29.12.1997

NATIONAL ACTION PLAN FOR BIODIVERSITY IN FINLAND, 1997-2005

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SUMMARY

Biological diversity

Biological diversity (biodiversity) refers to the variability among all living organisms on our planet. This concept embraces the inherent genetic diversity of all biological organisms (genetic exchange within species), diversity within and between species, and diversity of ecosystems (the functional unit formed by living organisms and their non-living habitat).

In addition to wild species, the concept of biodiversity also embraces domesticated and cultivated species and natural processes within ecosystems. Often it also includes geological formations.

The objective of the International Convention on Biological Diversity (Rio de Janeiro 1992) is to conserve the diversity of ecosystems, plant and animal species (natural organisms) and their gene stocks, and to promote the sustainable use of natural resources and the fair and equitable sharing of the benefits arising from the utilization of biological resources. By endorsing the Convention, Finland has committed itself to promoting biological diversity and the sustainable use of natural resources in all its endeavours.

Recent reforms in Finland have added new momentum to the maintenance of biological diversity, first and foremost through the comprehensive reform of the Nature Conservation Act and the Forest Act, and the environmental programmes being implemented systematically by various spheres of administration, trade and industry. The basic framework for the conservation of biodiversity in all key sectors — agriculture, forestry, environmental administration and legislation — is at present sound enough to satisfy even the most critical international scrutiny.

Decision-in-Principle by the Finnish Council of State

The Council of State has taken a Decision-in-Principle on *Measures promoting the research and conservation of biological diversity* (Council of State Decision dated December 21, 1995). Its objective is to promote cooperation between ministries and to define their respective responsibilities in the implementation of the Convention on Biological Diversity. The Decision-in-Principle states that each ministry is responsible for the conservation and sustainable use of biological diversity within its field of jurisdiction, as well as for making proposals for measures

promoting biodiversity (under the principle of "sectoral responsibility").

To achieve this end, on March 20, 1996 the Ministry of the Environment appointed a *National Commission For Biological Diversity*, comprising a wide body of representatives from all ministries, key sectors of trade and industry, as well as environmental organizations. The Commission drafted *Finland's national action plan for biological diversity*, as mandated by the Council of State Decision-in-Principle. The action plan is partly based on biodiversity reports drafted by the ministries for their respective spheres of jurisdiction.

National action plan

A key goal guiding the formulation and implementation of the national action plan is the need to safeguard Finland's biological diversity by preventing the diminishment and genetic depletion of habitats and natural organisms, including stocks of cultivated and domesticated species. A further aim is to create jobs and promote business and industry. The action plan was formulated in line with the provisions of EU nature conservation directives and the obligations laid down in the Convention on Biological Diversity and other international agreements.

The maintenance of Finland's biological diversity rests on two things: having a sufficient number of nature reserves and ensuring the sustainable use and management of commercially exploited land, while also giving due consideration to other public interests. The increasing emphasis that is being placed on biodiversity in the commercial use of land will eventually reduce the need to establish new nature reserves.

The national action plan is designed to preserve a sufficiently representative sample of the various species and structural diversity of natural habitats and ecosystems in all of Finland's biogeographical zones. A concurrent aim is to protect and care for flora, fauna, genetic resources and habitats.

In addition to the protection of living organisms and ecosystems, the action plan aims to preserve the biological diversity of those cultivated and domesticated species with established importance as a genetic resource in Finland. Particularly, it strives to encourage the sustainable use of natural resources on commercially used land, and to foster business opportunities offered by the promotion of biodiversity, which could hold great potential for job creation and new types of consultative business enterprise.

By introducing the concept of "sectoral responsibility", the national action plan integrates various spheres of administration, trade and industry under the joint objective of protecting and promoting the sustainable use of

biological resources. Ministries and businesses are accordingly held accountable for ensuring that their activities do not conflict with the conservation of biodiversity. The plan also defines who is accountable for the costs involved. As far as possible, these costs will be included in the operating budgets allocated for each sector of administration.

