area of rich fen mown by hand or grazed. Meanwhile, county administrative boards will be carrying out inventories to build up a clearer picture of the nature conservation interest of these habitats.

FIG. 11.3 Alkaline fens in Natura 2000 network



This map shows the distribution of alkaline fens (habitat 7230) included in the Natura 2000* network. Alkaline fens are a form of rich fen, a generic term for our most species-rich wetlands. A common denominator of all rich fens is that they are poor in nitrogen and phosphorus, but well supplied with minerals, usually calcium.

SOURCE: SWEDISH SPECIES INFORMATION CENTRE



Sustainable Forests

The value of forests and forest land for biological production must be protected, at the same time as biological diversity and cultural heritage and recreational assets are safeguarded.

Will the objective be achieved?

☹️➡️ The assessment made is that this environmental quality objective will not be achieved by 2020. There are several conflicting trends at present in the state of the forest environment. Improvements can for example be seen in certain key factors for biodiversity, but at the same time forest environments of great biological value continue to be lost.

Removal of felling debris (lop and top) for use as a biofuel generally entails a gradual acidification and impoverishment of the soil. The loss of nutrients can be offset by recycling the ash, combined in some areas with nitrogen fertilization. The quantities of wood ash recycled to forest land are expected to increase, but are still too low. In Sweden, forestry currently causes net acidification of forest soils over an estimated area of 20,000 ha every year.

Forest biodiversity is still being eroded in certain respects. Some harvesting of forests of very high nature conservation interest is occurring, but a continuing lack of proper attention to conservation in conjunction with regeneration felling also has adverse implications for diversity. Several common species associated with forests are declining.

At the same time, encouraging trends may be noted in some of the basic parameters on which biodiversity depends, such as the volume of dead wood, the occurrence of large trees, old forest etc. Biological processes in forests are slow, however, which means that new habitats take a long time to form. Noticeable improvements in biodiversity are not expected to be achieved until after 2020.

The level of damage to archaeological and cultural remains is unacceptably high. The proportion of archaeological remains suffering damage appears to have increased, although the relative frequency of serious damage has decreased.

Initiatives to identify and develop the social values of forests are in progress and may be expected to produce good results. At the same time, demand for forest raw materials has led to record-high levels of felling in recent years. With higher energy prices, interest in bioenergy products is now firmly established in the forestry sector. There is a danger that intensive management and use of forests could make this objective even more difficult to achieve.

ACTION IN 2006

During the year, county-based strategies for formal protection of forests were, with a few exceptions, adopted by county administrative boards and the Swedish Forest Agency. Work is under way to identify and ensure appropriate management of forests with long continuity, and action programmes to prevent soil acidification and to promote sustainable use of

forest land are being developed. These projects will be completed in 2007.

Under the Rural Development Programme*, support is among other things to be provided for measures to promote the social values of forests.

The Swedish Environmental Protection Agency and the Swedish Energy Agency have published a report on the use of economic instruments in environmental policy. It proposes a review of the rules on capital gains taxation in conjunction with the establishment of nature reserves, and the possibility of spreading taxation of payments received under nature conservation agreements* over several years.

Will the interim targets be achieved?

LONG-TERM PROTECTION OF FOREST LAND

INTERIM TARGET 1, 2010

☹ *A further 900,000 hectares of forest land of high conservation value will be excluded from forest production by the year 2010.*

This target is not expected to be met in full within the defined time frame. Nature reserves are a core element of the overall target, and sufficient areas are not expected to have been designated by the target year.

The interim target relates to forest land outside the montane forest zone. Of the total area of productive forest land to be excluded from production, nature reserves are to account for 320,000 ha and habitat protection areas* for 30,000 ha, while nature conservation agreements* are to cover 50,000 ha. Forest owners are to set aside at least a further 500,000 ha on a voluntary basis, making a total of at least 730,000 ha of productive forest with voluntary protection by 2010.

Nature reserves

Between 1999 and 2006, 114,767 ha of forest land was safeguarded by the establishment of nature reserves, representing 36% of the target area. Progress towards the target varies from one county to another.

FIG. 12.1 Additional area of productive forest land outside montane forest zone given formal protection each year, 1999–2006



SOURCES: SWEDISH ENVIRONMENTAL PROTECTION AGENCY AND SWEDISH FOREST AGENCY

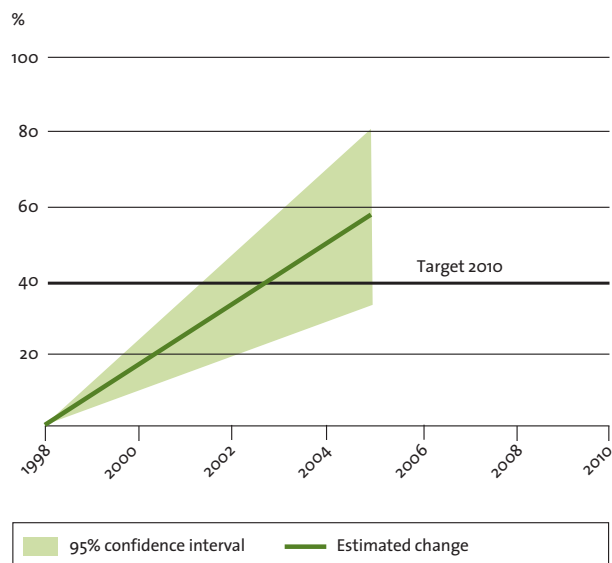
This diagram shows the additional area of productive forest land outside the montane forest zone safeguarded each year by nature reserve or habitat protection area designation or under nature conservation agreements. The areas given protection year by year have admittedly increased, but are still not sufficient to meet the overall target of 400,000 ha with formal protection by 2010.

With current funding and existing price levels for forests and forest land, the target for nature reserves will not be met until 2015. By 2010, 60–65% of the intended area is expected to be protected. The target is not expected to be met in full by 2010, although increased funding would ensure greater progress towards it. The best possible results will be achieved if the allocation for biodiversity is raised from its present level to SEK 3,000 million a year.

Habitat protection areas and nature conservation agreements

Up to the end of 2006, habitat protection areas covering some 13,500 ha had been created and 17,600 ha had been safeguarded under nature conservation agreements, representing 45% and 35% of the respective target areas. At that rate of progress,

FIG. 12.2 Change in volume of hard dead wood, 1998–2005, excluding effects of winter storm Gudrun in 2005



Note: The confidence interval shows the range within which there is a 95% probability of the true change lying.

SOURCES: NATIONAL FOREST INVENTORY, SLU, AND SWEDISH FOREST AGENCY

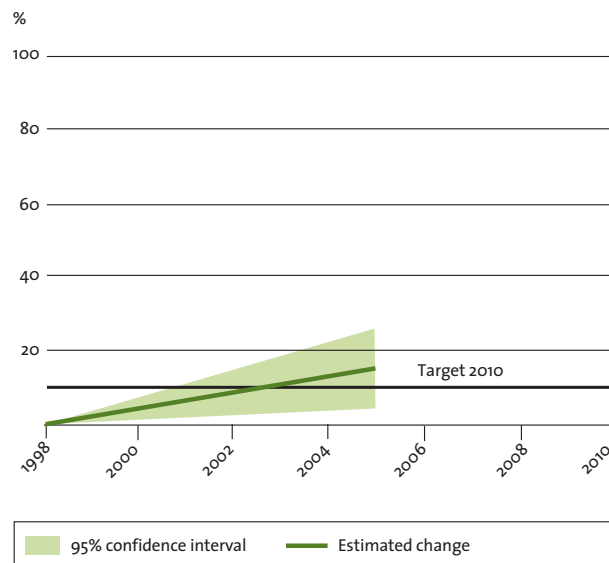
The volume of hard dead wood in forests shows a steep rise throughout Sweden. If the present trend continues, the figure for 2010 will be almost twice that recorded in 1998. The increase is more rapid in the south than in the north of the country. The trend is due almost entirely to the fact that more trees that die naturally are now retained in forests. In southern Sweden, the additional spruce wood left in the wake of winter storm Gudrun will have to be removed, owing to the risk of insect damage. This will slow the trend for hard dead wood in the areas affected.

roughly 70% of the target for habitat protection areas and around 50% of the target for nature conservation agreements will have been achieved by 2010. It is still considered possible to reach the target areas, but only if the allocation for payments to landowners is increased to around SEK 470 million a year, compared with the present level of roughly SEK 175 million.

Voluntary set-aside

Information currently available suggests that the target of 730,000 ha has not yet been met. Surveys were

FIG. 12.3 Change in area of mature forest with a large deciduous element, 1998–2005



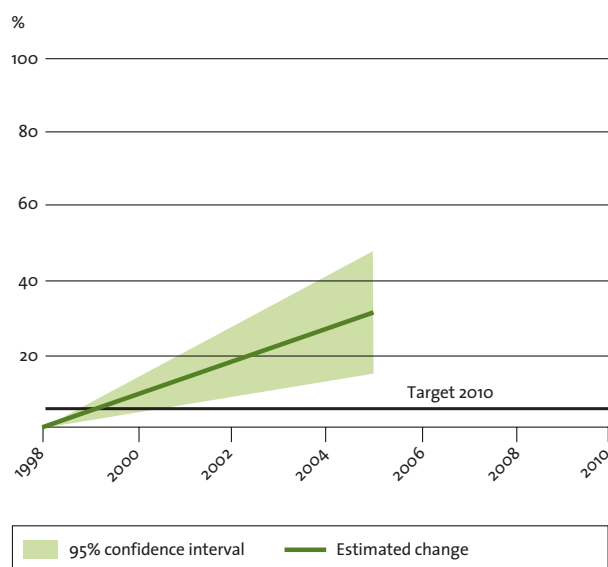
Note: The confidence interval shows the range within which there is a 95% probability of the true change lying.

