***Please provide to following details on the origin of this report***

| | |
|---|---|
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| Date of submission: | |

***Please provide summary information on the process by which this report has been prepared, including information on the types of stakeholders who have been actively involved in its preparation and on material which was used as a basis for the report***

One source of information has been the Swedish national report on the implementation of the MCPFE Work-Programme on the conservation and enhancement of biological and landscape diversity in forest ecosystems 1997-2000.Another have been a compilation of results regarding the National Agenda 21. Various other sources have also been used like the Swedish Environmental Protection Agency, The Swedish University of Agricultural Sciences,The Swedish Forest Research Institute, NGO`s and the Forestry Sector

The draft report has been presented to and elaborated by the Swedish Scientific Council on Biodiversity.

The report has been considered by relevant Ministries, agencies and NGO’s before finally approved by the Swedish government.

***Decision IV/7 on Forest biological Diversity***

| 1. What is the relative priority afforded to implementation of this decision by your country? | | | | | |
|---|---|---|---|---|---|
| a) High | x | b) Medium | | c) Low | |

| 2. To what extent are the resources available adequate for meeting the obligations and recommendations made? | | | | | | | |
|---|---|---|---|---|---|---|---|
| a) Good | | b) Adequate | x | c) Limiting | | d) Severely limiting | |

| 3. Has your country assessed the status and trends of its forest biological diversity and identified options for its conservation and sustainable use? (Decision IV/7, paragraph 12) | |
|---|---|
| a) no | |
| b) assessment underway (please give details below) | |
| c) assessment completed (please give details below) | x |
| d) not relevant | |

| ***If a developing country Party or a Party with economy in transition -*** 4. Has your country requested assistance through the financial mechanism for projects that promote the implementation of the focused work programme an forest biological diversity? (Decision IV/7, paragraph 7) | |
|---|---|
| a) no | |
| b) yes (please give details below) | |

***Programme element 1: Holistic and inter-sectoral ecosystem approaches that integrate the conservation and sustainable use of biological diversity, taking account of social and cultural and economic considerations***

| 5. Has your country identified methodologies for enhancing the integration of forest biological diversity conservation and sustainable use into an holistic approach to sustainable forest management at the national level? (Work Programme, paragraph 13) | |
|---|---|
| a) no | |
| b) yes – limited extent (please give details below) | |
| c) yes – significant extent (please give details below) | x |
| d) not applicable | |

| 6. Has your country developed methodologies to advance the integration of traditional forest-related knowledge into sustainable forest management, in accordance with Article 8(j)? (Work Programme, paragraph 14) | |
|---|---|
| a) no | x |
| b) yes – limited extent (please give details below) | |
| c) yes – significant extent (please give details below) | |
| d) not applicable | |

| 7. Has your country promoted cooperation on the conservation and sustainable use of forest biological resources at all levels in accordance with Articles 5 and 16 of the Convention? (Work Programme, paragraph 15) |
|---|

| | |
|---|---|
| a) no | |
| b) yes – limited extent (please give details below) | |
| c) yes – significant extent (please give details below) | x |
| d) not applicable | |
| 8. Has your country promoted the sharing of relevant technical and scientific information on networks at all levels of protected forest areas and networking modalities in all types of forest ecosystems? (Work Programme, paragraph 17) | |
| a) no | |
| b) yes – limited extent (please give details below) | |
| c) yes – significant extent (please give details below) | x |
| d) not applicable | |

***Programme element 2: Comprehensive analysis of the ways in which human activities, in particular forest-management practices, influence biological diversity and assessment of ways to minimize or mitigate negative influences***

| | |
|---|---|
| 9. Has your country promoted activities for an enhanced understanding of positive and negative human influences on forest ecosystems by land-use managers, policy makers, scientists and other relevant stakeholders ) (Work Programme, paragraph 29) | |
| a) minimal activity | |
| b) yes – limited extent (please give details below) | |
| c) yes – significant extent (please give details below) | x |
| d) not relevant | |
| 10. Has your country promoted activities to assemble management experiences and scientific, indigenous and local information at the national and local levels to provide for the sharing of approaches and tools that lead to improved forest practices with regard to forest biological diversity? (Work Programme, paragraph 30) | |
| a) minimal activity | x |
| b) yes – limited extent (please give details below) | |
| c) yes – significant extent (please give details below) | |
| d) not relevant | |
| 11. Has your country promoted activities with the aim of providing options to minimize or mitigate negative and to promote positive human influences on forest biological diversity? (Work Programme, paragraph 31) | |
| a) minimal activity | |
| b) yes – limited extent (please give details below) | x |
| c) yes – significant extent (please give details below) | |
| d) not relevant | |

| | |
|---|---|
| 12. Has your country promoted activities to minimize the impact of harmful alien species on forest biological diversity? (Work Programme, paragraph 32) | |
| a) minimal activity | |
| b) yes – limited extent (please give details below) | x |
| c) yes – significant extent (please give details below) | |
| d) not relevant | |
| 13. Has your country identified means and mechanisms to improve the identification and prioritisation of research activities related to influences of human activities, in particular forest management practices, on forest biological diversity? (Work Programme, paragraph 33) | |
| a) minimal activity | |
| b) yes – limited extent (please give details below) | |
| c) yes – significant extent (please give details below) | x |
| d) not relevant | |
| 14. Does your country hold research results and syntheses of reports of relevant scientific and traditional knowledge on key forest biological diversity issues and, if so, have these been disseminated as widely as possible? (Work Programme, paragraph 34) | |
| a) not relevant | |
| b) some relevant material, but not widely disseminated | |
| c) significant material that could be more widely disseminated (please give details below) | x |
| d) yes - already widely disseminated (please give details below) | |
| 15. Has your country prepared case-studies on assessing impacts of fires and alien species on forest biological diversity and their influences on the management of forest ecosystems and savannahs? (Work Programme, paragraph 35) | |
| a) no – please indicate below whether this is due to a lack of available case-studies or for other reasons | |
| b) yes – please give below any views you may have on the usefulness of the preparation of case-studies for developing a better biological understanding of the problem and/or better management responses. | x |

***Programme element 3: Methodologies necessary to advance the elaboration and implementation of criteria and indicators for forest biological diversity***

| | |
|---|---|
| 16. Has your country assessed experiences gained in national and regional processes, identifying common elements and gaps in existing initiatives and improving indicators for forest biological diversity? (Work Programme, paragraph 43) | |
| a) minimal activity | |
| b) yes – limited assessment made (please give details below) | x |
| c) yes – significant assessment made (please give details below) | |
| d) not relevant | |

| 17. Has your country carried out taxonomic studies and inventories at the national level which provide for a basic assessment of forest biological diversity? (Work Programme, paragraph 43) | |
|---|---|
| a) minimal activity | x |
| b) yes – limited assessment made (please give details below) | |
| c) yes – significant assessment made (please give details below) | |
| d) not relevant | |

# Detailed information.

## 3.1 Effects on biodiversity of the new forest policy - SMILE

***Objectives of Project***
The Swedish government has requested the National Board of Forestry and the Swedish Environmental Protection Agency to continuously evaluate the effects on biodiversity of the new forest policy. The above-mentioned authorities conduct this evaluation through the SMILE project - Environmental Effects of Forestry.