The action plan is designed to create a new orientation in administration, trade and industry by ensuring that the maintenance of biodiversity is given due attention in all public endeavours. The ministries, however, are limited to operating within their existing budgets, as very little additional funding has been allocated for the implementation of the action plan. The cost of the measures outlined in the action plan will largely depend, then, on the extent to which they can be integrated with other spheres of planning and development. Indeed, the proposed measures and goals should be considered in the initial stages of planning.

The national action plan is valid from 1997 to 2005, providing a basis for long and short term planning, decision-making and international initiatives. It outlines a set of proposals for promoting the maintenance and sustainable use of biological resources and the allocation of sectoral responsibilities and resources. The plan will later be revised and updated on the basis of the current situation, i.e. new requirements in the maintenance and sustainable use of biological diversity, the latest research findings, as well as national and international developments.

Core proposals

All spheres of administration, trade and industry are to ensure, as best they can, the protection and sustainable use of biological resources within their respective spheres of activity.

To achieve this end, all spheres of administration will institute any necessary legislative reforms and new financial and administrative incentives to support the maintenance and sustainable use of biological diversity. Key organizations in administration, trade and industry will undertake to ensure that this objective is supported by the incentives, training and counselling provided to their personnel. Wherever possible, they should also channel funding into the research of biodiversity in their respective fields and engage in cross-sectoral monitoring of the state of biodiversity. The action plan also entails a commitment to participate in national and regional cooperation.

General development objectives

1. All sectors of administration, trade and industry undertake to promote, as best they can, the conservation and sustainable use of biological diversity within their respective spheres of activity. The conservation of biodiversity should ideally become an integral part of their routine operations.
(All relevant bodies, 1997-2005)

2. All sectors of administration, trade and industry will assess the impact of their actions and decisions on biological diversity and monitor the implementation of their internal strategies, any specific targets pertaining to the maintenance of biodiversity, and the efficacy of measures taken to this end.
(All relevant bodies, 1997-2005)

3. All sectors of administration, trade and industry undertake to collaborate with research establishments in drafting criteria and indicators for the maintenance and sustainable use of biological diversity (e.g. inventories of endangered species, protected habitats, fragmentation of habitats, etc.) as part of a broader project to develop indicators of sustainable development.
(All relevant bodies, 1997-2005)

4. All sectors of administration, trade and industry will intensify cooperation so as to promote new business and job-creation potential based on the conservation and sustainable use of biological diversity.
(All relevant bodies, 1997-2005)

5. The conservation and sustainable use of biological diversity will be promoted through training, education and information.
(All relevant bodies, 1997-2005)

6. Financial instruments will be developed with due attention to the need and prospects for promoting biodiversity through financial incentives.
(All relevant bodies, 1997-2005)

7. Through measures such as building up a sound knowledge base, Finland will enhance its capacity for incorporating the conservation and sustainable use of biodiversity within the standard procedure for environmental impact assessment.
(All relevant bodies, 1997-2005)

8. Finland will supplement the statutory conservation of biodiversity with new, more flexible approaches to promoting the sustainable use of nature and biological resources in commercially used areas.
(All relevant bodies, 1997-2005)

9. All fields of administration and key sectors of trade and industry will strive to intensify their efforts to promote the conservation and sustainable use of biological

diversity, including any necessary improvements to their environmental management schemes and quality assurance systems (e.g. ISO, EMAS).
(All relevant bodies, 1997-2005)

10. A national liaison network comprising representatives of all sectors of administration, trade and industry will be appointed to follow up the implementation of the national action plan for biological diversity and to coordinate the overall monitoring of biodiversity in Finland.
(Ministry of the Environment, all relevant bodies, 1998-2005)

Required legislative reforms

11. The conservation and sustainable use of biological diversity will be given due consideration in the reform of all laws related to the use of natural resources.
(All relevant bodies, 1997-2005)

12. Legislation on water resources will be simplified so as to lay greater emphasis on protecting the diversity of aquatic habitats, particularly small bodies of water.
(Ministry of the Environment, Ministry of Justice, Ministry of Agriculture and Forestry, 1999-2001)

13. New legislation will be enacted to regulate the deliberate release of foreign species which are liable to establish themselves in the wild and pose a threat to indigenous species.
(Ministry of the Environment, Ministry of Agriculture and Forestry, Ministry of Social Affairs and Health, Ministry of Trade and Industry, 1997-2005)

