

SWEDEN'S ENVIRONMENTAL

objectives

– Buying into a better future

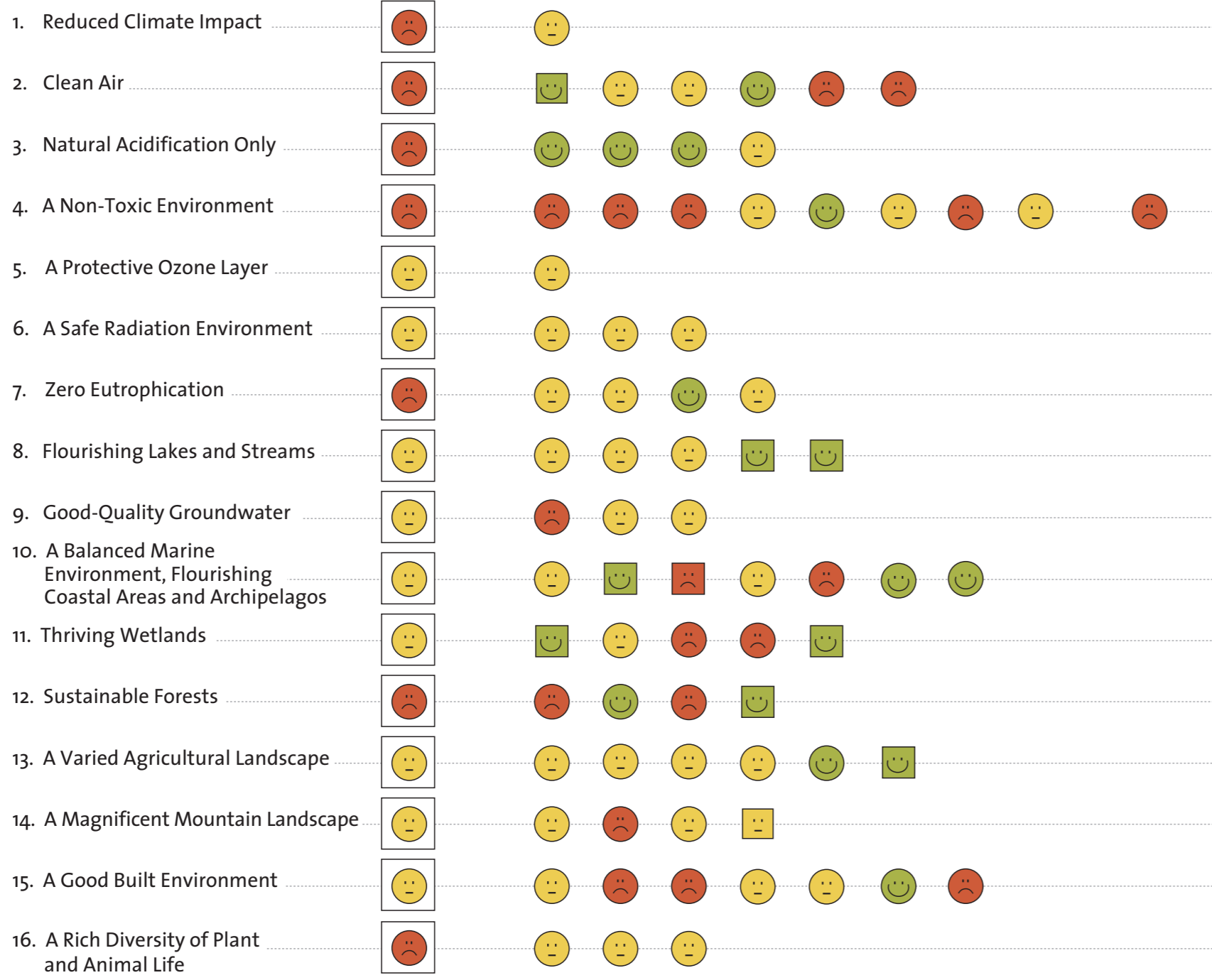


**ENVIRONMENTAL
QUALITY OBJECTIVE**

Will the objective
be achieved?

Will the interim targets be achieved?

1 2 3 4 5 6 7 8 9



Will the environmental objectives be achieved?

The assessments presented here relate to the objectives and targets that apply following a decision by the Swedish Parliament in November 2005. The diagram is not directly comparable with those in earlier editions of *de Facto*. Explanations of the assessments reached, which will make this summary easier to understand, can be found in the chapters on the different objectives.

An environmental quality objective is more than the sum of its interim targets, and our assessments also take into account other factors and circumstances. The objectives are long-term, whereas – with a few exceptions – the interim targets can be seen as staging posts, to be reached just a year or a few years from now. In some cases an environmental quality objective may prove difficult to achieve, despite favourable assessments for most of the interim targets involved.

Two examples of how progress towards an objective depends on more than our success in attaining the interim targets are Zero Eutrophication and Natural Acidification Only. In these cases, the assessment is that the interim targets can be met. And yet there is a considerable risk that the states which the two

objectives describe will not be achieved on time. Why? The answer is that the nutrients and acidifying substances responsible for the problems originate to a large extent in other countries, which means that action in Sweden alone will not be enough to attain these objectives. In addition, the natural environment will need time to recover. These factors apply in the case of the ‘red’ objectives Natural Acidification Only, Zero Eutrophication, Sustainable Forests and A Rich Diversity of Plant and Animal Life.

The fact that we are still some way short of implementing the environmental objectives, despite the intense nature conservation and environment protection efforts of the last decade, does not mean that those efforts have not had, or will not have, any effect. On the contrary, the action taken has been beneficial for the environment. The main obstacles to reaching the objectives by the target dates are the long timescale of biological processes and the fact that other countries besides Sweden also influence our environment.

Further information can be found on the Environmental Objectives Portal, www.miljomal.nu.

The assessments shown indicate whether the environmental quality objectives will be achieved by 2020 (2050, as a first step, in the case of Reduced Climate Impact) and whether the interim targets will be met by the dates set for them. For targets that were to be achieved by 2005, square symbols are used. Where such targets have not yet been attained, efforts will continue.

Target year

not passed passed



Current conditions, provided that they are maintained and decisions already taken are implemented in all essential respects, are sufficient to achieve the environmental quality objective/interim target within the defined time frame.



The environmental quality objective/interim target can be achieved to a sufficient degree/on a sufficient scale within the defined time frame, but further changes/measures will be required.



The environmental quality objective/interim target will be very difficult to achieve to a sufficient degree/on a sufficient scale within the defined time frame.

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Preface

Following a decision by the Riksdag (the Swedish Parliament) in 2005, Sweden now has a total of sixteen environmental quality objectives and seventy-two associated interim targets. A new environmental quality objective, ‘A Rich Diversity of Plant and Animal Life’, has been adopted. Several of the interim targets have been revised, some of the earlier ones have been dropped and a few new ones have been introduced.

The environmental quality objectives describe the quality and state of the environment and natural and cultural resources of Sweden which the Riksdag judges to be environmentally sustainable in the long term. The interim targets indicate the direction and timescale of the action to be taken to achieve those objectives.

Together, the objectives and targets serve to guide Sweden’s efforts to safeguard the environment, at the national and international levels – efforts which form a central part of our commitment to a sustainable society.

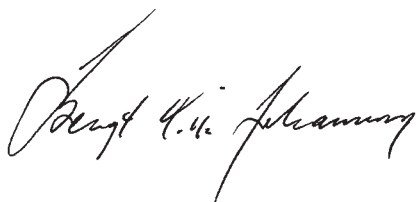
To attain these environmental goals, we all have to play our part, from government agencies, local authorities and the business community to organizations and consumers. As consumers, each one of us has a responsibility. In this, its fifth annual report to the Government, the Environmental Objectives Council has therefore chosen to look in particular at the implications of consumption for progress towards the objectives. The chapter ‘Household consumption and the environmental objectives’ has been drafted by the Swedish Consumer Agency. The main body of the report is devoted to the sixteen environmental quality objectives and the interim targets set for each of them.

Our assessments of progress towards the objectives and targets are summed up using smiley and sad faces. These can be regarded as overall indicators of trends in the environment, measured against the different goals. The assessments presented answer the questions: Will the environmental quality objectives be achieved and will the interim targets be met within the time frames laid down for each of them? It should be made clear, though, that the smiley/frowny symbols do not always reflect the actual state of the environment, but rather the prospects of reaching the objectives



and targets. That means that the environmental situation may have improved, but it may still be considered difficult to attain the goal set. Our assessments of progress on two of the objectives, Clean Air and Natural Acidification Only, have for example been revised from amber to red. These goals will be very difficult to achieve, even though a wide range of action is being taken and things are, by and large, moving in the right direction. The new environmental quality objective, A Rich Diversity of Plant and Animal Life, will also, in our judgement, be difficult to attain on the time-scale envisaged. The chapters on the individual objectives explain the reasoning behind our assessments.

At www.miljomal.nu, readers will find further information on the environmental objectives, indicators tracking progress at the national and regional levels, and links to relevant authorities and organizations.



Bengt K. Å. Johansson
Chairman, Environmental Objectives Council



Buying into a better future

A PROGRESS REPORT FROM THE SWEDISH
ENVIRONMENTAL OBJECTIVES COUNCIL

Consumption has effects

To achieve Sweden's environmental quality objectives, there will need to be changes in both lifestyles and patterns of consumption, in society as a whole and on the part of every individual. The conditions which society creates for making sustainable and environment-friendly choices, and our actual day-to-day choices as consumers, are key factors in securing progress towards the objectives. 'The consumer is king,' it is said. Get enough consumers together, and the effects of environmentally aware consumer behaviour can be significant. The authorities have a range of regulatory and economic instruments at their disposal, as well as various means of disseminating information, but consumer choices are still important. The idea that everything is in the hands of the individual, though, is an oversimplification. The actions of the authorities, including in the area of public procurement, are also of great significance. The interplay between policy instruments and their effects on the sum total of people's habits and behaviour needs to be better understood than it is at present.

Seven of the sixteen environmental objectives are currently judged to be very difficult to achieve within the defined time frame. For two of them, Clean Air and Natural Acidification Only, this is a new assessment compared with last year. The new, sixteenth objective, A Rich Diversity of Plant and Animal Life, is also considered very hard to attain on the timescale

envisaged. When it comes to the role of consumption in promoting or obstructing progress towards these objectives, there are a range of measures that can be introduced. For the other nine goals, our forecast remains that they can be achieved on time if further measures are put in place, including policy instruments to change consumer behaviour. Given that the Environmental Objectives Council's assessment is that seven of the sixteen objectives will not be reached within the defined time frame, we wish to draw attention to a number of areas, relevant to these difficult objectives, in which changed patterns of consumption could nevertheless be of major significance in helping us to move closer to our goals.

Will the national objectives be achieved?

RED OBJECTIVES

For two of the environmental quality objectives, our assessment has been revised from amber to red. Clean Air will be difficult to achieve because in 2020, in our judgement, air pollutants such as particulates will still be causing damage, not least to health. In the case of Natural Acidification Only, improved scientific understanding makes it clear that recovery of the natural environment will take a long time. A wide range of action is being taken to reach the objectives, and by and large progress is being made,



but for these particular ones it does not look as if this will be enough. In the view of the Environmental Objectives Council, the new objective A Rich Diversity of Plant and Animal Life will be very difficult to attain, given the time that will be needed to reverse the threats both to certain habitats and to a number of species. Vigorous measures are called for.

Reduced Climate Impact

The Council considers it of great importance that the objective Reduced Climate Impact is achieved. For that to happen, Sweden must play an active role in maintaining far-reaching goals in international agreements, as well as being prepared to adopt measures and implement programmes at home to meet the interim target that has been set. Emissions of greenhouse gases from the residential sector have fallen, partly thanks to many households switching from oil to renewable forms of energy. Transport emissions, on the other hand, are rising. Reduced dependence on fossil fuels, through investments in renewable energy sources and improved efficiency in both the transport and the energy sector, is of crucial importance in bringing this objective within reach. The Council also regards measures to encourage changes in consumption patterns, including travel habits, as a crucial factor.

Clean Air

Overall, it is very doubtful at present whether the environmental objective Clean Air will be achieved on time and here, therefore, the Environmental Objectives Council is changing its assessment from amber to red. This has to do with the expectation that, in 2020, exposure to small particles (PM2.5) will in all likelihood still shorten average human life expectancy in Sweden by two months. In addition, levels of ozone in 2020 are expected to be such that the number of premature deaths attributable to that pollutant will not be falling at the desired rate compared with today, and that critical levels for forests will still be exceeded by 4%.

As regards emissions of particulates to air, use of studded winter tyres in built-up areas is currently a major problem. The Council wishes to emphasize the importance of stepping up efforts already in hand to reduce the effects of abrasion of particles by tyres of this type.

Natural Acidification Only

In the light of new, improved calculations of critical load exceedance, the Environmental Objectives Council is likewise revising its appraisal for the objective Natural Acidification Only from amber to red, indicating that this goal will not be achieved on time either. The Council's assessment is that the reduction in loadings to Sweden's acid-sensitive natural environment will not be enough to repair the adverse effects of acidification within the defined time frame. Continuous improvements in the performance and efficiency of technology have led to lower emissions of acidifying compounds. Reducing national pressures on the environment in this respect, though, will take more than just technical improvements; it will also require, among other things, a decrease in the amount of freight carried by road. As pollutants travel long distances and across national frontiers, progress towards this objective will above all be dependent on agreements and action within the EU and on a wider international basis.

A Non-Toxic Environment

The Council's assessment is, as before, that the environmental quality objective A Non-Toxic Environment will be very difficult to achieve on the timescale laid down. Systematic efforts at the international level must continue. The Council also wishes to point out that consumption of ecolabelled products and services can help to attain this objective. The legislation being developed within the EU – REACH – is a tool that could facilitate progress towards the objective and its interim targets. However, the proposal has yet to be finalized.



Zero Eutrophication

The four interim targets under Zero Eutrophication appear to be within reach, provided that additional action is taken. Despite this, it does not look as if the overall objective will be achieved within the defined time frame. Large-scale natural fluxes of nitrogen and phosphorus and the long timescale of recovery mean that the effects of the measures implemented will not be sufficient to bring about the desired state of the environment.

Sustainable Forests

Our assessment for Sustainable Forests remains that this objective will probably not be attained on time, mainly owing to the long timescale of many of the biological processes involved. In addition, a great deal of damage is still being caused to archaeological and cultural remains. The Environmental Objectives Council takes the view that more must be done than at present to protect valuable forest areas, and that future forestry legislation needs to take into account the social values of forests.

A Rich Diversity of Plant and Animal Life

In November 2005, the Riksdag adopted a new, sixteenth environmental quality objective, A Rich Diversity of Plant and Animal Life, and three associated interim targets. This is the first time progress towards these goals is being evaluated. At the present juncture, the Council's assessment is that the objective will be very difficult to achieve within the time frame set. Action in this area needs to be made even more effective, more focused and better coordinated. A review of existing policy instruments and resources may also be necessary.

AMBER OBJECTIVES

Nine of the environmental quality objectives are considered capable of being achieved on time, provided that further action is taken. In several cases, such as A Protective Ozone Layer, international agreements on relevant measures will be needed to attain the

goals by the deadlines set. A Varied Agricultural Landscape and A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos are also dependent on developments in the framework of the EU's Common Agricultural Policy.

For some of the objectives, such as A Good Built Environment, effective policy instruments are not available, making it difficult to bring about the necessary action. Several of the goals – A Safe Radiation Environment, Flourishing Lakes and Streams, Good-Quality Groundwater and Thriving Wetlands – will only be met if all the relevant stakeholders introduce new measures or strengthen existing ones. As for A Magnificent Mountain Landscape, the Environmental Objectives Council emphasizes in particular that further research, survey and information efforts and new arrangements to improve collaboration on mountain issues will be necessary to achieve the objective.

Support and incentives for consumers

Effective economic and regulatory instruments are needed, combined with a greater understanding of the links between our consumption and effects on the environment. In the Environmental Objectives Council's view, it is important to provide a clear, tangible picture of these links, both to foster understanding of how the individual can help to improve the environment and to create public acceptance for regulatory and economic instruments. An important factor in this context, the Council believes, is action of various kinds to make it easier for households to make sustainable choices.

A range of specific suggestions as to what the individual can do to help achieve the environmental quality objectives already exist. The Council itself offers a number of such suggestions on its Environmental Objectives Portal, www.miljomal.nu. Ideas are also to be found on the websites of many local authorities, the Swedish Consumer Agency and



non-governmental organizations (e.g. the Swedish Society for Nature Conservation and Friends of the Earth Sweden, to mention just two).

In the context of public procurement, it is becoming increasingly common to apply environmental criteria in the selection of suppliers of goods or services. County councils and local authorities have done more in this area than the central government sector. The Council sees environmentally sustainable public procurement as an important tool for society as a whole, and wants to see central government assuming its responsibility in this area to the full. One possible way forward is to make greater use of the tools that now exist to facilitate green purchasing, such as the Swedish Environmental Management Council's EKV instrument.

The Environmental Objectives Council believes that, with media attention and growing public awareness and access to information, we are now better placed to understand and follow the entire chain of cause and effect, from our individual choices, via changes in the local environment, to national and global environmental impacts.

ECOLABELLING OF PRODUCTS – A GOOD DEAL

Environmental labelling of products is a very good way of helping consumers to make environmentally aware choices. A survey commissioned by the Consumer Agency reveals a high level of public confidence in established ecolabelling schemes. In the food sector, as many as 96% of Swedish consumers recognize the KRAV organic label, and almost half of households, 43%, say that organic products make up at least a tenth of their purchases. The Fairtrade label, too, is well established among the country's consumers. In 2005, sales of Fairtrade products rose by 52%.

Increased sales of locally produced beef from animals reared on traditionally managed pastures are good for biodiversity. They also reduce the need for long-distance transport to get the meat onto our

plates. By choosing ecolabelled fish, consumers can avoid adding to the growing problem of overfishing of our seas. Here, both information and advertising about links, causes and effects can strengthen the individual's sense of how things are connected and what he or she can do to promote sustainability.

Consumption here has effects there

The Environmental Objectives Council wishes to point out that the environmental impacts of our consumption can extend far beyond our own country's borders, affecting the state of the environment in other parts of the world.

Many of the products consumed on a day-to-day basis in Sweden are produced overseas, or are based on raw materials which are. Consequently, our choices also have environmental repercussions in other countries. Production of coffee and bananas and of products containing palm oil or soya, for example, affects the environment many thousands of kilometres from the final consumer.





household consumption and
the environmental objectives

Household consumption and the environmental objectives

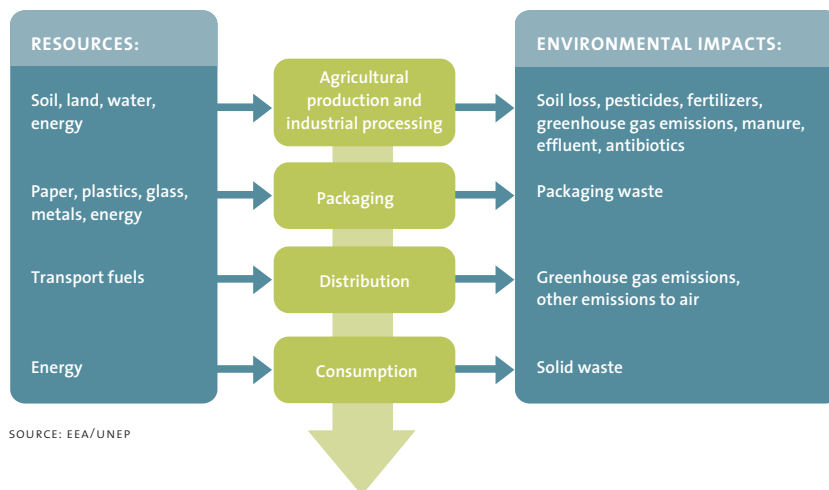
The environment – a part of sustainable consumption

Household consumption has recently figured particularly prominently on the environmental agenda. During 2005, a Swedish government inquiry to develop a plan of action for sustainable household consumption was completed. The final report (*Bilen, biffen, bostaden* – ‘Transport, food and housing’), published in May, presented some 60 different measures to make it easier for households to consume sustainably, in both environmental and economic and

social terms. The final issue for 2005 of the journal of the Swedish Society for Nature Conservation had consumption and lifestyle as its theme. And in March 2006 the Government presented a bill to the Riksdag entitled ‘Safe consumers who shop sustainably – The goals and direction of consumer policy’.

Sweden’s environmental quality objectives are concerned with the environmental dimension of sustainable development. The consumption choices made by households also affect progress towards these objectives, and it is important in this connection

FIG. B.1 Environmental impacts of food consumption



SOURCE: EEA/UNEP

Using food as an example, this diagram shows how the production–consumption–waste chain involves several stages in which environmental impacts can arise. Other areas of consumption could be similarly described.



to take a broad, overall view of sustainability. Measures designed to make household consumption environmentally sounder should, for instance, also take into account households' economic and social circumstances. In addition, they should help to ensure that everyone is able to lead a good life, and that the economy as a whole remains on track.

The expression 'household consumption' is used here to refer to the products and services which households buy, but also to the ways in which products are used and households dispose of their waste.

FACTORS BEHIND CONSUMPTION PATTERNS

Swedes in general feel that environmental issues and action to reduce impacts on the environment are important. The fact that consumers attach importance to these issues and are well informed about them, however, does not automatically translate into environmentally sound consumption. Numerous factors affect buying choices and other consumption patterns, including needs, social group, purchasing power, habits, prices, and existing infrastructure. Many consumers feel that environment-friendlier consumption is too demanding. This is particularly true of areas of consumption in which there are significant barriers to change, for example where the alternatives cost more or are more time-consuming.

Creating conditions for sustainable consumption

A report from the Swedish Environmental Protection Agency in 2004 on Swedish action to promote sustainable production and consumption identified a number of factors as important in achieving sustainable consumption. A linchpin in any effort in that direction is that it must be easy and financially advantageous to choose sustainable alternatives. The costs of environmental impacts need to be reflected in the prices of goods and services, a state of affairs that can be achieved through the use of economic instruments. Support for technological development as a basis for sustainable products is also mentioned as important, as are educational initiatives.

Over the years, and especially in recent decades, much has been done to reduce the environmental impacts of household consumption. Many consumer products have become more eco-friendly and energy-efficient. Meanwhile, though, the overall volume of consumption has increased, largely eroding the environmental gains achieved.

How can household choices be changed?

Taking households themselves as our starting point, there are three main routes to achieving changes in household consumption that will reduce pressures on the environment:

1. 'Greener consumption' – consumers choose the environmentally soundest alternatives when consuming.
2. Consumers shift their consumption from goods to services with small environmental impacts, such as the arts, education and so on.
3. Overall consumption is reduced – households opt for lower incomes and lower consumption in exchange for more leisure.

Numerous suggestions as to how households can 'green' their consumption have been put forward. The Environmental Objectives Portal lists a few examples for each objective.

Promoting environmentally sound consumption

The wider society in which we live has a major role to play in facilitating consumption that is better for the environment. To achieve progress in that direction, action needs to be taken by a wide range of agencies and organizations:

- The Government, the Riksdag and government agencies need to create favourable basic conditions for environmentally sound household consumption. This can be achieved through infrastructure projects, economic and regulatory instruments, information campaigns and public procurement.



- Companies need to offer consumers environmentally sound products and services.
- Local authorities are very well placed to exert an influence and can do so in a variety of ways, for example through physical planning, procurement, school and pre-school education, and information to households.
- Organizations and others can encourage change, both directly in their dealings with consumers and in their interaction with other stakeholders.

Environmental impacts in a global perspective

Trade is now a global phenomenon, and Swedish households consume goods that are produced in every part of the world. Figures from Statistics Sweden show that up to a third of the pollutant emissions attributable to Swedish household consumption arise outside Sweden from the production and transport of products which we import.

Pollution is not the only problem, however. The environments of countries that export to us may also be adversely affected by depletion of natural resources and impacts on biodiversity, a point made clear in a report on ‘The missing environmental objective’, published by Friends of the Earth Sweden in 2004. If more and more ‘Swedish-consumed’ products are produced abroad, in other words, there is a danger that emissions and other pressures on the environment will be reduced at the national level, but at the price of increased impacts in other countries. This is not acceptable from a global sustainability point of view. There is thus every reason to monitor trends in the environmental impacts which Swedish consumption has in other parts of the world.

Implications for the environmental objectives

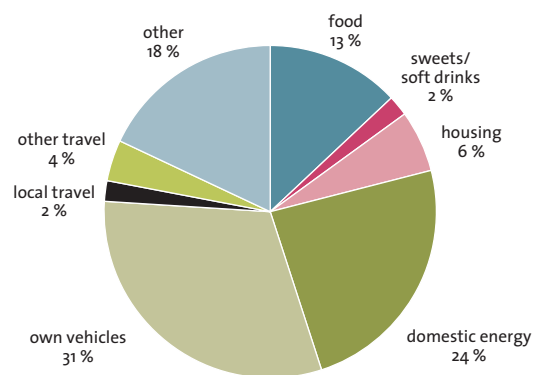
As for how these factors affect Sweden’s environmental objectives, the picture is more complex. Locally, we will see greater progress towards the objectives if

production with adverse impacts on the environment moves abroad. This would be the case, for example, with factories emitting pollutants that do not disperse over very great distances. On the other hand, for aspects of biodiversity that are dependent, say, on grazing livestock, the implications for the objectives will be unfavourable if production in Sweden declines as a result of imports. In the case of transboundary environmental pressures, whether the national objectives are affected in a positive or negative direction will vary from one type of impact to another.

Imports also open to consumer influence

Two imported products that have been much debated in recent years are palm oil and tiger prawns. They are examples of how ever growing areas and resources in developing countries are being used to produce commodities for export to richer nations. Expanding plantations and pastures for export-oriented production transform plant and animal habitats on a large scale,

FIG. B.2 Total emissions of carbon dioxide (CO₂) from household consumption in 2003, by area of consumption



SOURCE: STATISTICS SWEDEN/ENVIRONMENTAL AND ECONOMIC ACCOUNTS

The dominant sources of household emissions of carbon dioxide are the categories ‘Own vehicles’ (chiefly cars) and ‘Domestic energy’. This diagram provides a good picture of the situation from the point of view of climate change, but similar comparisons for other environmental impacts are harder to find.



and are a major factor behind species extinctions. Environmental problems of this kind can also be found in sectors such as mining, clothing and engineering.

Changes in consumer choices regarding imported products, too, can help to improve the environment. It is important, though, to apply a broad view of sustainability in these contexts, since consumer boycotts, for example, can have undesirable economic and/or social consequences. Progress can be achieved, for instance, if consumers buy ecolabelled and/or Fairtrade products, authorities and others provide information and education on these issues, and companies seek to promote both social and environmental responsibility in their production and supply chains.

Scale of environmental impacts of household consumption

A number of reports over the years have shown that, with existing patterns of production and consumption, household consumption accounts for a significant share of different impacts on the environment. Changes in patterns of consumption consequently have great potential to help achieve the environmental quality objectives. In order to focus on changes that will bring maximum benefits for the environment, it is important to be clear about what is 'big' and 'small' in terms of areas of consumption and activities on the part of households that give rise to environmental impacts.

KEY AREAS OF CONSUMPTION

Various studies, for example at the Environmental Strategies Research Centre at Stockholm's Royal Institute of Technology, have attempted to rank different product groups according to their impacts on the environment, although it is difficult to get hold of comprehensive data for such studies. In the absence of a really good overall knowledge base on this subject,

the following areas of consumption can be identified as particularly important:

- Passenger transport
- Domestic energy use
- Food
- Other products
- Waste management

PASSENGER TRANSPORT

Household travel, particularly by car and air, has major impacts on the environment. The environmental objectives Reduced Climate Impact, Clean Air and A Good Built Environment are affected to a particularly high degree. There is much to suggest that it is in the area of passenger transport that households have the greatest potential to contribute to achieving the environmental objectives by changing their patterns of consumption.

Trends

In Sweden, passenger transport has grown by about 70% since 1970. Up to 2020, a further increase of 37% is predicted. A steep rise in car use is the most important factor behind the overall increase. As for emissions from passenger transport, those of carbon dioxide have largely matched the growth in traffic, while parameters such as nitrogen oxides and hydrocarbons from cars show substantial decreases since the 1980s. The latter improvements can be attributed to advances in engine and emission abatement technology.

'Clean' cars

Sweden continues to have Europe's most 'fuel-thirsty' vehicle fleet. 2005, however, saw a sharp rise in sales of what are termed 'clean cars'. These were mostly new vehicles bought as official or company cars, although in a few years' time the same vehicles will be available to households on the second-hand market. This is still only a marginal phenomenon



compared with the overall fleet and total sales of new vehicles, but hopefully it could mark the start of a trend that will turn the tide as regards carbon dioxide emissions. The potential for fuel-efficient vehicles and changes in travel behaviour and car use is considerable. Furthermore, many local authorities have used or plan to use state investment grant schemes, such as Local Investment Programmes (LIPs) and the Climate Investment Programme (Klimp), to introduce measures to reduce transport emissions.