***Potential Contribution to the Implementation of the Action***
The first report from this project has recently been presented. The report demonstrates that important inputs are being made in forestry in order to achieve the environmental target. In many respects the development is positive. However, we still have not reached the environmental target. In order to achieve this there must be improvements in, for example, general consideration of the environment, at the same time as restoration inputs and the area of formally protected land and "voluntary set-asides" must increase considerably. The budget for protected forest areas has been raised considerably, and with regard to the short time that has elapsed since the new forest policy was decided it is natural that much still has to be achieved.

***Actors***
The Swedish National Board of Forestry
The Swedish Environmental Protection Agency

***Methods, Time Frame and Geographical Scope***
The evaluation of the effects of the new forest policy on biodiversity is a continuous process.

The evaluation consists of:
-quantitative and qualitative analysis
-indicators on effect, condition, and measures
-geographical division
-ownership division
-division on biotopes/ecosystems (deciduous forest, waste land, wetland forest, dry forest etc.)

The data is obtained from the national survey of forest resources, performed by the Swedish University of Agricultural Resources, the National

Environmental Monitoring, specific inventories such as national inventories of wetland forests and key-habitats, administrative registers on e.g. notification of final fellings and key-habitat protection.

***Sources of Further Information***
Publications:
The first report from the continuous evaluation is based on information taken from 17 sub-reports, of which two were presented on 31 December 1996: Forest Reserves in Sweden (Swedish Environmental Protection Agency) and Protection of and Consideration to Nature in the Forest (National Board of Forestry). The other sub-reports were prepared during 1997 by the National Board of Forestry, the Swedish Environmental Protection Agency, the Forestry Research Institute, the Swedish University of Agricultural Sciences (Threatened Species Unit, National Forest Inventory, Dept. of Conservation Biology), and Metria.

The report and the sub-reports can be ordered from The National Board of Forestry, S-551 83 Jönköping, Sweden.

Web-site:
http://www.svo.se/ENG/facts/biodiver.htm

## 3.2 National inventory of woodland key-habitats

***Objectives of Project***
The Swedish National Board of Forestry has, from 1993, been commissioned by the Government to make a survey of woodland key-habitats on 11.7 million hectares of privately owned forest land. This survey is recently completed.

***Potential Contribution to the Implementation of the Action***
The inventory has given new detailed information about the proportion, distribution, and nature of woodland key-habitats in the Swedish forest ecosystem. This information is now in practical use in forest management planning for enhanced biodiversity.

***Actors***
The National Forestry Administration

***Methods, Time Frame and Geographical Scope***
The survey has been carried out in two stages and began with preparatory work indoors with the compiler researching a variety of sources for potential key habitats, e.g. infrared aerial photographs, forest inventories and forest management plans, information from landowners and non-governmental organisations and some different types of maps. The material was then assessed in the field and habitats with red-listed species were delimited and described as woodland key habitats.

***Sources of Further Information***
Publications:
"Key habitats in Woodland", National Board of Forestry, S-551 83 Jönköping Sweden

Web-site:
http://192.165.43.9/hansyn/nyckel/metnyckel.htm

***Contact Person(s)***
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E-mail: mikael.noren@svo.se

***Financing Institution and Budget***
Budget for the period 1993-99: 100 million SEK

### 3.2.1 Monitoring of biodiversity in Woodland key-habitats

Starting from 2000,a sample of woodland key-habitats will be repeatedly investigated regarding changes in their biological values. The assessment will focus on selected "indicator-species" who by their presence are signalling high biological qualities of certain habitats. A total of 11 different types of habitats are selected for the assessment and for each habitat 15 - 30 indicator species have been identified, most of these are either lichens or mosses and a few are vascular plants and wood-living fungi. The number of woodland key habitats in the sample is 491 areas, which form a network of checkpoints regarding biodiversity changes. A systematic re-assessment of these areas will make it possible to see changes over time. Since the selected indicator species can be expected to react to changes in their environment, they will function as an early warning system regarding general loss of biodiversity.

## 3.3 National inventory of wetland forest

***Objectives of Project***
The Swedish National Forestry Administration has recently completed a nation-wide survey of wetland forests. Its aim, among other things, is to create a basis for decisions concerning wetland forests, both management and conservation.

***Potential Contribution to the Implementation of the Action***
The results from the survey provide better information for forest management planning regarding the environmental values, and forest production capacity, of these forests. Users of the data are County Forestry Boards, County Administrations, Municipalities, local societies of nature conservation and other actors in the forestry sector.

***Actors***
The National Forestry Administration

***Methods, Time Frame and Geographical Scope***
The wetland forest survey was carried out as a combination of interpretation of infrared aerial photographs combined with information from the National Forest Inventory. Out of each area to be inventoried a smaller selection, around 5-10%, of the sites with high nature conservation values were selected for visits and evaluation in the field. The methodology of combining interpretation of infrared aerial photos with data from the National Forest Inventory has proved to be a good way to secure identification of all areas of interest.

***Sources of Further Information***
Publications:
"Wetland Forest in Sweden - results from the wetlands forest inventory 1990-1998" (in Swedish)
National Board of Forestry, Meddelande 3-1999

Web-site:
(in Swedish)

***Contact***
Address: National Board of Forestry, S-551 83, Jönköping, Sweden
Phone: +46 15 56 85
Fax: +46 16 61 70

***Budget***
Budget for the period 1990-99: 55 million SEK

## 3.4 Environmental Monitoring of Forest Ecosystems

Within the framework for the National Survey of Forest, Soil and Vegetation, soil, soil chemistry and vegetation are mapped on about 23,500 sampling sites that have been objectively chosen spread over the whole country (apart from in the mountain regions). These sites were chosen between 1983 and 1987 and the first reinventory was started in 1993 and is estimated to continue until 2002. One tenth of these sampling sites are visited each year. These sites are also included in the National Forest Inventory's mapping of the Swedish forest stocks. SLU carry out this work.
Studies of small mammals (voles and lemmings) are carried out at Vindeln, Grimsö and Norra Kvill. Umeå University is responsible for this work.
Measurements of metals in elk are done at six different sites in Sweden. The samples are taken during the elk-hunting season in the autumn. The Veterinary Institute carries out this work (in five cases) and the Museum of Natural History.
Integrated monitoring. Comprehensive measurements of the inflow, condition and outflow from a number of sample sites within small catchment areas. The Swedish University of Agricultural Sciences carries out this work.