SOURCES: NATIONAL FOREST INVENTORY, SLU, AND SWEDISH FOREST AGENCY

The area of mature forest with a large element of deciduous trees is increasing rapidly, although wide geographical variations may be noted. Overall, the rate of increase is high in the south of Sweden and declines towards the north, where the area remains largely unchanged. The main reasons for the increase are that forest owners are refraining to a greater extent from felling mature forest with a significant deciduous element, and that more coniferous than deciduous trees are now removed in thinning operations.

carried out in 2005 and 2006 of land set aside voluntarily by forest owners. Preliminary findings indicate that of the order of 750,000–800,000 ha of forest land outside the montane forest zone has been safeguarded on a voluntary basis, which is almost twice the total area of formally protected non-montane forest land. The reason the target level of voluntary set-aside is not yet judged to have been reached is that there is still considerable uncertainty about how large a share of the area set aside consists of forest of high conservation value.

FIG. 12.4 Change in area of old forest, 1998–2005



Note: The confidence interval shows the range within which there is a 95% probability of the true change lying.

SOURCES: NATIONAL FOREST INVENTORY, SLU, AND SWEDISH FOREST AGENCY

The area of old forest is growing very rapidly, and consistently more in the south than in the north of the country. This trend is attributable to the fact that, at present, large areas of forest are reaching a sufficient age to be classed as old forest. The increase far exceeds the areas of old forest that are being lost.

The figures reported here are lower than those previously presented, mainly owing to revised definitions and survey methods. Among other things, there is now a requirement that the forest owner has documented the setting aside of the land.

ENHANCED BIOLOGICAL DIVERSITY

INTERIM TARGET 2, 2010

😊 *By 2010 the amount of dead wood, the area of mature forest with a large deciduous element and the area of old forest will be maintained and increased by:*

- increasing the quantity of hard dead wood by at least 40% throughout the country and considerably more in areas where biological diversity is particularly at risk;

- increasing the area of mature forest with a large deciduous element by at least 10%;
- increasing the area of old forest by at least 5%;
- increasing the area regenerated with deciduous forest.

The volume of hard dead wood, the area of mature forest with a large deciduous element and the area of old forest are increasing very significantly, in all cases more in the south than in the north of the country. If present trends continue, the targets will be met by a good margin.

The area regenerated with deciduous forest appears to have increased. In 2006, the trend in this regard was estimated for the first time, using two methods: the Forest Agency's 'Polytax' inventory system and the National Forest Inventory. The results point to a small but significant increase.

PROTECTION OF CULTURAL HERITAGE

INTERIM TARGET 3, 2010

☹️ *By 2010 forest land will be managed in such a way as to avoid damage to ancient monuments and to ensure that damage to other known valuable cultural remains is negligible.*


This target is not considered achievable within the intended time frame. The levels of damage being caused to ancient monuments and known cultural remains in forests are still unacceptably high, and no clear positive trend in the occurrence of damage can be made out. The proportion of archaeological remains harmed by forestry has increased in certain respects, although the relative frequency of really serious damage appears to have decreased. As before, site preparation is responsible for a large share of the serious damage occurring.

As part of the Forests and History project, inventories of cultural heritage features in forests have been carried out with funding from the National Labour Market Administration. Information about the location of cultural remains is important if damage arising from forestry is to be avoided. To date, some 20% of the country's forest area has been surveyed,

and 150,000 new sites with cultural remains have been registered. Changes in labour market policy mean that these inventories will soon come to an end, making it even more difficult to achieve this interim target.

ACTION PROGRAMMES FOR THREATENED SPECIES

INTERIM TARGET 4, 2005

 *By 2005 action programmes will have been prepared and introduced for threatened species that are in need of targeted measures.*

By the end of 2005, a total of 23 action programmes had been drawn up, containing measures to safeguard 52 threatened species. In the long term, these programmes are expected to benefit a large number of other species. This target is thus considered to have been met.

Given the encouraging results achieved by existing action programmes, the Environmental Protection Agency is now developing programmes for further species.



INTERNATIONAL INFLUENCES ON FORESTS AND FORESTRY IN SWEDEN

Within the EU, forest policy issues are dealt with at the national level, although several EC directives, such as the Water Framework Directive and the Habitats Directive*, also have implications for forests. In addition, a number of international conventions, agreements and processes are linked to and affect forests and forestry in Sweden. They include:

- The Convention on Biological Diversity (CBD):
A legally binding agreement, requiring signatory countries, among other things, to develop national plans and strategies for the conservation of biodiversity. There are also links here to interim target 1, for example in the programme of work on protected areas.
- The UN Framework Convention on Climate Change, including the Kyoto Protocol*.
- The Forest Principles adopted at UNCED (the Rio Conference).
- The Ministerial Conference on the Protection of Forests in Europe (MCPFE).

Illegal logging in various parts of the world has been raised as a major problem in a number of contexts, and action to tackle it remains important. Within the EU, the FLEGT process has been launched to reduce imports of illegally harvested timber. The Swedish forest products industry is heavily dependent on international trade, and for several years has been a net importer of large volumes of timber, corresponding to around 10% of its total consumption.

A Varied Agricultural Landscape



The value of the farmed landscape and agricultural land for biological production and food production must be protected, at the same time as biological diversity and cultural heritage assets are preserved and strengthened.

Will the objective be achieved?

☹️🔗 This environmental quality objective is judged to be achievable, provided that additional action is taken and the negative trends we see at present change in the years ahead. Despite uncertainty about future developments in agricultural policy, and about trends in terms of biodiversity and cultural heritage, the assessment is that positive progress is being made towards the objective.

To safeguard the values of the agricultural landscape, the land needs to be farmed and it must be attractive to live and work in the countryside. The future shape of the EU's Common Agricultural Policy will therefore crucially affect the prospects of securing this objective. The new Rural Development Programme* being introduced in 2007 represents a greatly increased commitment to business and rural development. Purely environmental support will be retained on roughly the same scale as before, but the programme also offers scope for new types of measures in the environmental field.

As far as biodiversity and cultural heritage are concerned, various improvements may be noted,

including increases in the areas of land of high conservation value that are under management. At the same time, many farmland species are threatened or declining. Major changes are affecting the existing diversity of buildings and built environments, and many working farm buildings have become redundant.

The condition and long-term productivity of arable soils are satisfactory. However, a close eye needs to be kept on contamination with cadmium and compaction of subsoil. Measures to minimize inputs of cadmium to arable land help to reduce levels of the metal in food. In the last ten years development of farmland has increased, chiefly for urban purposes and infrastructure.

Will the interim targets be achieved?

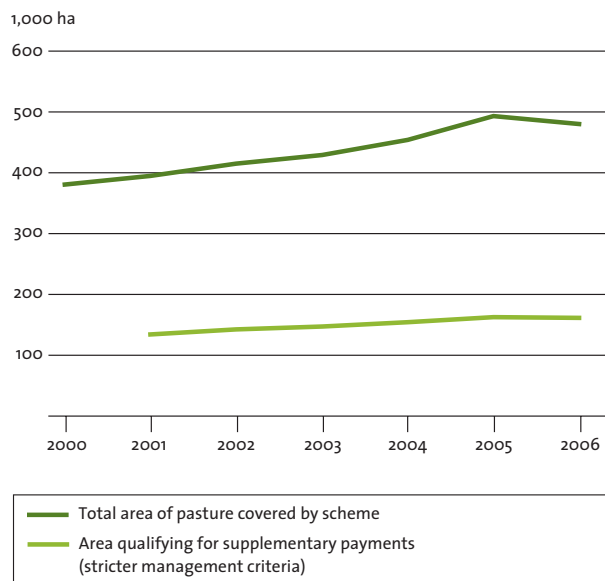
MEADOW AND PASTURE LAND

INTERIM TARGET 1, 2010

☹️ By 2010 all meadow and pasture land will be preserved and managed in such a way as to preserve its value. The area of traditionally managed meadow land will increase by at least 5,000 hectares and the area of managed pasture land of the most endangered types will increase by at least 13,000 hectares by 2010.