DOMESTIC ENERGY USE

The factor of greatest significance for energy consumption in our homes is heating. All forms of energy use have some kind of environmental impact, and the methods used to produce the energy determine which of the environmental objectives are affected. Relevant objectives include Reduced Climate Impact (oil-fired heating), Flourishing Lakes and Streams (hydroelectric power), Thriving Wetlands (peat-fired heating), A Safe Radiation Environment (nuclear power) and Clean Air (small-scale wood-fuelled heating). Heating is the biggest source of emissions, especially of carbon dioxide, followed by domestic consumption of electricity. Use of hot water, too, consumes a great deal of energy.

Trends

Over the period 1983–2002, the amount of energy per unit area used to heat Swedish homes decreased. Meanwhile, however, domestic consumption of electricity for purposes other than heating (appliances, home electronics, lighting etc.) showed a marked rise. This is hardly because such uses of electricity have become less efficient, but rather is a result of the ever growing quantity and size of equipment in our homes. The fact that more and more devices are constantly left on standby makes a difference, too. The period mentioned also saw an increase in the total floor space of dwellings. All in all, this meant that total energy use in homes remained relatively constant over the period.

Heating systems

Our dependence on oil for domestic heating, which before the oil crises was very marked, has been greatly reduced. This is due partly to a shift to other fuels in collective systems such as district heating, but also to changes in individual households. Over the last decade, sales of wood pellets, heat pumps and solar collectors have risen significantly: the use of pellets in houses, for example, has almost quadrupled since 1999. And on 1 January 2006 a grant scheme was introduced to encourage households to replace oil-fired systems and electric space heating with other alternatives. Grants are available to those switching to district heating, biofuel-based heating systems, ground- or water-source heat pumps, or solar heating.

FOOD

Consumption of food and drink has very significant impacts on the environment, mainly because the production, packaging, transport and storage of food consume energy and other resources and generate emissions. Adverse pressures on biodiversity, for example from overfishing, are another key problem.

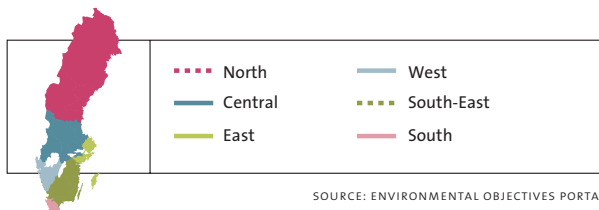
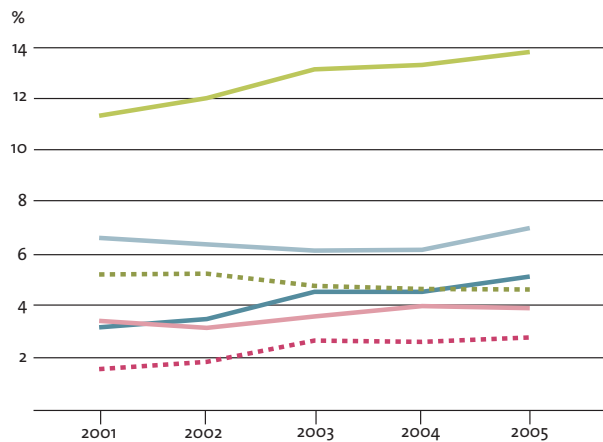
Many of the environmental objectives are affected, including A Balanced Marine Environment, Zero Eutrophication, Good-Quality Groundwater and A Non-Toxic Environment. At the same time, certain objectives are dependent on production, and hence consumption, of food being maintained. A Varied Agricultural Landscape is a case in point.

Trends

During the 1990s, food consumption changed in a number of ways that have environmental implications: the Swedish population's consumption of meat, chiefly poultry, and of exotic fruit that cannot be grown in Sweden or the rest of Europe increased, for example, while their consumption of fresh potatoes and other root crops decreased. The opposite trend would be preferable, as modern-day meat production is energy-intensive and exotic fruit has to travel long distances. Fresh potatoes and root vegetables, on the



FIG. B.3 KRAV-labelled (organic) milk as a percentage of total quantity of milk sold in litres, 2001–2005, by region (A C Nielsen standard regions)



By buying KRAV-labelled (organic) milk, consumers are supporting production in which at least 95% of the cattle feed used is grown without chemical pesticides. They are also helping to achieve the environmental objective A Varied Agricultural Landscape, as organically reared cows are put out to graze and thus keep pastures open to a greater extent than other livestock. In addition, by avoiding imported, non-organic feed, farmers are reducing environmental impacts in other countries.

other hand, are foods which, from both a health and an environmental point of view, it would make sense to consume more of. Another trend is the growing use of ready-made meals, which usually involve higher energy consumption and more packaging. Exotic fruits are not the only type of produce that entails long-distance transport. An overall trend for both ready-made meals and other foods is a globalized product range, leading to higher imports and hence reduced self-sufficiency.

The ‘SMART food’ concept has attracted growing attention in Sweden in recent years. This is a concept with a focus on both healthy and environmentally sound food, involving among other things more vegetable products, greater reliance on organic production, fewer energy-intensive vegetables grown under glass, more meat from traditionally managed pastures, and more local and seasonal produce. Organic foods have also attracted a good deal of attention, and are no longer small niche products. The Swedish national culinary team has for example highlighted organic ingredients in various contexts, not least following its victory in the 2004 Culinary Olympics. Of all the milk sold in Sweden, KRAV-labelled organic milk now accounts for 6% overall. For all categories of food, the share of organic produce is around 3%.

OTHER PRODUCTS

This category comprises the various products bought by households, other than food. Groups of products that are mentioned in studies as having major impacts on the environment include clothes, shoes, furniture, electrical goods and chemical products (such as detergents, adhesives, herbicides, paints and car waxes). The key objective in this context is perhaps A Non-Toxic Environment, but goals such as Zero Eutrophication and Clean Air are also affected by consumption of such products.

Trends

While many products of these kinds are becoming increasingly environment-friendly, as our overall consumption increases we are buying more and more of them. Product development gives rise to new chemical substances, and many products still contain substances that are known to harm the environment and/or human health. In 2005, for example, attention was drawn to silver as an antibacterial additive in various products.



WASTE MANAGEMENT

What waste households need to dispose of depends on the products they buy and the way they handle them. Waste is in other words something that can be influenced earlier on in product life cycles – in the production, purchasing and use phases. However households buy and handle products, though, there are environmental benefits to be gained from sound waste management. The objectives of greatest relevance here are A Non-Toxic Environment and A Good Built Environment.

Trends

The total amount of waste arising from households continues to rise in pace with consumption. On the other hand, the trend is for more and more of this waste to be put to use in some way, and for less and less to be disposed of to landfill. Various bodies and agencies are seeking in various ways to ensure that more household waste is separated at source.





the 16 national
environmental
quality objectives

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?

☹️ At the international level, Sweden must seek to ensure that global efforts contribute to achieving this objective, which requires atmospheric concentrations of the six greenhouse gases listed in the Kyoto Protocol, calculated as carbon dioxide equivalents, to be stabilized below 550 ppm. Sweden's climate objective includes a long-term target of reducing the country's emissions to no more than 4.5 tonnes of carbon dioxide equivalents per capita per year by 2050, with further reductions to follow.

This long-term target is based on the premise that, in the long run, emissions should be evenly distributed over the earth's population. In 2004, Swedish emissions amounted to around 7.9 tonnes of carbon dioxide equivalents per capita.

HOW CAN RISE IN AVERAGE EARTH TEMPERATURE BE LIMITED?

Underlying the goal of 550 ppm is the assessment that such a concentration will enable the 'two degree target' to be met, i.e. it will prevent the annual mean temperature of the earth from rising by more than 2 °C from its pre-industrial level. However, new estimates suggest that stabilizing greenhouse gas concentrations at around 550 ppm will in all probability not be enough to keep the temperature rise below 2 °C. Concentrations may in fact have to be stabilized at a considerably lower level, requiring additional emission reductions and hence lower per capita emissions by 2050 compared with Sweden's long-term target.

DEEP EMISSION CUTS NEEDED

To achieve the climate objective, emissions will need to be substantially reduced, above all in developed countries and rapidly growing developing nations, and in the longer term in other developing countries as well. Industrial nation emissions must begin to fall as early as 2020 if long-term goals are to be met. To bring emission trends into line with these goals,

EU heads of state and government wish to explore possible strategies to reduce greenhouse gas emissions by 15–30% by 2020, compared with 1990 levels. Unfortunately, the UN Climate Change Secretariat's latest compilation of statistics shows that emissions in the developed world rose by an average of around 9% between 1990 and 2003. The global instruments introduced have so far proved insufficient, and progress in line with the climate objective still seems a long way off.

INITIATIVES MAKE FOR BRIGHTER PROSPECTS

However, a number of initiatives have been taken that could help to turn the tide. International discussions are under way, and at the UN Climate Change Conference in Montreal in late 2005 the countries agreed to engage in a process involving two key elements:

1. Negotiations on commitments for developed countries beyond the first commitment period of the Kyoto Protocol.
2. A dialogue under the Climate Change Convention on future international cooperation to address climate change.

The European Climate Change Programme (ECCP) – the joint climate strategy of the EU – comprises a range of instruments designed to tackle the climate problem. Its most important component is the EU's emissions trading scheme from 2005, which will prepare the way for emissions trading under the Kyoto Protocol. In 2005 a review of the ECCP was launched, to improve the prospects of meeting the EU member states' joint commitment under Kyoto and to ensure that the strategy helps to achieve long-term goals.

Will the interim target be achieved?

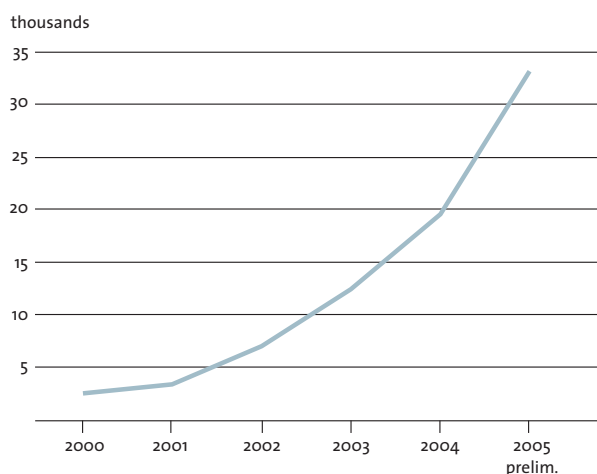
GREENHOUSE GAS EMISSIONS

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.

A range of proposals have been put forward in recent years which, if implemented, could help to meet this interim target. In 1990 emissions amounted to 72.4 million tonnes of carbon dioxide equivalents, which can be compared with the figure for 2004, for example, when they were estimated at 69.9 million tonnes. The latest projection from the Swedish Energy Agency and the Swedish Environmental Protection Agency indicates that, in 2010, emissions will be roughly 2% below their 1990 level.

FIG. 1.1 'Clean' light vehicles in Sweden



SOURCE: WWW.MILJOFORDON.SE

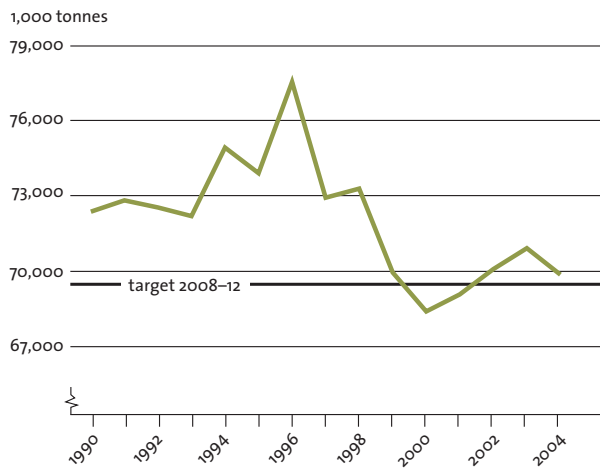
This diagram shows the rise in the total number of cars in Sweden that can be run on alternative fuels.



Sweden is one of the few countries with economic growth which, at the beginning of the 21st century, have lower emission levels than in 1990. However, Swedish emission trends vary from one sector to another.

Emissions of greenhouse gases in the residential and services sector have fallen by almost 5 million tonnes since 1990, thanks to reduced use of oil. In recent years, oil consumption has declined at an increasingly rapid rate, while the use of district heating has grown. Emissions from district heating plants have nevertheless fallen, as most of the growth in output has been based on biofuels.

FIG. 1.2a Total greenhouse gas emissions in Sweden



Note: Figures are not climate corrected

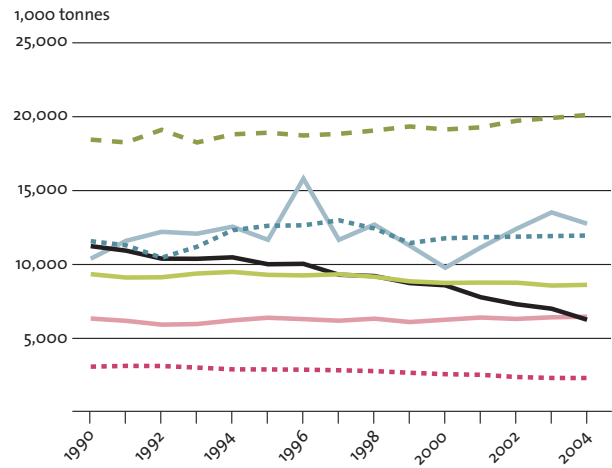
SOURCE: SWEDISH EPA

Over the period 1990–2004, Swedish emissions of greenhouse gases, calculated as carbon dioxide equivalents, have varied between 68.4 (2000) and 77.5 million tonnes (1996). Differences between years are due largely to variations in temperature and precipitation. Every year since 1999, however, emissions have been somewhat below or close to their 1990 level. In 2004 they totalled 69.9 million tonnes, 3.5% less than in 1990.

In 2004, emissions from road transport were some 1.7 million tonnes higher than in 1990, with most of the increase attributable to light and heavy goods vehicles. Cars have on average become somewhat more fuel-efficient, and the use of ethanol–petrol blends has also been of some significance. ‘Clean’ vehicles accounted for a rapidly growing share of new vehicle sales in 2004 and 2005.

In industry, the principal sectors responsible for rising emissions are iron and steel and refineries. In 2004, emissions from these sources were in all some 2.4 million tonnes higher than in 1990. Major components of these emissions are included in

FIG. 1.2b Greenhouse gas emissions in Sweden, by sector



Note: Figures are not climate corrected

SOURCE: SWEDISH EPA

Trends in greenhouse gas emissions are pointing in different directions in different sectors. The most marked decrease can be seen in the residential and services sector.



POLICY INSTRUMENT CHANGES OF SIGNIFICANCE FOR CLIMATE OBJECTIVE, PROPOSED OR DECIDED IN SWEDEN IN 2005

Swedish Road Administration

- Environmental classification scheme for new diesel vehicles with particulate filters
- Proposed new definition of 'clean vehicle'
- Rules on retrofitting of vehicles to run on alternative fuels
- Environmental classification scheme for alternative fuels (diesel fuels)

National Board of Housing, Building and Planning

- 'Stick and Carrot' – report on energy efficiency of buildings

Swedish Energy Agency

- Improved energy efficiency in the built environment

Swedish Environmental Protection Agency

- Greener public procurement – proposal for action plan

The Government

- Energy-efficient and energy-smart construction, Ds 2005:51
- Proposal for an improved system of renewables certificates, Ds 2005:29
- More stringent public procurement requirements – clean vehicles (decision)

Government and Riksdag

- Lower tax on biofuels for transport use to be extended beyond 2008
- Green reform of vehicle tax on light vehicles
- Lower tax on diesel vehicles with low particulate emissions
- Reduced 'benefit in kind' values for clean vehicles – extension and further reduction
- Tax on air travel
- Investment support for conversion from electric space heating and oil-fired heating in dwellings (decision)

emissions from electricity and heat production in international statistics and in fig. 1.2b. The main explanations for the increases are higher export demand and changes in production.

In 2004 a number of proposals with a bearing on the climate objective were presented, for example in the 'Checkpoint 2004' report and in the Swedish Road Administration's report on a climate strategy for the transport sector. Some of these proposals were considered by the Government and the Riksdag in 2005. Additional new proposals, and proposals that had been further developed, were put forward in 2005 by both government agencies and the Government itself.



Travel behaviour is a major factor affecting household emissions of greenhouse gases, especially travel by car and air. These emissions will have to be appreciably reduced if long-term targets are to be met.

Emissions from domestic energy use are also of great significance for the 'carbon dioxide profile' of households. In this area, the contribution of Swedish households is falling sharply.



Clean Air

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

Will the objective be achieved?

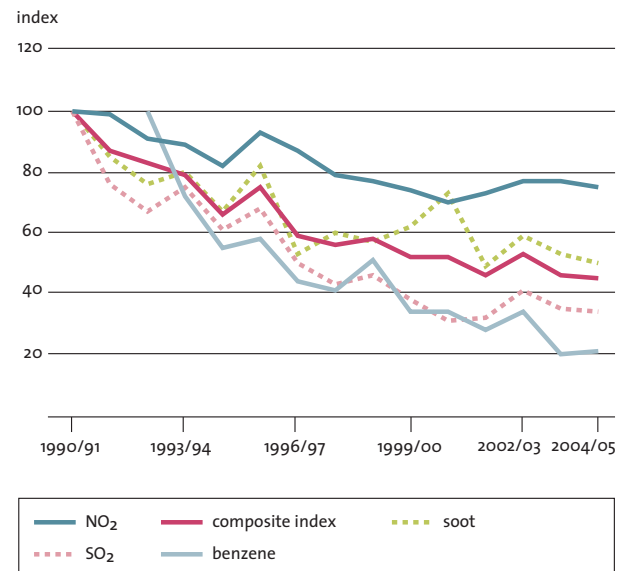
☹️ The assessment for this objective has been revised since 2005.

Air pollutants cause damage to health, natural ecosystems, materials and cultural heritage. In Sweden, exposure to air polluted with particles and nitrogen dioxide is estimated to result in a total of over 5,000 deaths every year. For two of the interim targets the present situation is satisfactory. Emissions of volatile organic compounds are falling, and the target concentration of sulphur dioxide is now met in all local authority areas. The sulphur dioxide target has thus been achieved.

As regards nitrogen dioxide levels in urban areas, the pace of remedial action is too slow. However, decisions to establish action programmes have improved the prospects of meeting the interim target on time.

Concerning the two new interim targets, for particles and benzo(a)pyrene, our assessment is less optimistic. The targets for particulates are exceeded chiefly because of emissions from road surface abrasion and resuspension of dust, while the main reason for exceedance of the benzo(a)pyrene target is probably

FIG. 2.1 Population-weighted index of air quality in Swedish towns and cities in winter months (October–March), 1990/91–2004/05



Note: Index is based on weighted average of concentrations in some 30 local authority areas. Figures for base year 1990/91: NO₂ 21 µg/m³, soot 10 µg/m³, SO₂ 5 µg/m³. Benzene concentration in base year 1992/93: 6 µg/m³.

SOURCES: IVL AND SWEDISH ENVIRONMENTAL MONITORING PROGRAMME

This diagram shows that, with the exception of benzene, the earlier improvement in air quality has not been maintained in the last few years. Particles and benzo(a)pyrene, for which new interim targets have been adopted, are not included in the index.

wood-fired heating of individual houses. More vigorous measures need to be introduced. The action decided on so far will probably be insufficient to achieve these interim targets on time.

Judging from projections in the EU's thematic strategy on air pollution, our assessment is that it will be very difficult to attain this environmental quality objective within the defined time frame. More ambitious measures are therefore called for both in Sweden and at the EU level.

Will the interim targets be achieved?

SULPHUR DIOXIDE

INTERIM TARGET 1, 2005

😊 *A level of sulphur dioxide of 5 µg/m³ as an annual mean will have been achieved in all municipalities by 2005.*

The whole of the country presumably now meets this target for sulphur dioxide. However, coastal towns significantly affected by shipping, such as Trelleborg, Oxelösund, Göteborg and Helsingborg, only do so by a small margin.

NITROGEN DIOXIDE

INTERIM TARGET 2, 2010

😞 *A level of nitrogen dioxide of 60 µg/m³ as an hourly mean and of 20 µg/m³ 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.*

The wording of this interim target was revised in 2005.

Excessive levels of nitrogen dioxide remain a problem in many urban areas of Sweden. Measurements and estimates from 2004 and 2005 show that, in roughly half of the country's towns and cities, concentrations close to busy streets could exceed the targets for hourly and annual means.

In urban air, nitrogen dioxide always co-occurs with other pollutants and thus acts as a marker for air pollution, particularly from traffic. Nitrogen dioxide in urban air is linked to both mortality and morbidity,

accounting for an estimated total of up to 2,000 premature deaths per year in Sweden as a whole. Measures to curb levels of this pollutant in urban air reduce the incidence of respiratory conditions in children, and continued monitoring of concentrations will therefore be of great value. However, the focus of action should be on tackling the particulates from vehicle emissions for which nitrogen dioxide is a good indicator in urban air.

To tackle the high levels of nitrogen dioxide in some towns, decisions have been taken to introduce action programmes for Göteborg, Helsingborg, Malmö, Stockholm, Umeå and Uppsala.

GROUND-LEVEL OZONE

INTERIM TARGET 3, 2010

😞 *By 2010 concentrations of ground-level ozone will not exceed 120 µg/m³ as an 8-hour mean.*

The target for ground-level ozone is exceeded throughout Sweden, mainly in rural areas, but also in some towns.

Ozone causes irritation of the respiratory tract and reduced lung function, and is linked to increased mortality. It is estimated that exposure to current levels of ozone could cause over 2,000 premature deaths per year in the country as a whole. Ground-level ozone also causes billions of kronor's worth of damage to crops and forests. According to estimates made in connection with the development of a European strategy on air pollution, exceedance of critical levels of ozone for forests will decrease from the present figure of 18% to 4% by 2020. By the same year, however, premature mortality will only have been marginally reduced.

Ozone mainly forms in heavily polluted air in the presence of sunlight. It is also carried across Sweden's borders, chiefly into the south of the country, and for short periods this can result in high concentrations. In rural areas, the target level was for example exceeded on between 4 and 18 days during the period April–September 2001, least often in northern



areas and most frequently in the south. The number of episodes of very high ozone concentrations is falling, but the annual mean concentration seems to be gradually rising.

Action taken across the EU as a whole is expected to help reduce ozone levels. The interim target will probably not be met during warm summers, when more ground-level ozone forms. An environmental quality standard for ozone has been introduced.

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.*

Measures to reduce emissions of benzene have resulted in a decrease of over 70% from the high concentrations recorded in urban air in the early 1990s. This decline is continuing, and the target will probably be met by 2010. In 2004, total VOC emissions in Sweden amounted to 255,000 tonnes.

PARTICLES

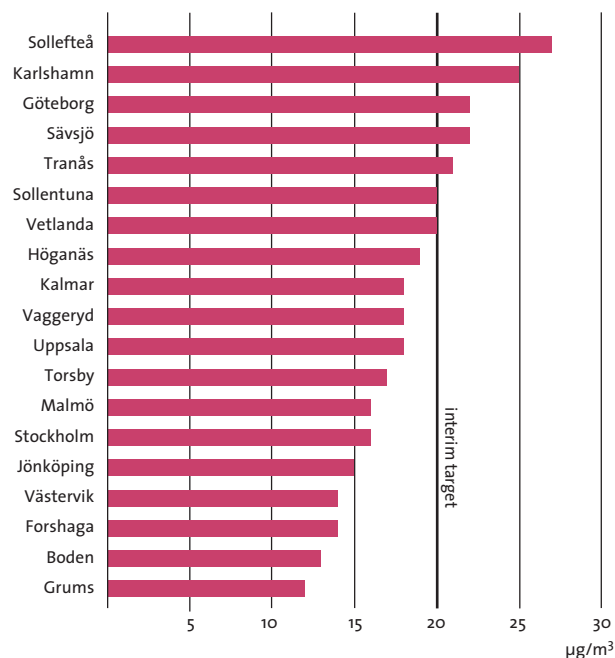
INTERIM TARGET 5, 2010

☹ *A level of particles (PM₁₀) of 35 µg/m³ as a daily mean and of 20 µg/m³ 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 µg/m³ as a daily mean and of 12 µg/m³ 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 is a new interim target for 2006.

Of the various forms of air pollution, particles are judged to represent the biggest health problem in urban areas of Sweden. It is therefore important to measure concentrations and, where action is taken, to monitor the improvements achieved. To this end, the Riksdag has introduced a new interim target for particles. PM₁₀ is a good indicator for particles from road abrasion and resuspension of dust, but somewhat less useful as an indicator for those from vehicle exhausts.

FIG. 2.2 Mean concentrations of PM₁₀ in urban background air, October 2004–March 2005



SOURCES: IVL AND SWEDISH ENVIRONMENTAL MONITORING PROGRAMME

The annual mean concentration of PM₁₀ particles set as an interim target is currently exceeded at urban background sites in small as well as large towns. It should be noted that levels can be twice as high on busy streets.

A rough estimate suggests that most towns south of the river Dalälven, and larger ones along the coast of northern Sweden, are in the risk zone in terms of exceeding the target annual mean concentration of PM₁₀ at urban background sites. Measurements made in the winter months show that the annual mean value set in the interim target is exceeded in towns of all sizes. Unfortunately, concentrations at street level have only been measured all year round in a few urban areas, and it is therefore difficult to gain a complete picture of progress towards the target. An action programme on PM₁₀ already exists for the county of Stockholm, and, following a Government decision, new ones are to be drawn up for Göteborg, Norrköping and Uppsala.

As yet, only limited data are available on PM_{2.5} particles. Estimates suggest that, in 2020, exposure to PM_{2.5} will still shorten life expectancy by about two months. The contribution of long-range transport of particles is appreciable, especially in the south of Sweden. Concerted European action to reduce particulate emissions is therefore a high priority.


The most important reasons for exceedance of the target levels are resuspension of dust and the use of studded snow tyres, which by abrading road surfaces cause substantial emissions of particles to air. The public and the tyre trade have been informed about the problem, but information alone is unlikely to be enough. The target daily mean concentrations will probably not be achieved unless additional action is taken.

Between 1990 and 2000, particulate emissions fell by about 40%, mostly as a result of reductions in the energy and industrial sectors. From 2001 to 2004, by contrast, a small rise was observed.

In 2005 an EU decision was taken to introduce new emission standards for heavy vehicles. Standards have also been adopted for non-road mobile machinery and equipment. These measures may be expected to curb releases of particles in Sweden and the rest of Europe. Particulate emission limits for both heavy and light vehicles will be tightened up with Sweden's new Environmental Class 2005 standard. The proposed lower rate of tax on diesel vehicles with low particulate emissions will, if introduced, also have a positive impact on emissions.

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.

This is also a new interim target for 2006.

Compared with past levels, concentrations of benzo(a)pyrene are low, appreciably reducing the risk of lung cancer resulting from air pollution. Even on the busiest of urban streets, concentrations are now

at or below the target level. In certain places, however, elevated levels persist. In several municipalities in inland areas of northern and central Sweden, concentrations during the colder half of the year are appreciably higher than the interim target level, and the target value laid down in an EC directive is also exceeded in a few locations. In a number of places in southern Sweden, as well, target concentrations are exceeded in winter. In many cases, the elevated levels are probably due to wood-fired heating of individual homes.

The measures proposed to date are insufficient to achieve the interim target. It is now technically feasible, however, to reduce emissions and thus meet this target on time.



Households are a significant source of air pollution. Between 2001 and 2004, there was a fall in particulate emissions from private cars, but a rise in emissions from household use of gardening equipment. Households are responsible for a major share of emissions from wood-fuelled heating.

Economic and regulatory instruments are often effective in changing patterns of consumption. One example of this is the congestion charge introduced in Stockholm, which, during the initial phase of the trial, led to a reduction of traffic in the city centre.



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?

☹ The assessment for this objective has been revised since 2005.

The changed appraisal is the result of new data which show that it will be very difficult to achieve the objective. Atmospheric emissions and deposition of acidifying pollutants are still falling, but not sufficiently rapidly. In addition, recovery of natural ecosystems will take a long time.

To assess progress towards this objective, the concept of critical load exceedance is used. Critical loads are the maximum levels of deposition of acidifying sulphur and nitrogen which the environment can tolerate.

Over the period 1990–2004, sulphur and nitrogen deposition in Sweden fell by around 60% and 30%, respectively.

EU AIR STRATEGY NOT ENOUGH

On 21 September 2005 the European Commission presented an EU Thematic Strategy on Air Pollution,

which was approved by the Council on 9 March 2006. In 2007 the Commission intends to propose a new directive with binding emission ceilings for sulphur dioxide, nitrogen oxides, volatile organic compounds, ammonia and particulate matter, to be met by 2020. A decision is expected in 2008 or 2009.

The Commission's proposals to tackle air pollution in Europe will not be sufficient to achieve this environmental quality objective. If no further action is taken beyond that already decided or agreed, the EU's estimate is that, in 2020, critical loads for acidification will be exceeded for around 11% of the area of lakes and 15% of the forest area of Sweden. The proposed EU strategy will bring a slight improvement, of some 2%, but this will be far from enough.

MORE AMBITIOUS ACTION

The level of ambition of the strategy is crucial, and needs to be raised considerably compared with the Commission's proposals. It is important to link climate and air pollution policies, as this would create pressure for change in the energy, transport and agriculture sectors, enabling both national and EU environmental goals to be attained within the foreseeable future.