## 3.5 Other monitoring of biodiversity in forests

### 3.5.1 The Swedish National Forest Inventory and the National Survey of Forest Soils and Vegetation

The Swedish National Forest Inventory, which was started in 1923, is carried out by the Swedish University of Agricultural Sciences in Umeå, and is funded by the government. The main purpose is to describe the state of Swedish forest resources, and changes in them, but environmental monitoring is also included in its remit. The inventory assesses roughly 18 000 sample plots each year. Some of these plots are permanent and re-sampled every tenth year. The sampling density is adjusted to give good precision for estimates at a county level, by using information from a 5-year period. Results are presented in various fora, one of the most important being the annually published "Statistical Yearbook of Sweden - Forestry", issued by the National Board of

Forestry. The main emphasis is put on recording tree and stand variables. Also, for each sample plot, ground vegetation type is classified in 16 field layer and six ground layer categories.

On all permanent plots, in total ca 23 500, a detailed assessment of soils and vegetation is performed by the National Survey of Forest Soils and Vegetation, which is also conducted at the Swedish University of Agricultural Sciences. One tenth of the plots are surveyed each year. A total of 267 species and groups of species are assessed. 201 of these belong to the field layer, 44 to tree and shrub layers and 22 are bryophytes and lichens. A criterion for selecting species is that they should be common in a large part of the country. Thus rare species are not included. Also, the species should be easy to identify in the field during a large part of the growing season. Recently, an inventory of pendulous lichens (Usnea and Alectoria spp.) has been initiated, and one of algae present on spruce needles. The soil analysis includes evaluations of pH, nitrogen and carbon levels, degree of base saturation and heavy metal content. Pilot studies are about to commence focused on inventory of wood-decaying fungi, standardised photography of epiphytic lichens and inventory of ant hills. Test for modifications in vegetation type classification will be initiated (web-sites National Survey of Forest Soils and Vegetation, Swedish National Forest Survey).

**3.5.2 The Swedish National Forest Inventory** is also engaged in a systematic assessment of the Swedish forests and collects data on the development of dead wood in various grades of degradation, thus follows one of the most important substrates with regard of forest biodiversity. The National Forest Inventory also takes samples of other features of importance, e g the browsing pressure on forest vegetation by large herbivores.

### 3.5.3 The biodiversity evaluation scheme of ”Skogsbiologerna”

Some of the forest companies, e.g. Korsnäs AB and Holmen Skog, together with some of the associations of private landowners, e.g. the Swedish Forestry Society and SÖDRA, have been using an inventory method based on stand properties known to be important to biodiversity, e.g. elements of natural forests, and certain species. During field work a simple sheet is used on which these various variables are recorded. Each variable is assigned a score in advance, depending on its presumed value for biodiversity. All values are summed and each stand is given a numerical ranking with 50 as the maximum (Drakenberg & Lindhe 1999). So far no test has been made of the correlation between this evaluation method and the ”true” biodiversity value in the sense of features such as species richness or abundance of rare species. Examples of variables recorded are large solitary trees, broadleaved trees, epiphytes, snags, logs, traces of forest fires and signs of beaver activity.

### 3.5.4 Green book-keeping or auditing systems of the forest companies and members of Forest-owners Associations

Green book-keeping systems have been developed by some of the large forest companies or enterprises and also by some of the associations of small private forest owners. In these systems, a random selection of clear-fellings and thinnings are evaluated regarding the quality of conservation measures. The assessments are presented in green-account documents yearly.

### 3.5.5 The Angelstam model for biodiversity assessment

Per Angelstam has suggested a model for assessment of forest biodiversity in Sweden, based on knowledge of the disturbance regimes in the forest landscape

(Angelstam 1999). He distinguishes between four types of disturbance regimes: 1. gap-phase, internal dynamics (in wet spruce forests and some deciduous woodlands) 2. frequent fires on dry soils (in unevenly aged and unevenly layered boreal pine forests and nemoral oak-pine forests) 3. large-scale disturbances (in fire-influenced successions, often evenly aged boreal coniferous forests) 4. forests disturbed by former human agricultural use (forests on wooded meadows, grazed forests etc). He also makes a distinction between different geographical scales, and presents his model as a matrix with disturbance regime as one axis and scale as the other (Table 3). He suggests that indicator species should be used (see 3.2.1 ) and selected according to this matrix, and gives examples of relevant species (Table 4). In a pilot project the Angelstam model has been tested in two forest landscapes in mid-Sweden, in cooperation with the company Stora Enso Forest. Information on a number of variables reflecting natural forest conditions and also of c. 70 old-growth specialist species was collected in managed and unmanaged stands including retention groups, woodland key habitats and nature reserves. There was a positive correlation between specialist species and a number of the forest components, suggesting that either can be used to monitor biodiversity (Höjer 1999).

Table 3. Forest inventory variables relevant to biodiversity assessment, based on disturbance regimes and different geographical scales. According to Angelstam (1999).

| | Variables related to trees within stands | Variables related to stands | Landscape level variables |
|---|---|---|---|
| Gap-phase dynamics (pine, deciduous woodlands) | | | |
| | Deadwood | | |
| | Variation in tree size and age | | |
| | Vertical structure | | |
| | Wind-throws | Height of ground-water table | |
| | Tree continuity | | |
| | Stand size | Amount in landscape | |
| | Degree of fragmentation | | |
| | Mosaic structure | | |
| Succession following large-scale disturbance (Picea abies, Betula spp. Populus tremula)) | | | |
| | Burned wood | | |
| | Deadwood | | |
| | Variation in tree size and age | | |
| | Old trees | | |
| | Vertical structure | | |
| | Large trees | Site type | |
| | Tree species composition in different age classes up to c. 300 years stand age | | |
| | Stand size | | |
| | Amount in landscape | | |
| | Degree of fragmentation | | |
| | Mosaic structure | | |
| | Proportion naturally occurring | | |
| Frequently fire-disturbed unevenly aged and unevenly layered stands on dry soil (Pinus sylvestris and Quercus spp.) | | | |

Burned wood
Deadwood
Variation in tree size and age
Old trees
Vertical structure
Large trees Site type
Tree species composition in different age classes up to c. 300 years stand age
Stand size  Amount in landscape
Degree of fragmentation
Mosaic structure

Stands influenced by former agricultural impact
(wooded meadows, grazed forests)
Old and large trees
Deadwood  Tree continuity
Stand size  Amount in landscape
Degree of fragmentation

### 3.5.6 Flora guardians

The most threatened plant species on the red-lists, in the threat categories ”Endangered” and ”Vulnerable”, are being monitored as part of the WWF-project ”Flora guardians”, in co-operation with the Swedish Threatened Species Unit at the Swedish University of Agricultural Sciences and regional botanical societies. The work relies heavily on the efforts of amateurs. Monitoring is mostly focused on vascular plants, but also to some extent on bryophytes and lichens. The status of the populations are reported annually by around 500 persons attached to the project. At present c. 200 species are monitored at all known localities. Landowners are informed of the presence of red-listed species on their property and how to protect them. This commitment to the WWF project will soon cover all parts of Sweden and all of the most threatened species.