The area of meadow and pasture land managed under the agri-environment scheme has increased satisfactorily since 2000. The assessment is that this target can be met if further measures are taken. There is still uncertainty, though, about how the natural and

FIG. 13.1 Area of pasture land covered by agri-environment scheme, 2000–2006



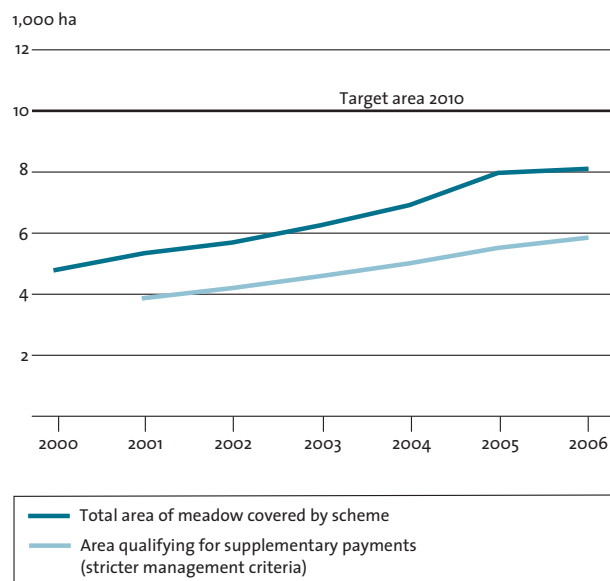
SOURCE: SWEDISH BOARD OF AGRICULTURE

The area of pasture land managed under the agri-environment scheme for pastures and meadows has increased since 2000. The decrease in 2006 was due to the fact that many undertakings had come to an end, and that introduction of the single farm payment scheme also resulted in applications for agri-environment payments for pastures that did not qualify, and which therefore did not receive support in 2006. The area is expected to increase again in 2007.

cultural values of these types of land are developing, and to preserve and enhance these values restoration measures are judged to be necessary. In 2006, the area of pasture land covered by the agri-environment scheme decreased, while the increase in the area of meadows within the scheme levelled off. These trends can be attributed to changes in support measures for agriculture and to the fact that a programme period has come to an end. The areas receiving payments are expected to increase again when the new Rural Development Programme* gets under way in 2007.

As far as managed pastures of the types most at risk are concerned, the areas of alvar grasslands

FIG. 13.2 Area of meadow land covered by agri-environment scheme, 2000–2006



SOURCE: SWEDISH BOARD OF AGRICULTURE

The area of meadow land managed under the agri-environment scheme has shown a good rate of increase since 2000. The target is for at least 10,000 ha to be managed by 2010. Restoration measures can enhance the natural and cultural values of the land, allowing more meadows to qualify for supplementary payments (or payments for meadow land of particular value under the new Rural Development Programme).

(grasslands on thin soil over level limestone), forest pastures, and grazing land in northern Sweden have increased satisfactorily since 2000. However, it is important to monitor developments when the new programme begins. The number of shielings (upland summer pastures) shows a satisfactory rise, while for heather heaths no data are available.

National monitoring of the quality of meadow and pasture land began in 2006 as part of the National Inventory of Landscapes in Sweden (NILS). This monitoring will provide a basis for future assessments of trends in the quality of land of these types.



EU AGRICULTURE POLICY A MAJOR FACTOR

Swedish agriculture is affected to a large degree by the Common Agricultural Policy (CAP) of the EU. The prospects of achieving the objective A Varied Agricultural Landscape are therefore dependent on how the CAP develops.


Further pressure for a more market-focused agricultural sector in the EU, along with changes resulting from the accession of new member states, could affect the design of the CAP. A forthcoming WTO^{*} agreement will also be of significance. Should these changes lead to lower numbers of grazing livestock, the goal concerning

managed pasture land will be adversely affected, unless targeted measures are introduced.

At the same time, the prospects of meeting the various goals are enhanced by increased resources within the CAP for environmental and rural development measures and a greater emphasis on the environment in support schemes. It is important, however, that member states should remain in a position to design the policy instruments they need to achieve national environmental objectives.

SMALL-SCALE HABITATS

INTERIM TARGET 2, 2005 (PART OF TARGET)

 *Small-scale habitats on farmland will be preserved to at least the same extent as today throughout the country. By 2005 a strategy will have been adopted to increase the number of such habitats on the agricultural plains of Sweden.*

The part of this target calling for a strategy to increase the number of small-scale habitats has been achieved with the biodiversity strategy for the agricultural plains of southern and central Sweden, adopted by the Swedish Board of Agriculture in 2004. Further measures will be needed, though, to ensure that the target as a whole is met in the longer term. Trends regarding small-scale habitats remain difficult to assess, for want of sufficient data on how many such features are being lost or created. Abandonment of farmland is an important factor behind losses of habitats of this kind. New ones are created, for example, when wetlands are established.


National monitoring of small-scale habitats on arable land began in 2006 in the NILS framework. This work will provide a basis for assessing how numbers of such habitats are changing over time.

In its biodiversity strategy for the agricultural plains, the Board of Agriculture presents a range of measures that will enhance biodiversity in these areas of the country.

The main purpose of this target is to reverse the negative trend for species associated with the farmed landscape. To promote the biodiversity of arable land, a ban was introduced in 2006 on the topping of fallow during the period 1 March–30 June.

CULTURALLY SIGNIFICANT LANDSCAPE FEATURES

INTERIM TARGET 3, 2010


 *The number and extent of culturally significant landscape features that are managed will increase by about 70% by 2010.*

Trends in relation to this target are unclear. The assessment made is that further measures will be needed to achieve it. Since 2000 the total length of linear features (stone walls, open ditches etc.) managed under the agri-environment scheme has increased satisfactorily. The number of point features (field clearance cairns, pollard trees etc.) has shown a smaller rise.

In 2006 there was a decrease in the number and extent of landscape features covered by the scheme. This was due to many undertakings having expired; the expectation is that take-up will increase again with the launch of the new Rural Development Programme* in 2007.

Changes to the rules for agri-environment payments from 2007, designed to increase take-up in parts of northern Sweden, are expected to enhance the prospects of achieving the target.

PLANT GENETIC RESOURCES AND INDIGENOUS BREEDS**INTERIM TARGET 4, 2010**

 *By 2010 the national programme for plant genetic resources will be fully developed and there will be sufficient numbers of individuals to ensure the long-term conservation of indigenous breeds of domestic animals in Sweden.*


The goal regarding the national programme for plant genetic resources is expected to be achieved, on the basis of the inventory of cultivated plants being undertaken as part of the Programme for Cultivated Diversity (POM). Discussions are under way as to how to conserve in the long term material considered to merit conservation.

At present, there are insufficient numbers of individuals to ensure the conservation of all of Sweden's indigenous livestock breeds. For endangered breeds of poultry especially, the situation is uncertain. To achieve the target, further action will be needed.

The Board of Agriculture proposes in a new report that, in addition to existing semen collection programmes, genetic material from female animals and semen from horses should be collected. It also calls for storage of genetic material to be spread over several sites.


A new European database – the European Farm Animal Biodiversity System (EFABIS) – is now in use. This has made updating of Swedish livestock material simpler and more reliable.

ACTION PROGRAMMES FOR THREATENED SPECIES**INTERIM TARGET 5, 2006**

 *By 2006 action programmes will have been prepared and introduced for threatened species that are in need of targeted measures.*

This interim target was achieved during 2006, with 68 action programmes now introduced, comprising measures that will benefit over 150 species of the farmed landscape, including species associated with trees of high conservation value. The target will now be subsumed under interim target 2 of the objective A Rich Diversity of Plant and Animal Life, in the same way as previously with targets for action programmes under five other environmental quality objectives.

FARM BUILDINGS OF CULTURAL HERITAGE VALUE**INTERIM TARGET 6, 2005**

 *By 2005 a programme will have been prepared for the conservation of farm buildings of cultural heritage value.*

This target has been met. A strategy for future efforts to safeguard working farm buildings was presented in 2005; what remains now is to implement it. The new Rural Development Programme* creates greater scope for conserving these buildings.

A Magnificent Mountain Landscape



The pristine character of the mountain environment must be largely preserved, in terms of biological diversity, recreational value, and natural and cultural assets. Activities in mountain areas must respect these values and assets, with a view to promoting sustainable development. Particularly valuable areas must be protected from encroachment and other disturbance.

Will the objective be achieved?

☹️👉 The overall assessment is that this environmental quality objective can be achieved, provided that the relevant sectors and society as a whole show the consideration which the interim targets require.

Regarding the state of the mountain environment, a positive trend can now be made out. The interim target regarding action programmes for threatened species has been met, and the percentage of new light off-road vehicles with low noise emissions rose markedly in 2006, a trend which, if sustained, will in the long run reduce noise levels in mountain areas.

The joint regional environment and sustainable use programme, drawn up by the county administrative boards concerned, began to be implemented in 2006. Its aim is to improve conditions for sustainable development in the mountain region. Of particular importance are the proposed model for collaboration on mountain issues, resource and development planning geared to the needs of mountain areas, and continued efforts in the area of research, survey and information.

There is a considerable need for new knowledge relating to vegetation, aquatic organisms, noise problems, cultural heritage, and non-native and threatened species in mountain areas. The county administrative boards' programme and the environmental plans of reindeer husbandry districts together offer essential tools for addressing mountain land use issues. To maintain a landscape whose character is shaped by grazing, reindeer herding – undertaken and developed in an environmentally sustainable manner – is essential.

The pressure to develop new wind energy capacity in the mountain region could adversely affect both natural and cultural assets and the prospects of achieving larger areas of undisturbed mountain terrain. To avoid impacts of this kind, any expansion of wind power must be preceded by careful land use planning.

Will the interim targets be achieved?

DAMAGE TO SOIL AND VEGETATION

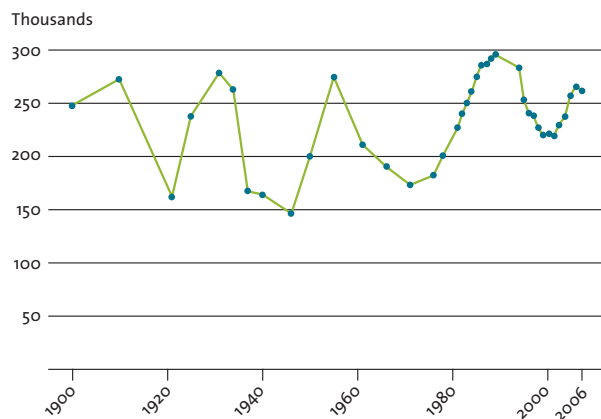
INTERIM TARGET 1, 2010

☺ *By 2010 damage to soil and vegetation caused by human activities will be negligible.*

This target can be achieved within the defined time frame, provided that steps are taken to channel tourism away from sensitive areas, and reindeer numbers continue to be adjusted to the natural carrying capacity of the mountain environment. Efforts in pursuit of regional goals will be a major factor in securing progress towards the target.