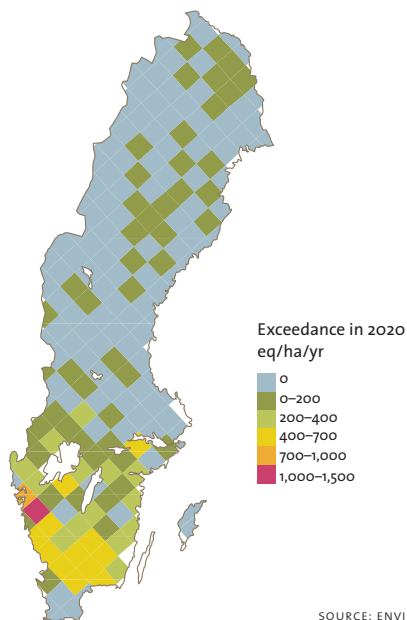
A review of the Gothenburg Protocol is likely to begin soon. This will give Sweden and the EU an opportunity to press for larger cuts in emissions in the United States, Canada and additional countries in eastern Europe.

At the national level, further action is needed, primarily to reduce nitrogen oxide emissions and the acidifying effects of forestry.

DIFFERENT METHODS OF CALCULATION

The difference between calculations based on critical load exceedance and those based on the proportions of lake and forest areas that are acidified is that the critical load approach refers to a future risk, taking account, for example, of the risk of increased leaching of nitrogen and hence more severe acidification.

FIG. 3.1 Exceedance of critical loads of acid deposition to Swedish lakes in 2020



SOURCE: ENVIRONMENTAL DATA CENTRE, SLU

New, improved Swedish calculations of exceedance of critical loads – the maximum amounts of deposition which the natural environment can tolerate – indicate that in 2020 some 13% of the country's lake area will still be receiving too high an input of acidifying pollutants, despite greatly reduced emissions. The new calculations are more clearly linked to biological effects and incorporate a better description of nitrogen processes.

Will the interim targets be achieved?

ACIDIFICATION OF LAKES AND STREAMS

INTERIM TARGET 1, 2010

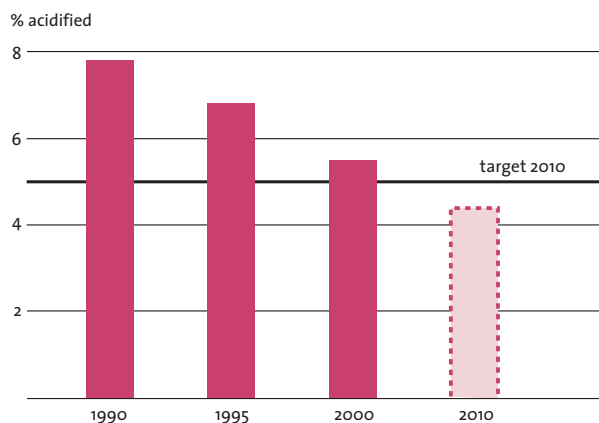
😊 By 2010 not more than 5% of all lakes and 15% of the total length of running waters in the country will be affected by anthropogenic acidification.

The target for lakes is based on lakes with an area of more than 4 ha which have not been limed.

The Riksdag has called on the Government to revise this interim target to include a definition of acidified lakes and streams that makes clear how limed lakes are to be treated. The target should also be amended to take account of lake size.

New environmental quality criteria have been drafted, but have yet to be finalized. They have the advantage of being more clearly linked to biological effects and of enabling predictions of future acidification status to be made. Preliminary results based on the new criteria indicate that some 5.5% of unlimed lakes larger than 4 ha were acidified in 2000 and that around 4.5% are expected to be acidified in 2010.

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



SOURCE: IVL

Over the last decade there has been a decrease in the proportion of lakes acidified. 'Affected by acidification' means that the pH has fallen by 0.4 units or more.



ACIDIFICATION OF FOREST SOILS

INTERIM TARGET 2, BEFORE 2010

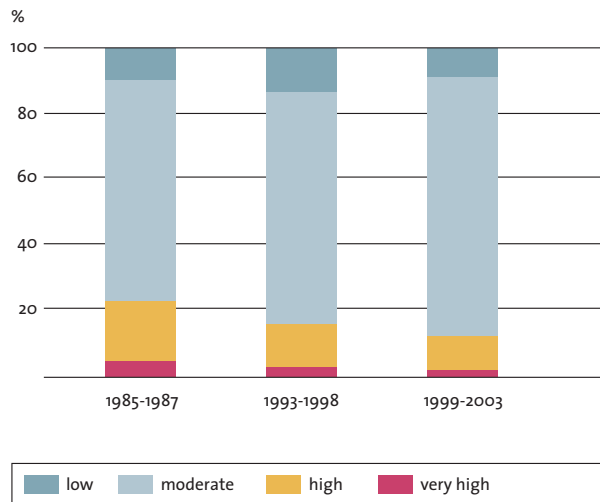
☺ *By 2010 the trend towards increased acidification of forest soils will have been reversed in areas that have been acidified by human activities, and a recovery will be under way.*

In terms of the average trend, rather than individual parameters, this target has already been met. The proportion of the forest area with soil of high or very high acidity fell from 23% during the period 1985–87 to 16% in 1993–98 and to 12.5% in 1999–2003.

In the most severely acidified region, some 70,000 ha of forest land have been treated with lime or ash since 1990, which in the longer term could enhance recovery in these areas.

In January 2005, winter storm Gudrun brought down almost as much timber as an entire year's felling. The area hit coincides largely with the most acidified part of the country. Nitrogen leaching here is expected

FIG. 3.3 Breakdown of forest land in Sweden by soil acidity class during three periods



SOURCES: SWEDISH ENVIRONMENTAL MONITORING PROGRAMME, SWEDISH FOREST SOIL INVENTORY

A smaller proportion of soils of high or very high acidity points to an improvement that can be linked to reduced acidification.

to increase, reaching a peak a couple of years from now. If that peak is a high one, acidification of the soil could become worse. The storm's effects on lake and stream chemistry are being regularly monitored in catchments that have suffered varying degrees of damage.

SULPHUR DIOXIDE EMISSIONS

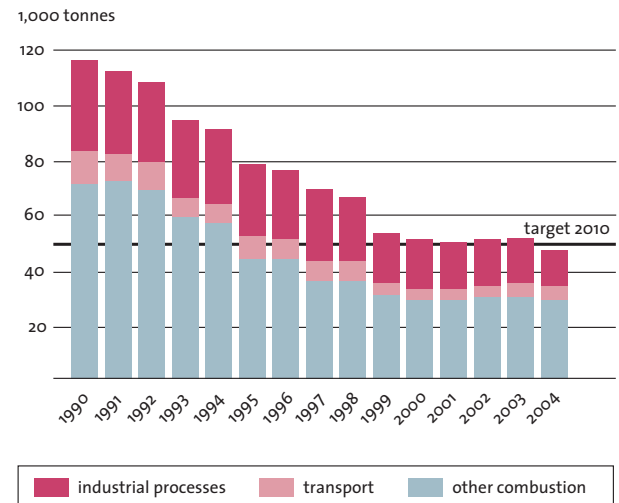
INTERIM TARGET 3, 2010

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

The wording of this interim target was revised in 2005.

The target, as amended by the Riksdag, now calls for emissions to be reduced to 50,000 tonnes, rather than the earlier figure of 60,000. In 2004 sulphur dioxide emissions totalled 47,000 tonnes, excluding emissions from international marine and aviation bunker fuels. The revised target has thus already been met.

FIG. 3.4 Swedish emissions of sulphur dioxide to air, 1990–2004 (excluding international bunker fuel emissions)



SOURCE: SWEDISH EPA, SWEDISH REPORTING UNDER CLIMATE CONVENTION

The new interim target for sulphur dioxide emissions has already been met. Emissions from international shipping from Swedish ports, which are not covered by the target, added up to 88,500 tonnes in 2004, almost twice the total for domestic sources.



On 6 July 2005 a decision was taken to amend the EU directive on the sulphur content of marine fuels, reducing the maximum content to 1.5%. This will apply to all EU ships on the Baltic Sea from 2006 and on the North Sea from 2007. On 1 January 2005, larger environmentally based differentials in shipping lane charges were introduced in Sweden, providing a greater incentive to curb emissions of both sulphur dioxide and nitrogen oxides. These two measures will primarily reduce emissions from international shipping; Swedish emissions will be affected to a lesser extent.

NITROGEN OXIDE EMISSIONS

INTERIM TARGET 4, 2010

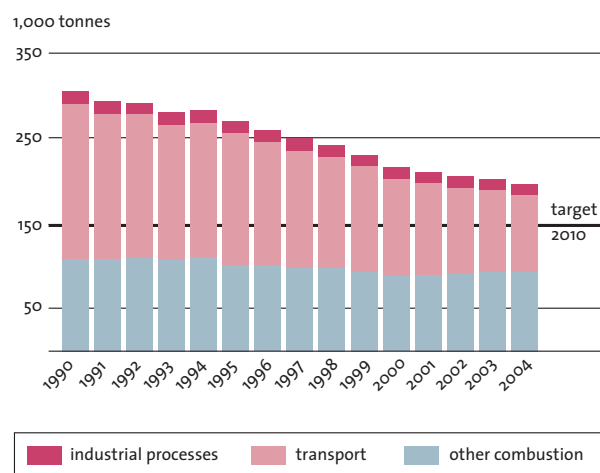
☹️ *By 2010 emissions of nitrogen oxides to air in Sweden will have been reduced to 148,000 tonnes.*

Further action must be taken if this target is to be met. The Riksdag has called on the Government to make the target more ambitious.

Emissions of nitrogen oxides in Sweden fell from 306,000 tonnes in 1990 to 197,000 tonnes in 2004, i.e. by 35%.

In 2005 a decision was taken to further develop emission standards for heavy vehicles. The EU directive develops on the earlier Euro 4 and 5 standards. This means in practice that diesel engines and heavy vehicles, too, will need to be fitted with advanced abatement equipment, such as catalytic converters. Corresponding EU standards for diesel engines for use in non-road mobile machinery were transposed into

FIG. 3.5 Swedish emissions of nitrogen oxides to air, 1990–2004 (excluding international bunker fuel emissions)



SOURCE: SWEDISH EPA, SWEDISH REPORTING UNDER CLIMATE CONVENTION

Over the last ten years, transport emissions of nitrogen oxides have fallen by over 40%. Total emissions are expected to be down to around 160,000 tonnes by 2010 – not enough to reach the target. Further action is needed. In 2004, international shipping from Swedish ports, which is not covered by the target, emitted 138,000 tonnes of nitrogen oxides.

Swedish legislation in 2005. These standards will be progressively tightened up to 2018, eventually resulting in the use of abatement equipment corresponding to that employed for heavy vehicle engines. A new proposal for stricter standards for light vehicles has been presented by the European Commission (Euro 5). This will entail 20–25% lower emissions from petrol and diesel vehicles, compared with current standards.

Our consumption patterns and lifestyles crucially determine the impacts our society has on the environment. Continuous improvements in the performance and efficiency of technology have led to lower acid emissions, but we now travel more than we used to. To lessen the pressure on the environment, improved technology needs to be accompanied by a reduction in travel and transport.

With out-of-town shopping centres growing in size and number, the volume of transport is increasing. Shopping close to home, rather than driving to the shopping mall, reduces emissions.

The products we buy in the shops have often travelled long distances. By buying more local produce, e.g. Swedish-grown apples, and drinking tap water instead of bottled, we can reduce the amount of transport required.



ENVIRONMENTAL OBJECTIVE FOUR

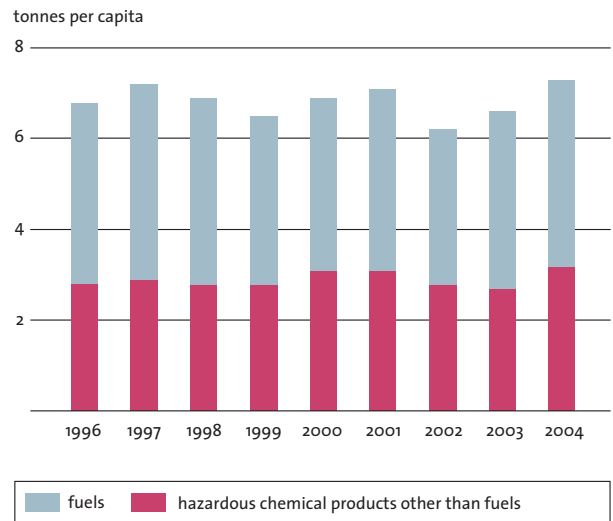
A Non-Toxic Environment

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

Will the objective be achieved?

☹️ The EU is expected to take a decision on new chemicals legislation (REACH), which could come into effect in 2007. REACH will create a significantly better framework for protecting health and the environment, compared with existing legislation. Companies will have a clearer responsibility to declare the health and environmental hazards which their chemicals represent, to assess the risks involved, and to describe how substances can be used safely. However, the present proposal does not go far enough to achieve the goal of A Non-Toxic Environment. Although stricter rules on pesticides are planned, they will come too late to make a difference to progress towards this objective within the defined time frame.

FIG. 4.1 Quantities of chemical products hazardous to health manufactured and imported by Sweden per capita per year, 1996–2004



SOURCE: SWEDISH CHEMICALS INSPECTORATE

The annual per capita turnover in Sweden of chemical products classified as hazardous to health has shown little change in recent years. How human health is affected depends on what products contain and how they are handled. Separate figures are shown for petroleum-based fuels, which make up a large share of the total.

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 REACH proposal represents a significant advance in terms of meeting this target in the longer term. The REACH system's principle that data should be available on the health and environmental hazards associated with chemicals has no counterpart in the current legislation, except in the case of a small number of substances. The new requirement will cover 10,000 substances manufactured or imported in volumes of over ten tonnes per company per year. These substances account for over 99% of the market by volume, and the risks related to them will be able to be more effectively assessed, providing a good basis for protective measures. REACH will also be an improvement on existing legislation for many of the 20,000 substances produced/imported in volumes of between one and ten tonnes per year. The testing requirements for these chemicals, however, fall short of what is needed to achieve A Non-Toxic Environment, and represent a lowering of standards as far as new substances are concerned.

During 2005 the OECD performed hazard assessments on a further 75 chemicals. Out of a total of just under 600 substances assessed, results have been published for 270.

ENVIRONMENTAL AND HEALTH INFORMATION ON PRODUCTS

INTERIM TARGET 2, 2010

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

REACH will probably require suppliers to inform downstream users about any substances of very high concern which their products may contain.

Inspections by the Swedish Chemicals Inspectorate reveal that companies need to provide better information to downstream users, and that standards of knowledge among product suppliers need to be improved.

PHASE-OUT OF SUBSTANCES OF VERY HIGH CONCERN

INTERIM TARGET 3, 2007/2010

☹️ *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.

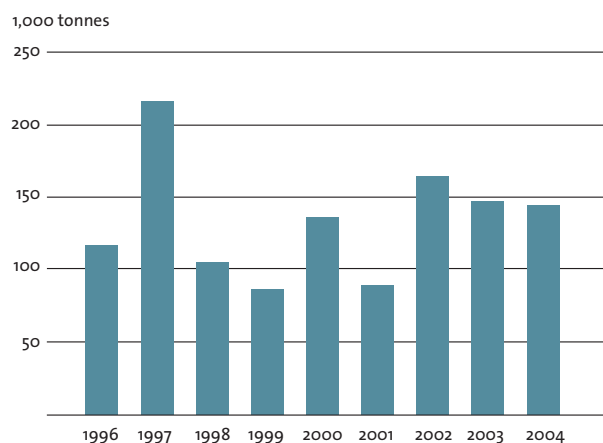


This interim target applies to substances that are man-made or extracted from the natural environment. It also applies to substances giving rise to substances with the above properties, including those formed unintentionally.

The wording of this target was revised in 2005.

Under REACH an authorization system will probably be introduced for substances of very high concern. These substances will not be permitted to be used without a specific authorization, which will be limited to stated uses. The authorization scheme has no counterpart under existing rules, and from a health and environmental point of view is a significant improvement. Authorizations will be granted for a limited period, enhancing the prospects of substituting safer alternatives.

FIG. 4.2 Quantities of CMRs in finished products manufactured in Sweden



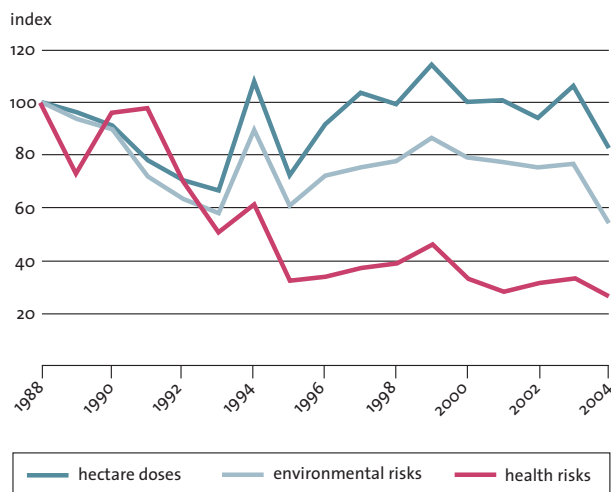
SOURCE: SWEDISH CHEMICALS INSPECTORATE

Finished products manufactured in Sweden in 2004 contained around 150,000 tonnes of CMRs (substances that are carcinogenic, mutagenic and/or toxic for reproduction). The quantities in imported products are not included. No clear trend in the use of CMRs in finished products can be seen for the years shown. Products containing CMRs are used throughout society. Some plasticizers incorporated in plastics are toxic for reproduction. Wood preservatives and pressure treatment agents can contain creosote, chromium and arsenic, which are carcinogenic. Paints and lacquers may contain lead compounds that are toxic for reproduction.

A range of relevant measures have been introduced:

- The RoHS Directive, whose provisions take effect this year, will achieve a wide-ranging phase-out of the most dangerous substances used in electronic equipment. However, the EU has granted an exemption for the brominated flame retardant decaBDE, which is suspected to have PBT properties.
- The Council supports the European Commission's mercury strategy and is advocating a ban on mercury exports no later than 2011.
- An EU decision has been taken to ban the three most dangerous phthalates in toys and childcare products.

FIG. 4.3 Risk indicators for plant protection products used in Swedish agriculture and horticulture, 1988–2004



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

SOURCE: SWEDISH CHEMICALS INSPECTORATE

The national risk indicators shown here are intended to reflect trends in the health and environmental risks associated with plant protection products in the longer term. Up to the end of 2004, the potential health and environmental risks had been reduced by 74% and 46%, respectively, expressed in terms of a risk index with 1988 as its base year. The sharp fall in 2004, however, does not reflect a real change, but is due to a marked decline in sales in 2004 resulting from stockpiling the year before.



- An EU decision has been taken to ban carcinogenic high aromatic extender oils in tyres.
- The Swedish Chemicals Inspectorate has rejected several applications for plant protection products containing substances from the conazole group that are toxic for reproduction.
- Further substances have been classed as CMRs and are thus banned in consumer products.
- The construction sector has launched the BASTA system, with a view to phasing out substances with particularly hazardous properties in chemical and building products.
- The Swedish Environmental Protection Agency has submitted a report to the Government on sources of unintentionally produced substances, with proposals for action to reduce or eliminate releases.

CONTINUOUS REDUCTION OF HEALTH AND ENVIRONMENTAL RISKS OF CHEMICALS

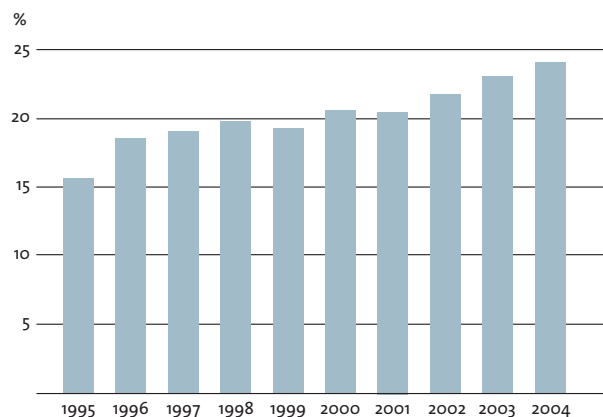
INTERIM TARGET 4, 2010

☹️ *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.*

The provisions of REACH that will require companies to generate and submit data will provide a better basis for safer use of chemicals.

- The tight restrictions on straw shorteners that have been in place in Sweden for several years have resulted in the development of new, stiff-straw varieties and reduced dependence on chemicals in cereal growing.

FIG. 4.4 Percentage of consumer-available chemical products containing known allergenic substances



SOURCE: SWEDISH CHEMICALS INSPECTORATE

Of the roughly 11,000 chemical products used in Swedish households in 2004, some 2,600 (about 20%) contained one or more allergenic substances. The proportion of chemical products containing known substances of this kind has increased somewhat in recent years.

- In the framework of the EU's Existing Substances programme, risk assessments have been undertaken for 130 of a total of 141 substances. For 58 of the 71 substances for which assessments have been completed at the EU level, risk reduction measures are to be developed.
- The EU's Detergents Regulation has come into force and could help to alleviate allergy problems.

GUIDELINE VALUES FOR ENVIRONMENTAL QUALITY

INTERIM TARGET 5, 2010

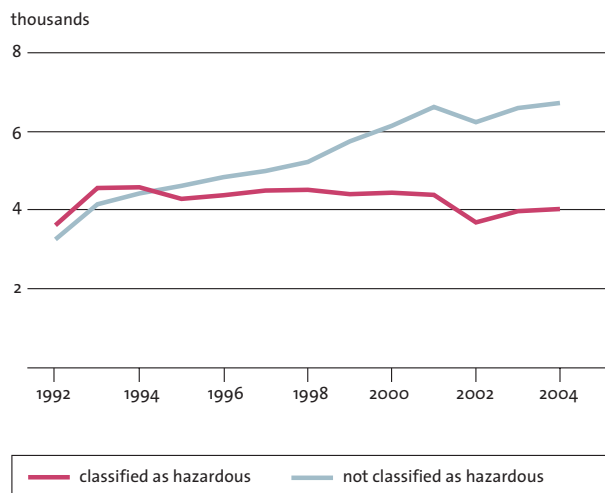
☺️ *By 2010 guideline values will be established by the competent authorities for at least 100 selected chemical substances not covered by interim target 3.*

The wording of this interim target was revised in 2005.

The Environmental Objectives Council reported last year that the target had been achieved.



FIG. 4.5 Numbers of consumer-available chemical products classified and not classified as hazardous to health



SOURCE: SWEDISH CHEMICALS INSPECTORATE

The number of consumer-use chemicals classified as hazardous to health has changed very little in recent years, while the number not classed as hazardous has increased. Products in the latter category may still contain hazardous substances, but in low concentrations, or may in fact be hazardous to health, but have not been classified as such because they have not been tested.

REMEDICATION OF CONTAMINATED SITES

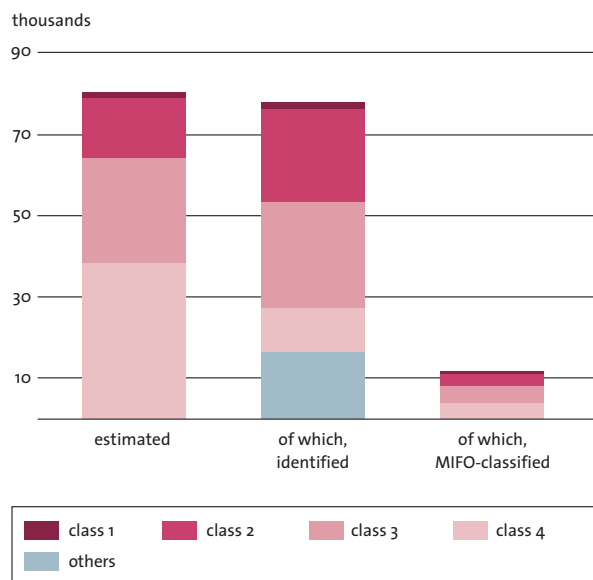
INTERIM TARGET 6, 2010

😊 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 wording of this target and the assessment of progress towards it have been revised compared with 2005.

The process of identifying all contaminated sites in Sweden was completed in 2005, and one element of the interim target has therefore been achieved. The phrasing of the target indicates which sites are to be given priority when it comes to funding for

FIG. 4.6 Contaminated sites in Sweden in 2005, by risk category



SOURCE: SWEDISH EPA

The process of identifying contaminated sites in Sweden has now been completed, bringing the total to over 70,000. The number of sites in the highest risk class (class 1) remains at the same level as in 2004, at around 1,500, while the number in the second highest class has risen to about 15,000. A risk classification using the MIFO method provides a good basis for selecting priority sites for investigation and remediation. Over 46% of the highest-risk sites have now been classified by this method.

investigations and remediation. A preliminary assessment puts the number of sites posing an acute risk at a few dozen for the country as a whole.

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.

This interim target is new for 2006.

Inventories and investigations are continuing with a view to establishing how large an environmental



problem contaminated sites represent and what action needs to be taken. Special emphasis is now being placed on supervisory efforts to ensure that remedial work is carried out at contaminated sites for which responsible operators can be identified and grants cannot be made. Clean-up and rehabilitation are judged to have been undertaken in line with the interim target for 2005 at half the sites in question. So far, the focus has been on high-priority sites, where remediation is costlier and more time-consuming than at the average site.

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.*

This target is new for 2006.

Two action programmes are currently under way: Sweden's implementation plan for the Stockholm Convention and the EU's programme to establish Community-wide maximum levels for dioxins in food. The EU introduced maximum levels in 2002, and these are to be reviewed in 2008.

As a basis for proposing further effective measures, more needs to be known about the contributions of different sources to the dioxin levels found in food, including the significance of secondary sources such as atmospheric deposition and contaminated sites.

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.*

This target is also new for 2006.

It is not possible at present to determine a safe level of exposure, and data on the effects of current measures have yet to be compiled. Given these uncertainties, it is difficult at this point to assess what

needs to be done to achieve the interim target. For the time being, the focus should be on reducing exposure, as required under the EU's Existing Substances programme.

There are no indications today that cadmium levels in food are rising. Measures introduced in Swedish agriculture have reduced inputs of the substance to arable land. Concentrations are expected to continue to fall as atmospheric deposition originating in other countries decreases as a result of agreements under CLRTAP.

Effects on the kidneys and skeleton have been reported in groups exposed to cadmium in their diet. Risk groups include women, individuals with poor iron status, and smokers. Smokers are exposed to roughly twice as much cadmium as non-smokers. Certain cadmium compounds entail a risk of cancer.

Some 400 people in Sweden are occupationally exposed to cadmium. In 2005, only a small number of these were exposed to levels which prompted enhanced protective measures.



Consumption of ecolabelled products and services can help to achieve this objective. This is particularly relevant in the case of food and household chemicals, but also for other types of products for which ecolabelling schemes exist. A detailed study of the implications of consumption patterns for progress towards A Non-Toxic Environment has yet to be made.



A Protective Ozone Layer

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

Will the objective be achieved?

☹️ Thanks to action in Sweden and other countries, the adverse effects of ozone-depleting substances on the ozone layer have been reduced. Provided that the Montreal Protocol and the amendments to it are implemented by all the parties, the ozone layer may be expected to recover, but not until some point beyond 2050 at the earliest.

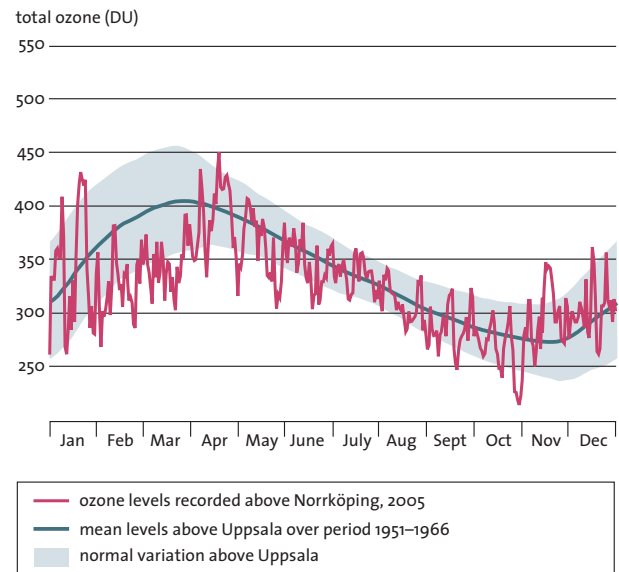
VARIATIONS IN THE OZONE LAYER

Constantly low temperatures in the upper atmosphere above the North Pole in late 2004 and early 2005 resulted in unusually severe ozone destruction in spring 2005. As a consequence, the ozone layer was unusually thin over Sweden from late January to early April. Over the North Pole, lower ozone levels had not been observed since the winter of 1999/2000.

The ozone layer over Sweden also hit a record low in October, but was thicker than usual in November. This illustrates how variable the natural environment can be, and also indicates how difficult it will be to detect and measure an expected recovery of the ozone layer.