## 5.1 National Forest Policy

The Swedish national forest policy was amended in 1993 and has been effective from 1994. The main characteristics of the forest policy are that it focuses on the two national goals regarding economic production and environmental consideration. Through the National Board of Forestry, the national goals have been converted into 9 sub-goals for the forestry sector. These sub-goals cover:

-Regeneration after final felling
-Silviculture
-Harvesting
-Forest protection
-Soil and water
-Nature conservation and protection of the cultural heritage
-Protection of habitats
-Planning and infrastructure
-International obligations

The forestry Act, which is part of the policy, underlines the importance of valuable sustainable production and development regarding both goals but

serves more as a legal framework than as a source of detailed regulation. The Forestry Act has become a more pronounced piece of minimum legislation, i.a. an Act that is not in itself sufficient to achieve the above goals. Instead, forest owners are given greater latitude in the management of their forests within the framework of the forest policy.

The national forest policy includes:

-The forestry Act
-Extension Services and Training
-Financial support to Environmental Measures
-Inventories
-Contractual Services
-The Forest Administration.

The main focus is on extension services and training since better knowledge for forest owners will give them higher responsibility and better motivation in achieving the forest policy goals. According to the general sector principle, the policy addresses the entire forestry sector and the responsibility for progressive results of the sector.

## 5.2 Evaluations of the forest policy

After only four years of the new forest policy, the Government instructed the National Board of Forestry to evaluate the effects of the changed policy. The evaluation was carried out in a very comprehensive way, in all covering 15 thematic areas of the forest policy framework.
The results are that considerable progress has been made, but also that a great deal remains to be accomplished. The conclusion therefore is that forestry so far has failed to reach its production and environmental goals.

It is true that forestry generates a high and sustainable level of wood production, but as a result of deterioration of forest practices in the 1990s,the forests do not have the desired qualitative composition.
The deterioration in silviculture can only be attributed to a limited extent to changes in forest policy. Significant advances have been made in the field of the environment, although there is still much to be done, foremost in the conservation of biological diversity.
In recent years there have been indications of improvements that may be of importance to the future orientation of forest policy. The profound interest in forest certification may act as a driving force towards more ecologically sound forest practices. However, better silviculture and site adaptation should make it possible to create preconditions for a higher outtake of raw materials in the forests. Good forest assets and good profitability also create the scope for achieving high ambitions in environmental protection. An important precondition is that damage by game and air pollution can be limited.

**5.2.1 A second evaluation** of the effects of the forest policy is currently done during 2001 as a result of a new Governmental instruction to the National Board of Forestry and to the National Environmental Protection Agency.
The new evaluation shall be done with focus on the two national political goals and on the sector sub-goals described earlier. Since the effects of the

forest policy sometimes can be difficult to differentiate from other sources of influence, also other factors and actors that have some influence on the forest shall be described. It is therefore of equally importance to study the different actors with regard to activities and attitudes as it is to study the effects in the forest. For similar reasons the evaluation should also consider other fields of politics and to what extent voluntary measures, like certification or voluntarily protected areas have an influence on the registered situation in the forest. The results of the second evaluation will be published by the end of 2001.

## 5.1 Protection of the cultural heritage

The cultural heritage in the forest consists partly of ”non-living” values such as grave cairns, remnants of buildings and so on and partly of a living cultural heritage such as pollards, stands of trees and even soil types created by human use of the forest ecosystem.
These values are dealt with mainly by research and inventory projects, economical support to management and restoration through the so-called NOKÅS-project and by spreading knowledge in new publications.

Together with France, Sweden runs an EU-LIFE- project named ”The Biological Cultural Heritage of the Forest”. The objective of the project is to invent, restore and inform about these values in four areas in Sweden and one area in France. In each area ”cultural information paths” and other kinds of information for the public, researchers and so on are arranged. The project is of an interdisciplinary character. It will be finished in the year 2002.

The NOKÅS- instrument is very important as it offers financial support for the restoration of natural and cultural values in the forest. At present around 8 million SEK/year are available. Between 30-40% are used for cultural values and the rest for natural values. An important function is to improve specific values so that the area or value in question can qualify for other forms of support.

Gathering new (and old) research results and presenting them in a simple and easily digestible way is an important task.
This year for example a publication on the history, values and management of pollards are published in cooperation with *The Swedish National Agricultural Board.*

## 5.3 Action Plan for Biological Diversity and Sustainable Forestry

***Objectives of Project***
The National Board of Forestry elaborated in 1995 an "Action Plan for biodiversity and sustainable forestry" as part of five similar plans for other sectors. The plan proposes measures to be taken for the preservation and sustainable use of forest resources and for the development of forestry practices based on ecological principles.
The work has lately been further developed into sub-national or regional action plans, elaborated under the auspices of the Regional Forestry Boards in close cooperation with the regional forestry sector, Non-governmental environmental organisations and other public bodies. The regional Action Plans will function as strategic policy documents for the regional development on a

short to medium long term.

***Potential Contribution to the Implementation of the Action***
The Action Plans proposes concrete measures to be undertaken to maintain and enhance biological diversity in forest ecosystems.

***Actors***
The following organisations participated in steering and reference groups in the elaboration of the Action Plan:
National Board of Forestry, County Forestry Boards, National Environmental Protection Agency, Swedish Forest Industries Federation, National Federation of Swedish Forest Owners' Associations, Federation of Swedish Farmers, Swedish Society for Conservation of Nature, and WWF.

***Methods, Time Frame and Geographical Scope***

***Sources of Further Information***
Publications:
"Action Plan for Biological Diversity and Sustainable Forestry"- A Summary with Examples of Landscape Analysis.

10 Regional Action Plans for Biological Diversity and Sustainable Forestry.

## 5.4 Protected Forest Areas.

The public funds for PFA:s has increased considerably in recent years and thus made it possible for both the Swedish Environmental Protection Agency (SEPA), the County Administrative Boards (CAB) and for the Forestry Administration to work progressively and systematically on PFA:s (see also 8.1 on Natura 2000).

1994-97 several surveys showed that it only remained 1 000 000 hectar natural forests in Sweden below the mountain area. The Swedish Parliament decided 1998 that 250 000 hectar should be protected as nature reserves (by CAB:s) and 25 000 hectar as Habitat Protection by the Forestry Admininstration. To achieve this, the Parliament decided to increase the budget for Nature reserves up to 500 million SEK 2001. Further increase of the budget for the establishment of forest nature reserves has been indicated.

It is of high priority to increase the areas of nature reserves all over the country below the northern mountain areas and to give high priority to protect those Woodland-Key Habitats that are too large or too valuable to be protected on voluntary ground by private owners.

SEPA and the CAB:s are working in close co-operation to create nature reserves. SEPA is responsible for national priorities, budget and for purchase of land for reserves. The CAB:s are responsible for inventories and the individual decisions. Presently, there are more than 600 areas in pipeline for Nature reserves. The average area of these is about 100 hectar.

The conservation instruments controlled by the Forestry Administration are the Habitat Protection, applicable for 19 various types of habitats, not exceeding 5 hectar in size, and the so called civil agreements that are signed between the Forestry Administration and a private forest owner or enterprise.

For Habitat Protection areas, the forest-owner is fully compensated financially while regarding civil agreements these are limited in time to a maximum period of 50 years and the financial compensation is meant to cover only the mayor part of the value and never the full cost.