Incorporation of biodiversity in the daily routine of administration, trade and industry

Forestry

14. Through broadly based cooperation, Finland will formulate a national forestry policy incorporating the aims and measures of the Environmental Programme for Forestry, thereby reconciling the needs of various forest users.
(Ministry of Agriculture and Forestry, Ministry of the Environment, 1997-1998)

15. The goals, implementation and instruments of the Environmental Programme for Forestry will be monitored and updated in line with the latest research findings and monitoring data. The target status for sustainable forestry outlined in the programme will be revised in the light of new developments.
(Ministry of Agriculture and Forestry, Ministry of the Environment, Central Union of Agricultural Producers and Forest Owners, Finnish Environment Institute, Finnish Forest

Research Institute, Finnish Forest Industries Federation, Finnish Forest and Park Service, Forestry Development Centre Tapio, Finnish World Wide Fund for Nature, Finnish Association for Nature Conservation, 1997)

16. The diversity of habitats will be safeguarded in the use and management of forests through new forest legislation, implementation of the Environmental Programme for Forestry, development of regional forest planning, drafting of landscape ecological plans for State-owned forests, promotion of research on forest diversity and development of new methods of monitoring biodiversity.
(Ministry of Agriculture and Forestry, Ministry of the Environment, Finnish Forest and Park Service, 1997-2005).

Rural areas and agriculture

17. The goal of rural development is to maintain the viability, biological diversity and natural heritage of rural regions. The diversity of agricultural environments, rural landscapes and domesticated and cultivated species will be maintained and improved in line with the Environmental Programme for Agriculture. New approaches will be developed for maintaining and promoting the diversity of wild species that thrive in agricultural habitats and also that of cultivated and domesticated species used in agriculture. The Environmental Programme for Agriculture will be updated and supplemented with intensified measures for promoting traditional rural landscapes and the biological diversity of rural regions.
(Ministry of Agriculture and Forestry, Ministry of the Environment, Agricultural Research Centre, Finnish Environment Institute, 1997-2005)

18. Traditional rural landscapes and biotopes will be placed under special management as extensively as possible.
(Ministry of Agriculture and Forestry, Ministry of the Environment, Finnish Forest and Park Service, 1997-2005)

19. Organic farming, which is beneficial to biodiversity, will be augmented: the target is to extend its combined area to 150,000 hectares by 2001.
(Ministry of Agriculture and Forestry, 1997-2001)

Mining

20. The adverse effects caused to biodiversity by mining will be reduced as far as this is financially and technically feasible.
(Ministry of Trade and Industry, Ministry of the Environment, Geological Survey of Finland, Finnish Environment Institute, 1997-2005)

Use of water resources

21. An action plan will be drafted for preserving the biodiversity of aquatic habitats, including the restoration of waters and the formulation of criteria for assessing the current state of aquatic biodiversity.
(Ministry of the Environment, Ministry of Agriculture and Forestry, Ministry of Justice, Ministry of Finance, Ministry of Transport and Communications, Ministry of Trade and Industry, Finnish Forest and Park Service, Finnish Maritime Board, Finnish Environment Institute, Finnish Game and Fisheries Research Institute, Finnish Forest Research Institute, 2000-2001)

22. Finland will define a set of objectives for the prevention of water pollution and assess the need for a comprehensive strategy for preventing environmental hazards caused by water pollution, in accordance with relevant international conventions and commitments.
(Ministry of the Environment, Ministry of Agriculture and Forestry, Ministry of Justice, Ministry of Finance, Ministry of Transport and Communications, Ministry of Trade and Industry, Finnish Forest and Park Service, Finnish Maritime Board, Finnish Environment Institute, Finnish Game and Fisheries Research Institute, Finnish Forest Research Institute, 1997-1998).

23. Adverse effects on the diversity of aquatic habitats caused by hydro-engineering will be reduced, for example by timing construction so as to cause minimum disturbance to aquatic species, and by preventing the discharge of solid waste into waterways, particularly during periods crucial to the reproduction of fish and crayfish, and also during fishing season. (Ministry of Agriculture and Forestry, Ministry of the Environment, regional environment centres, 1997-2005).