A depleted ozone layer admittedly allows more ultraviolet radiation to reach the earth's surface, but

FIG. 5.1 Ozone layer above Norrköping in 2005 and normal variation above Uppsala 1951–1966

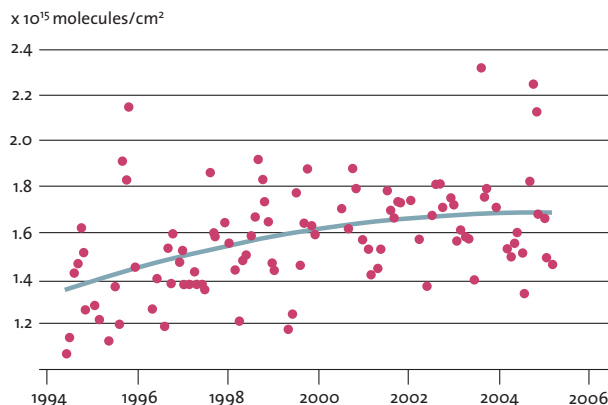


SOURCE: SWEDISH ENVIRONMENTAL MONITORING PROGRAMME

During 2005 wide variations occurred in the ozone layer over Sweden. It was unusually thin in the spring and in October, but thicker than normal in November. As usual, there were marked fluctuations from one week to another.

for Sweden the time of year is far more important a factor than variations in ozone thickness. In winter, the sun is so low above the horizon that very little UV radiation is able to pass through the atmosphere. The ozone thinning in early 2005 was therefore not accompanied by a marked rise in UV levels.

FIG. 5.2 Monthly mean levels of hydrogen fluoride (HF) in the stratosphere, recorded at the Harestua Solar Observatory



SOURCE: NETWORK FOR THE DETECTION OF STRATOSPHERIC CHANGE (WWW.NDSC.WS)

Hydrogen fluoride is the main reservoir for fluorine in the upper atmosphere; it is confined to the stratosphere and is formed from CFCs/HCFCs carried aloft from the lower atmosphere. Levels of hydrogen fluoride vary over the year, owing to the dynamics of the atmosphere, but it is evident that the increase in concentrations levelled off at the end of the 1990s.

The Antarctic ozone hole grew rapidly in 2005, reaching its maximum extent, 27 million km², in September. For comparison, North America has an area of 24.5 million km². Only in 2000 and 2003 was a larger hole observed. The rather extreme year which 2005 represents for both poles does not mean that the situation has deteriorated, but rather illustrates the system's variability and sensitivity to changes in weather conditions.

Concentrations of ozone-depleting substances, chiefly CFCs, in the lower atmosphere are now declining. HCFCs are still rising, but the overall ozone depletion potential is decreasing. A disturbing factor is the ongoing enhancement of the greenhouse effect, which is causing warming near the earth's surface, but cooling at higher altitudes. This could delay recovery, since ozone destruction processes at the poles are favoured by low temperatures in the upper atmosphere.

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.*

Provided that existing regulations are adhered to, and further measures are introduced relating to the use and handling of ozone-depleting substances, there is a good chance of moving towards this target.

National emissions of ozone depleters have fallen markedly since the late 1980s. Leakage from products containing these chemicals, as refrigerants or in insulating materials, remains the biggest source of emissions. By 2010, the use of old refrigerators and other refrigeration equipment will probably have largely ceased; by then, such equipment is expected to have reached the end of its technical lifetime and been replaced.

Large quantities of CFCs and HCFCs are still present in insulating materials in buildings, pipes and the ground. How soon insulated products containing ozone-depleting substances are replaced with environment-friendlier alternatives will depend on the rate at which old buildings and other structures are renovated or demolished. There are indications of poor compliance with the existing ban on the use of CFCs in refrigeration and air conditioning equipment. One reason could be that it is not sufficiently well known to the various parties concerned.

No new proposals for action were put forward by the Swedish Environmental Protection Agency in 2005. Earlier proposals concerning a ban on the use of HCFCs and relating to trade in refrigerators and freezers are still considered relevant.



If you own an old fridge or freezer containing ozone-depleting chemicals such as CFCs and HCFCs, it is high time to invest in new equipment, which is both ozone-friendlier and uses less energy. And don't forget to take your old appliance to a recycling centre.



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 objective exist, but new or intensified efforts will have to be made by all concerned to reduce the incidence of skin cancer. In addition, we need a better overall understanding of radiation in society and the external environment, as a basis for monitoring the full range of activities that could conceivably affect progress towards the objective, and for assessing their impacts on people and the environment. Naturally occurring radioactive substances may for example build up to high concentrations in certain industrial processes. The Swedish Radiation Protection Authority (SSI) has launched a study of exposure levels among employees and the general public from such operations.

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

The planned increases in output at several nuclear power stations could give rise to higher radioactive emissions, unless appropriate action is taken. To ensure that this interim target is met, it is important to use the best possible technology, so that emissions are progressively reduced despite the higher output.

Regulations have been drawn up on the control of high-activity sealed radioactive sources and orphan sources, in line with the Euratom directive. Further legislative changes will need to be made by the Government and the Riksdag to fully incorporate this directive into Swedish law.

SSI attaches considerable importance to a comprehensive national system for the management of non-nuclear radioactive waste. In February 2006 the Government presented a bill entitled 'Nuclear Safety and Radiation Protection', in which this was one of the issues addressed. SSI has been given funding for the management of orphan and other radioactive wastes in society. Such wastes represent a potential risk, as they can give rise to radiation doses far in excess of 0.01 millisieverts (mSv).

In health care, the quantities of the commonest radioactive substances used have remained unchanged in recent years. New technologies mean that the use

of short-lived radionuclides is increasing, but the majority of these radionuclides decay into stable substances before they reach the environment, which means that there is no additional dose to the public. SSI is currently revising its regulations on the management of radioactive waste from the health sector.

To prevent the public being exposed to more than 0.01 mSv/year from the recycling of caesium-contaminated wood ash to forests, new regulations on ash recycling have been introduced with effect from January 2006.

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.*

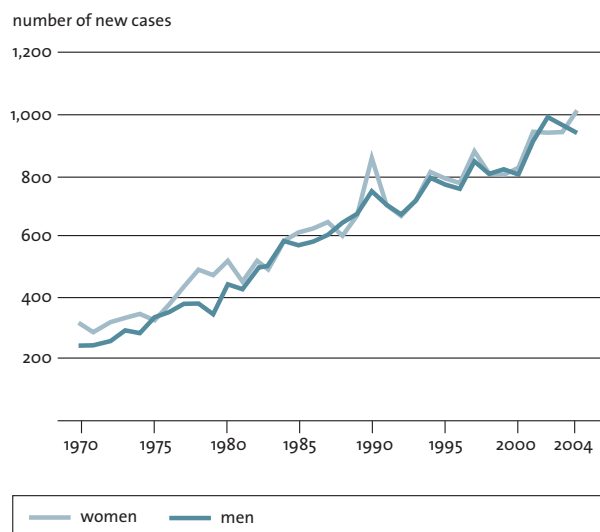
The number of new cases of skin cancer continues to rise. Our assessment, though, is that it is possible, but will be difficult, to attain this interim target. The problems are that changing attitudes and behaviour takes time, and that it can be difficult to detect the effects of such changes in regular measurements.

The main cause of skin cancer is exposure to ultraviolet radiation. Exposure is in turn a product of the radiation available and the individual's behaviour. Radiation is now monitored by means of measurements and modelling. Since 2005 an annual survey has been conducted of people's behaviour in the sun. The results will form the basis for a new indicator to track progress towards this target.

SSI is working to secure the involvement of other agencies and organizations that can help to prevent skin cancer. Children are a priority target group for prevention efforts. Initiatives taken by SSI include training for primary and lower secondary school teachers, and plans to publish a children's book about the sun and how to protect oneself, partly for use in pre-schools.

This interim target has been reworded to include all sources of UV radiation, since sunbeds also make a significant contribution to overall exposure. The

FIG. 6.1 Incidence of malignant melanoma in Sweden, 1970–2004



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

The incidence of skin cancer continues to rise. It is still considered possible, but will probably be difficult, to achieve this target. One problem is that changing attitudes to sunburn and outdoor behaviour takes time. Another is that it will be decades before any effects of behavioural changes are discernible in the cancer statistics, owing to the long latency period of skin cancer.

Nordic radiation protection agencies issued a joint statement in 2005, advising against the use of sunbeds for cosmetic purposes.

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.*

In most applications in which electromagnetic fields (EMFs) occur, the general public's exposure to them is very low compared with existing reference levels. SSI is currently developing an environmental monitoring programme for EMFs, partly to be able to track trends in public exposure. In the case of



low-frequency fields, chiefly from power lines, and mobile phone use, SSI's view is that existing risk assessments involve a degree of uncertainty which justifies applying the precautionary principle. Further research into the effects and possible health risks of radiation from mobile phones is needed as a basis for a more confident assessment of the risks.

The rapid development of mobile telephony and other wireless technology is causing concern among some members of the public. SSI has organized a 'Transparency Forum on Mobile Telephony' to promote a dialogue between different stakeholders, including public authorities, interest groups and the industry.

Local authorities are an important link in enhancing public understanding of EMFs. SSI is therefore arranging courses on mobile telephony and power lines for local council officials.

Local authorities have also been sent information about the criteria to be applied to EMF measurements performed by commercial companies.



In 2003, around 95% of the smoke detectors sold in Sweden contained a radioactive substance, while the rest were optical devices. Now the proportions are believed to be reversed. This change has been driven by producer responsibility for electrical and electronic equipment, which among other things means that radioactive smoke detectors carry a waste surcharge roughly twice that applied to optical ones. From the point of view of the environmental objective dealt with here, this is a good thing, since it reduces the quantity of radioactive substances in circulation in society.



Zero Eutrophication

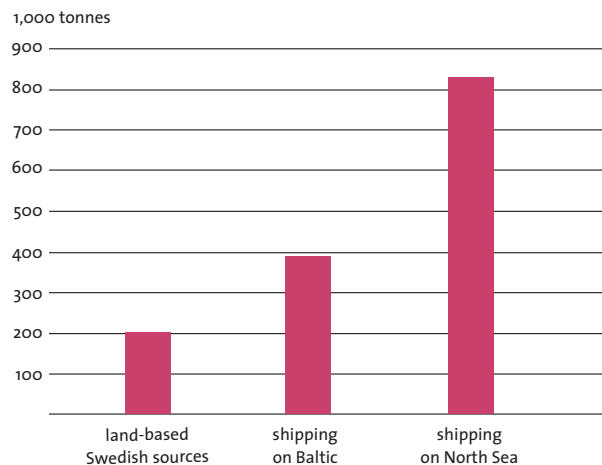
Nutrient levels in soil and water must not be such that they adversely affect human health, the conditions for biological diversity or the possibility of varied use of land and water.

Will the objective be achieved?

☹️ Nutrient emissions to air and water continue to fall. Owing to large-scale natural fluxes of nitrogen and phosphorus and the long timescale of recovery, however, reductions in the effects of eutrophication in the environment are not as clear. The state of the environment described in this objective will therefore be difficult to achieve within one generation.

The biggest sources of nutrients in Sweden are agriculture, single-household sewage systems and municipal sewage treatment plants. Emissions in neighbouring countries are also a major factor. Atmospheric emissions of nitrogen oxides from international shipping on the Baltic Sea, Kattegat and Skagerrak, for instance, exceed aggregate Swedish emissions of these gases. Overall, Sweden is responsible for only a small share of total waterborne and atmospheric inputs of nutrients to the Baltic: around 10% of the phosphorus and 20% of the nitrogen. On a per capita basis, though, Sweden is the second

FIG. 7.1 Comparison of nitrogen oxide emissions from land-based sources in Sweden and from shipping on the seas around Sweden



SOURCES: EMEP AND SWEDISH REPORTING UNDER CLIMATE CONVENTION, 2003

This diagram shows nitrogen oxide emissions from shipping, both foreign and Swedish, on the seas around Sweden. Strong growth in international shipping is expected in the next few years. Unless action is taken to reduce them, emissions of nitrogen oxides from ships in EU waters are also expected to end up higher than those from land-based sources within the EU. Corresponding reductions of land-based emissions will be a good deal more expensive.

largest emitter of nitrogen among the Baltic Sea states. On a corresponding list for phosphorus, by contrast, the country comes second from the bottom.



INDEPENDENT INTERNATIONAL ASSESSMENT

In spring 2005, in response to the debate among Swedish scientists about the respective roles of nitrogen and phosphorus in the eutrophication of the country's seas, the Swedish Environmental Protection Agency invited an international group of experts to make an independent assessment of the situation in the marine environment, based on existing data. The current action strategy on nutrients has also been evaluated. The experts are divided about the benefits of nitrogen removal treatment for coastal waters along the east coast of Sweden. Some of them argue that the effects of such treatment have been clearly demonstrated. Others consider that the available data do not demonstrate any benefits in these waters, and that the emphasis should continue to be on curbing inputs of phosphorus until there is a more convincing case for nitrogen removal.

The group recommends the following measures to reduce eutrophication, indicating that action on phosphorus could assume greater importance:

- **Reduce phosphorus inputs to the open Baltic proper.** Sweden can play a part, but far-reaching action needs to be taken in the other countries concerned. Regarding the open Baltic, too, views differ among the experts on the benefits of nitrogen removal.
- **Reduce phosphorus inputs to enrichment-sensitive archipelago areas of the Baltic proper.** Nitrogen removal could also be beneficial. However, a substantial reduction of nitrogen inputs could stimulate the growth of nitrogen-fixing cyanobacteria if it is not accompanied by a cut in phosphorus inputs.
- **Reduce atmospheric deposition of nitrogen to the seas around Sweden.** This will also have benefits in terms of reducing nitrogen enrichment and acidification of soils and fresh waters. However, if deposition is reduced without an accompanying decrease in phosphorus inputs, there will be a heightened risk of blooms of nitrogen-fixing cyanobacteria.

- **Reduce nitrogen inputs to the waters off the west coast.** A cut in phosphorus inputs would also be beneficial, but only if nitrogen inputs are curbed at the same time.

The assessment will form an important basis for continuing efforts to tackle eutrophication in the seas around Sweden.

The earlier interim target on programmes of measures to achieve good ecological status is considered to have been met, in that EC legislation requires Sweden to establish such programmes. This target has therefore been dropped.

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.*

The wording of this target was revised in 2005.

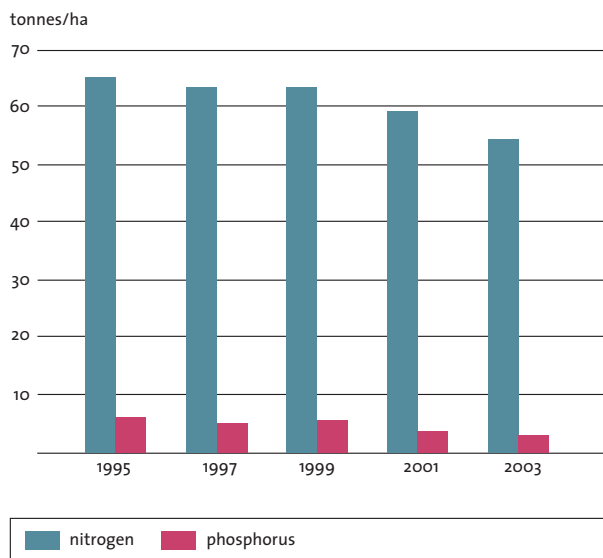
In its bill 'Swedish Environmental Objectives – A Shared Task', the Government made the target more precise, changing the wording from 'decreased continuously from 1995 levels' to 'decreased by at least 20% from 1995 levels'. The subsequent decision by the Riksdag added the final sentence: 'The largest reductions will be achieved in the most sensitive areas.'

Estimates from Statistics Sweden show that the phosphorus surplus in agriculture, i.e. the difference between annual inputs of phosphorus to farmland and the amounts removed with harvests, decreased by a further 15–20% over the period 2001–2003.

At present, there are shortcomings in the way the legislation on single-household sewage systems is being applied. The Swedish Environmental Protection Agency has therefore drafted new guidelines, which are being presented to the European Commission early in 2006, after which they will come



FIG. 7.2 Nitrogen and phosphorus surpluses in agriculture, 1995–2003



SOURCE: STATISTICS SWEDEN

The surpluses shown represent the differences between the nutrients supplied to farmland and the quantities removed when crops are harvested. A comparison of these surpluses over the period 1995–2003 shows a clear decrease for both phosphorus and nitrogen. 'Farmland' here includes arable and pasture land.

into effect. Unlike the guidelines that have now been withdrawn, which mainly described techniques, the new ones emphasize functions, e.g. removal of phosphorus, but also of nitrogen, depending on the sensitivity of the receiving environment. If the guidelines have the effect hoped for, they will reduce phosphorus emissions by 280 tonnes per year, or around 40% compared with today. The new guidelines are also intended to create more scope for nutrient recycling and to encourage greater use of new technologies.

In conjunction with a revision of its regulations on manure management, the Swedish Board of Agriculture has published guidelines on the storage and spreading of manure, to help farmers to comply with the legislation.

NITROGEN EMISSIONS

INTERIM TARGET 2, 2010

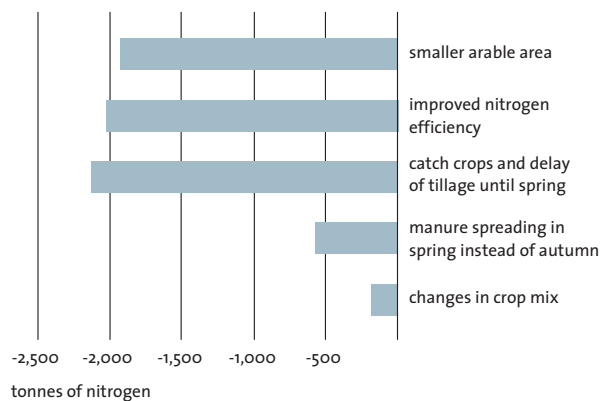
☹️ By 2010 Swedish waterborne anthropogenic emissions of nitrogen compounds into sea areas south of the Åland Sea will have been reduced by at least 30% compared with 1995 levels.

New estimates of leaching of nitrogen from arable land indicate a decrease of 7,000 tonnes, or 12%, between 1995 and 2003. The goal is a reduction of 7,500 tonnes by 2010. The decrease achieved so far can be attributed to:

- Specific measures to reduce leaching.
- More efficient use of nutrients in crop production.
- A decrease in the arable area between 1995 and 2003.

To estimate the impacts of the reform of the Common Agricultural Policy, which came into effect in 2005, the Swedish University of Agricultural Sciences

FIG. 7.3 Factors behind the decrease in nitrogen leaching from 1995 to 2003



SOURCE: SWEDISH BOARD OF AGRICULTURE

Of the various measures introduced, agri-environment payments for the growing of catch crops and postponement of tillage until the spring have had the greatest impact, accounting for almost a third of the total decrease. Improved nitrogen efficiency means that, for various reasons, yields have increased, with unchanged or reduced inputs of nitrogen. This improvement is partly due to information and advice, including the 'Focus on Nutrients' campaign.



(SLU) has calculated levels of nitrogen leaching between 2003 and 2005. The study indicated a further decrease in leaching of over 2,000 tonnes over this period, due to the change in the arable area alone. In addition, cereal production in Sweden is expected to decline, while the areas under forage crops and left fallow are likely to increase. A fall in beef and sheep production is also expected, and with it a reduction of nutrient loadings.

In line with these changes, the nitrogen surplus in Swedish agriculture has also decreased, with a fall of 4–8% between 2001 and 2003 according to Statistics Sweden (see also fig. 7.2).

Despite these reductions, it is difficult to discern a clear downward trend in river inputs of nitrogen and phosphorus to the sea. However, a recent evaluation of nutrient trends in twelve rivers draining areas of high agricultural activity over the period 1983–2003 revealed a statistically significant fall in nitrate levels in six of them. The analyses showed that nitrate concentrations had often decreased by one or a few per cent per year in Skåne, but more slowly in rivers further to the north. The results suggest that, in several of these catchment areas, measures to reduce nutrient losses from agriculture have been effective.

Farming of mussels and other bivalves is an interesting means of removing nitrogen, and phosphorus, from water. Unlike fish farming, it requires no active supply of nutrients, since they can be taken up directly from the water. Under existing regulations, the municipal sewage treatment plant in Lysekil ought to be retrofitted for nitrogen removal. To allow an evaluation of the effects of large-scale mussel farming, the local authority has been given a temporary permit up to 2010 to run such a scheme as an alternative to upgrading the plant. Mussels will be farmed and harvested on such a scale that they are expected to take up all the nitrogen released from the treatment plant.

The ‘Focus on Nutrients’ campaign has had a major impact. In 2006, full-scale projects will be launched in six new counties.

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.*

Total emissions of ammonia fell by 13% over the period 1995–2003, leaving a further reduction of just 2% to reach this target.

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.*

See Environmental Objective Three, Natural Acidification Only, interim target 4.

Our consumption of food has major impacts on emissions. A decrease in meat consumption, for example, could significantly reduce nutrient loadings. If in addition we were to eat more Swedish mussels, the effect would be doubled, as the mussels remove nutrients from the water in which they grow.

Almost a million houses in Sweden have on-site sewage systems which provide only limited treatment. By switching to phosphate-free detergents, households dependent on such facilities would appreciably reduce their emissions of phosphorus. Investments in improved on-site treatment systems would also make a difference.



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 nature conservation authorities are working in the long term to strengthen efforts to protect and restore lakes, rivers and streams, and are introducing targeted measures to conserve threatened species. Success in achieving this objective in the wider countryside is also dependent on factors such as:

- farmers and forest owners living up to their aims in terms of managing their holdings with due regard for nature and cultural heritage conservation;
- the value of shores and banks for biodiversity and outdoor recreation being maintained; and
- hydroelectric companies paying proper regard to the remaining nature conservation interest of the rivers on which they operate.

FIG. 8.1 Construction close to lake shores and river banks



SOURCE: STATISTICS SWEDEN

In 2004, in Sweden as a whole (urban areas excluded), 627 new buildings were constructed within a hundred metres of a lake, river or stream. Buildings erected more than 75 m from existing ones are assumed to encroach on new land to a greater extent than other new buildings, resulting in previously undisturbed areas being developed. The level of construction activity close to shores and banks remains high and may obstruct progress towards this environmental quality objective. 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.

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.

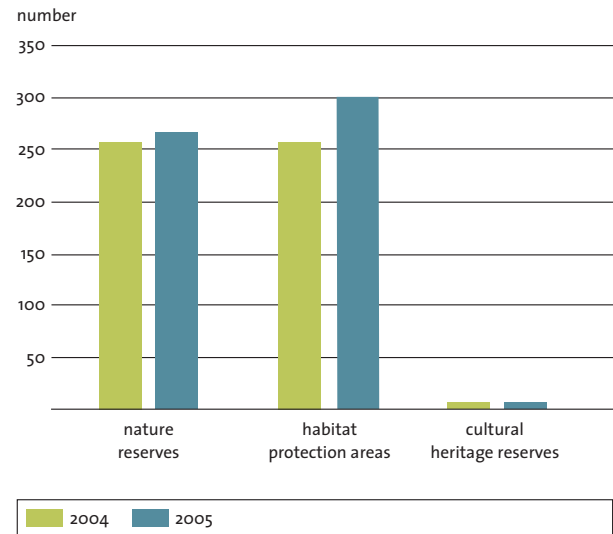
The wording of this target was revised in 2005.

During the year the Swedish Environmental Protection Agency, the National Heritage Board and the Swedish Board of Fisheries, assisted by county administrative boards, compiled a list of areas with freshwater environments which, at a national level, are of high or particularly high value for nature conservation, cultural heritage, fish and fisheries. Lists and map layers detailing these areas form an important part of the action programme to provide protection in line with this interim target.

Nine new nature reserves were established during the year to safeguard features of nature conservation interest in lakes or running waters, e.g. on the Moån in Norrbotten county, a river with a rich diversity of benthic species and riparian habitats. In Kalmar county, the Emsfors power station has been acquired to provide greater scope for the restoration and long-term conservation of valuable natural features and fisheries on the lower reaches of the river Emån. In this context, a range of different interests need to be managed. Among the habitat protection areas designated by the Swedish Forest Agency, there are ten of the type 'riparian or floodplain forests' and 34 'small streams and pools'. Habitat protection designations generally cover smaller areas than nature reserves.

For many of Sweden's Natura 2000 sites containing freshwater habitat types (lakes, rivers or streams), county administrative boards have developed and

FIG. 8.2 Protected sites – lakes, rivers and streams



SOURCES: SWEDISH EPA, SWEDISH FOREST AGENCY

Nature reserves designated to conserve freshwater interest features, cultural heritage reserves associated with lakes and running waters, and habitat protection areas associated with water on forest land (Riparian or floodplain forests and Small streams). County administrative boards and local authorities mainly use nature reserve designation, while the Swedish Forest Agency uses habitat protection areas for long-term conservation of sites. Nature reserves offer stronger protection and are larger in extent than habitat protection areas. The criteria for cultural heritage reserves associated with lakes, rivers and streams are currently being reviewed, and figures for these reserves have therefore not been updated.

secured support for conservation objectives and plans. These documents set out the action required to preserve the natural features identified and secure 'favourable conservation status'.

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 main focus of restoration efforts should be on rivers and streams judged to be of high or particularly high conservation value from a national point of view. It will be possible to estimate the number of running waters that need to be restored in line with this interim target, but the nature and extent of the measures required will vary widely from one stream or river to another. Restoration work must be carried out with due regard for the conservation of cultural heritage.

One type of work currently being undertaken with the aim of restoring rivers is measures to re-establish fish migration routes. During the year, Västra Götaland County Administrative Board evaluated the effectiveness of constructed fishways. Of those surveyed (72 in all), only 53% were judged to be working satisfactorily. Twelve of the ones that were not were on rivers classed as being nationally of high or particularly high conservation value. The evaluation reveals a need for more careful planning, scaling, documentation and impact monitoring of restoration measures.

Many rivers with retired hydroelectric installations are of considerable conservation interest and may eventually be restored. The renewable energy certificates scheme provides an undesirable economic incentive for the development of small-scale hydro at many of these sites, making the achievement of this interim target more difficult. In December 2005, therefore, the Government proposed that, from 2010, small-scale hydro should be excluded from the scheme. Among existing small-scale hydroelectric plants there are a number that are of cultural heritage interest. Here, continued operation could be a way of preserving features that would otherwise be in danger of falling into disrepair.

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.

A range of measures are being taken to protect water sources. The National Food Administration is supporting local authorities in their efforts to secure more reliable supplies of drinking water, and has among other things underlined the need for protection of sources. The Swedish Environmental Protection Agency provides guidance on how this can be achieved.

A questionnaire survey has shown that, of 156 municipal surface water sources, 54 (35%) are safeguarded by water protection areas. The survey gives no indication, though, of what protection is actually in place or what specific regulations have been introduced.

During the year the Government overturned a number of decisions on water protection areas, following appeals based on a lack of clarity in the associated regulations.

The water authorities' work on management plans highlights the need to protect sources of drinking water and establish water protection areas.

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.*

Stocking of fish is one of the commonest fishery conservation measures. It is practised on a large scale, although it is not always beneficial for fisheries and fish populations, and can sometimes even be detrimental. A report from the Swedish Board of Fisheries, entitled 'Fish in the wrong water' (Finfo 2005:9), looks at the ecological consequences of fish releases.

In 2005 stricter rules on releases of non-native fish species and stocks were introduced. Under the new regulations (FIFS 2004:47), American lake trout may only be stocked to waters in which it is already present. Releases of American brook trout and splake are only allowed in waters for which permits have previously been granted.



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.*

Responsibility for adopting action programmes for threatened species associated with fresh waters rests with the Environmental Protection Agency and the Board of Fisheries. The list of species requiring such programmes is regularly revised in the light of revisions of the Red List of threatened species, but the number of programmes adopted or introduced so far corresponds to the number originally judged to be necessary.

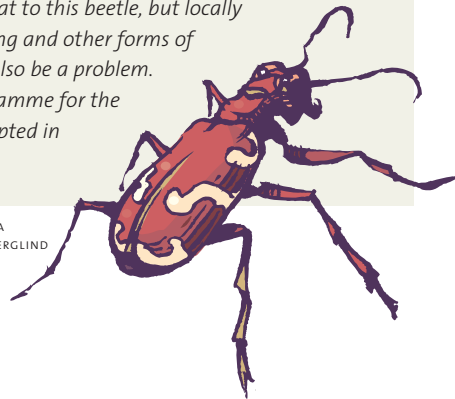
An amendment to the Fisheries Ordinance (SFS 1994:1716) allows county administrative boards to designate special protection areas for the noble crayfish (*Astacus astacus*). To reduce the risk of crayfish plague spreading to such areas, stricter rules apply concerning movements of crayfish and disinfection of equipment. No live signal crayfish are permitted, and fish for use as bait must be caught in the water in which they are to be used. These measures are

The demand for fishing for fast-growing species and stocks, and for crayfish from Swedish waters, may affect the prospects of achieving this objective. Such demand maintains interest in stocking non-native fish and signal crayfish, which can have adverse consequences for biodiversity. Non-native species may also spread as a result of the use of live bait.

On the other hand, fishing – especially for recreation – often promotes greater environmental awareness, and many anglers become involved in restoration measures which are of importance for the objective.

An information film produced by the Swedish Anglers' Association, with a grant from the Swedish Environmental Protection Agency, clearly explains the links between recreational fishing and the objective Flourishing Lakes and Streams. Interest groups can also be a useful channel for information on the risks associated with releases of non-native species.

The dune tiger beetle lives on and in the sand on shores and banks exposed to the sun, close to the water. Its habitat is created by fluctuating water levels and natural movements of the sand at the water's edge. River regulation and reduced fluctuations in levels are thus the biggest threat to this beetle, but locally canoeing, bathing and other forms of recreation can also be a problem. An action programme for the species was adopted in 2005.