Voluntarily protected forest areas are also quite important and many forest-owners have their own "reserves" that are set-aside from normal forestry for a number of personal reasons. Certification organisations also require certain voluntarily protected areas from certified members.

The total of Protected Forest Areas in Sweden, including the voluntary efforts and protection according to various legal instruments, including the Forestry Act, has now passed 20 % of the Swedish Forests. About 6% of the protected forests are protected as Nature reserves or National parks (based on an estimate of all types of forests, including mountain forests).

## 5.5 Certification of Swedish forestry

Certification of Swedish forestry has advanced very rapidly since the first option to certify forests under management was offered 1n 1996. Currently over 40 % of the forests are certified and the two dominating systems in Sweden are the Forest Stewardship Council, FSC, and the Swedish Pan-European Forest Certification, PEFC. Both systems involve a third-party certification and both systems are voluntary and market-driven by nature without any public involvement from governmental authorities.

Forest certification is a voluntary and market-regulated system aiming at ensuring that the forests are managed in a socially beneficial, environmentally sound and economically viable manner. Forest owners who want to certify their forest operations do establish a contract with the certifying organisation or with a mediator/umbrella organisation. In the contract, the forest owner pledges to manage his or her forest land in accordance with current standards. The certification work itself involves the documentation of the current status of the forest land and its management.

In addition to the two systems with fixed level standards, Swedish forest owners can choose to certify their forestry to any of the two environmental management systems ISO 14001 and EMAS. These systems are without any fixed environmental standard levels but are providing support regarding environmental manners and their positive development on the certified estate.

Forest Stewardship Council certification is based on a Swedish National FSC-standard, elaborated by a Swedish FSC-stakeholder group in 1998 and approved by the International FSC A.C. in 1999.

Forests to be certified according to FSC have to comply with Swedish laws and regulations, with FSC General Standards and Criteria and with the Swedish National Level Standard. FSC is open to any forest owner but the dominating part of forests certified according to FSC belongs to large forest companies and to public owners. As of April 2001 over 10 million hectar are certified according to FSC in Sweden.

The Swedish Pan European Forest Certification System, PEFC, was developed from an earlier system called the Family Forestry Certification, FFC, whereby the

different forestry cooperatives in Sweden during the mid 1990s developed their own forestry standards and signed certification contracts with individual family forest enterprises. A joint requirement for such certification was compulsory Green Management Plans.

The PEFC has developed from those early experiences and the Swedish PEFC standard and technical document was approved by the Pan-European Forest Certification Council in June 2000.The Swedish standard is adjusted to the different geographical conditions in south-, mid- and north Sweden.
PEFC certification covers five certification units regarding single or group certification of different stakeholders. Current certification agreements with members of the different forest owners associations as of April 2001 are 13200 agreements covering 1,4 million hectar.

## 7.1 Bilateral and multilateral Cooperation

International assignments

Staff members of National Board of Forestry are regularly representing Sweden in international organisations and meetings. Within the European Union and the United Nations the Board contributes to the work of FAO in Forest Resource Assessment 2000, European Forestry Commission, FAO/ECE Timber Committee, The United Nations Forum on Forests (UNFF), European Commission “Standing Forestry Committee” etc. Another arena for international cooperation in Europe is the Ministerial Conference on the protection of Forests in Europe (MCPFE). The National Board of Forestry is also a member of different Nordic co-operation networks and with countries surrounding the Baltic Sea, “ The Baltic 21”, an Agenda 21 for the Baltic Basin.

On a bilateral basis Sweden has also been engaged in a many development programs in a large number of countries. Of particular importance are various fields of cooperation with neighbouring countries; Estonia, Latvia, Lithuania, Poland, Russian federation and Ukraina. Other partners have been Armenia, Slovakia, Belarus, Georgia etc.

International contractual services

Within the Forestry Administration there are foresters with long-term working experience from developing countries like Burkina Faso, China, Colombia, Dominican Republic, Ethiopia, Guinea-Bissau, India, Kenya, Laos, Malaysia, Mozambique, Nicaragua, Nepal, Tanzania, Vietnam and Zambia.

After the dissolution of the Soviet Union the Forestry Administration has carried out several consultancy works in Estonia, Latvia, Lithuania, Russia, Armenia, Slovak Republic, Poland, Romania, Czech Republic, Belarus etc. Some recent projects are Forest Resources Assessment in Armenia, Forest Resource Management in Northwest Russia, Training of Forestry Extension Workers in Estonia and Latvia, Inventories of Key Habitats in Latvia and Estonia, Wood fuel development project in Lithuania, Training of chief executives in the Russian forestry administration etc.

National Board of Forestry can undertake consultancy work in fields of

- Forest Policy and Legislation. Implementation and evaluation
- Institutional Capacity Building
- Silviculture and Forest Management
- Inventories and Surveys
- Management Planning for protection of biodiversity
- Extension and Training

## 7.2 LIFE project: Demonstration of sustainable forestry to protect water quality and aquatic biodiversity

***Objectives of Project***
The project is to demonstrate how to minimise negative impact of commercial forestry on water quality and aquatic biodiversity, in 2 contrasting, significant water catchments in UK and Sweden.

***Potential Contribution to the Implementation of the Action***
See above.

***Actors***
Beneficiary: Forestry Commission, SW Scotland UK, co-ordinates the British partners
The County Forestry Board in Västra Götaland, Sweden, co-ordinates the Swedish partners

***Methods, Time Frame and Geographical Scope***
The project is to establish state of the art information, holistically plan 2 significant forestry catchments with all key players, and establish and disseminate best forest operation and water biodiversity practice. This will be done through training courses followed by guided tours to demonstration areas. Printed matter and videos will be produced as well as information on Internet home pages. A concluding conference will be held in Sweden.

The project starts in autumn 1999 and ends in December 2002.

***Sources of Further Information***

***Contact Person(s)***
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## 7.3 LIFE project: Local Participation in Sustainable Forest Management based on Landscape Analysis

***Objectives of Project***
The project aims to integrate environmental and landscape aspects into forestry development at five locations in Sweden and Finland, in particular with respect to small private holdings. The project will gather experience from co-operation between the local forest authorities and forest owners and other concerned organisations.

***Potential Contribution to the Implementation of the Action***
The project is expected to contribute to the sustainable management of forest resources in Europe. The results of tested models for landscape analysis and

elaborated methods for local participation will be published in reports and disseminated through seminars and excursions at five subprojects. The developed GIS applications will be extensively used in the Nordic countries.

***Actors***
National Board of Forestry (beneficiary)
Finnish Forestry Development Centre Tapio
3 County Forestry Boards

***Methods, Time Frame and Geographical Scope***
Five subprojects are launched in the woodlands of northern Europe, each representing a different type of forestland. The models aim at a wide range of ecological, economic and social conditions. The project aims to cover the following aspects:

- Development of general and replicable models for landscape analysis as a base for sustainable forest management. The models shall be suitable for at least 12 million hectares of privately owned forestland.