24. Restoration projects undertaken for the revival of biodiversity will be augmented in aquatic environments affected by hydro-engineering, agriculture or forestry, particularly in small bodies of water. (Ministry of Agriculture and Forestry, Ministry of the Environment, Finnish Forest and Park Service, regional environment centres, 1997-2005)

Game management and hunting

25. Hunting will be regulated so as to maintain the favourable conservation status of animal species within their natural range.
(Ministry of Agriculture and Forestry, Finnish Game and Fisheries Research Institute, 1997-2005)

26. The natural habitats of game species will be maintained by safeguarding their ecological requirements in the routine practice of forestry, for example, in line with the measures outlined in the Environmental Programme for Forestry.

(Ministry of Agriculture and Forestry, Finnish Game and Fisheries Research Institute, 1997-2005)

27. The diversity of game species will be safeguarded by formulating new methods for estimating game populations and using these as a basis for determining hunting quotas.
(Ministry of Agriculture and Forestry, Finnish Game and Fisheries Research Institute, 1997-2005)

Fisheries

28. The diversity of fish species will be safeguarded by protecting fish stocks, by applying the principle of sustainability in the fishing industry, by artificially raising declining stocks of important fish species and by promoting the revival of natural fish stocks. Waters will primarily be stocked with species indigenous to them.
(Ministry of Agriculture and Forestry, Ministry of the Environment, Finnish Game and Fisheries Research Institute, Finnish Environment Institute, 1997-2005)

29. A sufficient variety of fish species and healthy, high-quality spawn will be made available for the cultivation of declining fish stocks.
(Ministry of Agriculture and Forestry, Finnish Game and Fisheries Research Institute, 1997-2005)

30. The habitats of fish stocks and crayfish will be upgraded through the restoration of fishing waters, with special attention to the habitats of declining fish stocks.
(Ministry of Agriculture and Forestry, Ministry of the Environment, Finnish Game and Fisheries Research Institute, regional environment centres, 1997-2005)

31. An effort will be made to reduce water pollution from fish hatcheries (which is potentially harmful to aquatic habitats), to prevent cultivated fish from being inadvertently released into the wild, and to upgrade production and pollution-treatment technology used by fish farms, particularly in marine regions.
(Ministry of Agriculture and Forestry, Ministry of Trade and Industry, Finnish Game and Fisheries Research Institute, 1997-2005)

32. Scientific data will be compiled as a basis for setting optimum fishing quotas, and for use in the management of fish stocks and aquaculture; new data will be compiled particularly on fish populations and the effects of stocking.
(Ministry of Agriculture and Forestry, Finnish Game and Fisheries Research Institute, 1997-2005)

Reindeer husbandry

33. Reindeer husbandry will be developed in line with the

carrying capacity of the environment and the maintenance of biological diversity. The condition of reindeer pastures will be improved by reducing maximum herd limits, by regulating the composition of the reindeer population and by upgrading pasture management through pasture rotation and other farming methods. The size of herds will be reduced, especially in northern Lapland.
(Ministry of Agriculture and Forestry, Ministry of the Environment, Finnish Forest and Park Service, the Sámi Parliament, Federation of Reindeer Owners' Associations, 1997-2005).

Transport and urban infrastructure

34. Urban policy will be reformed to safeguard the diversity of urban environments. Special emphasis will be placed on the maintenance of parks and other notable natural sites, sound principles of maintenance will be observed, and urban national parks will be established.
(Ministry of the Interior, Ministry of the Environment, Association of Finnish Local Authorities, 1997-2005)

35. The planning, construction and maintenance of transport infrastructure will be carried out with proper consideration for biodiversity and other environmental impacts.
(Ministry of Transport and Communications, Ministry of the Environment, Association of Finnish Local Authorities, 1997-2005)

36. The fragmentation of intact natural habitats caused by transport and urban infrastructure will be prevented, for instance by establishing "ecological corridors" and monitoring their efficacy.
(Ministry of Transport and Communications, Ministry of the Environment, Association of Finnish Local Authorities, Academy of Finland, 1997-2005)

National defence

37. The defence administration will incorporate the conservation of biodiversity in the forthcoming reform of its environmental policy and in upgrading its environmental management system.
(Ministry of Defence, National Defence Forces, 1997-2005)