DRAWN BY TYPOFORM FROM A PHOTOGRAPH BY SVEN-ÅKE BERGLIND

intended to improve the chances of conserving remaining noble crayfish populations.

In 2005 an action programme was adopted for the dune tiger beetle (*Cicindela maritima*), and several other programmes are currently being revised, including those for the wels (*Silurus glanis*), noble crayfish and thick-shelled river mussel (*Unio crassus*).

During the year, a number of conflicts over clearance of watercourses hosting threatened bivalve species attracted attention. In farming areas, provisions to protect threatened species often come into conflict with permits for water operations.



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?

😊 Our assessment is that this objective can largely be achieved within one generation, provided that additional action is taken.

Under the EC Water Framework Directive, programmes of measures are to be established by 2009 to ensure that groundwater bodies achieve good status no later than 2015. This will contribute significantly to attaining the generational objective.

Sweden's initial characterization and analysis of its groundwater bodies, reported to the European Commission in March 2005, provides an appraisal of the main priorities for action. Owing to gaps in data, however, assessments of many groundwater bodies are uncertain and further studies are required.

Groundwaters affected by agriculture, contaminated sites and acidification will probably remain affected beyond 2020, owing to slow soil processes and the long residence times of groundwater.

Will the interim targets be achieved?

PROTECTION OF WATER-BEARING GEOLOGICAL FORMATIONS

INTERIM TARGET 1, 2010

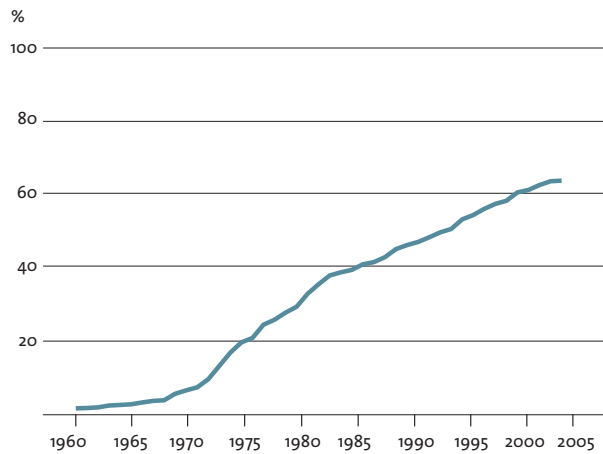
☹️ *By 2010 long-term protection from development activities that restrict water use will be provided for water-bearing geological formations of importance in meeting present and future water supply needs.*

The assessment for this interim target has been revised since 2005.

The new assessment is that the target will not be met by 2010, since there are too many water sources, both public and other major sources, for which water protection areas have still to be designated. Of the 1,271 public groundwater sources on the Geological Survey of Sweden (SGU) database, 471 lack a protection area. In addition, the majority of groundwater bodies not currently used to supply water, but which could be of great significance in the future, are without protection. It is crucial that local authorities, in their planning, take account of important groundwater resources and establish protection for them, so as not to endanger their future use for water abstraction.

The Government also intends to propose amendments to the Environmental Code to allow groundwater bodies to be classed as being of national

FIG. 9.1 Public groundwater sources with water protection areas



SOURCE: SGU

Efforts to establish water protection areas for groundwater sources must be stepped up. Of the 1,271 groundwater sources so far reported in to SGU's database, almost 37% lack a protection area. What is more, over 40% of existing protection areas are more than 25 years old and may need to be reviewed.

interest. More weight will then be attached to them in land use planning. SGU is continuously seeking to improve the information available on important bodies of groundwater, as a basis for designating certain of them as being of national interest.

Extraction of gravel from eskers may pose a threat to our use of the groundwater resources they contain. Levels of extraction are falling, but the largest quantities of gravel are still being obtained from the sand and gravel deposits which, on the basis of regional mapping, SGU considers to hold the best potential for groundwater abstraction. In the areas where SGU has identified major groundwater resources in superficial deposits, judged to be of importance for water supply purposes (Class 1 areas), gravel production was only 13% lower in 2004 than in 1997, compared with a decrease of 20% in the total output of natural gravel.

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.

SGU's assessment is that this target can be achieved, provided that local authorities

- identify areas that are sensitive to changes in groundwater levels and flows (this can be done in consultation with county administrative boards);
- include information on sensitive areas in comprehensive and detailed development plans;
- place restrictions on water wells and heat pump boreholes where supplies of fresh groundwater are limited, or where quality problems could arise.

A certification scheme for borehole and well drillers has been introduced, which will mean safer and more reliable drilling, from the viewpoint of both the environment and the customer. In 2004 and 2005, a total of 55 well drillers were certified.

GOOD-QUALITY DRINKING WATER

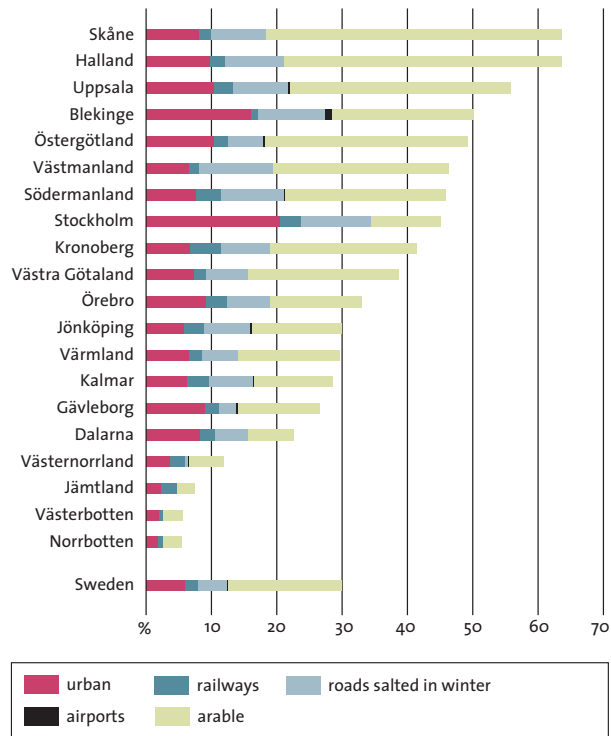
INTERIM TARGET 3, 2010

☹️ 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's assessment is that this target will not be met everywhere. Groundwater quality is dependent on our success in achieving elements of the environmental quality objectives Zero Eutrophication, Natural Acidification Only and A Non-Toxic Environment, which are judged to be difficult to attain. The process of designating water protection areas, with regulations governing the activities carried on there, is progressing far too slowly.



FIG. 9.2 Land use that could affect groundwater quality in sand and gravel deposits



SOURCE: SGU

SGU has identified in broad outline areas with major groundwater resources in superficial deposits, judged to be of importance in meeting present and future water supply needs. In southern Sweden, urban development, roads and railways often occupy a significant share of the land surface in groundwater areas, which means that the water infiltrating to form groundwater may be polluted to varying degrees. SGU takes the view that groundwater bodies of potential significance for supply purposes in a long-term national and regional perspective should be protected as being of national interest. This should be done even if local authorities have no plans to use them at present.

We still have only a limited picture of progress towards this interim target, but monitoring systems are being developed.

Large quantities of the substances contained in everyday consumer products, such as food, personal hygiene products, medicines, detergents and cleaning agents, end up in household sewage. In areas where




Drinking water is our most important foodstuff. The great majority of the 180 litres per person per day which the average Swedish household consumes is used for other purposes than drinking, such as cooking, washing up, laundry, cleaning, and even sewage disposal.

More and more people now drink bottled water. The development of a Swedish table and mineral water industry can be seen as a good thing from an environmental standpoint, in that locally produced bottled water does not need to be transported as far as the imported variety. However, the greenest alternative is ordinary tap water – and at roughly one-thousandth the price of bottled water. That it tastes just as good in most areas is demonstrated by taste tests, in which ordinary municipal tap water often gets high ratings. In a competition run by Svenskt Vatten AB, the award for ‘Sweden’s Best-Tasting Tap Water 2005’ went to Lerum, with Vimmerby in second place out of a total of 178 participating municipalities.

It is important to maintain public confidence in tap water. This can be done if the general public know that ground and surface water resources are protected against pollution, that purification of water at treatment plants is quality assured, and that no deterioration in quality occurs as water is distributed to consumers through the mains.

on-site treatment systems are common, this sewage is often allowed to infiltrate into the ground after settlement of the sludge, and there is a considerable risk of harmful substances finding their way into groundwater and affecting drinking water quality. The scale of this problem is largely unknown.





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?

☹ In 2005 the Government presented a national marine environment strategy, one aim of which is to ensure more effective coordination of user and conservation interests with impacts on the sea. A concerted plan of action for the Swedish marine environment will be developed during 2006. In the autumn of 2005 the European Commission also

adopted a Marine Strategy, which is designed to create a better basis for integrating environmental concerns into relevant areas of EU policy.

FINITE MARINE RESOURCES

The situation for several commercially exploited fish species remains serious. A fishing fleet that is too large and efficient is exploiting a finite resource, and bycatch continues to be a problem. To achieve this environmental objective, both international cooperation and further measures at the national level are called for.

The target of five new marine nature reserves by 2005 has been met. During the year the Riksdag decided that a further 14 marine areas should be protected as reserves by 2010. Proposals for the inclusion of additional marine areas in the EU's Natura 2000 network have been submitted to the Government.

Interim target 2 has been achieved with the adoption of the National Heritage Board's strategy for the preservation and use of cultural heritage and agricultural landscapes in coastal and archipelago areas. Target 3, concerning action programmes for threatened marine species, had not been met by 2005, however.

Efforts to map the marine environment continue. One example is the INTERREG project BALANCE (www.balance-eu.org), which is developing tools for


effective marine spatial planning, with a focus on areas of high conservation value. This project will continue up to the end of 2007.

To achieve this environmental quality objective, the objectives relating to eutrophication and a non-toxic environment also need to be attained. However, progress on 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.

The wording of this target was revised in 2005.

The goal of five new marine nature reserves by 2005 has been attained. During the year, the Kungsbackafjorden, Nordre Älv Estuary and Fifång nature reserves were created, while Kronören and Knähaken were designated earlier in the 2000s. There are now twelve marine nature reserves in Sweden.


County administrative boards and the Environmental Protection Agency have proposed additional marine areas of high biological interest for inclusion in Natura 2000. They include the Northern Middle (Midsjö) Banks in the Baltic and Persgrunden off the west coast. In 2004 and 2005 the Agency carried out biological surveys of offshore marine banks.

Following consultation with county administrative boards, the Environmental Protection Agency and

fishing industry organizations, and the joint management initiative under way on Gotland, the Swedish Board of Fisheries has decided to designate the area around Gotska Sandön as a no-fishing zone.

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.*

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 considerable attraction, and many of them are under great pressure for change.

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

THREATENED SPECIES

INTERIM TARGET 3, 2005

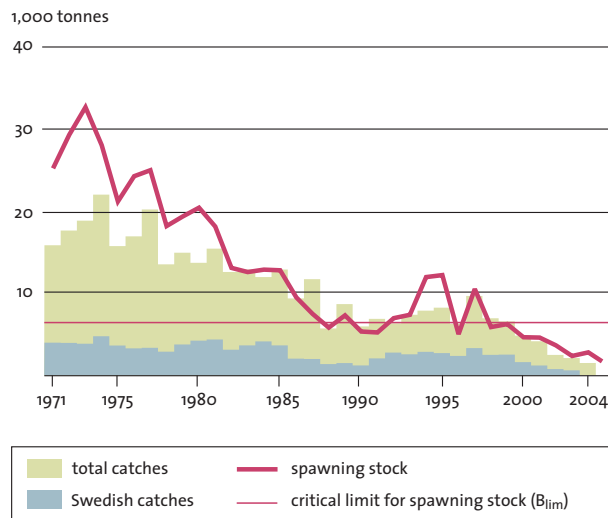
 *By 2005 action programmes will have been prepared and introduced for threatened marine species and fish stocks that are in need of targeted measures.*

In the Red List published in 2000, the Swedish Species Information Centre identified 17 species associated with marine environments and shores as being in immediate need of special measures. So far, action programmes have been launched for twelve threatened marine species.

In 2005 the Centre published a new national Red List, including a total of 219 marine species, 176 of them invertebrates. Of Sweden's marine fish species, 22 are now listed, compared with 14 in the 2000 Red List. Seven of these are commercially exploited, including cod and eel. For these species, international agreements are needed.



FIG. 10.1 Cod and cod fishing in the Kattegat



SOURCE: SWEDISH BOARD OF FISHERIES

Cod was one of the commercially exploited fish species added in 2005 to Sweden's Red List. In the Kattegat, the population of cod is now less than a twentieth of what it was in the 1970s. The critical limit for its spawning stock (B_{lim}) has been set by ICES at 6,400 tonnes, and the stock has been below that level since the end of the 1990s.

The Board of Fisheries has proposed measures for all the fish species on the new Red List. In addition to species-specific actions, it urges the Swedish Government to give a lead within the EU in securing international protection for threatened species and ensuring that EU regulations apply to all commercially exploited species.

For marine mammals, the situation has improved somewhat. Both the grey and common (harbour) seal populations, for instance, are now judged to be viable. One exception is the common porpoise, whose status in the Baltic remains critical.

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.*

Since February 2004, trawls used to fish for Norway lobster inside Sweden's trawling limit have had to be fitted with sorting grids and 70 mm square-mesh netting. Sampling shows that this dramatically reduces (by 80–90%) catches and hence fishing mortality of non-target species. In February 2005 this type of gear was also introduced as an alternative under EU regulations.

The Swedish Board of Fisheries has developed a voluntary record keeping system, designed primarily to study seal damage to gear and catches, but also to monitor bycatch. In 2004 a bycatch of 42 seals was recorded. Extrapolation of these data indicates that the total bycatch in Swedish commercial fisheries now amounts to 300–500 grey seals, the same number of common seals, and a smaller number of ringed seals. The relative bycatch of grey and ringed seals is thus falling, as populations of these species have risen by 30%. Most of the decrease is attributable to the introduction of seal-proof salmon traps. No bycatch of porpoises was reported.

CATCHES – RECRUITMENT

INTERIM TARGET 5, 2008

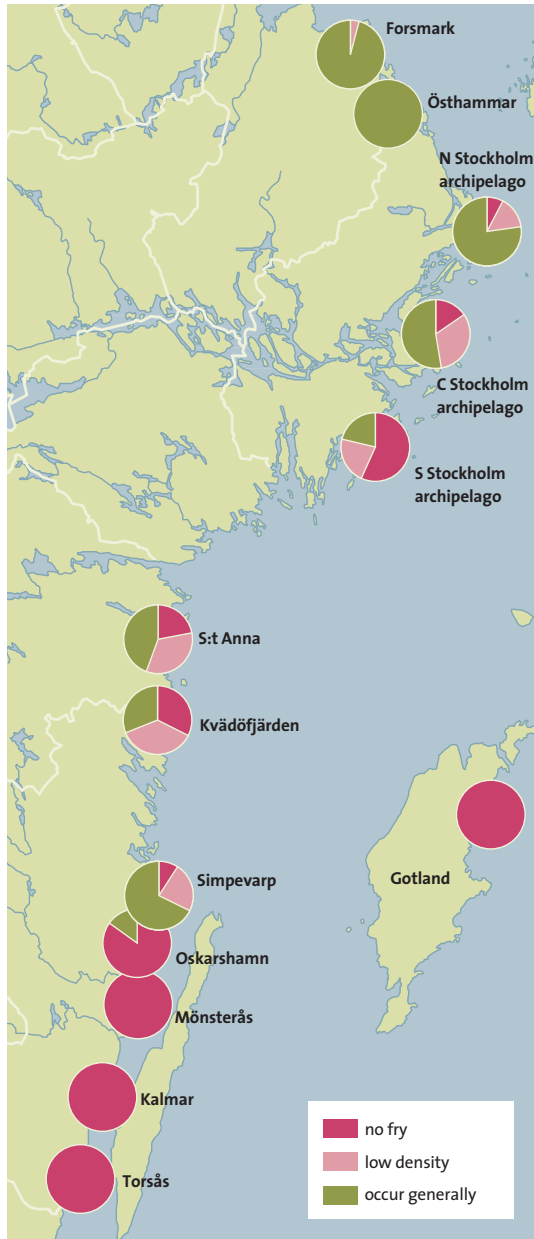
☹️ *By 2008 catches of fish, including bycatches of juveniles, will not exceed levels commensurate with maintaining fish stocks of a size and composition sufficient to ensure that the ecosystem's basic structure and functions are preserved. Populations will have been restored to levels well above biologically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

The wording of this target was revised in 2005.

The present management system, based on quotas for individual species, has given rise to a number of problems with mixed fisheries, one being increased discards and 'black' landings of fish. A change to the system has been proposed, in order to regulate fishing effort rather than, as now, harvesting of individual stocks. The main advantage will be that fishermen will be permitted to land basically everything they have caught. In the summer of 2005 this issue was highlighted by a proposal from the North Sea Regional Advisory Council for trials in the Kattegat beginning in 2006.



FIG. 10.2 Occurrence of perch fry, 1997–2003



SOURCE: SWEDISH BOARD OF FISHERIES

One problem arising from fisheries is that, when nets are lost, they continue to entangle fish, birds and mammals. This phenomenon, known as ‘ghost’ fishing,

◀ Recruitment to populations of coastal fishes such as perch and pike is currently very poor in the archipelagos of the Baltic proper. The recent decline has mainly occurred in outer parts of the archipelagos, close to the open sea. The Swedish Board of Fisheries and Environmental Protection Agency, in a study commissioned by the Government, therefore call for a major programme of action and research. The chief priority should be to restore and protect key habitats in fresh waters, inner archipelago waters and confined inlets. This map shows the proportions of shallow-water sites on different stretches of coast, studied in 1997–2003, with successful (green), poor (pink) or no (red) recruitment of perch. The number of sites surveyed in each area varies between 5 and 23.

is particularly common with bottom-set gill nets. In an EU-funded project, the Sound (Öresund) was dragged for ghost nets in the summer of 2005, and nets with a combined length of 18 km were recovered.

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.

In 2005 the Environmental Protection Agency completed its work on draft noise quality standards relevant to areas of natural and cultural heritage interest.

The revised rules on personal watercraft (jet skis), introduced on 15 July 2004, have not led to any appreciable increase in noise levels, since such craft are confined to public shipping lanes, which do not pass through sensitive archipelago areas.

A necessary condition for achieving this target is that county administrative boards work with the local authorities concerned to designate particularly sensitive areas.

DISCHARGES OF OIL AND CHEMICALS

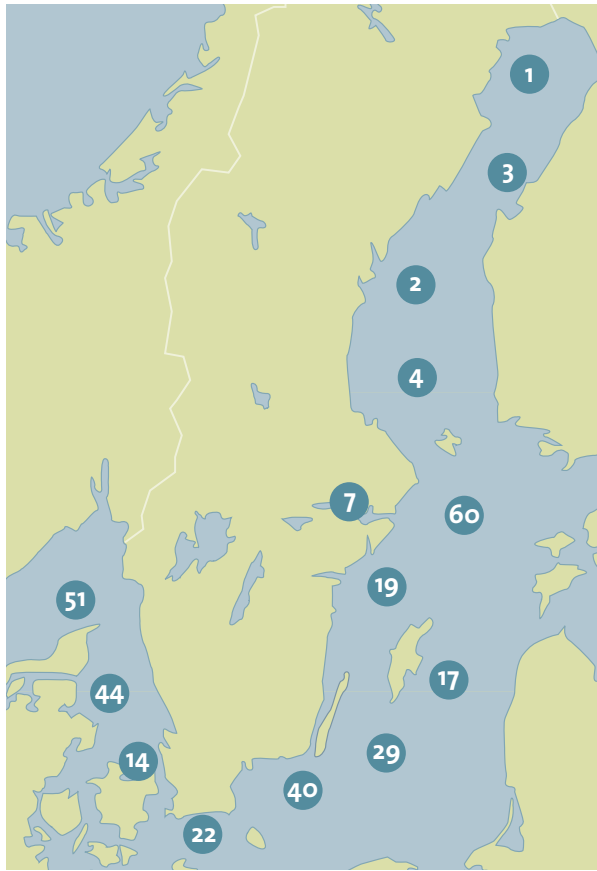
INTERIM TARGET 7, 2010

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

The biggest threat from shipping to the environment of the Baltic, Kattegat and Skagerrak is the rapidly



FIG. 10.3 Geographical distribution of detected discharges of oil



SOURCE: SWEDISH COAST GUARD

The figures indicate the number of discharges detected in each area in 2005. Most emissions occur along major shipping routes. Intensified environmental surveillance, combined with increased use of satellite remote sensing, the practice of reporting all discharges and greater public readiness to report sightings, means that a growing proportion of the true number of discharges is now being discovered.

growing 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.

A range of protective measures have been introduced by the Helsinki Commission and the International Maritime Organization. The risk of collisions and

groundings is being reduced by improved traffic management systems, hydrographic surveys, modern navigation instruments and greater use of pilotage.

In parallel with a stepping up of aerial surveillance and growth in shipping movements, the welcome downward trend in numbers of discharges is continuing, showing that the agreed measures are having an impact. Aerial surveillance, in particular, has proved to have a deterrent effect, significantly reducing illegal discharges. There has also been an increase in the quantities of waste oil delivered to port reception facilities, showing that more and more vessels are now opting to leave such oil in port rather than discharging it at sea.

The EU's Common Fisheries Policy has not yet managed to match the capacity and size of the fishing fleet to available fish resources. As a result, several stocks are being overexploited owing to total allowable catches (TACs) that are set too high, and discards and 'black fishing' can occur – effects which obstruct progress towards this environmental objective.

By making careful choices, consumers can help to ensure that the fishing industry uses marine resources more sustainably. This may involve consuming larger quantities of species that are currently underexploited. Other options are to buy fish that is ecolabelled by KRAV or the Marine Stewardship Council, for example, and to avoid species that are particularly sensitive to overfishing, such as sharks, rays and deep-sea species.

Consumers can also support small-scale inshore fisheries by buying locally caught fish. TV4's reports on extensive black fishing in the Baltic and Barents Seas have attracted wide attention. Consumers have been able to put pressure on the food industry to ensure that its fish products do not originate from illegal landings.



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?

☹️ This environmental quality objective can be achieved within one generation if greater attention is paid to safeguarding and restoring wetlands in the wider countryside. Implementation of the Water Framework Directive should lead to an increased focus on the functions which wetlands perform. To ensure that wetland areas are used sustainably, every sector of society must assume its responsibility. The two interim targets relating mainly to agriculture and forestry, however, will not be met on time: forest roads are still being built across wetlands of significant conservation interest, and too few wetlands are being recreated on farmland, where large areas have been lost.

Natura 2000 and implementation of the Mire Protection Plan will provide satisfactory protection for Sweden's most outstanding wetlands. But to attain this objective, wetlands with interest features in the form of traces of past human use, hydrological integrity, or flora and fauna also need to be safeguarded from development.

MEASURES REQUIRED AND PLANNED

The National Strategy for Thriving Wetlands represents an important step towards achieving this objective. When assessing the need for different measures and the effects of various forms of disturbance, it is important to view wetlands in their landscape ecological context. Developers should compensate for any encroachments on wetland environments to a greater extent than they do at present. Good conservation practice in farming and forestry is of great importance, and the strategy includes guidelines, for example, on forestry in wet woodlands. It also identifies a range of measures that need to be studied more closely in advance of the in-depth evaluation of this objective.

Wetlands of various types need restoring throughout the country. The Swedish Environmental Protection Agency is funding a pilot project in which the Jönköping County Administrative Board is studying methods to restore drained mires. The forestry company Sveaskog is investing SEK 2.5 million in a wetlands project that is being run in association with the Swedish Wetlands Fund and the Swedish Ornithological Society. By 2010, 100 wetlands are to be restored in forest areas.



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.*

The Swedish Environmental Protection Agency, Board of Agriculture, Forest Agency and National Heritage Board have together drawn up a National Strategy for Thriving Wetlands, reflecting a shared view of how efforts to safeguard wetlands should be strengthened and what action is required to achieve the environmental objective. The strategy deals with various aspects of the use, conservation, restoration, establishment and management of wetlands.

MIRE PROTECTION PLAN

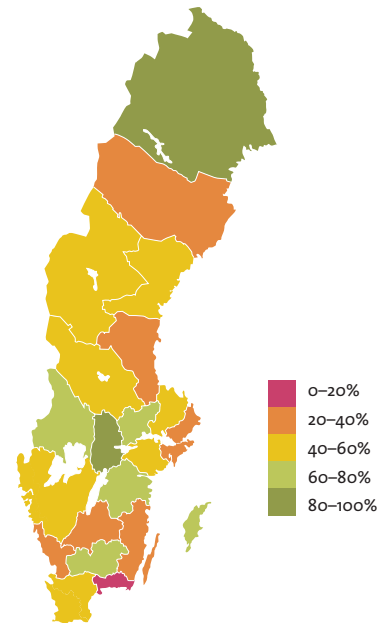
INTERIM TARGET 2, 2010

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

As of January 2006, 259 of the 502 sites listed in the Mire Protection Plan enjoy satisfactory protection, which means that at least 75% of their mire area is now included in a nature reserve, national park or Natura 2000 site. In 2004/2005, new reserves providing protection for 14 sites were created. In addition, during 2005 the Environmental Protection Agency purchased 8,141 ha of mires and forest–mire mosaics, including areas of 50 of the sites covered by the plan.

In 2006, to facilitate protection efforts, county administrative boards and the Environmental Protection Agency are undertaking a revision of the Mire Protection Plan. The boundaries of the mire areas listed in the plan in 1994 are to be reviewed. The plan will also be supplemented with the results of a survey of wet woodlands and with cultural heritage information. Mire sites no longer meeting the criteria are to be excluded and replaced with new ones of high conservation value. A number of new areas will be included in the plan, primarily in Norrbotten. Protection for these additional sites should be in place by 2015.

FIG. 11.1 Proportion of Mire Protection Plan sites with protection



SOURCE: SWEDISH EPA, JANUARY 2006

Proportion of mire sites with at least 75% of their area protected by inclusion in a nature reserve, national park or Natura 2000 site. To date, 697,327 ha have been safeguarded, corresponding to around 79% of the total Mire Protection Plan area. To provide quality assurance of site boundaries and step up the pace of protection, county administrative boards and the Swedish EPA are revising the plan during 2006. Additional areas will be included, chiefly in Norrbotten.

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.*

The wording of this interim target was revised in 2005.

An analysis covering 15 counties, carried out by the Swedish Forest Agency in 2005, shows that the target will probably not be achieved by 2006. On 89 of the 7,600 wetlands with significant natural assets studied, forest roads had been built during the period 2000–04. At 95 sites, it was not possible to say for



sure whether the changes observed were the result of newly built forest roads.

The method used involves an analysis of changes revealed by satellite images of wetlands assigned to nature conservation classes 1 and 2 in the Wetlands Inventory. Further analyses are to be performed to cover the whole country, since data are lacking for several counties with significant forest and mire areas, including Norrbotten and Jämtland. For ongoing monitoring, the method needs to be further developed and broadened to include information on cultural assets.

Owing to high levels of timber extraction, interest in building forest roads over wetlands is expected to remain strong, and the Forest Agency plans to step up its efforts to discourage such projects. In Västerbotten the Agency is working with the county administrative board on a successful outreach programme providing information and advice in this area.

WETLANDS ON AGRICULTURAL LAND

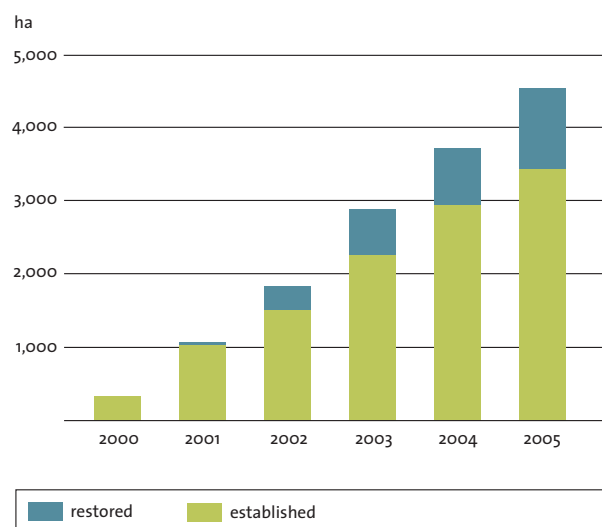
INTERIM TARGET 4, 2010

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

In 2005, a total of 850 ha of wetlands were created, recreated or restored on agricultural land. Restored wet hay meadows and pastures accounted for 320 ha. EU agri-environment payments (through the Rural Development Programme, RDP) were the main source of funding, covering 610 ha of wetlands. Around 210 ha were financed from other quarters, such as the Swedish Wetlands Fund or, in northern Sweden, the EU structural funds.

A good deal of emphasis is placed in the national strategy on the re-creation of wetlands, since such projects are also of significance in achieving other environmental objectives and fulfilling Sweden's undertakings on biodiversity and water resource management. At the present rate of progress, however, only 8,400 ha will have been recreated by 2010.