- Creation of methods for co-operation between different socio-economic actors and their participation in the process of decision-making to balance economic development and environmental protection. Each sub-project will have local reference groups at which local forest authorities and representatives of NGO's will participate.

- Development of extension methods and other transfers of knowledge to forest owners, decision-makers at local authorities and other actors.

- Testing and demonstrating models and methods for experimental purposes in at least one landscape entity in each project area.

- Development of technical tools like GIS for collecting, processing and analysing data as essential components of the whole process. The new applications are suitable for major extension campaigns directed at private forest owners.

The project will run approximately for three and a half years ending in mid 2000. The development of technical tools continues during the whole period.

***Sources of Further Information***
Publications:
"Progress reports", National Board of Forestry, S-551 83 Jönköping, Sweden

Web-site:

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## 7.4 The One Step Ahead-Project

The methodology has been developed by a Swedish environmental NGO and the basic idea is to find virgin forest areas in the northern part of Sweden

through investigations of the occurrence of a number of selected indicating plants - vascular plants, lichens, mosses or fungi - which by their presence indicate high conservational values. The system is linked to the IUCN categories of endangered species and the indicator plants are given points, 1 - 4 each, according to their listing in the Swedish Red List. Of importance is that an investigator only has to learn and identify a very limited number of species to be able to operate in the forest. The total sum of points from endangered species found gives a clear indication of how high the conservational value of a certain forest is, with regard to biodiversity. The system has also been adopted and put into practice in Norway.

For more information contact www.jokkmokk.krets.snf.se/stegetfore/metod.html

## 8.1 Natura 2000

The Swedish contribution so far to the European ecological network Natura 2000 contains ca 2450 proposed Sites of Community Interest (pSCI) in accordance with the Habitats Directive. These sites comprise a total area of ca 5 million hectare. In addition to that, the Swedish Government has designated 395 sites as Special Protected Areas (SPA) in accordance with the Birds Directive covering 2,4 million hectar. Several sites/areas are designated both as pSCI and SPA. The "net" number of sites proposed are therefore ca 2550 covering an area of 5,1 million hectar.

## 8.2 Pan- European Process

The "Ministerial Conference on the Protection of Forests in Europe" is an ongoing initiative for co-operation between around 40 European countries to address common threats and opportunities related to forests and forestry. This process is constituted by a chain of political level conferences and mechanisms for the follow-up work. The signatory states and the European Community are responsible for the national and regional implementation of the decisions taken at the conferences. The discussion and work between the conferences is called the "Pan-European Process", which is characterised by a dynamic joint approach with a strong political commitment. The intention to implement the forest related results of the United Nations Conference on Environment and Development (UNCED), which took place in 1992 in Rio de Janeiro, led to the Second Ministerial Conference, held in 1993 in Helsinki. There the international debate on forests was continued, bringing together not only the countries and their respective ministries responsible for forestry affairs but also the private sector, international forest community and environmental NGOs.
Thirty-seven states and the European Community signed four resolutions, and for the first time a common definition of Sustainable Forest Management was agreed upon:

*"Sustainable management means the stewardship and use of forests and forest lands in such a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems."*
In addition, biodiversity was given considerable emphasis, an increasing co-operation with countries in transition to market economies was decided and strategies regarding the consequences of a possible climate change for the

forest sector were initiated.

In the continuation of the follow-up work and in order to further reinforce forestry partnership, the European countries have always welcomed a wider association with other countries and organisations for mutual benefit. Therefore the Pan-European Process on the Protection of Forests in Europe has been keeping links with other international and regional processes, initiatives, organisations including NGOs, which share the concern about sustainable forest management as well as protection and conservation of forests.

In the subsequent process the current topic of socio-economic aspects in forestry arose, which led to the Lisbon Conference and brought an extension of the focus on the forest sector involving also the relation and interaction of forest and society.

## 8.3 COST E 4 on Forest Reserves

An environmental cooperation program within EU-countries regarding information on Forest Protected Areas. The very comprehensive results can be found in a database at the European Forest Institute. http://www.efi.fi/

## 9.1 Future Analysis

In 1998-2000 the Analysis Department of the National Board of Forestry carried out an extensive Forest Impact Analysis, FIA 99 (Swedish acronym SKA 99) in co-operation with a number of other Swedish authorities. The impact analysis project aimed at estimating possible national changes in a number of variables over the next 100 years including; condition of forest, size and composition of the highest sustainable harvesting level, potential accessibility of forest fuel, environmental aspects and carbon and nutrient balances. This is done through extensive calculations based on specified alternatives for future forest management and environmental considerations. The overall objective was to give public authorities, organisations and industry a broad base for strategic decision-making.

In the project, 11 scenarios were specified, calculated and analysed. The scenarios differ in harvest strategies, silviculture, and environmental considerations. The main scenario, called ”Forestry of the 1990s”, was created to analyse the consequences of prolonging the current direction of Swedish forestry into the next century. It should be pointed out that none of the scenarios represent a “desired” development; rather they are merely possible developments.

The calculations show that the annual increment will continue to increase into the 21:nd century, a trend that has been observed throughout the 20$^{th}$ century. The possible harvesting levels in the 21$^{st}$ century are significantly higher than today’s felling figures. Even in scenarios were ambitions in environmental considerations are twice as high as today the possible harvesting levels are estimated to be higher than the harvesting levels of the 1990s.

A larger share of the forest will be really old (>120 years) in the future, partly due to an increase in strictly and voluntarily protected areas. On the other hand the share of middle-aged forest will decrease. The recent changes in forest management also leads to an increased share of deciduous trees, especially in southern Sweden.

The calculations have also yielded results concerning the potential for forest

fuel harvest and the carbon and nutrient balances of the forest. These and more comprehensive results on the future condition of the forest and possible harvesting levels has been made available in English at www.svo.se/ska99/.

## 9.2 "2021" - Forestry of the Future - ways to a sustainable forestry

***Objectives of Project***
"Forestry of the future" is a system study describing ways to an environmentally adapted forestry in Sweden by the year 2021. The study is part of a future-study of a sustainable Sweden by the year 2021, carried out by the Swedish Environmental Protection Agency. The central part of the investigation deals with to what extent and in what way a reinforced environmental consideration shall be combined with a sustainable production of timber.

***Potential Contribution to the Implementation of the Action***
The study presents two possible visions for forest management in the future; combined and concentrated environmental consideration respectively. The results from the study show that a combination of the two visions, with a strong regional adaptation, gives the best fulfilment of the goal - a sustainable forestry in Sweden by the year 2021.

***Actors***
The study has been conducted by the Swedish Environmental Protection Agency in co-operation with the National Board of Forestry and a broad representation from the forest sector.

***Methods, Time Frame and Geographical Scope***
The study aims 25 years ahead in time and has a broad perspective. The method used is back-casting, which means that possible scenarios for the future are set up, and then the way to reach the scenarios is described.

The study is based on two future visions; combined and concentrated environmental consideration. To test the two visions under different regional conditions, eight test areas in different parts of Sweden have been used. For each area, two "future forests" have been computer simulated, one for each vision. In a consequence analysis is tested whether the visions hold for environmental- and production goals, set up at the regional level.