In the absence of better data, the risk of damage to soil and vegetation is currently assessed indirectly, on the basis of reindeer numbers and the number of off-road vehicles. The reindeer population has declined by 1.4% compared with 2005, while off-road vehicles (snowmobiles and quad bikes) have increased only insignificantly in number in recent years. Improved

FIG. 14.1 Reindeer numbers in Sweden, 1900–2006



SOURCE: SWEDISH BOARD OF AGRICULTURE

Sweden's reindeer herds are counted in winter, after the autumn slaughter and before calving. At that time of year, they graze mainly on lichens. The large fluctuations in reindeer numbers reflect the varying abundance and accessibility of lichens, chiefly in forest areas outside the mountain region.

marketing in Sweden and abroad has boosted demand for reindeer meat, with the result that, in the autumns of 2005 and 2006, more reindeer were slaughtered, reducing the population.

To achieve this interim target, further research and development is required. We need a better understanding of the significance of reindeer grazing for the mountain ecosystem, and of how vegetation is affected by climate change and different forms of wear and tear. Data from the environmental monitoring programme NILS (National Inventory of Landscapes in Sweden) are expected to be able to be used for the first time in the in-depth evaluation of the target in 2008.

In their regional environment and sustainable use programme, the county administrative boards of the mountain region call on the Swedish Environmental Protection Agency and the Swedish University of Agricultural Sciences (SLU) to create a practical basis for using satellite-based remote sensing at the regional and national levels. This would improve monitoring of damage to soil and vegetation.

NOISE

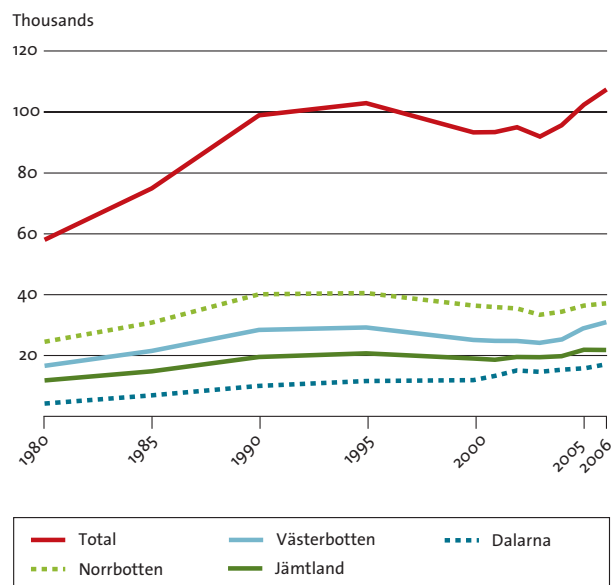
INTERIM TARGET 2, 2010/2015

☺ *Noise in mountain areas from motor vehicles driven off-road and from aircraft will be reduced to meet the following requirements:*

- *by 2015 at least 60% of light off-road vehicles will meet stringent noise standards (below 73 dBA);*
- *by 2010 the noise from aircraft will be negligible both in class A regulated areas under the Off-Road Driving Ordinance (1978:594) and in at least 90% of the national park area.*

The assessment for this interim target has been revised, and it is now judged to be achievable. To meet the target for light off-road vehicles, however, it will for one thing be necessary to include noise limits for new vehicles of this kind in EC Directive 2000/14/EC, Article 14, in line with a proposal sent to the European Commission by the Swedish Environmental Protection

FIG. 14.2 Light off-road vehicles in use in mountain counties of Sweden, 1980–2006



Note: Light off-road vehicle = off-road motor vehicle with a maximum ready-for-use weight of 400 kg. In practice, refers to three- and four-wheeled ATVs and, above all, snowmobiles.

SOURCE: STATISTICS SWEDEN

Driving on ground unprotected by snow damages soil and vegetation, and may also harm archaeological remains. Other adverse effects, on snow-covered as well as bare ground, are noise and exhaust emissions, which make the mountain environment less attractive for outdoor recreation. Snowmobiles may also be important for tourism, however. The main legal users of off-road vehicles on snow-free ground in mountain areas are reindeer herders, along with the defence forces and telephone and power companies.

LESS NOISE AN IMPORTANT EU ISSUE

This environmental objective is a regional one, with a focus on national issues. Progress towards it, however, will be strongly influenced by the effects of global climate change. Those effects, if the process cannot be controlled, will in the longer term have dramatic consequences for the flora and fauna of mountain areas. In the short term, it is important to include noise limits for new light off-road vehicles in EC Directive 2000/14/EC, Article 14.

Agency in 2005. In addition, as a basis for monitoring progress towards the target, information on the noise levels of different vehicle types will need to be included in the vehicle register. The question of registration is currently being studied by the Swedish Road Administration. The proportion of light off-road vehicles with four-stroke engines, which are normally quieter, has risen sharply in the last year, to almost half the vehicles sold. To meet the interim target, however, existing off-road vehicles will need to be phased out more rapidly than at present.

Over the period 1 April 2006–31 March 2007, the Swedish Civil Aviation Authority is conducting a survey of aircraft operations in class A regulated areas under the Off-Road Driving Ordinance and in national parks in the mountain region. A report is to be submitted to the Government by 31 May 2007. Only when the results of this survey are available will it be possible to assess what steps need to be taken to achieve the target for aircraft noise.

NATURAL AND CULTURAL ASSETS

INTERIM TARGET 3, 2010

☹ By 2010 long-term protection, including where necessary management and restoration measures, will have been provided for the majority of mountain areas with representative and significant natural and cultural assets.

The assessment for this target has been revised, and it is no longer expected to be achieved. Continued efforts will be needed beyond 2010. Development and implementation of regional objectives relating to the Sami cultural heritage, and better information about the cultural environments of mountain areas, will be crucial in securing progress towards the target. Gaps in existing knowledge need to be filled and better use made of available forms of protection.

Large areas of Sweden's mountain region are protected as nature reserves or national parks. Protection of the freshwater environment, though, is limited, as is our knowledge of where representative and significant cultural assets are to be found. Resources must be

made available to provide a clearer picture of the cultural assets of mountain areas, both in existing reserves and parks, and as a basis for establishing long-term protection for new sites in the future.

During the year the National Heritage Board commissioned *Ájtte* – the Swedish Mountain and Sami Museum – to study to what extent nature reserves and national parks protect the cultural heritage values of the areas concerned. The study shows that, on the whole, they do not. In only two of the 38 areas studied has full provision been made in management plans for the management of cultural heritage. To address the lack of knowledge about the cultural assets of mountain areas, the National Heritage Board has begun to discuss with representatives of the county administrative boards and county museums concerned what research and survey work is needed to achieve, as soon as possible, a satisfactory level in relation to the interim target.

ACTION PROGRAMMES FOR THREATENED SPECIES

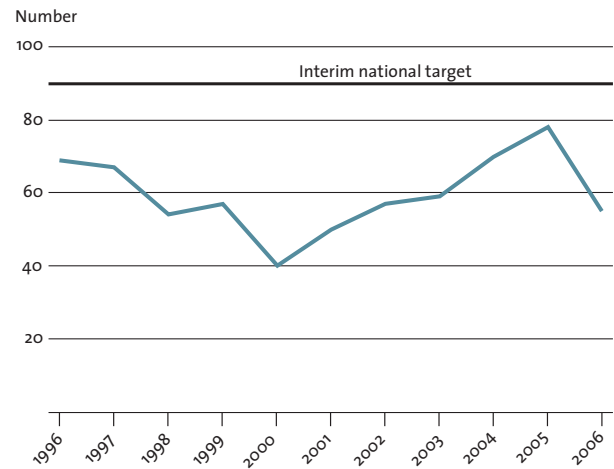
INTERIM TARGET 4, 2005

☺ *By 2005 action programmes will have been prepared and introduced for threatened species that are in need of targeted measures.*

This interim target is judged to have been met by the target year 2005. Originally, five action programmes were envisaged, covering species to be found in both mountain and forest areas.

With regard to species of mountain areas, by the end of 2006 action programmes had been adopted for the Arctic fox and the wolverine, and a programme for the great snipe (*Gallinago media*) was out for consultation. In addition, three programmes of relevance to the mountain region have been completed, for rich fens and for the wolf and brown bear. In all, six action programmes have thus been prepared.

FIG. 14.3 Number of wolverine litters found in reindeer herding region, 1996–2006



Note: The interim national target is 90 litters per year, as proposed in the Predatory Animals Bill 2000/01:57.

SOURCES: NORRBOTTEN, VÄSTERBOTTEN, JÄMTLAND AND DALARNA COUNTY ADMINISTRATIVE BOARDS

The range and size of Sweden's wolverine (*Gulo gulo*) population are determined annually by means of predatory animal surveys conducted by the county administrative boards of mountain counties. The survey results form the basis for the compensation payments for predator populations made to reindeer husbandry districts under a system introduced in 1996. The welcome upward trend in the number of litters was unfortunately reversed in 2006; it is not known why. Hopefully, the wolverine population is more vigorous than the number of litters indicates.