FIG. 11.2 Areas of wetlands established and restored, 2000–2005



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

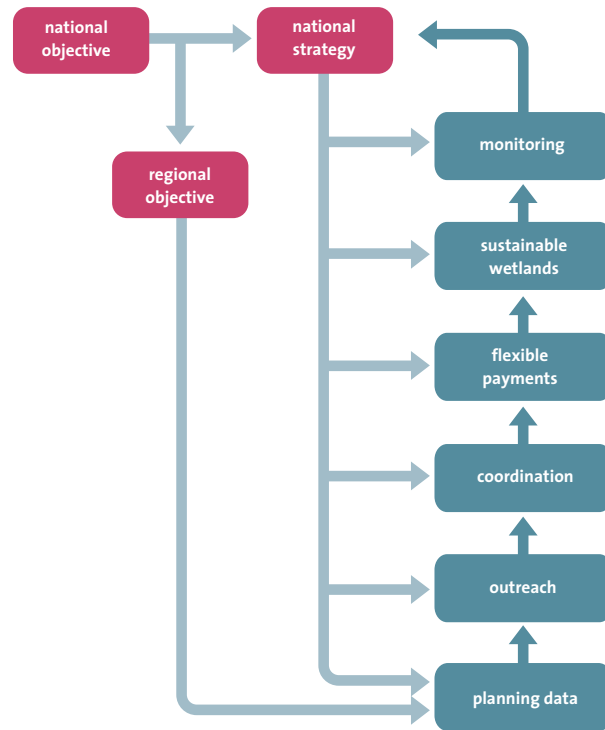
Most of the wetlands in southern Sweden, 87% of the area, have been funded under the RDP. In the north, 259 ha of wet hay meadows and pastures have been restored with support from EU structural funds. Between 2000 and 2004, some 370 ha of wetlands were created under local investment programmes (LIPs).

To step up the pace, planning at the landscape level is needed, along with more information and support to landowners. The 'wetland chain' approach (see fig. 11.3) is also intended to enhance the quality of the wetlands recreated, in terms of nutrient removal, biodiversity and protection of cultural heritage.

To achieve these aims, increased RDP resources and supplementary state funding will be required. Local authorities are key players when it comes to planning how land and water are to be used, and it is important to maintain the wide support for wetlands which many authorities have built up through local nature conservation projects and local investment programmes (LIPs).



FIG. 11.3 The 'wetland chain' approach



SOURCE: NATIONAL STRATEGY FOR THRIVING WETLANDS (SWEDISH EPA, FOREST AGENCY, BOARD OF AGRICULTURE AND NATIONAL HERITAGE BOARD)

◀ All the links shown need to be developed and put in place to achieve the target area and ensure that the quality of the wetlands established and restored is high.

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.

Around a dozen action programmes linked to wetlands are now in place or are due to be introduced shortly. Since many wetland species have declined as a result of changes in their habitats, restoration and continuous management of those habitats are necessary. The 2005 Swedish Red List includes 209 threatened species associated with wetlands.

The action programmes for rich fens and the white-backed woodpecker (*Dendrocopos leucotos*) include wide-ranging measures to enhance wetland habitats. If the measures envisaged under different action programmes are reflected in landscape ecological planning for the restoration and establishment of wetlands, major synergies can be achieved.



Just over 5% of district heating in Sweden is based on peat. Harvesting of fuel peat has declined in the last decade, in parallel with a steep rise in imports. In 2005, 28% of the peat used for fuel was imported, primarily from the Baltic states. Horticultural peat, however, has grown in importance, and now accounts for over a third of the total quantity extracted in Sweden.

The report of a government inquiry on peat discusses how peat workings should be rehabilitated to reduce greenhouse gas emissions and limit the damage to the natural and cultural environment.

Future use of fuel peat, in particular, will depend on Sweden's environment and energy policies. Peat burned at power stations and district heating plants is classed as a fossil fuel, and since 2005 carbon dioxide emission allowances have had to be held for this use. At the same time, since 2004 peat used to generate electricity has, like renewable energy sources, qualified for renewables certificates. So far, peat has been exempt from the carbon dioxide tax.

Overall, the use of fuel peat is likely to decrease. Demand for peat for horticultural purposes and to some extent as litter for livestock, on the other hand, is growing.



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?

☹️ This environmental quality objective will probably not be achieved by 2020. For some of the interim targets the outlook is brighter, but these targets do not cover every aspect of the objective. As far as biodiversity is concerned, the main difficulty is quite simply the long timescale of biological processes in forests. Several of the basic factors on which biodiversity depends, such as dead wood, large trees, and a significant deciduous element in coniferous forests, currently show positive trends. On the negative side, however, forests of very high conservation value are to a certain extent still being felled. Appreciable improvements in biodiversity are unlikely to become apparent until after 2020.

ONE YEAR ON FROM STORM

The effects of winter storm Gudrun in southern Sweden are not reflected in the present assessment of progress towards the objective, but in spring 2006 the Swedish Forest Agency presented a separate evaluation of the storm's impact. Overall, the

impression is that the cultural heritage assets of forests suffered considerable damage. At the same time, the study shows that forests with valuable natural features, such as key habitats for red-listed species and areas formally protected in various ways, were less severely affected than other forest areas.

80-10-10 – A LONG-TERM APPROACH

Achieving the Sustainable Forests objective will take time. Formal protection, voluntary exclusion of land from production, and a high level of attention to conservation in forest management are important aspects of sustainable forestry. The Forest Agency has adopted a long-term national approach referred to as '80-10-10'. The idea is to ensure that 10% of forest land is excluded from forest production, through formal protection of various kinds or under voluntary undertakings, and that another roughly 10% is managed with 'enhanced consideration' for nature conservation, which may for example involve avoiding clear-cutting.

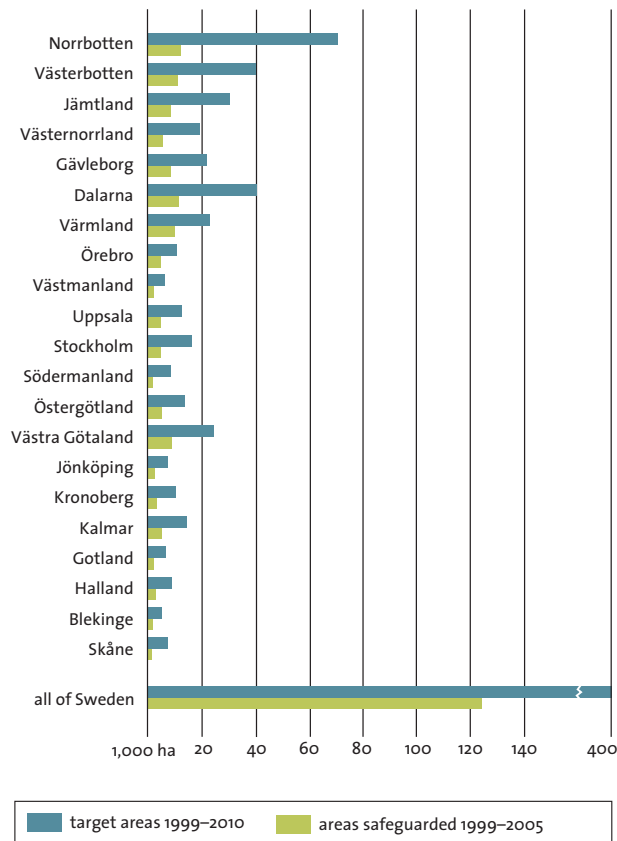
ACTION TAKEN IN 2005

- A joint national strategy for formal protection of forests (interim target 1) was adopted by the Swedish Environmental Protection Agency and the Swedish Forest Agency.
- The Forest Agency adopted national sectoral objectives for forestry.

ACTION IN PROGRESS

- Methods are being developed to identify and manage forests with long continuity (Forest Agency).
- The development phase of an action programme to prevent soil acidification and promote sustainable use of forest land is under way (Forest Agency).

FIG. 12.1 Nature reserves, habitat protection areas and nature conservation agreements outside montane forest zone: target areas and areas safeguarded, by county



SOURCES: SWEDISH EPA AND SWEDISH FOREST AGENCY

In the strategy for formal protection of forests, the national target of 400,000 ha has been broken down by county. In this diagram, county targets are compared with the areas safeguarded to date. Progress towards these targets varies widely between counties.

- ‘Forests and History’ – an inventory of cultural remains in forests (Forest Agency and National Heritage Board).
- Initiatives to highlight the social values of forests are being developed and launched (Forest Agency).
- Regional strategies are being drawn up for formal protection of forests, based on the national strategy now in place (county administrative boards and Forest Agency).

PLANNED ACTION

- Encourage the creation of local authority nature reserves (Environmental Protection Agency).
- Promote more efficient land purchase procedures for the creation of nature reserves on land belonging to the state-owned forestry company Sveaskog (Environmental Protection Agency).
- Study the capital gains tax rules governing purchase money and compensation payments for land acquired for site safeguard (Environmental Protection Agency).

PROPOSED ACTION

- There is a continuing need for increased resources for nature reserves, habitat protection areas and nature conservation agreements.
- Design a new nature conservation instrument that will enable targeted management measures to be undertaken.
- Develop agreement-based instruments for purposes other than nature conservation.
- Give the Forest Agency greater scope to make field visits prior to felling.
- Take the social values of forests clearly into account in future forestry legislation.



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.*

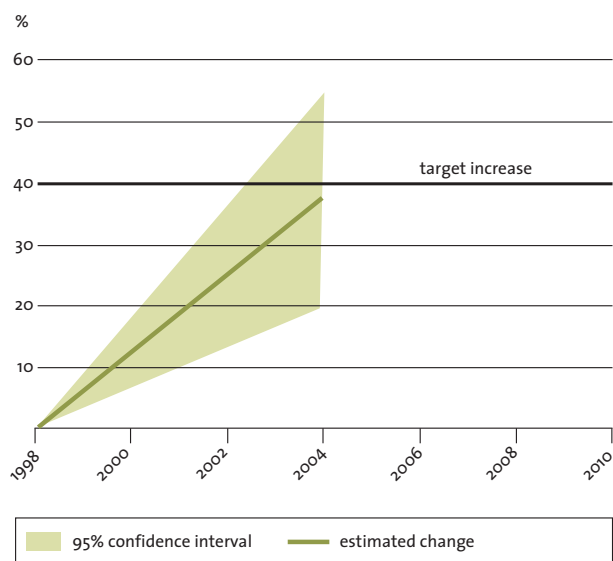
This target relates to areas outside the montane forest zone. Of the total area of productive forest land that is to be excluded from production by 2010, 320,000 ha are to consist of nature reserves and 30,000 ha of habitat protection areas, while 50,000 ha are to be covered by nature conservation agreements. Forest owners are expected to set aside at least a

further 500,000 ha on a voluntary basis, resulting in an area of at least 730,000 ha of productive forest with voluntary protection by 2010.

Our assessment is that the target for nature reserves will be difficult to meet by 2010. Between 1999 and 2005, 94,216 ha of forest land were protected by nature reserve designation, 22,371 ha of that area during 2005. With current funding and existing price levels for forests and forest land, this target will not be achieved until 2020.

Up to the end of 2005, 12,007 ha of habitat protection areas had been created, and 14,780 ha safeguarded under nature conservation agreements. With an increase in funding from around SEK 175 million to

FIG. 12.2 Change in volume of hard dead wood in Sweden as a whole, 1998–2004

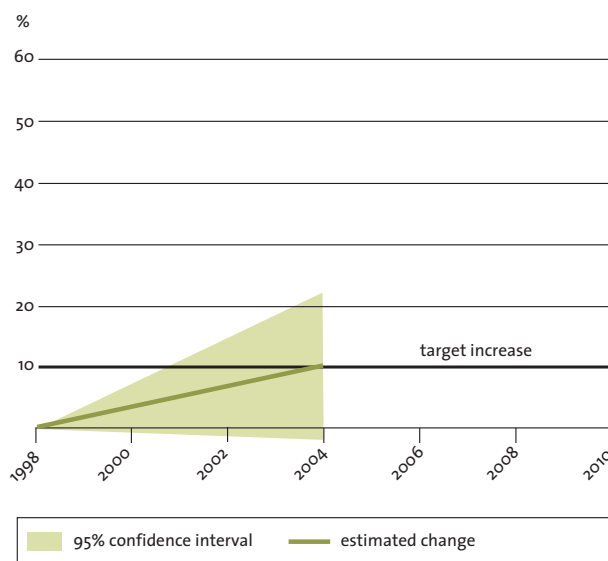


Note: The confidence interval shows the range within which there is a 95% probability of the true change lying.

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

The trend for hard dead wood has been encouraging, and the target may be expected to be achieved well before 2010. The increase is in marked contrast to the situation for almost the whole of the 20th century, when the volume of dead wood in forests was constantly low. The change is due almost entirely to the fact that, in recent years, forest owners have begun to retain trees that have died naturally.

FIG. 12.3 Change in area of mature forest with a large deciduous element in Sweden as a whole, 1998–2004



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

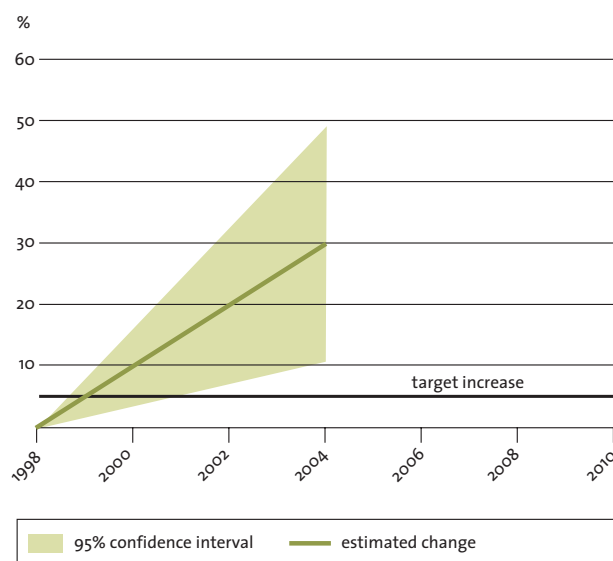
The area of mature forest with a large element of deciduous trees is steadily increasing, and the target level for 2010 has basically already been achieved. Changes in focus in the forestry sector could alter this trend, however.



SEK 320 million a year, it will still be possible to meet the targets for these forms of protection by 2010.

In 2002 just under 1 million ha were estimated to have been set aside voluntarily by forest owners, of which 800,000–850,000 ha were outside the montane forest zone. In 2005 the Forest Agency performed a systematic survey of these voluntary undertakings, beginning with small-scale holdings outside the area of southern Sweden affected by the storm. The survey revealed that owners with small holdings are setting aside significantly fewer areas of land than expected, and that the total area safeguarded voluntarily has decreased. This trend is considered serious, and additional areas will probably need to be set

FIG. 12.4 Change in area of old forest in Sweden as a whole, 1998–2004



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 has developed very favourably, and the target has already been met by a wide margin. This is mainly because, as time passes, large areas of forest are attaining the defined minimum ages (120 years in southern Sweden and 140 in the north), and this 'recruitment' far exceeds the rate of felling in forests already classed as old.

aside to achieve the target by 2010. The survey is to continue, and will provide a clear picture of voluntary undertakings for the in-depth evaluation of progress towards the environmental objectives in 2008.

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.

Success in meeting these targets will depend mainly on how forests are managed, what stands are chosen for felling, and to what extent dead trees are retained in forests. Judging from present trends, the targets for hard dead wood, old forest and mature forest with a large deciduous element should be achieved without additional measures. The area regenerated with deciduous forest is expected to 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.


A great deal of damage is still being done to known ancient monuments and cultural remains. Further work is needed in a number of areas, including the development of more careful site preparation methods, training, information to stakeholders, and inventories of cultural remains in the forest landscape. Inventories of hitherto unknown archaeological and cultural remains are under way in virtually every county, as



part of a joint project with the labour market authorities. The scale of this work is determined by the needs of those authorities and the resources which the National Heritage Board and the Forest Agency are able to devote to organizing it. However, it will not be completed soon enough to provide a basis for achieving this interim target. The situation could be appreciably improved, though, by the introduction of digital mapping techniques and more effective, targeted advice.

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, proposing measures to safeguard 52 threatened species. The programmes will also benefit a large number of other species. The 52 species include white-backed woodpecker (*Dendrocopos leucotos*), lynx (*Lynx lynx*), the beetle *Ceruchus chryso-melinus*, flat-headed pine borer (*Chalcophora mariana*), the fungi pig's ear (*Gomphus clavatus*), *Chamonixia caespitosa* and flaky puffball (*Lycoperdon mammiforme*), and fire-favoured insects.

Forests are an important source of renewable resources for society, but they are also sensitive to the way they are managed. Although, on the whole, destructive exploitation of forests does not occur in Sweden today, many aspects of forest management still need to be improved in order to achieve the environmental objectives.

At present, there are no quality labelling systems corresponding to the objectives. Two forest certification schemes that operate on market terms do exist, however: FSC and PEFC. Certified forest owners undertake to comply with standards governing environmental, social and other issues, although these standards are often highly technical and difficult to understand.

As consumers, though, we can still make a major contribution by finding out what the schemes entail and actively insisting on products meeting standards that we consider reasonable.



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?

☹️ The present condition and long-term productivity of arable land are satisfactory. As far as biodiversity and cultural heritage are concerned, the situation is improving, although quality aspects are difficult to assess with confidence. An important factor is the EU's Common Agricultural Policy (CAP), whose development will be crucial to the prospects of achieving this objective. For the buildings of the farmed landscape, no clear targets exist, and there is still a risk of traditional buildings falling into disrepair and being demolished as a result of inadequate maintenance.

Will the interim targets be achieved?

MEADOW AND PASTURE LAND

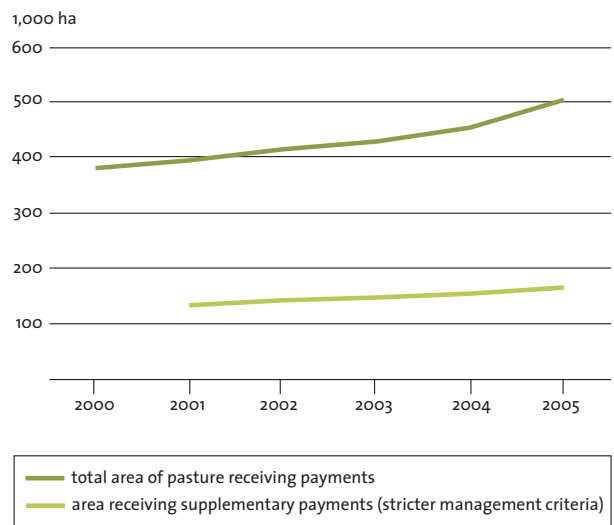
INTERIM TARGET 1, 2010

☹️ 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 pasture land covered by the agri-environment scheme is increasing satisfactorily, but there is still uncertainty about whether the highest quality land can

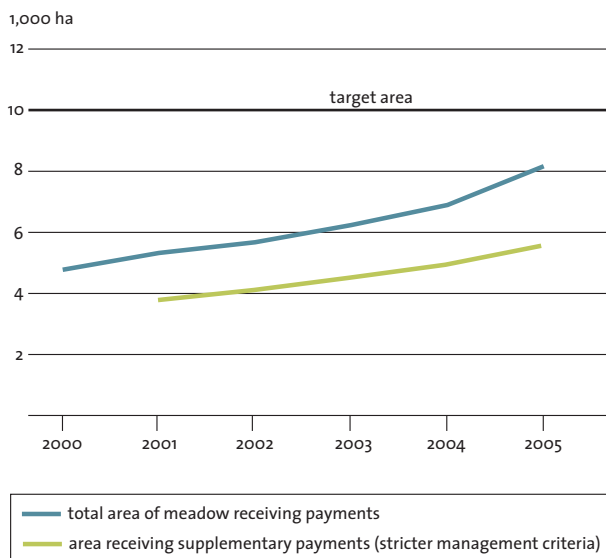
FIG. 13.1 Area of pasture land covered by agri-environment scheme



SOURCE: ENVIRONMENTAL OBJECTIVES PORTAL

500,000 ha of pasture land are now managed with support from the agri-environment scheme for pastures and meadows. Management prevents these pastures becoming overgrown, and is essential if biodiversity is to be conserved.

FIG. 13.2 Area of meadow land covered by agri-environment scheme, 2000–2005



SOURCE: ENVIRONMENTAL OBJECTIVES PORTAL

The area of meadow land receiving basic payments is increasing satisfactorily, but more land should also qualify for supplementary payments. To preserve their value, meadows need to be managed, e.g. by mowing. The purpose of the agri-environment scheme is to pay farmers for this management. Supplementary payments are available for land of greater conservation value, requiring a higher level of management.

be brought within the scope of the scheme. Of the areas covered by the National Survey of Semi-Natural Pastures and Meadows, 20% were not receiving agri-environment payments in the spring of 2005. Since then, there has been a slight improvement.

The increase in the area of pasture in recent years can be attributed to the CAP, and in particular to the introduction of the single farm payment scheme. Farmers now have an interest in registering previously unregistered pastures, so as to gain access to this form of support. The single payment scheme itself only entails a basic level of management, but the hope is that it will prevent pasture land becoming overgrown. Its introduction has also resulted in greater take-up of agri-environment payments. To qualify for the agri-environment scheme for meadows and pastures,

a specific management regime is required. Appropriate management is crucial to maintaining biodiversity.

Monitoring of changes in the quality of meadow and pasture land at the national level is starting in 2006 as part of NILS (National Inventory of Landscapes in Sweden). This inventory operates on a five-year cycle and changes in quality are slow, and it will therefore take time to obtain clear results.

The types of pasture most at risk have been identified as grazing land in northern Sweden, alvar grasslands (grasslands on thin soil over level limestone), forest pastures, shielings (upland summer pastures) and heather heaths. Up to 2005, the first three categories have increased by some 15,000 ha. For shielings, trends are based on numbers of sites, and a satisfactory increase can be observed. For heather heaths, no data are available, but there are indications of a decline.

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 assessment for this target has been revised since 2005.

Owing to exemptions from the general protection given to certain small-scale farmland habitats, some 200 such features are removed legally every year. In some cases, conditions are imposed, for example that new areas of habitat must be created. The largest numbers of exemptions have been granted in Skåne, Västra Götaland and Kalmar counties. How many small-scale habitats disappear illegally or as a result of farmland being taken out of production is very hard to say. There are no data on how many features of this kind there are in all, but according to an evaluation forming part of a study of the environmental impacts of the CAP, the main cause of their decline is farmland abandonment.



At the same time, new small-scale habitats – chiefly wetlands – are being created. Implementation of the measures in the Swedish Board of Agriculture’s biodiversity strategy for the agricultural plains of southern and central Sweden, drawn up in 2004, would promote progress towards this target.

Monitoring of small-scale habitats will begin in the NILS framework in 2006. Based on aerial photographs, this work will primarily be concerned with quantity, although a method to assess quality will also be tested on a limited scale. As NILS operates on a five-year cycle, it is difficult to assess developments at more frequent intervals.

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.*

The total length of linear features being managed under the agri-environment scheme is increasing satisfactorily, but point features show a poorer rate of increase. In certain regions, too, it is proving difficult to achieve wider take-up of the scheme, and this increases the expectations placed on the new Rural Development Programme.

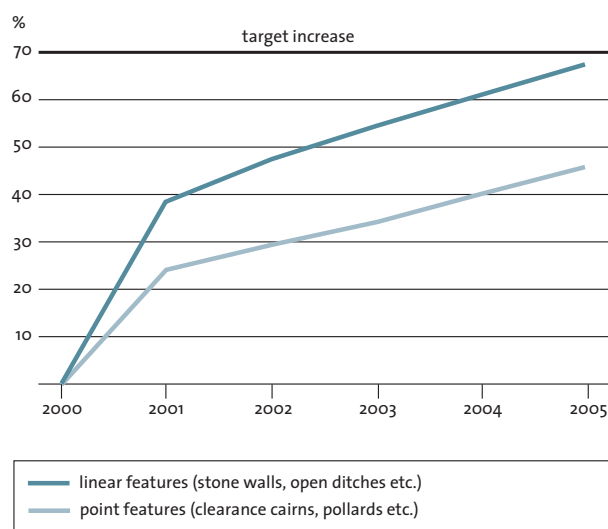
PLANT GENETIC RESOURCES AND INDIGENOUS BREEDS

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 inventory of cultivated plants being carried out as part of the Programme for Cultivated Diversity (POM) is progressing according to plan. Work on a strategy for the future conservation and use of plant genetic resources will be completed in 2006. The Swedish Database of Cultivated Plants (SKUD) can

FIG. 13.3 Cultural features on arable land. Percentage change in number or extent of landscape features covered by agri-environment scheme



SOURCE: ENVIRONMENTAL OBJECTIVES PORTAL

Linear features are increasing satisfactorily, point features at a somewhat slower rate. The expectation was that the highest take-up of the scheme would occur during its first five years.

now be accessed online, providing a basic tool for handling names of cultivated plants.

During 2005 the Swedish Board of Agriculture established two new groups in the area of livestock genetic resources:

- A collaboration group to improve information on endangered breeds of domestic animals.
- A reference group known as the Livestock Genetics Council.

The Council, which has held two meetings, acts in an advisory capacity to the Board of Agriculture on matters relating to livestock genetic resources. It draws its members from the Swedish University of Agricultural Sciences, Stockholm University, the Environmental Protection Agency, the Swedish Biodiversity Centre and county administrative


boards, together with breeding organizations and breed societies. The Swedish Association of Zoos and Aquaria and the Nordic Gene Bank for Farm Animals are also involved in its work. The Council has issued recommendations on the principles that should apply to semen collected from endangered breeds. The semen is being held in a semen bank for use at a later date.

To analyse in more detail how interim targets for livestock genetic resources should be framed, with a view to ensuring the long-term approach which the management of different breeds requires, an initial plan of work has been drawn up for preparations for the forthcoming in-depth evaluation of this environmental quality objective. A final report providing an input to that evaluation is to be presented by December 2006.

In December 2005 a report was presented on precautionary measures and contingency and emergency planning to safeguard livestock genetic resources. Measures to ensure that registers are secure and to protect livestock from wild predators are among a number of costed proposals included in the report.

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.*

The assessment for this target has been revised since 2005.

Over 200 species associated with farmland are in need of special measures. At the end of 2005, 32 action programmes were being circulated for consultation or had been adopted, covering 64 threatened species and also farmland trees of particular conservation interest, and another 17 programmes were at the draft stage. In 2006 work is beginning on a further 25. Many of the programmes cover several species, and the target is expected to be met.

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.*

The National Heritage Board has drawn up a strategy, setting out the choices of path open to it and the activities and actions which it should undertake. The options mentioned include the agencies responsible for cultural heritage assuming greater responsibility for the valuation and selection of agricultural built environments; further studies of ways of reusing farm buildings; and further development of arrangements to ensure appropriate targeting of public funding.

Among a number of actions proposed, the strategy suggests that the National Heritage Board should continue to draw attention to agricultural buildings in the context of regional and, in particular, rural development; and that it should initiate research and development relating to these buildings. The strategy also emphasizes that the heritage agencies' role is to help ensure that farm buildings are able to tell an important story and contribute to a rich living environment.

A programme, including specific measures and funding, has thus been prepared, setting out the action to be taken by the cultural heritage agencies to promote the conservation of farm buildings.



By choosing meat from animals that graze on traditionally managed pastures, consumers can show that they want such pastures to be preserved. To be able to exert such an influence, they need to be aware of how what they eat affects the environment; in addition, products need to be clearly labelled.



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?

☹️ To maintain a mountain landscape whose character is shaped by grazing, reindeer herding is essential. It must be undertaken and developed in an environmentally sustainable manner.

NEW COLLABORATION ARRANGEMENTS

The joint regional environment and sustainable use programme, drawn up by the county administrative boards of the mountain region, recommends action in seven areas aimed at improving the basic conditions for sustainable development. Of particular importance are the proposals concerning new arrangements 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. A great deal of work needs to be done to improve knowledge about vegetation, aquatic organisms, noise pollution, cultural environments, and non-native and threatened species in mountain areas. The programme also calls for a continuation of current surveys of the scale and effects of hunting and fishing and the threats which they represent.

SUSTAINABLE LAND USE IN MOUNTAINS

The regional programme and the environmental plans of reindeer husbandry districts are essential tools in addressing mountain land use issues. The pressure to develop new wind energy capacity in mountain areas could adversely affect both natural and cultural assets and the prospects of extending the area of undisturbed mountain terrain. To avoid impacts of this kind, such projects must be preceded by careful land use planning.

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

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.*

A new environmental monitoring programme known as NILS (National Inventory of Landscapes in Sweden), which includes mountain areas, is now under way. It is expected that data from the programme will be able to be used in the in-depth evaluation of progress towards this interim target in 2008.

As a basis for comprehensive monitoring of damage to soil and vegetation, both airborne and satellite-based remote sensing have been used.

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 to create practical conditions for

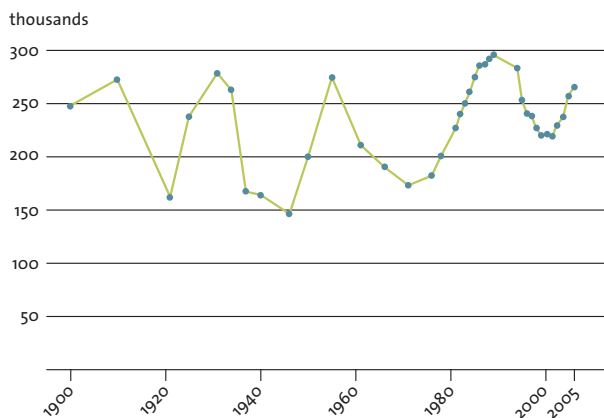
using satellite-based remote sensing at the regional and national levels.