***Sources of Further Information***
Publications:
"2021 - Forestry of the Future" (in Swedish), National Environmental Protection Agency, Report 4787

Web-page:
http://www.environ.se/

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## *10.* "Greener Forests" - A training and extension campaign

***Objectives of Project***
The National Forestry Administration launched in 1999 a training and information campaign called *Greener Forests.* The campaign demonstrates in practice the implementation of the Swedish forest policy, i.e. how forestry can effectively combine high economic production with site adapted nature conservation. The target groups are forest owners and other persons in the forest sector and the goal is to reach around 100 000 people, during a three year period, with different kinds of training and information activities. In addition, special efforts will be made to reach the public, schools, and the international society with information activities.

***Potential Contribution to the Implementation of the Action***
The campaign provides forest owners and other persons in the forest sector with practical knowledge on implementation of the Swedish Forest Policy, that is, how environmental consideration and forest production can effectively be combined in the management of forest resources. For this purpose 200 demonstration areas, spread over the country, are prepared to show consequences and effects on production and biodiversity of different forest management practices. The aim is to give an understanding of ecology and biodiversity on ecosystem level.

***Actors***
For the campaign to be successful the National Forestry Administration's priority have been for a wide partnership working with both the forest industry, non-governmental organisations and with different authorities, in both preparation and practical implementation.

***Methods, Time Frame and Geographical Scope***
Education and demonstration areas (200) to forest owners, farmers and people employed in forest companies and organisations. The campaign will go on for three years, 1999-2001.

***Sources of Further Information***
Web-site:
http://www.gronareskog.se

Publications:
"Greener Forest textbook"
"Greener Forests - part of a success story"
"Knowledge on Production and Environments in the Forests" (folder)

These publications can be ordered from the National Board of Forestry, S-551 83 Jönköping, Sweden.

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## 10.2 Development and enhancement of ecological core-areas (LEKO)

The project idea is to invent larger areas - 500-1000 hectar -with a concentration of conservation values, and to, on the basis of new "green" management plans (see 11.1) combine the various public conservation

instruments with the voluntary conservation efforts undertaken by the forest farmers, according to their green management plans.

The public instruments are: Nature reserves

Habitat protection

Civil agreements, normally during 50 years

Economic subsidies for certain env.measures

Extension services and training

Experiences so far are very promising and the Forestry Administration cooperates closely with the Conservation Authorities on the selection of such core areas, suitable for such intensive use of various conservation instruments and with interested forest owners present

## 11.1 Green management planning

A new concept for forest management planning within family forestry has been developed by the Swedish Forestry Administration. A similar model has also been developed by the Forest Owners Associations.

The innovative part of the planning model is that every stand within a forest property is classified according to a new system of 4 stand classes of which 2 classes are production classes and the other two are conservation classes.

One of the conservation classes is designed for stands that ideally should be left for an entirely free development towards a natural or virgin stage of forest and forest biodiversity. The other conservation class is designed to fit an optimal development of stands where some kind of human intervention is necessary on order to protect or enhance biodiversity. Examples of such stands are old pasture or meadows where the farming practice have ceased to exist but where certain measures like grazing, cleaning, tree harvesting, controlled burning or other forms of human intervention is needed to maintain the conservation values of the stand.

Lasting effects of the new planning system are that every stand is designed for what it is best qualified for - economic production or nature conservation - and that the effectiveness regarding both objectives will increase. The new forest management plan will also function as a conservation document for forest owners who want to certify their forest holding. All plans are ordered and paid for by the forest owners on totally voluntary conditions, and no subsidies are involved.

## 11.2 Financial support to forest farmers to enhance nature and cultural values.

This program is used to cover direct costs for actions to enhance nature or cultural heritage conservation. A large part has been with regard to management of valuable trees and environments where trees form an essential part. Examples are old farm sites. Restoration of wetlands, aquatic environments and prescribed burnings have also been a priority. With regard to the cultural heritage management and restoration of old building and ruins have been a priority area.

The experiences of this support programme are good, since it also provides motivation and stimulation for forest-owners and extends new information to them regarding their own conservation values.

## 12. Environmental Impact Assessment

The Swedish forest policy is very restrictive regarding introduction and use of non-indigenous or exotic species or regarding the introduction of new

techniques that might be harmful to the environment. Any such use must seek permission from the National Board of Forestry and a compulsory part of such applications are Environmental Impact Assessments highlighting any possible environmental consequence of such uses of exotic species or new techniques. The most well known example of such an exotic species in Sweden is the Pinus Contorta, or Lodgepole Pine, which was introduced in a fairly large scale in the 1960:ies and where the plantations currently covers around 0.5 million hectares, or 2 % of the forests. The current planting if P. contorta has shrunk drastically in recent years and is now very limited. Another well-known EIA regards the possible up-scaling of liming of Swedish forests to prevent acidification of forest soils from airborne pollution.

## 12.1 Environmental Impact Assessment of Lodgpole Pine.

This report presents an analysis of the ecological consequences of forestry with Canadian lodgepole pine introduced into Sweden. The report includes a compilation of present knowledge in the area, research priorities based on the knowledge gaps found, and proposed measures for dealing with the negative environmental consequences that could arise. Researchers from various countries, with special competence in relevant areas of subject, carried out the data compilations and literature reviews providing the basis of the analysis. This basic information will be published in a special issue of the scientific journal Forest Ecology and Management. The point of departure of the analysis is a description of the properties of lodgepole pine, including species-specific characteristics of the tree, and changes in stand environment and silvicultural management practices that can be expected. The report describes the dispersal capacity of lodgepole pine in its new Swedish environment and the effects of host-parasite interactions. Thereafter, ecological effects on the capacity of the soil for sustainable production and on biological diversity at various scales (tree, stand, landscape) are analysed. Lodgepole-pine forestry is also considered in relation to current laws and regulations as well as national and international environmental goals. At the end of the report, a strategy is proposed for handling the inevitable uncertainties associated with the introduction of exotic species. In connection with this strategy, three main points are emphasised:

General caution should be used; a monitoring programme should be established, and contingency plans should be drawn up so that any eventual problems can be dealt with effectively.

## 13. Environmental influences of different forest management practices.

***Objectives of Project***

To contribute with essential knowledge within the field, in order for forest management practices to be adapted with regard to their effect on the environment.

Specified objectives:
Show how treatment with lime and PK affects spruce forest (production, crown thinning, soil, water, flora) in the most heavily polluted areas in the South-western parts of Sweden.

***Potential Contribution to the Implementation of the Action***

The results from the program gives knowledge on how different forest management practices affects for example flora and water in the forest ecosystem.

***Actors***

The Forestry Research Institute of Sweden (SkogForsk)

***Methods, Time Frame and Geographical Scope***

***Sources of Further Information***
http://www.skogforsk.se/scripts/start.pl?IE

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## 13.2 The Swedish Scientific Council for Biological Diversity

The Council is intended to be a link between the research world and decision makers. It gives advice and produces scientific material forming the basis for governmental decisions relating to biodiversity. These concern Sweden´s international role vis-a-vis the Convention on Biodiversity and other international agreements on biodiversity. The Council deals continually with implementing the convention issues in the Swedish efforts to conserve biodiversity.