The requirements of this target are considered to have been met when an action programme has been adopted or a draft programme, approved by the Environmental Protection Agency, has been circulated for consultation.

Since the target was adopted, further species of mountain areas have been identified as requiring action programmes, bringing the total to nine.

A Good Built Environment



Cities, towns and other built-up areas must provide a good, healthy living environment and contribute to a good regional and global environment. Natural and cultural assets must be protected and developed. Buildings and amenities must be located and designed in accordance with sound environmental principles and in such a way as to promote sustainable management of land, water and other resources.

Will the objective be achieved?

☹️ ➡️ Continued growth in transport and increasing quantities of waste, as well as inadequate knowledge of indoor environment problems and the cultural heritage values of the built environment, mean that it is still uncertain whether this environmental quality objective can be achieved within the time frame envisaged. On the other hand, a number of encouraging trends may be noted: less and less waste is being sent to landfill, and homes are being soundproofed and are being heated to a greater extent using renewable energy sources. Furthermore, overall energy consumption in the residential sector seems to be falling somewhat.

Will the interim targets be achieved?

PROGRAMMES AND STRATEGIES FOR PLANNING

INTERIM TARGET 1, 2010

☹️ By 2010 land use and community planning will be based on programmes and strategies for:

- achieving a varied supply of housing, workplaces, services and cultural activities, in order to reduce transport demand and improve the scope for environmentally sound and resource-efficient transport;
- preserving and enhancing cultural and aesthetic assets;
- preserving, maintaining and enhancing green spaces and water bodies in urban and suburban areas for nature conservation, cultural and recreational purposes, and ensuring that the proportion of hard-surface areas in these environments does not increase;
- promoting more efficient energy use – thereby reducing it over time – and promoting use of renewable energy resources and development of production plants for district heating, solar energy, biofuels and wind power.

Intense efforts will be needed to achieve this interim target on time. Many local authorities still report that they lack up-to-date programmes and strategies in the areas referred to in the target. According to a survey of local authorities conducted in 2006 by the Regional Monitoring System for the Environmental Objectives (RUS) and the National Board of Housing, Building and Planning, 28% of councils have adopted documents to promote environmentally sound

transport and reduce transport demand. In most cases, these documents cover the whole of the local authority area. Just under a quarter of authorities deal with the issue in their comprehensive plans*, while a fifth report that they are developing programmes and strategies to address it.

Municipality-wide planning documents relating to cultural heritage issues have been adopted by 37% of local authorities. According to the National Heritage Board, however, most of them were drawn up before 1993, and authorities are having difficulty keeping them up to date. A third of councils have integrated these issues into their comprehensive plans.

Only just over 10% of local authorities have municipality-wide programmes or strategies relating to green space and water bodies, while 15% have such documents for one or more built-up areas within their boundaries. Almost 20% report that they are working on the question. Just under a quarter have addressed the issue in their comprehensive plans.

BUILT ENVIRONMENTS OF CULTURAL HERITAGE VALUE

INTERIM TARGET 2, 2010

☹ *By 2010 built environments of cultural heritage value will be identified and placed under long-term sustainable management.*

The assessment for this target is that it will be very difficult to achieve sufficient progress towards it within the time frame laid down. One condition for meeting the target is that authorities whose activities have impacts on the physical environment take cultural heritage issues into account in their decisions.

A review in 2006 of statutory instruments defining the terms of reference of 15 government agencies judged to be relevant in this context showed that in only two cases (the National Heritage Board and the Swedish Forest Agency) did these instruments express a clear responsibility for cultural heritage. The majority of them did, however, include references to the environmental objectives. That the cultural environment is not immediately identified as an



SEVERAL EC DIRECTIVES IMPORTANT IN ACHIEVING A GOOD BUILT ENVIRONMENT

A range of EC directives are of significance when it comes to meeting this objective. The directives on environmental assessment of projects and plans are of importance, for example, as are those on environmental noise and the energy performance of buildings, as well as several directives relating to waste.

Although land use planning is not within its area of competence, the EU has among other things developed a strategy on the urban environment. Substantial commitments of resources are being made under the EU structural funds to strengthen cohesion between the member states and promote sustainable regional and local development.

To achieve the objective, international decisions will for instance be needed to curb noise from vehicles and tyres and to reduce the volumes of waste arising from production and consumption of products.

integral aspect of those objectives is made clear by the fact that, of six state-owned companies with property management responsibilities, only Sveaskogs förvaltnings AB has addressed cultural heritage issues in its environment policy.

NOISE

INTERIM TARGET 3, 2010

☺ *By 2010 the number of people who are exposed to traffic noise in excess of the guide values approved by Parliament for noise in dwellings will have been reduced by 5% compared with 1998.*

The assessment made of the prospects of meeting this target is more optimistic than before, although growth in traffic means that it remains uncertain whether it can be achieved. Levels of environmental noise are unchanged or rising, but over the period 1998–2005 some 150,000 people among those most

exposed to noise have benefited from mitigation measures costing a total of around SEK 1.7 billion.

The long-term goal of a good sound environment for all is still a long way off. Action to tackle noise must first be put on a systematic footing, with a greater focus on reducing the problem at source. In addition, mitigation measures are needed for those most exposed to noise.

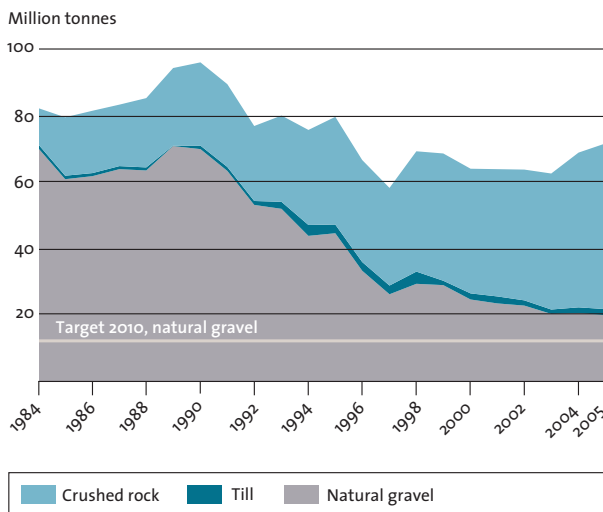
EXTRACTION OF NATURAL GRAVEL

INTERIM TARGET 4, 2010

☹️ *By 2010 extraction of natural gravel in the country will not exceed 12 million tonnes per year.*

The quantities of natural gravel extracted fell somewhat in 2005 compared with the previous year, to 20 million tonnes, but the assessment that this target

FIG. 15.1 Quantities of aggregates supplied in Sweden, 1984–2005



SOURCE: GEOLOGICAL SURVEY OF SWEDEN

Construction investment increased by 5% in 2006, and a further rise is predicted for 2007. Consequently, the growth in total aggregates supplied may be expected to continue. Although in relative terms the use of natural gravel is declining, increased construction activity will make it more difficult to achieve an absolute reduction in the amounts extracted.

will be difficult to meet remains unchanged. This is because investment in construction continued to rise in 2006. A higher level of construction activity means increased consumption of aggregates*, which include natural gravel.

Similarly, at the regional level, half the country's county administrative boards now take the view that their regional goals will be difficult to achieve. Permits to extract natural gravel continue to be granted, in some places allowing extraction far in excess of regional targets. As a share of all aggregates, however, use of natural gravel in Sweden continues to decline, as it has done without interruption for almost 20 years.

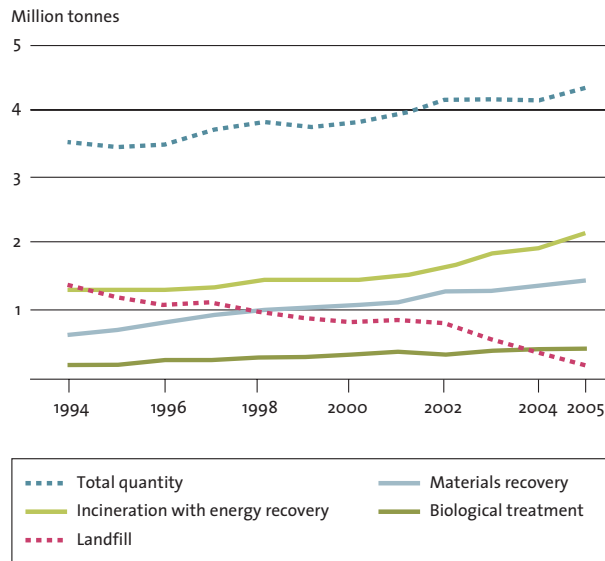
WASTE

INTERIM TARGET 5, 2005–2015

☹️ *The total quantity of waste generated will not increase and maximum use will be made of its resource potential while minimizing health and environmental effects and associated risks. In particular:*

- *The quantity of waste disposed of to landfill, excluding mining waste, will be reduced by at least 50% by 2005 compared with 1994.*
- *By 2010 at least 50% of all household waste will be recycled through materials recovery, including biological treatment.*
- *By 2010 at least 35% of food waste from households, restaurants, caterers and retail premises will be recovered by means of biological treatment. This target relates to food waste separated at source for both home composting and centralized treatment.*
- *By 2010 food waste and comparable wastes from food processing plants etc. will be recovered by means of biological treatment. This target relates to waste that is not mixed with other wastes and that is of such a quality as to be suitable, following treatment, for recycling into crop production.*
- *By 2015 at least 60% of phosphorus compounds present in wastewater will be recovered for use on productive land. At least half of this amount should be returned to arable land.*

FIG. 15.2 Quantities of household waste treated and disposed of, 1994–2005



SOURCE: SWEDISH ASSOCIATION OF WASTE MANAGEMENT

The total volume of household waste continues to increase, while the quantities disposed of to landfill are falling. In 2005, 44% of household waste was recycled for materials recovery, including biological treatment, with the latter accounting for 10.5%. Of total household waste, only 5% was sent to landfill, while half was incinerated.