For the time being, the risk of damage to soil and vegetation has to be assessed on the basis of reindeer numbers and the number of all-terrain vehicles, which has increased insignificantly in recent years. The number of reindeer has risen by 3.5% compared with 2004. A marketing campaign for reindeer meat in Sweden and other countries in 2005 has resulted in higher prices. As more reindeer were slaughtered in the autumn of 2005, the problems associated with a large reindeer population may be expected to abate.

From an environmental point of view, it is essential to undertake further research and development relating to the effects on vegetation of climate change, reindeer grazing, and various forms of wear and tear.

Our assessment is that this target can be achieved within the time frame, provided that steps are taken to manage tourism and to adjust reindeer numbers to the natural carrying capacity of mountain areas. The regional goals adopted are considered to significantly promote progress towards the target.

FIG. 14.1 Reindeer numbers in Sweden, 1900–2005



SOURCE: SWEDISH BOARD OF AGRICULTURE

Reindeer are counted in winter, after the autumn slaughter and before calving. At that time of year, they graze mainly on lichens. Fluctuations in reindeer numbers reflect the varying abundance and accessibility of lichens, chiefly in forest areas outside the mountain region.

NOISE

INTERIM TARGET 2, 2010/2015

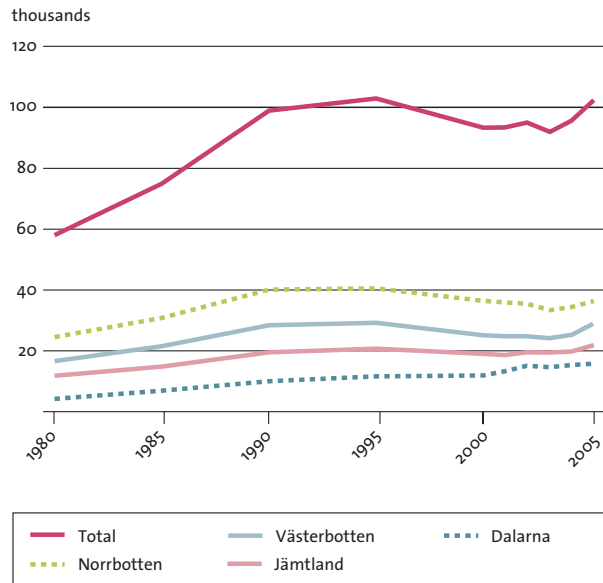
☹ *Noise in mountain areas from motor vehicles driven off-road and from aircraft will be reduced to meet the following requirements:*

- *by 2015 at least 60% of light all-terrain 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.*

As a basis for monitoring progress towards the target for all-terrain vehicles, information on noise levels will have to be included in the records kept at the vehicle registry, a possibility that is currently being studied by the Swedish Road Administration. Only a few existing all-terrain vehicles, however, are believed to meet the stringent noise standards required here,



FIG. 14.2 Light all-terrain vehicles in use in mountain counties of Sweden, 1980–2005



Note: Light all-terrain vehicle = all-terrain motor vehicle with a maximum ready-for-use weight of 400 kg. In practice, refers to quad bikes, three-wheelers 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, however, be important for certain aspects of tourism. 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.

and if the target is to be met vigorous action will have to be taken. It may be noted that the Government intends to draw up proposals for such standards and to submit them to the European Commission.

In a letter to the Government, the Environmental Protection Agency and the Civil Aviation Administration have called for legislative changes to reduce noise in sensitive mountain areas. As a result, the Civil Aviation Administration has been asked by the Government to develop a temporary reporting system for data from all aircraft operators and authorities on

their aviation operations in class A regulated areas and national parks in the mountain region. These data, to be collected by 31 May 2007, will provide the basis for a better assessment of noise levels in the mountain areas concerned and of the controls on aviation that may be needed to meet this target.

It remains unclear whether interim target 2 will be achieved.

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.

Large areas of Sweden's mountain region are already protected by nature reserve or national park designation. Protection of the freshwater environment, though, is limited, as is our knowledge of where the representative and significant cultural assets of mountain areas are to be found. More resources must be made available to the agencies responsible for cultural heritage, to enable them both to play a role in existing reserves and parks and to work together with the nature conservation authorities to provide long-term protection for new areas in the future.

In their regional environment and sustainable use programme, the county administrative boards of the region call on the Environmental Protection Agency and the National Heritage Board to draw up a joint programme to improve existing knowledge about the natural and cultural environments of mountain areas.

Our assessment is that this target can be achieved, provided that additional action is taken. Of particular importance are regional objectives concerning the Sami cultural heritage and better information about the natural and cultural environments of the mountain region. To maintain cultural assets associated with the Sami, the National Heritage Board provided funding in 2005 for the conservation of traditional Sami dwellings and storage huts.



ACTION PROGRAMMES FOR THREATENED SPECIES

INTERIM TARGET 4, 2005

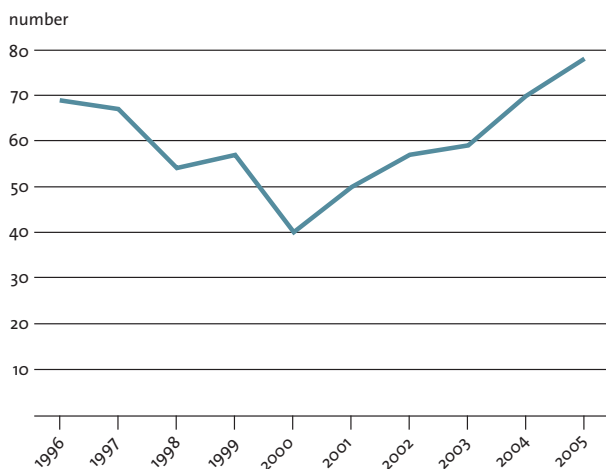
☹️ By 2005 action programmes will have been prepared and introduced for threatened species that are in need of targeted measures.

A total of ten action programmes, for as many species, have been judged to be necessary for Sweden's mountain areas. The requirements of this target are considered to be met when an action programme has been adopted or a draft programme, approved by the Environmental Protection Agency, has been circulated for consultation. By the end of 2005, action programmes for the arctic fox (*Alopex lagopus*) and wolverine (*Gulo gulo*) had been adopted, and programmes for

the great snipe (*Gallinago media*), lesser white-fronted goose (*Anser erythropus*) and gyrfalcon (*Falco rusticolus*) were out for consultation. Programmes for rich fens and for the wolf (*Canis lupus*) and brown bear (*Ursus arctos*) have also been drawn up. Work is in progress on action programmes for black vanilla orchid (*Gymnadenia nigra*), golden eagle (*Aquila chrysaetos*) and white frog orchid (*Pseudorchis albida*), while programmes for Laestadius poppy (*Papaver laestadianum*) and arctic catchfly (*Silene involucrata*) are being prepared for 2006. The last two are not among the programmes which, under the target, were to be introduced by 2005.

This interim target has not been fully met, as additional action programmes have proved necessary as work has progressed. It will be achieved a year or so behind schedule.

FIG. 14.3 Number of wolverine litters found in reindeer herding region, 1996–2005



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

The *Predatory Animals Bill* passed by the Swedish Parliament in 2001 set an interim national target for the wolverine (*Gulo gulo*) of 90 litters per year. The range and size of the wolverine population are determined annually in surveys of wild predators conducted by the county administrative boards of mountain counties. The survey results form the basis for the compensation payments for predator populations that are made to reindeer husbandry districts under a new system introduced in 1996. A welcome increase in the number of litters can be observed.

Both the demand for and the price of reindeer meat have increased. The number of animals slaughtered is therefore expected to rise, restraining growth of the reindeer population. Tourism and the use of all-terrain vehicles and aircraft are expected to increase. This creates a need for better planning and makes it difficult to maintain and extend the area of undisturbed mountain terrain.



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?

☹️ Following the Riksdag decision in November 2005, there are now seven interim targets, rather than ten, under A Good Built Environment. It is still uncertain whether this objective can be attained. The interim targets and intended outcomes within a generation in areas such as built environments of cultural heritage value, noise, waste generation and the indoor environment are expected to be difficult to achieve, as effective policy instruments are either not available or are not being used. Where the latter is the case, the reason may be a lack of resources, but also conflicting goals or interests, for example when new homes are to be built in central but noisy locations.

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:*

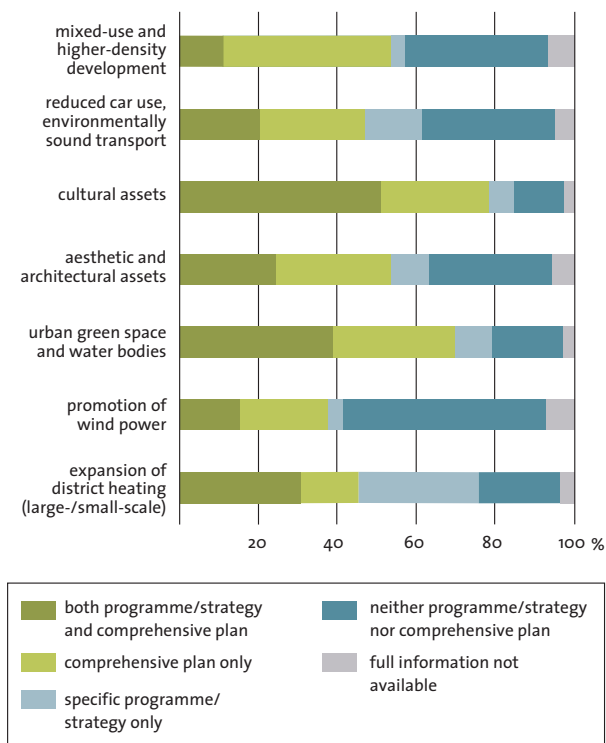
- *achieving a varied supply of housing, workplaces, services and cultural activities, in order to reduce transport demand and improve the scope for environmentally sound and resource-efficient transport;*
- *preserving and enhancing cultural and aesthetic assets;*
- *preserving, maintaining and enhancing 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.*

The housing market survey conducted by the National Board of Housing, Building and Planning shows that the proportion of local authorities reporting that they have adopted programmes and strategies addressing various aspects of this interim target is continuing to rise. In 2005, 35% of Sweden's 290 local authorities stated, for example, that they had programmes to reduce car use and/or improve the scope for environmentally sound transport. Almost

half reported that this issue had been addressed in a comprehensive plan.

Programmes to preserve and enhance green spaces and water bodies in urban areas had been adopted by almost half the authorities, while 70% had dealt with the question in a comprehensive plan. Cultural assets are the commonest issue addressed in programmes and strategies. The resource situation of local authorities and county administrative boards, however, makes it uncertain whether this target will be achieved on time.

FIG. 15.1 Proportions of local authorities with specific programmes or strategies to address environmental issues covered by interim target 1



SOURCE: NATIONAL BOARD OF HOUSING, BUILDING AND PLANNING, 2005

Compared with 2004, the number of local authorities reporting that they have both adopted programmes and addressed the issues concerned in comprehensive plans has increased most with regard to cultural assets (9% more authorities), urban green space and water bodies (7% more), and aesthetic and architectural assets (7% more).

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 wording of this target was revised in 2005.

According to the decision taken in November 2005, the old interim target, which called for long-term protection to be provided for at least 25% of valuable built environments, is incorporated in the new one.

One aspect of this target is the need to protect the buildings and environments of most value from a national point of view. In a survey by the Board of Housing, Building and Planning, only three county administrative boards stated without reservation that designated areas of national interest for cultural heritage conservation represented a relevant and comprehensive selection. Most felt that the selection was largely relevant, but needed to be reviewed. Few, though, had a strategy for doing this. Almost all the boards that identified specific obstacles to such a review referred to insufficient resources and a lack of support from central government agencies. Fewer than half the 21 boards had identified the buildings in their areas meeting the criteria for designation as cultural heritage buildings, and only five had in addition protected at least 20% of them. This target will be difficult to achieve.

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.

Many decision makers lack an adequate understanding of noise as a public health problem. General recommendations from the Board of Housing, Building and Planning on how the guide values are to be applied have prompted many local authorities to develop local policy documents. Despite the action being taken, this target is expected to be hard to attain. To meet it, noise emissions will need to be cut by a couple of decibels overall. And to achieve a good sound en-



vironment for all, a reduction of some 10 dB will be required.

A number of policy decisions need to be taken, for example to

- tighten EC directives on vehicles and tyres,
- encourage the purchase and use of quieter tyres and vehicles,
- substantially reduce the use of studded snow tyres,
- require bodies responsible for roads and railways to use materials and technologies that reduce traffic noise, and
- promote dissemination of knowledge and improve siting of homes.

As measures to reduce noise at source take a long time to produce results, further investments will need to be made in mitigation measures such as noise barriers and sound insulation of buildings.

EXTRACTION OF NATURAL GRAVEL

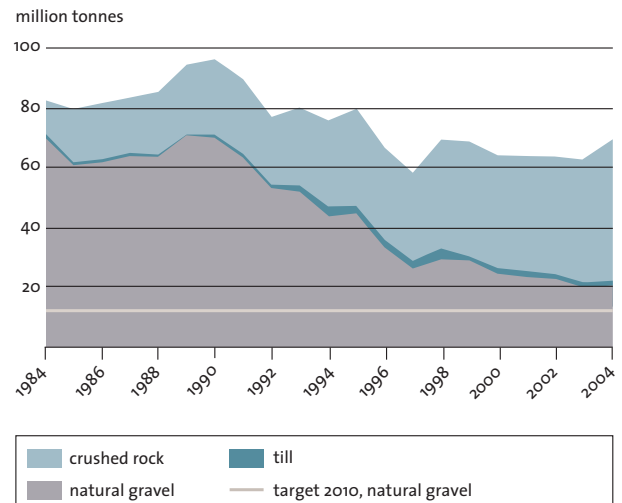
INTERIM TARGET 4, 2010

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

The wording and the assessment of this target have been revised compared with 2005.

As a result of rising investment in construction and the associated growth in demand for aggregates, 2004 saw an increase in the extraction of natural gravel. As a share of all aggregates, however, use of natural gravel continues to decline. The most effective weapon in reducing it is licensing. If this target is to be achieved, permit applications for gravel workings will have to be dealt with more restrictively, taking into account the need for protection and sustainable management. Processing of applications for hard rock quarries could be aided by regional aggregates development documents and up-to-date local authority comprehensive plans. The tax on natural gravel, which was raised at the beginning of 2006, is judged to have had some effect.

FIG. 15.2 Quantities of aggregates supplied in Sweden, 1984–2004



SOURCE: SGU

As on previous occasions when the total demand for aggregates has increased, natural gravel is following the overall trend, but rising less steeply. Construction investment, which co-varies with sales of aggregates, saw a further increase in 2005 and, according to the Swedish Construction Federation, is expected to go on rising in 2006.

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.

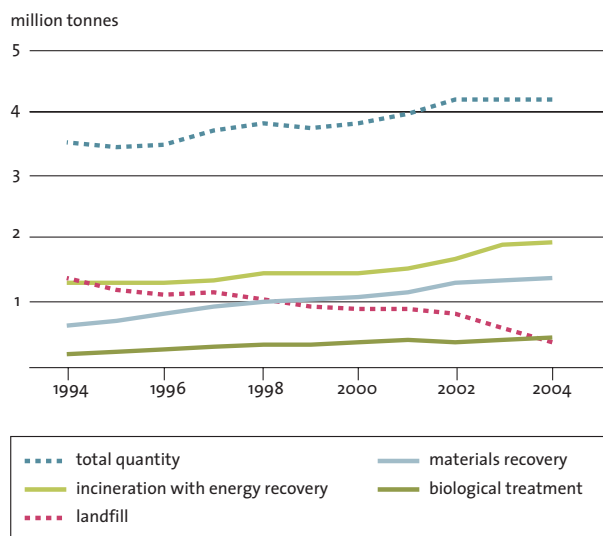
- By 2015 at least 60% of phosphorus compounds present in wastewater will be recovered for use on productive land. At least half of this amount should be returned to arable land.

The wording of this target was revised in 2005.

The goal that the total quantity of waste should not increase will not be achieved. To reduce the amount generated, measures need to be taken in the area of production and consumption of products.

The amount of household waste going to landfill fell by 70% between 1994 and 2004. Landfill disposal of other wastes, such as industrial and construction wastes, has also decreased substantially. Policy instruments that have contributed to these trends include the landfill tax and a ban on landfilling of organic waste.

FIG. 15.3 Quantities of household waste treated and disposed of, 1994–2004



SOURCE: SWEDISH ASSOCIATION OF WASTE MANAGEMENT

The amount of household waste disposed of to landfill in Sweden fell by over 70% between 1994 and 2004. The total quantity treated or disposed of has remained constant over the last three years, but this may be because large amounts of household waste are being stored pending an expansion of incinerator capacity.

In 2004, 44% of household waste was recycled through materials recovery, including biological treatment, with 10% of this attributable to biological treatment of food waste.

Around 40% of local authorities collect food waste separately, and several are planning further expansion of biological treatment. How much food waste from food processing plants is recovered by biological means is uncertain. There is much to suggest, though, that the quantity is growing and that recovery could become economically viable.

The amount of phosphorus from wastewater recovered for use on productive land is also uncertain, but it is probably still well short of the target. However, the use of sewage sludge in the production of soil and as a fertilizer in energy forestry is increasing.

ENERGY USE ETC. IN BUILDINGS

INTERIM TARGET 6, 2010

☺ The environmental impact of energy use in residential and commercial buildings will decrease and will be lower in 2010 than in 1995. This will be achieved, inter alia, by improving energy efficiency and eventually reducing total energy use, and ensuring that the proportion of energy from renewable energy sources increases.

The wording of this target was revised in 2005.

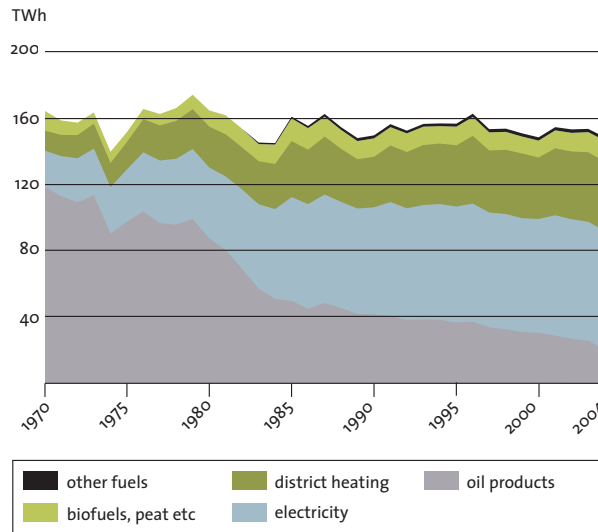
As far as the environmental impact of energy use is concerned, the target is expected to be met, in that the share of renewable energy is growing and the use of electricity and oil for heating is declining. Overall energy consumption in this sector remains fairly constant, despite growth in the total area of buildings, suggesting an improvement in energy efficiency.

Building regulations are being revised, and one result will be new rules relating to energy. Among other things, new standards are to be introduced for emissions from small-scale use of solid fuels. The EC Directive on the energy performance of buildings is expected to help attain this target, once its effects begin to be felt.

Financial support arrangements currently available, which will promote progress towards the target, include the Climate Investment Programme (Klimp) and the



FIG. 15.4 Energy consumption in the residential and services sector



SOURCE: STATISTICS SWEDEN, ANALYSED BY SWEDISH ENERGY AGENCY

Total energy consumption in this sector has been more or less constant for a long time, but the proportion accounted for by fossil fuels has fallen sharply. The electricity used in the sector can be broken down into power for common building services (41%), for heating (32%) and for individual household consumption (27%). Around half the electricity generated in Sweden comes from nuclear power.

new investment grant schemes for energy saving in public buildings and for conversion of dwellings from oil-fired and electric space heating to alternative systems. Other policy instruments include energy advice and the ongoing green tax shift.

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.

Some 400 cases of lung cancer every year are attributable to exposure to radon. Of those affected, 90% are smokers.

The National Board of Housing, Building and Planning and the Swedish Union of Tenants have mounted information campaigns encouraging householders to measure radon levels in their homes, and the National Board of Health and Welfare has invited local authorities to take part in a monitoring project on radon in schools and pre-schools.

In the 2005 housing market survey, 49% of local authorities (against 46% the year before) replied that radon surveys had been carried out covering all or a significant proportion of the homes in their areas.

During the year, a government inquiry on the building environment presented its final report, which emphasized the need for an updated survey of indoor environments.

Owing to a lack of data, slow progress in radon remediation of buildings, and inadequate checks on ventilation, this target is judged to be difficult to achieve.

Our consumption patterns have significant implications for progress towards certain aspects of the objective A Good Built Environment. Wide, heavy tyres for instance, which have become more popular, increase noise levels. Well-designed buildings and domestic appliances that last a long time and use less energy help to keep down waste and energy consumption. By not leaving equipment on standby and by keeping heating and ventilation systems in good shape, we can save energy and improve our indoor environment.



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 objective was adopted by the Riksdag in November 2005. In recent decades, far-reaching action has been taken to make human activities environmentally more sustainable. Despite this, trends in terms of biodiversity have not improved as much as is needed to fulfil national and international goals and undertakings. The Swedish Species Information Centre has for example shown that there has been no real reduction in the number of red-listed species since 2000. Accordingly, our assessment is that this environmental quality objective will be difficult to achieve within the defined time frame. In the longer term, Sweden has the potential to attain it, provided that action in this area is made more effective and focused and is better coordinated than it has been to date.

LONG-TERM PROCESSES

The fact that the intense nature conservation and environment protection efforts of the last decade have as yet failed to reverse the trend does not mean that those efforts have not had, or will not have, any effect. On the contrary, the action taken has been beneficial. For example, it seems that, although the trend is still pointing in the wrong direction, the decline in biodiversity is not as marked as before. The main obstacle to reaching the goals is the long timescale of the biological processes involved. For threatened species and ecosystem functions, the long-term and large-scale results of nature conservation measures will not become discernible until several decades beyond 2020.

ACTION IN 2006

The Swedish Environmental Protection Agency and other authorities concerned are starting work on a number of projects relevant to this objective, including:

- Developing and establishing a system to monitor progress towards the environmental objective in measurable terms. In the shorter term, this system will be of particular importance for interim target 1.
- Preparing general guidance on the elaboration of regional landscape strategies, based on the principle of sustainable use referred to in interim target 3, and setting out how, applying an integrated landscape approach, such strategies should be designed so as to ensure the conservation and sustainable use of natural resources.



- Developing a national action programme for the conservation of genetic variation in wild plants and animals.
- Developing a national strategy and action plan for a system to manage the introduction, movement and release of non-native species and genotypes.

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.

This interim target is based on an international undertaking made at the Johannesburg Summit in 2002. It represents Sweden's national contribution to attaining the international objective.

Large-scale changes in agriculture, forestry, fisheries and other sectors, and growing pressures on the environment from our increased consumption of raw materials, energy etc. over the past century, have refashioned the Swedish landscape and its natural habitats. This transformation has admittedly benefited many species and habitat types, but it has also entailed a severe loss of biodiversity.

To achieve this target, it will be necessary to

- develop and implement action programmes for threatened species as planned,
- significantly increase the rate at which new areas are protected,
- ensure appropriate management of reserves and Natura 2000 sites,
- promote a greater emphasis in farming, forestry and fisheries on good environmental practice, nature conservation and targeted species protection.

Measures also need to be taken under other objectives, chiefly Sustainable Forests and A Balanced Marine Environment.

It is uncertain whether the action decided on will be sufficient to halt the loss of biodiversity on as

short a timescale as the period up to 2010. In the in-depth evaluation in 2008 a more confident assessment will be possible.

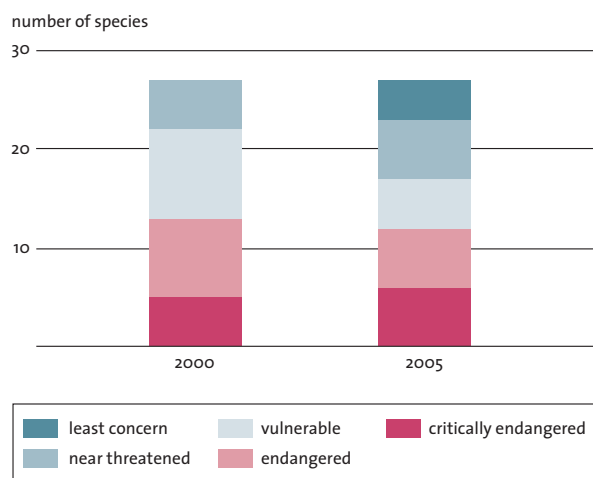
FEWER SPECIES UNDER THREAT

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.

According to the Swedish Species Information Centre, 1,884 species were classed as threatened in 2000, out of 19,430 species assessed. Between 2000 and 2005 there has been no decrease in the number of species under threat. Nevertheless, our assessment is that this target can be met by 2015, provided that further vigorous action is taken. The implementation of action programmes for threatened species is regarded as crucial to its achievement.

FIG. 16.1 Changes in threat status of 27 species for which action programmes have been adopted, 2000–2005

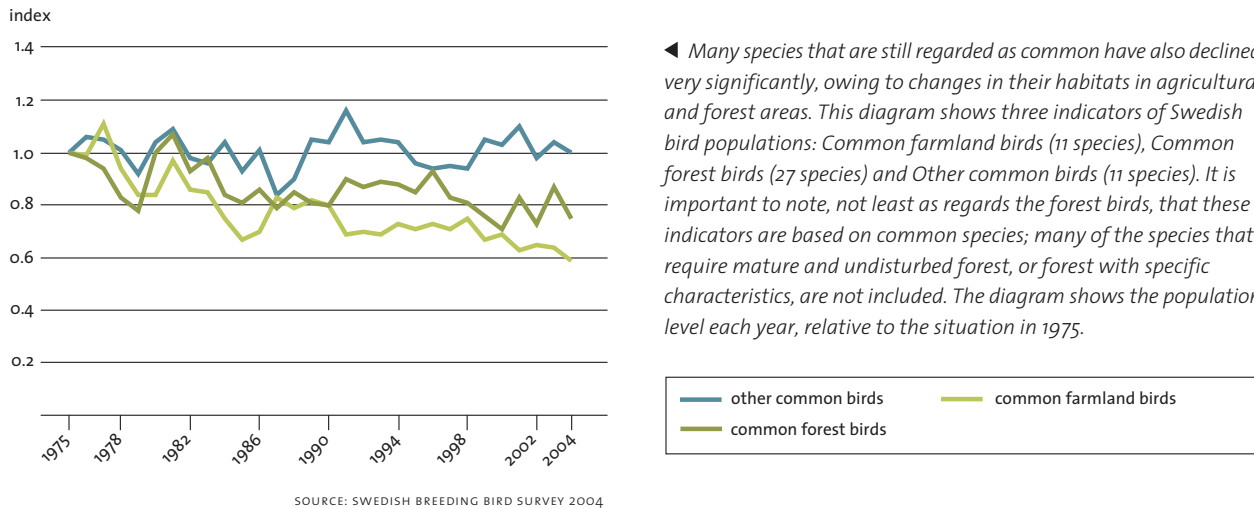


SOURCE: SWEDISH EPA

Favourable trends can be noted for a good number of the species for which action programmes have been adopted. Between 2000 and 2005, the situation improved for eleven species and deteriorated for two.

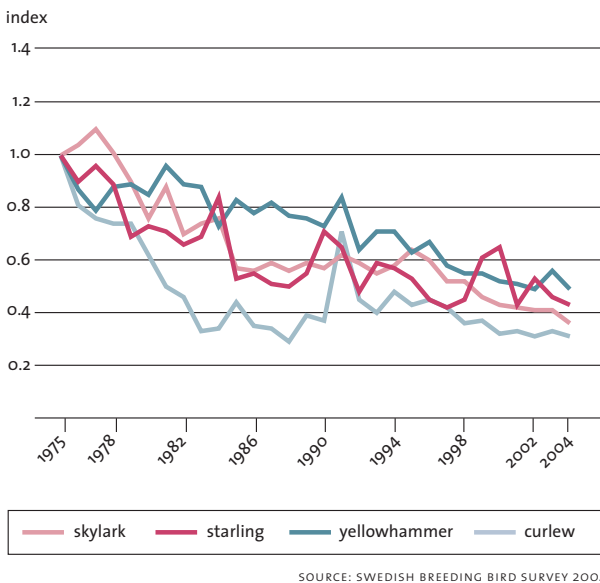


FIG. 16.2 Swedish bird indicators



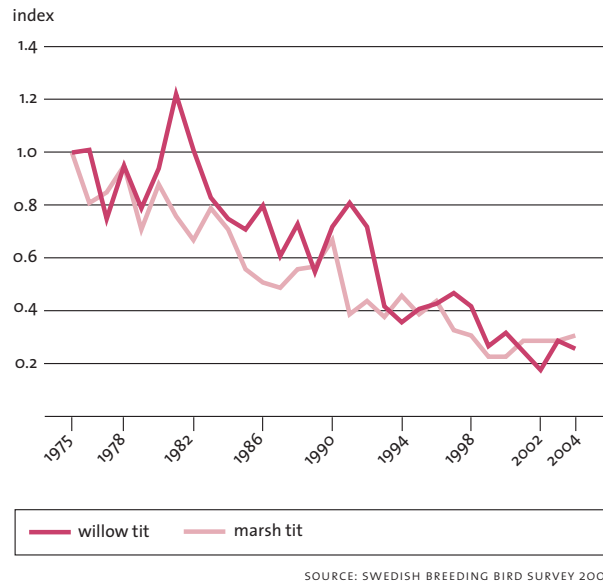
◀ Many species that are still regarded as common have also declined very significantly, owing to changes in their habitats in agricultural and forest areas. This diagram shows three indicators of Swedish bird populations: Common farmland birds (11 species), Common forest birds (27 species) and Other common birds (11 species). It is important to note, not least as regards the forest birds, that these indicators are based on common species; many of the species that require mature and undisturbed forest, or forest with specific characteristics, are not included. The diagram shows the population level each year, relative to the situation in 1975.