The Council comprises of 14 members, including the chairman. The members are by the government personally appointed scientists from a range of disciplines of importance for biodiversity. The secretariat of the Council is based at the Swedish Environmental Protection Agency.

## 13.3 The Swedish foundation for Strategic Environmental Research - MISTRA

MISTRA was established in 1994 with funding derived from former Employee Investment Funds, held as shares and securities under professional banking management. The current capital is around 4,5 billion SEK and the income earned on the capital is used to support strategic environmental research. The budget for activities in 2001 amounts to SEK 250 million.

MISTRA supports strategic environmental research- that is , research with a long-term perspective directed towards solving mayor environmental problems - which:
+ meet the highest scientific standards
+ is guided by a vision of an environmentally sounder society
+ has as its aim system changes promoting sustainable use of resources, radically reduced environmental impacts, or essential new knowledge about environmental problems and their relative significance
+ contributes to Sweden’s competitiveness, and
+ have clear and measurable objectives, enabling it to be effectively evaluated.

The research supported is to be organized if the form of broad-based inter- and multidisciplinary programmes (MISTRA programmes) which:

+ create a strong research environment, linked into national and international networks,
+ promote the recruitment, training and mobility of researchers,
+ involve the participation of industry, public agencies and other

stakeholders and,
+ have effective management structures that ensure integration and cross-pollination between projects.

### 13.3.1 Sustainable Forestry in Southern Sweden - SUFOR

The ambitions of this MISTRA-funded program is to prove that economic viable forestry can be sustainably combined with the ambitions to maintain biodiversity and production capacity of the ecosystems. Of particular importance is the practical applicability of the results generated.

Participants of this programme are scientists from The Swedish University for Agricultural Sciences (SLU), the Universities of Lund and Gothenburg, the Technical College of Lund and the Institute for research on Air and Water (IVL) The research program is divided into 5 sub-programs, each consisting of 3 - 5 projects. All results from the different sub-programs will be aggregated into the final model for sustainable forestry in southern Sweden.

Sub-programs are:

A. Forest management
B. The rotation of nutrients
C. Forest biodiversity
D. Forest vitality and health
E. Forest planning and management of resources

## 14 Dissemination of Results

The National Board of Forestry have tried to make it a rule to present current experiences and findings with regard to sustainable forest management at mayor international conferences and similar meetings for different audiences. At least once a year has been the practice and normally these findings are presented as exhibitions with a combination of posters, videos and printed matters. Examples are e g the Greener Forest Program during the IUFRO conference in Malaysia, Exhibitions at the World Forestry Congress in Paris and Antalya, COP 1 of the CBD, the IFF final session, Elmia Wood, Interforst in Munic etc.

## 15. The friendly forest fire

The forest fire used to be the natural nominator in the dominating parts of the northern coniferous forests. Effective fire control has, however, brought the natural fires to a minimum, which has had a very negative effect on the biodiversity that is linked to fires. Examples are some very specialized insects and a large group of organisms that are dwelling in carbonised wood. Also woodpeckers are very depending on forest fires for their food supply.

Starting from the natural intensity, frequency and pattern of forest fires a model for sustainable forest management has been developed which is called the ASIO model.

The idea is that forestry thrives to mimic the effects of natural fires and the forests under management are therefore divided into four groups with regard to the likely occurrence of natural forest fires in their theoretical natural condition. The classes are areas that: Never, Occasionally, Sometimes or Often have been affected by fires and where the biodiversity has developed accordingly. The dominating classes are Sometimes and Often and this is where the modern forestry practices during harvest in the most easy way can mimic

the effects of past fires. This is where the retention system falls in quite naturally, the retained trees and other vegetation and smaller areas being those who likely would have survived the past fire. Traditional final harvesting or clear-cutting systems falls into these categories.

On the opposite side the areas that "never" were affected by fires must never be clear-cut but are to be harvested through any single tree harvesting system.

The very use of prescribed fires are also on escalation in Swedish forestry and large forest-owners (over 5000 hectar) who have their forestry certified have to burn, in a controlled manner, 5 % of their regeneration area during each 5 year period.

## 16. LIFE-project: Demonstration of methods to Monitor Sustainable Forestry.

The beneficiary of this large project is the Swedish National Board of Forestry and partners are the Danish forest and Landscape Research Institute, The Forestry Development Centre TAPIO in Finland, The Institute pour le Developement Forestier and CEMAGREF in France, The Niedersächsische Forstliche Versuchsanstalt in Germany and the Swedish Environmental Protection Agency. The total budget is almost 2 million EURO. The project demonstrates and compares methods to monitor all aspects of sustainable forestry. New methods will be developed, methods will be adapted and relevant methods will be tested in demonstration areas - 2 for each country. The project organises seminars in participating countries and thrives to disseminate results to various stakeholders. Also the Pan-European Indicators are tested from their practical and informational value.

### 16.1 BEAR-project

The European project BEAR - Indicators for Forest Biodiversity in Europe - aims at developing a system of indicators of forest biodiversity.

For further information: http://www.algonet.se/~bear/bear.html

### 16.2 Environmental Quality Criteria

The Swedish Environmental Protection Agency´s Criteria for Environmental Quality Assessments constitute a system of classification, which facilitates the interpretation of environmental data. The system can be used to determine whether measured values are low or high in relation to either a national average or baseline readings.

Environmental Quality Criteria are developed for 6 different environmental areas of which Forest landscapes are one.

For further information:
http://www.internat.environ.se/documents/legal/assess/assess.htm

## Swedish International Development Cooperation

The Swedish International Development Cooperation Agency (Sida) supports conservation, sustainable use and fair and equitable sharing of biodiversity related to forest ecosystems in a number of ways, but do not have any summary of the contributions. Below are examples from 1998. To this must be added that Sida supports a number of NGOs working on the issue like IUCN-The World Conservation Union, the International Institute for Environment and Development (IIED), Instituto Nacional de Biodiversidad (INBIO), Swedish Society for Nature Conservation (SSNC) and Genetic Resources Action International (GRAIN) and

initiatives like the Underlying Causes for Deforestation and Forest Degradation (IUCN/World Rainforest Movement) which are not included in the list below. Sustainable forestry is also to some extent included in some rural development projects. In Bolivia Sida contributes to the development of voluntary certification of forest-products (SEK 23 million for a period of five years). Sida also support research in the field of forestry and biodiversity, mainly through the CGIAR (CIFOR and ICRAF).

Sida has also undertaken a project called “Mainstreaming of Biodiversity” with the focus on analysing the consequences on biodiversity of the programme/project supported by Sida and making stakeholders aware of the importance of biodiversity with the objective that consequences for biodiversity are analysed in the project identification, planning process and follow-up of all relevant programmes and projects supported, as part of EIA, to minimise negative effects and also point out positive impacts for biodiversity.