This target is considered possible to achieve, provided that further action is taken. There is some uncertainty, however, partly because the quantities of waste generated continue to rise. Over the period 1994–2005, the volume of household waste increased by 24%. Measures linked to the production and consumption of products are needed to prevent waste arising.

Trends in other areas, though, are more encouraging. The amount of household waste sent to landfill fell by 85% between 1994 and 2005. Landfill disposal of other wastes has also been greatly reduced.

To meet the target for recovery of materials from household waste, a larger share of the waste that is

currently incinerated will need to be separated out for materials recovery or biological treatment.

At present, some 16% of food waste from households, restaurants and shops is recovered by means of biological treatment. The capacity for such treatment, chiefly in the form of anaerobic digestion, is increasing, as is the number of local authorities with separate collection of food waste. Despite this, it is uncertain whether the target level will be achieved. An important instrument in this regard is investment support for anaerobic digestion plants.

A large proportion of food waste from food processing plants is recovered by biological means or used as animal feed. A study of the prospects of achieving the target for waste from this source is under way.

The amount of phosphorus from wastewater that is recovered for use on productive land is uncertain. A large share of sewage sludge is used for noise bunds and to cap landfills, but some is also used in soil production or as a fertilizer in energy forestry. The quantities of phosphorus recovered probably fall far short of the target.

ENERGY USE ETC. IN BUILDINGS

INTERIM TARGET 6, 2020/2050

☺ Total energy consumption per unit area heated in residential and commercial buildings will decrease, with target reductions of 20% by 2020 and 50% by 2050, compared with consumption in 1995. By 2020 dependence on fossil fuels for the energy used in the built environment sector will be broken, at the same time as there will be a continuous increase in the share of renewable energy.

The wording of this target was revised in 2006¹, which means that this year's assessment of progress towards it has been made on a new basis. The old target focused on reducing the environmental impact of energy use in residential and commercial buildings – and encouraging progress has been made in that direction. The new one is more ambitious in terms of

1. Riksdag decision taken in 2006, concerning a new interim target for more efficient use of energy in the built environment.


improving energy efficiency, but it is unclear as yet whether the target reductions in consumption can be achieved on time. Further measures are needed.

Total energy consumption per unit area heated in residential and commercial buildings fell by 2–7% (depending on the method of calculation) between 1995 and 2005. Good progress is being made in reducing dependence on fossil energy sources, with a decrease of almost 50% in the use of fossil fuels for heating from 1995 to 2005. Over the same period, the share of renewable energy increased by 16 percentage points.

Energy performance certificates could help to achieve this interim target, once their effects begin to be felt. Several forms of financial support exist which will promote progress towards the target, including the Climate Investment Programme* and various conversion grant schemes.

A GOOD INDOOR ENVIRONMENT

INTERIM TARGET 7, 2010/2015/2020

 *By 2020 buildings and their characteristics will not have adverse impacts on health. It must therefore be ensured that*

- *all buildings in which people frequently spend time or spend extended periods of time have ventilation of documented efficiency by 2015,*
- *radon levels in all schools and pre-schools are below 200 Bq/m³ air by 2010 and that*
- *radon levels in all dwellings are below 200 Bq/m³ air by 2020.*

Information efforts relating to radon in buildings have been effective, and all the funds budgeted for remediation grants in 2006 were used. Despite this, the target for radon in dwellings is judged to be difficult to achieve. Preliminary results of a study of school buildings suggest that there is a risk of radon levels exceeding the target in fewer than one in ten such buildings.

In a questionnaire survey conducted by the National Board of Housing, Building and Planning, 132 of the 160 local authorities responding reported that they used registers to monitor compliance with the mandatory ventilation inspection (OVK) system. The target concerning ventilation is considered difficult to meet, particularly as ventilation systems in single-family houses are only tested when installed. Both ventilation and radon data are to be included in energy performance certificates, which in the long run will be beneficial in terms of achieving this interim target.

The Board of Housing, Building and Planning has been commissioned to carry out a survey of the technical design, energy consumption and indoor environment of buildings. One aim is to obtain better data for use in monitoring progress towards this target and formulating new interim targets. A final report is to be submitted in December 2008.

A Rich Diversity of Plant and Animal Life

Biological diversity must be preserved and used sustainably for the benefit of present and future generations. Species habitats and ecosystems and their functions and processes must be safeguarded. Species must be able to survive in long-term viable populations with sufficient genetic variation. Finally, people must have access to a good natural and cultural environment rich in biological diversity, as a basis for health, quality of life and well-being.

Will the objective be achieved?

☹️ ➡️ This environmental quality objective, which was adopted by the Riksdag in 2005, is judged to be difficult to achieve by 2020. Although substantial efforts have been made, trends in terms of biodiversity have not improved as much as is needed to fulfil national and international goals and undertakings. Data from the Swedish Species Information Centre*, for example, show that there has been no real reduction in the number of red-listed species since 2000. The obstacles to meeting the objective Sustainable

Forests also affect the prospects of achieving A Rich Diversity of Plant and Animal Life.

No overall improvement in the state of the environment with regard to this objective can be observed. More encouragingly, the rate of biodiversity loss is not as high as it was before, demonstrating that nature conservation and environmental protection efforts are having an effect. One reason it will be difficult to achieve the objective by 2020 is the long timescale of the biological processes that influence the distribution and abundance of animals and plants. Looking ahead, the impacts of climate change on biodiversity also need to be analysed.

Progress towards the overall environmental quality objective is dependent on action being taken under other objectives, chiefly Flourishing Lakes and Streams, A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos, Thriving Wetlands, Sustainable Forests, and A Varied Agricultural Landscape. Closer cooperation is called for between the authorities and sectors concerned.



Will the interim targets be achieved?

HALTING THE LOSS OF BIODIVERSITY

INTERIM TARGET 1, 2010

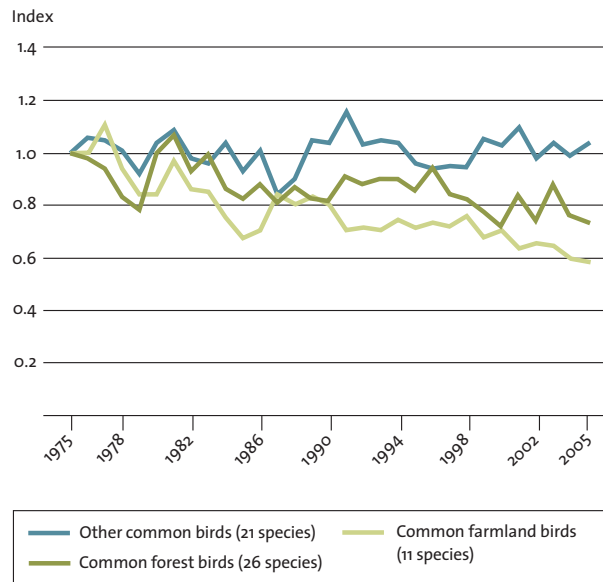
☹️ *By 2010 loss of biological diversity in Sweden will have been halted.*

The assessment for this target is that it will be difficult to achieve. Although efforts have been stepped up very significantly in recent years, losses of species, habitats and ecosystem services continue, and trends in the state of biodiversity are still predominantly negative. The main obstacle to meeting the interim target on time is the long timescale of the biological processes shaping the conditions for the occurrence of animals and plants. The reason the target is nevertheless regarded as possible to achieve is that the measures now being taken are expected to act to halt the loss of biodiversity, although by 2010 only a partial picture will have emerged of the progress made. Not until several decades beyond 2010 can we expect to have a full picture of whether the natural functions of ecosystems have been safeguarded, and whether threatened habitats and species have been restored to a favourable conservation status*.

During 2006, Sweden has been actively involved in international efforts to achieve the 2010 target*. The country has also begun the process of securing support for a new, overall international generational goal for biodiversity, going beyond the target for 2010, and has sought to develop Swedish and international indicators and monitoring systems for biodiversity.

Implementation of the Natura 2000* network will be an important factor in achieving this environmental objective. During the year, the Government decided to designate 102 new sites, making a total of 4,061 Natura 2000 sites in Sweden, together covering around 15% of the surface area of the country. These areas can continue to be used, provided that favourable conservation status is ensured for the natural habitats and species to be protected. Around 60% of Sweden's Natura 2000 sites are national parks or nature reserves.

FIG. 16.1 Population trends for a number of common bird species in Sweden, 1975–2005



SOURCE: SWEDISH BREEDING BIRD SURVEY 2005

Many species that are still regarded as common have declined very significantly as a result of changes in their habitats. This diagram shows trends since 1975 in three different indicators of Swedish bird populations. Farmland birds are faring worst of all, with a continuing decline, but the trend for forest species, too, gives cause for concern. The indicator *Other common birds*, however, shows that trends are not uniformly negative. It is important to note, not least as regards the forest birds, that these indicators are based on common species; many of the species requiring mature and undisturbed forest for example, or forest with specific characteristics, are not included. If they had been, the decline would have been even more pronounced.