FIG. 16.3 Population trends for a number of breeding birds with declining numbers in farming areas



Shown above are four examples of bird species that are still common, but whose breeding populations have been reduced by half or more over the last 30 years. Many farmland birds are clearly in serious difficulty. The diagram shows the population level each year, relative to the situation in 1975.

FIG. 16.4 Population trends for a number of breeding birds with declining numbers in forest areas



The situation for common forest birds is not satisfactory, either. Here we see two examples of birds that are still common, 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 a high proportion of deciduous trees. The diagram shows the population level each year, relative to the situation in 1975.




By 2010, over 210 action programmes, covering more than 500 species, are to have been launched or implemented. By 2005, a total of 87 programmes had been introduced or were being implemented, relating to 169 species and two habitats. A further 60 or so programmes are expected to be developed in 2006. These programmes will not only benefit the species for which they are adopted: the action programme for the white-backed woodpecker, for example, is also expected to secure long-term favourable conservation status for at least 200 other red-listed species.

Since the availability of habitats determines whether long-term viable populations of species can be maintained, protection and management of ecosystems and their habitat types are decisive factors in preserving biodiversity. Current efforts to safeguard forest areas are therefore expected to appreciably improve the conservation status of many threatened species not covered by action programmes in the years ahead.

The future shape of Swedish agricultural policy is difficult to assess at present. The single farm payment scheme and the new RDP offer the possibility of maintaining an open landscape, for example through grazing and mowing. As well as greatly increasing the area of meadow and pasture land that is managed, it is necessary to improve the quality of management from a nature conservation point of view, by means of information and financial support.

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.*

The great majority of our biological diversity is to be found, not in protected areas, but in areas used by people for fishing, farming, forestry and settlement. Most of the Swedish plants and animals that are currently under threat benefit in various ways from – or

are even dependent on – management of the landscape. Changes in the methods and emphases of agriculture and forestry over the last century are reflected in the trends we see in terms of species having become more or less common. We know that the management practices of the past gave rise to a wealth of biodiversity.

The follow-up methods envisaged in this target are expected to have been developed by 2007, but the goal of sustainable use of biodiversity and biological resources is judged to be difficult to achieve by 2010. This is mainly because it takes time to implement change in sectors such as agriculture, forestry, fisheries, industry and urban planning. To attain this interim target, a landscape approach must be applied.

Current patterns of consumption, including the availability of ecolabelled and eco-certified products and services, have a direct impact on threatened species, habitat types and ecosystems. Consumer interest in such products and services is gradually growing, and is expected to increase still further in the years to come.

There are also many examples of the reverse, however, such as trends in beef consumption. The growth seen in sales of meat from local, traditionally managed pastures is highly beneficial for biodiversity, but this positive trend has to be weighed against rising imports of foreign beef and milk. These imports may be expected to erode profit margins for Swedish farmers and hence reduce the number of livestock on the country's pastures.

The current expansion of forest certification is judged to be beneficial in terms of species conservation, and consumer demand can probably further encourage good conservation practice in the forest sector. The growing interest in ecotourism, too, may help to conserve certain species and habitat types.





the 4 broader issues
related to the objectives

The Natural Environment

Since the 1960s the world's population has doubled, global economic activity has risen sixfold, and food production has increased two and a half times. This growth in prosperity has come at a price, however. Water consumption, for example, has doubled and consumption of paper trebled, at the cost of long-term ecosystem productivity.

STATE OF THE WORLD'S ECOSYSTEMS

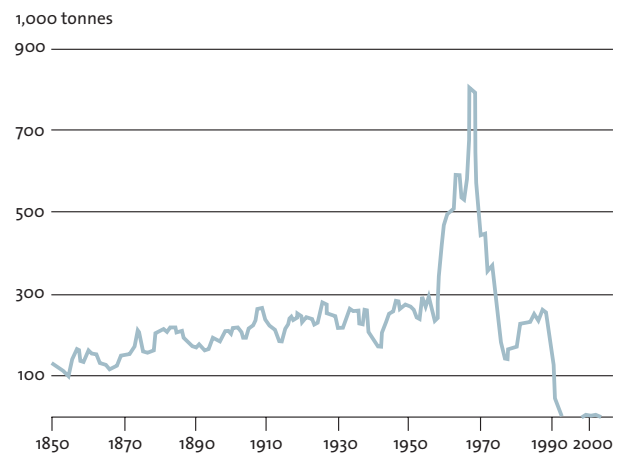
The UN's wide-ranging evaluation of the state of the environment, the Millennium Ecosystem Assessment (MEA), has studied the condition of the world's ecosystems, with a focus on their long-term ability to continue to deliver goods and services. Its conclusion is that the natural environment remains in poor shape, although there are signs of improvements in certain fields. Food production for example continues to increase, and in many parts of the world a shift to ecologically more sustainable methods is under way. This brighter picture is clouded, though, by a continuing loss of genetic resources and severe overfishing in most of the world's oceans. This threatens the ability of food production to keep pace with population growth.

FINITE NATURAL RESOURCES

As far as fibre production in forests and on farmland is concerned, the picture is both positive and negative: the global supply of bioenergy from forests, for

example, is not sustainable in the long term. Supplies of fresh water also show a downward trend, with significant overexploitation in many densely populated areas. Of 24 ecosystem services, the MEA has found 15 to be overexploited today, and for most of them the trend is negative.

FIG. I.1 Declining fish catches



SOURCE: MEA

Statistics on fish catches off Newfoundland, Canada, from 1850 to 2000 offer a clear example of how overexploitation of biological resources can have dramatic and often irreversible effects on the ability of ecosystems to produce goods and services.

A LOCAL PERSPECTIVE

From a Swedish point of view, these global trends mean that the pressure on biological resources is likely to increase. The changes in consumer use of energy seen in recent years are the clearest example of such a trend. Last year, for instance, sales in Sweden of pellet-fired boilers doubled, while sales of wood pellets rose by 33%. This represents a 'greening' of the energy sector, but at the same time it puts greater pressure on biological resources. In the short term the ability of forests to supply raw materials for energy production will be affected, and in the long term there will be implications for agriculture.

The farmed landscape is changing, with more and more areas of open countryside becoming overgrown. At the same time, restructuring of agriculture may in the longer term reduce the problems of eutrophication in the Baltic, Kattegat and Skagerrak, provided that it takes place in coastal areas. If the landscape changes on a large scale, the situation for farmland species that rely on open country and traditional management will deteriorate significantly as a result of growing encroachment by scrub and woodland.



The Cultural Environment

Directly or indirectly, many of our day-to-day choices of products and services affect the state of the cultural environment. An important factor shaping its development is therefore our understanding of the links between individual choices of this kind and their impacts on the environment. Adequate knowledge about the quality of products, based on how they have been produced, is therefore fundamental to our choices as consumers.

EXAMPLES FROM THE LANDSCAPE

For many thousands of years, the landscape has been constantly influenced by the different activities in which humans have engaged, and the traces of the past are constantly present in our everyday lives. From a historical vantage point, it is clear that changes have always and are always occurring, the difference being that our influence on the environment and landscape today is dramatically different from what it was in earlier eras. In the wake of processes such as urbanization, industrialization, agricultural restructuring and technological development of society, there are now large areas of the Swedish countryside with encroaching scrub and woodland and abandoned buildings and settlements. In stark contrast, there are also fully exploited 'production landscapes', with distinct boundaries between forest, farmland, industry, commerce, housing and other uses.

CHANGING ATTITUDES AND BEHAVIOUR

Considerable efforts are now being made by public sector agencies to conserve and protect traditional landscapes such as the open farmed landscape, ancient monuments and remains, wetland areas and species-rich habitats. But if development is to be sustainable in the long term, there also need to be changes in our personal attitudes and behaviour with regard to production and consumption. Everyone needs to become aware, for example, that

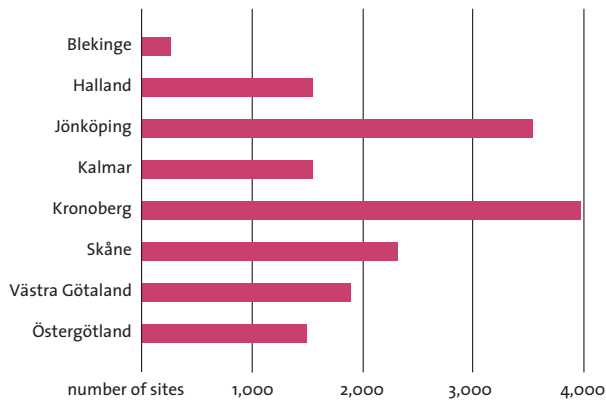
- demand for Swedish agricultural produce helps to maintain an open landscape,
- choices of materials and methods for the construction of new buildings and renovation of existing ones will affect the direction of forest production, and
- out-of-centre shopping areas have repercussions for the structures of town centres.

To bring about changes in behaviour, it is important to make visible the links between consumption and the environment, from a landscape point of view, and to make good use of traditional knowledge of materials and methods. Another important factor is a view of the cultural environment as a whole as a resource for people and local communities. Conservation and use of the historical dimensions of the landscape will then be seen as essential in securing progress towards sustainable development.

WINTER STORM GUDRUN

An example of how human choices of methods can be a contributory factor behind effects on the cultural environment was the damage caused by winter storm Gudrun, which swept across southern Sweden in January 2005. A study of the storm's impact on the forest landscape, currently being conducted by the National Heritage Board, indicates that more archaeological remains were damaged in spruce stands than in areas of mixed forest. Consumer demand for products from forests with a larger element of deciduous trees could therefore have the effect of reducing future damage to ancient remains and helping to better preserve the historical structures of the landscape.

FIG. II.1 Numbers of sites with damaged archaeological and cultural remains in storm-damaged forest areas



SOURCE: SWEDISH FOREST AGENCY AND NATIONAL HERITAGE BOARD

This diagram shows, for each of the counties of southern Sweden, the number of sites with registered archaeological and cultural remains located in forest areas found to have suffered storm damage. It indicates that a great many such remains may have been damaged by the storm's effects on the landscape.



Human Health

People's lifestyles and consumption patterns affect their health and environment in many different ways. A few examples are given below.

GOOD ENVIRONMENT CAN HELP PREVENT OVERWEIGHT

Overweight is a growing public health problem. The World Health Organization estimates that 80% of cardiovascular disease, 90% of type 2 diabetes and 30% of cancer cases could be prevented by a healthy diet, physical activity and giving up smoking. Sweden's National Institute of Public Health and National Food Administration have presented an action plan to prevent overweight. Several of the proposals are concerned with creating environments for recreation, which coincides with what the environmental objectives are trying to achieve.

BAN ON TOBACCO SMOKING

In June 2005 Sweden introduced a ban on smoking in all enclosed public spaces. This has reduced exposure to environmental tobacco smoke and represents an important step towards achieving a good indoor environment (A Good Built Environment, interim target 7). In addition, it will save energy, in that rooms will not need to be aired to remove smoke (A Good Built Environment, interim target 6).

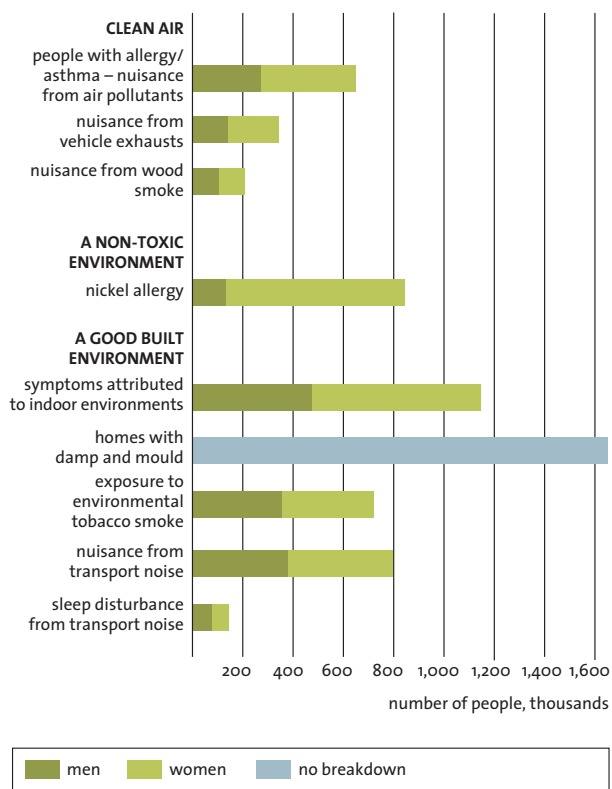
ASTHMA, ALLERGY AND HYPERSENSITIVITY

Many consumer products contain chemical substances that are allergenic, one example being nickel. As a result of the Nickel Directive, introduced in 2001, exposure to this metal has begun to decline, and the symptoms caused by it are likely to become less common. A decrease in the incidence of nickel allergy has been reported from Denmark, where similar restrictions on the metal have been in force since 1990. Many household chemical products and building materials carry environmental and health information. Greater care must continue to be taken, though, with low-price imports that have not been inspected.

'CONSUMPTION' OF HOUSING IN DENSER URBAN AREAS

In the centres of several Swedish towns and cities the shortage of homes is acute. A greater density of housing in urban areas could reduce transport requirements and thus curb air pollution and noise. But such a trend may conflict with other goals. Using green spaces for housing reduces opportunities for recreation. The areas where higher-density development may be contemplated often have an unacceptable noise environment. There is a danger that even more people than at present could be exposed to noise levels above the guide values adopted by the Riksdag,

FIG. III.1 Overview of nine environmental health indicators



SOURCE: ENVIRONMENTAL OBJECTIVES PORTAL

This diagram gives an overview of nine environmental health indicators, based on a national survey of environmental health conducted in 1999. They show to what extent Sweden's population is adversely affected by the different environmental factors concerned.

and we know that many people are disturbed even by noise below guide value levels. In addition, an expansion of road and rail infrastructure may give rise to noise problems in previously undisturbed areas. Progress towards interim target 3 under A Good Built Environment is dependent on sensible land use planning that takes health issues into account.





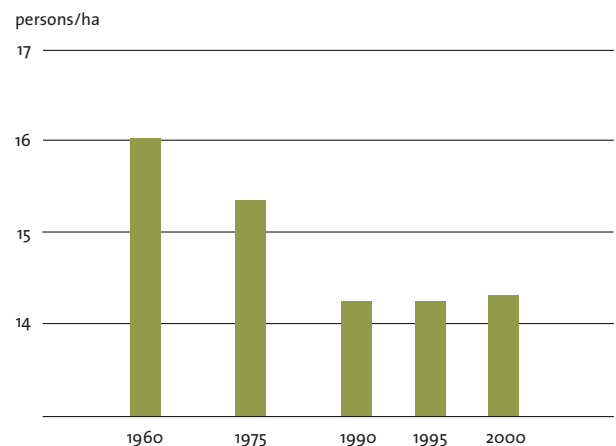
Land Use Planning and Wise Management of Land, Water and Buildings

WE WANT TO LIVE IN THE COUNTRY – OR IN TOWN

More and more people nowadays choose where they want to live on the basis of an attractive location, rather than proximity to their place of work. In Sweden, many young families especially choose to live in rural areas on the urban fringe, which can often be described as urban living, but in the country. To be able to do so, they need access to at least one car. Meanwhile, regions are growing and commuting is increasing, requiring more space for infrastructure such as roads and railways. In the Stockholm region, the area of undeveloped land has dwindled by around 2 km² per year in recent years, partly as a result of road building. New barriers are being created, restricting the mobility of both humans and animals and fragmenting the landscape. New areas are being exposed to noise, and others to higher levels of it, making quiet areas increasingly few and far between. The basis for a safe supply of water is also affected. Leaving aside the northern counties of Sweden, towns, roads, railways and airports already occupy some 18% of the land surface over major ground-water bodies located in sand and gravel deposits.

A new trend among young families, though, is to carry on living in a town. This is a result of the

FIG. IV.1a Population density of Sweden's cities and towns

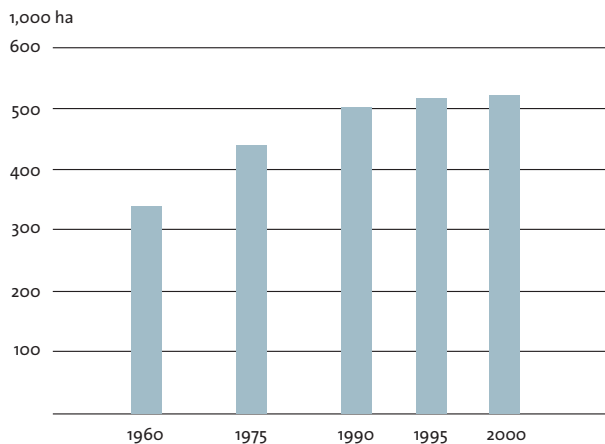


SOURCE: STATISTICS SWEDEN

The reduced number of inhabitants per unit area in Sweden's towns and cities shows that urban populations now take up more space per person than they did in 1960. In the last decade a break in this trend may possibly be discernible, with the number of people per unit area once again showing a slight rise.

parents' employment situation: both are interested in a career, and to make this feasible, closeness not only to their places of work, but also to day care and other services is essential. The wide range of activities on

FIG. IV.1b Urban area in Sweden



SOURCE: STATISTICS SWEDEN

At the same time, growth in the area of towns and cities has slowed down, from a rate of almost 2% per year between 1960 and 1975 to just under 0.4% per year from 1990 to 2000.

offer and the life of the local community of their part of town are two social advantages which many people cite as reasons for continuing to live there with their children. To meet this demand, the focus of urban development, which in the 1970s and 1980s was on building new homes on the outskirts of towns, has increasingly shifted towards 'densification'. This often poses a difficult challenge of balancing conflicting interests, such as building in parks and other green spaces or preserving cultural environments. The extent to which local authorities, when planning new developments, have access to all the information they need to strike such balances varies. Comprehensive planning does not take place on a continuous basis in every municipality. Increasingly often, detailed planning is undertaken on the initiative of individual developers and is confined to specific construction projects. Detailed development plans are increasingly rarely being used to regulate gradual change or the conservation of existing environments.

LIVING SPACE INCREASING

We take up more space now than we did in 1960, partly because standards of living have improved. Per person, the floor area of our homes is larger, and the number of households has increased. In particular, there has been a marked rise in the number of single-person households. In 2000 the average household consisted of two people, compared with a figure more than 40% higher than that in 1960.





glossary

Glossary

Area of national interest = area designated as being of national interest under ch. 3 and ch. 4 of the Environmental Code.

Baltic proper = central area of the Baltic Sea, extending as far as Falsterbo in Skåne.

Bioaccumulating = of a substance, tending to build up in organisms to higher concentrations than in their environment or food.

Bq = becquerel, unit of activity of a radioactive material. 1 Bq corresponds to one radioactive disintegration per second.

CAP = Common Agricultural Policy of the European Union.

Carbon dioxide equivalent = quantity of a greenhouse gas expressed as the amount of carbon dioxide that has the same impact on climate: 1 kg of methane corresponds to 21 kg of carbon dioxide, for example.

CFCs = chlorofluorocarbons, used in refrigeration, heating and air conditioning equipment, chemical products and foamed plastics.

'Clean car' ('clean vehicle') = vehicle that can be run on ethanol, natural gas or biogas, or an electric or hybrid electric vehicle. Also used to refer to a petrol or diesel vehicle with particularly low fuel consumption.

CLRTAP = Convention on Long-Range Transboundary Air Pollution.

CMRs = substances that are carcinogenic, mutagenic and/or toxic for reproduction (reprotoxic).

Comprehensive plan = in Sweden, every local authority is required to have an up-to-date comprehensive plan indicating broadly how areas of land and water are intended to be used and how the built environment is to be developed. It is not binding on authorities and individuals, but must be taken into account and serve as a source of guidance when various decisions are taken, as provided in ch. 1, s. 3, of the Planning and Building Act.

County administrative board = authority responsible in Sweden for central government administration at the regional level.

Culturally significant landscape features = e.g. stone walls, wooden fences, ditches, solitary trees and avenues (a full list, with definitions, can be found in Swedish Board of Agriculture Regulation 2001:114).

dba = unit of sound level. Sound pressure level is usually given in decibels (dB). To approximate to the frequency response of the human ear, a sound pressure meter is equipped with a frequency filter (A filter). The value thus obtained is referred to as the 'sound level', and expressed in dBA.

DU = Dobson unit, a measure of the thickness of the ozone layer. 1 DU = 0.01 mm. The annual mean thickness of the ozone layer over Sweden is normally 350 DU, i.e. about 3.5 mm.



Ecosystem = a dynamic complex of plant, animal and micro-organism communities.

EKU instrument = Swedish Instrument for Ecologically Sustainable Procurement. An online database providing suggestions for environmental specifications for use in the procurement of goods and services. The criteria proposed cover products commonly purchased by public agencies and other organizations, and are specifically designed for each product or service.

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

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

Euratom = European Atomic Energy Community, established under one of the founding treaties of the EU. Its aims are to facilitate the use of nuclear power, avoid its misuse, and promote research and monitoring in this field.

Focus on Nutrients = project to provide farmers with knowledge and tools that will, among other things, enable them to reduce nitrogen and phosphorus losses. Based on broad collaboration between the farming sector and the authorities.

Forests and History = primarily an inventory of the cultural heritage features of forests. Has been under way since 1995.

Gothenburg Protocol = a protocol to CLRTAP with the aim of abating acidification, eutrophication and ground-level ozone. It was signed in 1999 and came into force in 2005.

Habitat = the living place of a plant or animal or a community of plants and animals.

Habitat protection area = form of site safeguard (area protection) provided for in the Environmental Code (ch. 7, s. 11), used for relatively small areas of land and water.

Habitat types (natural habitats) = terrestrial or aquatic areas distinguished by geographical, abiotic and biotic features.

HCFCs = hydrochlorofluorocarbons, used in refrigeration, heating and air conditioning equipment, chemical products and foamed plastics.

ICES = International Council for the Exploration of the Sea.

Invertebrate = animal lacking a backbone.

IPCC = Intergovernmental Panel on Climate Change.

IVL = IVL Swedish Environmental Research Institute Ltd.

KRAV = Swedish certification body for organic farming and food production.

Kyoto Protocol = signed in Kyoto, Japan, in 1997 as a first step in establishing quantified commitments to achieve the goals of the Framework Convention on Climate Change (1992).

Linear features = e.g. stone walls, wooden fences, ditches or farm tracks.

Malignant melanoma = highly malignant form of skin cancer.

MIFO = Method for Inventories of Contaminated Sites, presented by the Swedish Environmental Protection Agency in Report 4918 (in Swedish).

Mixed fishery = fishery in which several species are fished for at the same time.

Montreal Protocol = the Montreal Protocol was signed in 1987 and contains binding agreements to reduce the use and production of CFCs and other substances that deplete the ozone layer. It is continuously revised as new substances are identified.

mSv = millisievert, a thousandth of a sievert, a unit used to express the absorbed dose of radiation, taking into account the biological effect of the radiation. Since one sievert is a very large dose, the millisievert is often used.

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.



NILS = National Inventory of Landscapes in Sweden.

Persistent = long-lived – a substance that takes a very long time to break down.

Phthalates = plasticizers, used in plastics.

Point features = e.g. mid-field pockets of rocky ground, field clearance cairns, or solitary trees.

ppm = parts per million.

RDP = Rural Development Programme. Programme providing financial support to farmers, with the aim of promoting ecologically, economically and socially sustainable development of the Swedish countryside. Corresponding programmes have been adopted in all the EU member states. In Sweden, the main agency responsible is the Swedish Board of Agriculture.

REACH = Registration, Evaluation and Authorization of Chemicals – EU proposal for new chemicals legislation.

Riparian = related to or situated on the banks of a river.

RoHS Directive = Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment. Provides that, from 1 July 2006, new electrical and electronic equipment put on the market must not contain mercury, cadmium or lead.

SEK = Swedish kronor.

SGU = Geological Survey of Sweden.

Site safeguard = protection of an area under ch. 7 of the Environmental Code, e.g. through designation as a nature reserve, habitat protection area or national park.

SLU = Swedish University of Agricultural Sciences.

Small-scale habitat = small area of land or water which constitutes or could constitute a habitat for valuable plant and animal species associated with the farmed landscape.

SMART food = food based on more vegetable products, fewer ‘empty calories’, a larger share of organic produce, the right kinds of meat and vegetables, and reduced use of transport.

SSI = Swedish Radiation Protection Authority.

Swedish EPA = Swedish Environmental Protection Agency.

Swedish Species Information Centre = body serving as a focal point for information on biodiversity in Sweden. It assesses the status of species and prepares Red Lists of species subject to different types and degrees of threat.

Swedish Wetlands Fund = fund providing advice and information on and grants for wetlands projects. It is supported and financed by several organizations and companies.

UV = ultraviolet (radiation).



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 adopted by the Riksdag. The Council consists primarily of representatives of central government agencies and county administrative boards. It is assisted by a group of experts representing local authorities, county councils, environmental NGOs and the business sector.

The principal functions of the Council are:

- to monitor and evaluate progress towards the environmental quality objectives,
- to report to the Government on how efforts to achieve the objectives are advancing and what further action is required,
- to coordinate the information efforts of the agencies responsible for the objectives,
- to ensure overall coordination of the regional application of the objectives, and
- to allocate funding for monitoring of progress towards the objectives, environmental monitoring, and some reporting at the international level.



MEMBERS OF THE ENVIRONMENTAL OBJECTIVES COUNCIL

The Government has appointed the following individuals as members of the Environmental Objectives Council for the period 1 January 2005–31 December 2008:

Bengt K. Å. Johansson, *Chairman*

Lars-Erik Liljelund, Director-General,
Swedish Environmental Protection
Agency, *Vice-Chairman*

Gunnar Ågren, Director-General,
National Institute of Public Health

Kjell Asplund, Director-General,
National Board of Health and
Welfare

Göran Enander, Director-General,
Swedish Forest Agency

Eva Eriksson, County Governor,
Värmland County Administrative
Board

Ethel Forsberg, Director-General,
Swedish Chemicals Inspectorate

Marie Hafström, Director-General,
Swedish Armed Forces

Lars-Erik Holm, Director-General,
Swedish Radiation Protection
Authority

Thomas Korsfeldt, Director-General,
Swedish Energy Agency

Inger Liliequist, Director-General,
National Heritage Board

Lars Ljung, Director-General,
Geological Survey of Sweden

Mats Persson, Director-General,
Swedish Board of Agriculture

Lisa Sennerby-Forsse, Secretary-
General, Swedish Research Council
for Environment, Agricultural Sciences
and Spatial Planning (Formas)

Ingemar Skogö, Director-General,
Swedish Road Administration

Ines Uusmann, Director-General,
National Board of Housing, Building
and Planning

Axel Wenblad, Director-General,
Swedish Board of Fisheries

EXPERTS TO THE COUNCIL

The following have been appointed by the Swedish Environmental Protection Agency as experts to the Environmental Objectives Council for the period 1 January 2005–31 December 2008:

Inger Strömdahl, Confederation
of Swedish Enterprise

Anna Jonsson, Friends of the
Earth Sweden

Mikael Karlsson, Swedish Society
for Nature Conservation

Peter Wenster, Swedish Association
of Local Authorities and Regions



Sweden's environmental objectives

de Facto 2006

– Buying into a better future

This is the annual report of the Environmental Objectives Council 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 household consumption has been drafted by the Swedish Consumer 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 Inspectorate
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 NATURAL ENVIRONMENT**
Swedish Environmental Protection Agency
- II. **THE CULTURAL ENVIRONMENT**
National Heritage Board
- III. **HUMAN HEALTH**
National Board of Health and Welfare
- IV. **LAND USE PLANNING AND WISE MANAGEMENT OF LAND, WATER AND BUILDINGS**
National Board of Housing, Building and Planning

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SWEDEN'S ENVIRONMENTAL OBJECTIVES – BUYING INTO A BETTER FUTURE. DE FACTO 2006

This is the fifth annual report of the Swedish Environmental Objectives Council. The Council's assessment is that the objectives Reduced Climate Impact, Clean Air, Natural Acidification Only, A Non-Toxic Environment, Zero Eutrophication and Sustainable Forests will be very difficult to achieve. The Council also gives its first appraisal here of progress towards the new environmental quality objective A Rich Diversity of Plant and Animal Life, with three interim targets, adopted by the Swedish Parliament in the autumn of 2005.

De Facto 2006 includes a chapter on the links between household consumption and the environmental quality objectives.