The increasingly large-scale character of agriculture and forestry in the past century, combined with a variety of other activities with impacts on the environment, has affected and reshaped the Swedish landscape and its natural habitats. Some habitat types have increased in extent, while others have declined and some have almost entirely disappeared. This has benefited certain species, but on the whole the result has been a substantial loss of biodiversity.

FEWER SPECIES UNDER THREAT

INTERIM TARGET 2, 2015

☺ *By 2015 the conservation status of threatened species in Sweden will have improved to the point where the proportion of evaluated species classified as threatened will have fallen by at least 30% on corresponding figures for 2000, with no increase in the percentage of species that have become regionally extinct.*

This target is judged to be achievable, provided that action programmes for threatened species are implemented as planned, and that areas of high nature conservation value continue to be protected and managed in line with plans under the other objectives relevant to biodiversity (Flourishing Lakes and Streams, A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos, Thriving Wetlands, Sustainable Forests, and A Varied Agricultural Landscape). In addition, voluntary action in the agriculture, forestry and fisheries sectors to improve conditions for threatened species needs to be stepped up.

According to the Swedish Species Information Centre*, 1,884 species were classed as threatened in 2000, out of 19,430 species assessed. Since then, there has been no decrease in the number of species under threat. Nevertheless, the assessment is that this target can be met if further vigorous action is taken.

In 2006, 40 new action programmes for threatened species were launched. In all, 127 programmes have now been introduced or are being implemented, covering over 250 species and several habitats. The species actually referred to in the programmes will not be the only ones to benefit: the action plan for trees of high conservation value in the cultural and urban landscape, for example, will bring long-term benefits for several hundred other Red List species. A large, ancient oak can host more than 800 other species. By 2010, over 215 action programmes are intended to have been launched or implemented, covering more than 550 species.

GLOBAL RESPONSIBILITY TO CONSERVE BIODIVERSITY

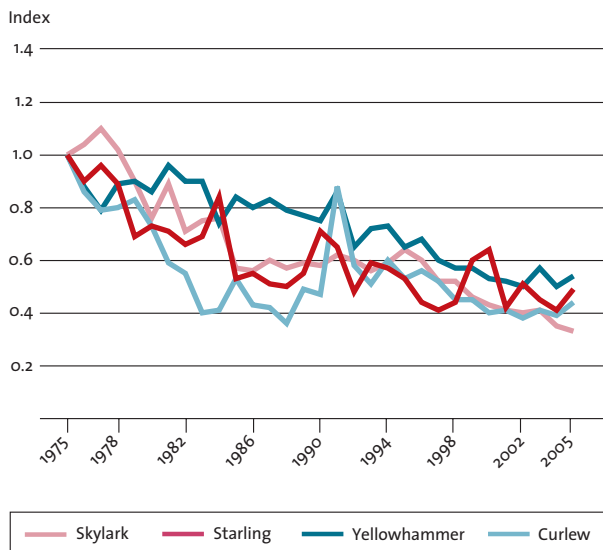
Sweden's natural environment forms part of a larger whole. The decline which several of the country's bird species have suffered, for example, may be a result of changes in the species' wintering areas. This makes clear the need for international commitments and for action that cuts across national borders. At the European level, implementation of the Natura 2000* network will be important in achieving the objective A Rich Diversity of Plant and Animal Life.

The aim of halting the loss of biodiversity by 2010 is an international undertaking (the 2010 target*), with its origins in the UN Convention on Biological Diversity (CBD) and the EU summit in Göteborg in 2001. The EU is playing a leading role in implementing the CBD, with its Habitats Directive* and Natura 2000* network. Sweden's Presidency

of the EU in 2009 will be a major opportunity to influence the international political agenda beyond the 2010 target.

In a European perspective, the natural environment of the Nordic region is unique. There are many species here that are at the limits of their ranges, many of them genetically interesting. The plants and animals of Sweden, however, make up only a small part of overall global biodiversity. The greatest diversity is to be found in many of the developing countries of the tropics. One of the biggest challenges we face is to conserve the earth's biodiversity, while ensuring that it can be used sustainably to improve human well-being the world over. International positions on ecological issues, however, rarely form a basis for the economic and legal instruments governing trade and patterns of consumption.

FIG. 16.2 Population trends for a number of breeding birds with declining numbers in farming areas, 1975–2005

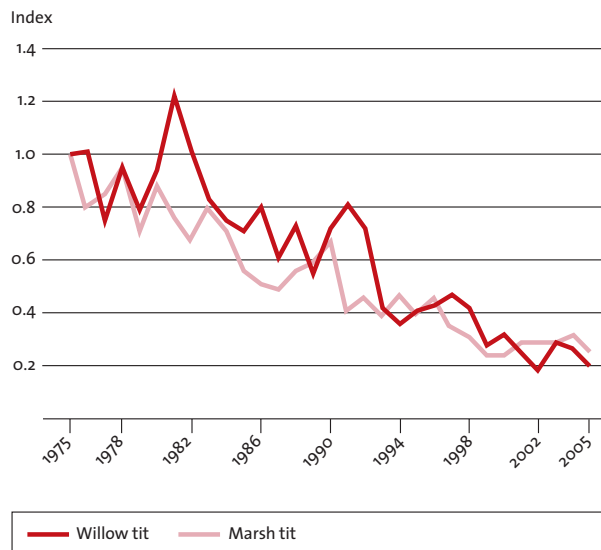


SOURCE: SWEDISH BREEDING BIRD SURVEY 2005

Many birds of Sweden's farmed landscape are in serious difficulty. This diagram shows trends for four bird species that are still common, but whose breeding populations have been reduced by half or more over the last 30 years. For example, there are now only a little over a third as many skylarks in Sweden as in 1975. The diagram shows how population levels have changed, relative to the situation in 1975.

For species classed in the Swedish Species Information Centre's Red List as *critically endangered* or *endangered*, the proposed action programmes are essential in securing the survival of viable populations. For those assessed as *vulnerable* or *near threatened*, the chief factor determining whether long-term viable populations can be maintained is the availability of suitable habitats. Here, good conservation practice in the wider countryside, and protection and management of ecosystems and their habitats, are of decisive importance. The efforts currently under way to

FIG. 16.3 Population trends for a number of breeding birds with declining numbers in forest areas, 1975–2005



SOURCE: SWEDISH BREEDING BIRD SURVEY 2005

The situation for common forest birds is not satisfactory. Here we see two examples of species that are still common in Sweden's forests, but whose breeding populations have been more than halved in 30 years. The willow tit is a typical species of coniferous forests, while the marsh tit is dependent on forests with significant numbers of deciduous trees. As both are resident species, it is reasonable to attribute their decline to changes in Swedish forests. The diagram shows how population levels have changed, relative to the situation in 1975.

establish nature reserves and other categories of protected area therefore have a major part to play in improving the conservation status of a large number of species – both threatened and more common – in the years ahead. In several parts of the country, however, improvements in the management of some of the most species-rich habitats still need to be achieved. A case in point is Sweden's ancient oak landscape, with its features of unique international interest.

SUSTAINABLE USE**INTERIM TARGET 3, 2007/2010**

☺ *By 2007 follow-up methods will have been developed with a view to ensuring that biological diversity and biological resources, both terrestrial and aquatic, are used in a sustainable manner. By 2010 biological diversity and biological resources, both terrestrial and aquatic, will be used in a sustainable manner, so that biodiversity is maintained at the landscape level.*

Methods to monitor the use of biodiversity are currently being developed, and are expected to be available by 2007. The goal of sustainable use of biological diversity and biological resources, terrestrial and aquatic, on the other hand, will be difficult to achieve by 2010.

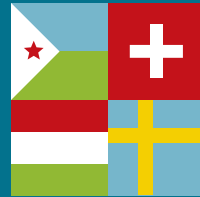
This is primarily because the necessary changes in sectors such as agriculture, forestry, fisheries, industry and urban development take time to implement. One key factor in achieving this interim target will be to ensure that use of our common natural resources is guided by a landscape approach* and better overall consideration for the environment and nature conservation. Other factors include a strengthening of voluntary protection of valuable natural environments, improved management and restoration of such environments, targeted species protection measures in agriculture, forestry and fisheries, and land use planning that incorporates, as a natural component, economic valuation of natural and cultural assets, including opportunities for recreation.

Sweden's sectoral agencies are currently defining what sustainable use entails in agriculture, forestry and the fishing industry. Other work in progress includes efforts to develop regional landscape

strategies in a number of counties, a national action programme to conserve the genetic variation of wild plants and animals, and a national strategy and action plan to establish a system to manage the introduction, translocation and release of alien species and genotypes. A research project has been started with the aim of determining the reasons for the steady decline in the populations of many common Swedish bird species (see fig. 16.1).

A wide range of measures required to achieve this interim target need to be implemented under other environmental objectives, chiefly Flourishing Lakes and Streams, A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos, Thriving Wetlands, Sustainable Forests, A Varied Agricultural Landscape, and A Good Built Environment.

The majority of Sweden's biodiversity is to be found in areas used by people for fishing, farming, forestry and settlements. The main threats to naturally occurring species are from development in areas of high conservation value, emissions of pollutants and nutrients, and agriculture, forestry and fisheries sectors that are not yet sustainable. In addition, a large proportion of threatened species are declining because human activities now have less of a beneficial impact on the natural landscape. Many traditional management regimes in farming and forestry, which once gave rise to features of considerable nature conservation interest, have been abandoned. Furthermore, human intervention has meant that many natural phenomena of great significance for biodiversity, such as flooding and fires, now occur much more rarely.



Glossary



Glossary

This glossary explains the meanings of words and abbreviations marked * in the text.

Aggregates = generic term for natural gravel, till and crushed rock used in construction and civil engineering.

Carbon dioxide equivalent = quantity of a greenhouse gas expressed as the amount of carbon dioxide that has the same impact on climate.

Clean Development Mechanism (CDM) = one of the flexible mechanisms provided for in the Kyoto Protocol. Enables countries with commitments under the Protocol to acquire emission credits ('certified emission reductions') by implementing projects in countries that are parties to the Protocol, but do not have quantified commitments – generally developing countries.

Climate Investment Programme (KLIMP) = Swedish state scheme to support investment in projects to address climate change.

Comprehensive plan = plan which local authorities in Sweden are required to prepare, indicating broadly how areas of land and water are intended to be used and how the built environment is to be developed.

Electromagnetic fields = radio waves, microwaves, visible light, ultraviolet radiation, X-rays and gamma rays are all examples of the same basic physical phenomenon, the electromagnetic wave or field.

EMEP = European Monitoring and Evaluation Programme. International programme under the UNECE Convention on Long-Range Transboundary Air Pollution (UNECE = United Nations Economic Commission for Europe).

Environmental Code = a major codification of environmental law that came into force in Sweden in 1999.

Favourable conservation status = through Natura 2000, all the EU member states are to ensure that natural habitats and species of Community interest have what is known as favourable conservation status, which means that they will be maintained in the long term and in viable populations.

Focus on Nutrients = advisory project to reduce nitrogen and phosphorus losses from agriculture and ensure safer handling of pesticides. See also www.greppa.nu.

GIS = geographic information system. Computer-based system for capturing, storing, analysing and displaying geographical data.

Göteborg Protocol = protocol to abate acidification, eutrophication and ground-level ozone. Drawn up within the UNECE (UN Economic Commission for Europe) and signed in 1999.

Habitat protection area = form of site protection provided for in the Environmental Code, used for relatively small areas of land and water.

Habitats Directive = EC Directive from 1992 on the conservation of natural habitats and of wild flora and fauna.

HELCOM = Baltic Marine Environment Protection Commission, also known as the Helsinki Commission.

Ionizing radiation = radiation with the ability to remove electrons from atoms or molecules. It may be produced by radioactive substances or technical equipment such as X-ray tubes.

IVL = IVL Swedish Environmental Research Institute Ltd.

Joint Implementation (JI) = one of the flexible mechanisms provided for in the Kyoto Protocol. Enables countries with commitments under the Protocol to acquire emission credits ('emission reduction units') by undertaking joint projects in other countries with commitments.

Kyoto Protocol = protocol to the UN Framework Convention on Climate Change, containing binding agreements to reduce emissions of six greenhouse gases.

Landscape approach = approach that considers species and habitats from a holistic point of view, taking into account the interaction between ecological, economic, cultural and historical factors over an area larger than the individual site.

Low-volume substances = substances, regulated under REACH, that are manufactured or imported in quantities of between one and ten tonnes per company per year.

Montreal Protocol = protocol containing binding agreements to reduce the use and production of substances that deplete the ozone layer.

National Emission Ceilings Directive = EU legislation setting upper limits for each member state's emissions of sulphur dioxide, nitrogen oxides, ammonia and other pollutants, to be achieved by 2010.

Natura 2000 = the EU's network of protected areas.

Nature conservation agreement = contract entered into between central government or a local authority and a landowner for the purpose of preserving and developing the natural features of a site.

OSPAR = Convention for the Protection of the Marine Environment of the North-East Atlantic (the Oslo-Paris Convention).

Paraquat = herbicide of high acute toxicity that poses lethal risks to agricultural workers in the developing world.

PM₁₀, PM_{2.5} = inhalable particles smaller than 10 micrometres (0.01 mm) and 2.5 micrometres in diameter, respectively.

Ramsar Convention = Convention on Wetlands of International Importance especially as Waterfowl Habitat. Adopted in Ramsar, Iran, in 1975.

REACH = Registration, Evaluation and Authorization of Chemicals – the new EU legislation on chemicals.

RoHS Directive = EC Directive banning the use of mercury, cadmium and lead in new electrical and electronic equipment put on the market from 1 July 2006.

Rotterdam Convention = convention requiring prior informed consent before certain hazardous chemicals and pesticides are imported.

Rural Development Programme = EU-funded programme to support environmentally, economically and socially sustainable development of the Swedish countryside (the most recent one covering the period 2007–13).

SAICM = Strategic Approach to International Chemicals Management. A global strategy on chemicals.

SLU = Swedish University of Agricultural Sciences.

Stockholm Convention = convention to protect human health and the environment from persistent organic pollutants (POPs).

Swedish Species Information Centre = centre which assesses the status of species and prepares Red Lists of species subject to different types and degrees of threat.

2010 target = international environmental goal originating in the Convention on Biological Diversity (CBD), calling for the loss of biological diversity to be halted or significantly reduced by 2010.

UNEP = United Nations Environment Programme.

UNFCCC = United Nations Framework Convention on Climate Change.

WMO = World Meteorological Organization.

WTO = World Trade Organization, a body in which the countries of the world negotiate on the rules of international trade.



The Environmental Objectives Council

The Environmental Objectives Council was established by the Swedish Government on 1 January 2002 to promote consultation and cooperation in implementing the environmental quality objectives laid down by the Riksdag. The Council consists of representatives of central government agencies, county administrative boards, local authorities, non-governmental organizations and the business sector.

The principal functions of the Council are:

- on an annual basis, to review, assess and report to the Government on overall progress towards the environmental quality objectives and regional efforts to attain them,
- to submit the analysis required as a basis for the Government's recurring in-depth evaluation of efforts to achieve the environmental objectives,
- to be responsible for overall information on the objectives and progress towards them,
- to promote overall coordination of the regional application of the environmental quality objectives,
- to allocate funding for monitoring of progress towards the objectives, environmental monitoring, and some reporting at the international level, and
- to consult with the authorities concerned and provide them with the guidance they need for their reporting on the environmental objectives.

MEMBERS OF THE ENVIRONMENTAL OBJECTIVES COUNCIL

appointed by the Government

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Peter Wenster, Swedish Association
of Local Authorities and Regions

Linda Hedlund, Federation of Swedish
Farmers

Sweden's environmental objectives

de Facto 2007

– in an interdependent world

This is the Environmental Objectives Council's annual report to the Swedish Government. The draft texts and data on which it is based have been supplied by the agencies responsible for the environmental quality objectives (see below). The chapter on the environmental objectives in an interdependent world has been prepared by the International Secretariat of the Swedish Environmental Protection Agency. Comments on the material included have been made by the organizations represented on the Environmental Objectives Council, through its Progress Review Group.

Environmental quality objectives

1. **REDUCED CLIMATE IMPACT**
Swedish Environmental Protection Agency
2. **CLEAN AIR**
Swedish Environmental Protection Agency
3. **NATURAL ACIDIFICATION ONLY**
Swedish Environmental Protection Agency
4. **A NON-TOXIC ENVIRONMENT**
Swedish Chemicals Agency
5. **A PROTECTIVE OZONE LAYER**
Swedish Environmental Protection Agency
6. **A SAFE RADIATION ENVIRONMENT**
Swedish Radiation Protection Authority
7. **ZERO EUTROPHICATION**
Swedish Environmental Protection Agency
8. **FLOURISHING LAKES AND STREAMS**
Swedish Environmental Protection Agency
9. **GOOD-QUALITY GROUNDWATER**
Geological Survey of Sweden
10. **A BALANCED MARINE ENVIRONMENT, FLOURISHING COASTAL AREAS AND ARCHIPELAGOS**
Swedish Environmental Protection Agency
11. **THRIVING WETLANDS**
Swedish Environmental Protection Agency
12. **SUSTAINABLE FORESTS**
Swedish Forest Agency
13. **A VARIED AGRICULTURAL LANDSCAPE**
Swedish Board of Agriculture
14. **A MAGNIFICENT MOUNTAIN LANDSCAPE**
Swedish Environmental Protection Agency
15. **A GOOD BUILT ENVIRONMENT**
National Board of Housing, Building and Planning
16. **A RICH DIVERSITY OF PLANT AND ANIMAL LIFE**
Swedish Environmental Protection Agency

Broader issues related to the objectives

- I. **THE CULTURAL ENVIRONMENT**
National Heritage Board
- II. **HUMAN HEALTH**
National Board of Health and Welfare
- III. **LAND USE PLANNING AND WISE MANAGEMENT OF LAND, WATER AND BUILDINGS**
National Board of Housing, Building and Planning

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A Swedish version has also been published, ISBN 91-620-1259-2.



SWEDEN'S ENVIRONMENTAL OBJECTIVES IN AN INTERDEPENDENT WORLD – DE FACTO 2007

de Facto is the annual report of the Swedish Environmental Objectives Council to the Government of Sweden on progress towards the country's 16 environmental quality objectives. In this year's report, the sixth, the focus is on the international dimensions of efforts to achieve these goals. Progress towards many of Sweden's environmental objectives is affected to a large degree by the actions of governments, authorities, companies and individuals in other countries. This is true of several of the objectives that are judged to be very difficult to achieve, such as Reduced Climate Impact, Clean Air and Natural Acidification Only. This year, the goal of A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos joins the seven objectives previously assessed as being very difficult to meet.