38. The defence administration will upgrade its centralized system of environmental protection and its network of environmental representatives, whose duties include issues related to biological diversity.
(Ministry of Defence, National Defence Forces, 1997-2005)

39. The defence administration will pay due attention to environmental protection in carrying out manoeuvres and in the maintenance of manoeuvre sites.
(Ministry of Defence, National Defence Forces, 1997-2005)

Economic instruments and other incentives

40. The practical implementation of the certification system for sustainable use and management of commercial forests will be promoted, and an effort will be made to integrate it with reciprocal international systems of certification.
(Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry of Education, Finnish Forest and Park Service, Forestry Development Centre Tapio and other forestry associations, Finnish Environment Institute, Academy of Finland, Finnish Forest Industries Federation, Central Union of Agricultural Producers and Forest Owners, Finnish Association for Nature Conservation, 1997-2005)

41. The conservation of biodiversity will be promoted by developing a system of certification proving the origin of goods such as natural products gathered from forests. The system will be developed as a cooperative effort between various relevant bodies.
(Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry of Trade and Industry, Confederation of Finnish Industry and Employers, 1997-2005)

Maintenance and use of biodiversity at local and regional level

42. Regional Councils will collaborate with environmental authorities to create methods of assessing the impact exerted on biodiversity by regional development programmes and regional planning.
(Ministry of the Interior, Ministry of the Environment, Regional Councils, regional environment centres, 1997-2005)

43. Regional environment centres and relevant partners will conduct inventories and compile basic data related to local ecology, on the basis of which they will draft regular progress reports on biodiversity for their respective areas of jurisdiction.
(Ministry of the Environment, regional environment centres, 1997-2005)

44. Regional Councils will strive to promote trade and industry based on biodiversity by intensifying cooperation with entrepreneurs, local authorities and authorities in the fields of trade and industry, labour, education and the environment.
(Ministry of the Interior, Ministry of Labour, Regional Councils, employment and economic development centres, Central Union of Agricultural Producers and Forest Owners, regional environment centres, 1997-2005)

45. The conservation of biodiversity will be integrated with the formulation of local Agenda 21 programmes.
(Ministry of the Interior, Ministry of the Environment,

Association of Finnish Local Authorities, regional environment centres, non-governmental organizations, 1997-2005)

46. Local authorities will chart areas within their jurisdiction to establish sites of key importance to biodiversity in cooperation with regional environment centres and forest centres.
(Ministry of the Interior, Ministry of the Environment, Ministry of Agriculture and Forestry, Association of Finnish Local Authorities, regional environment centres and forest centres, 1997-2005).

47. Local authorities will channel job-creation funds into the conservation of biodiversity, such as for the restoration of small waterbodies and other corresponding sites.
(Ministry of the Interior, Association of Finnish Local Authorities, Ministry of Labour, employment and economic development centres, 1997-2005).

In situ conservation

48. Finland will submit its national proposal for sites to be included in the Natura 2000 network to the EU Commission. The network is designed to protect the natural habitats of flora and fauna and to preserve natural habitat types of Community interest.
(Ministry of the Environment, Ministry of Agriculture and Forestry, Ministry of Finance, Finnish Forest and Park Service, Finnish Environment Institute, regional environment centres, 1997).

49. A national strategy will be formulated for the implementation of nature conservation programmes approved by the Council of State. The strategy will be based on a funding programme drafted in June 1996 by the Cabinet Economic Policy Committee, according to which the conservation programmes will be implemented by the year 2004.
(Ministry of the Environment, Ministry of Finance, Finnish Environment Institute, Finnish Forest and Park Service, regional environment centres, 1997-1998)

50. In conjunction with a three-year research project launched early in 1997, Finland's network of nature reserves will be assessed to establish the extent to which it preserves a representative sample of Finnish ecosystems, and to gauge its long-term potential for maintaining biological diversity.
(Ministry of the Environment, Finnish Environment Institute, Finnish Forest and Park Service, regional environment centres, Finnish Forest Research Institute, Geological Survey of Finland, 1997-2000)

51. The role of the Forest Act (1096/96) and the natural management of commercial forests (forest management, funding

of forest restoration) will be assessed to establish the extent to which they supplement Finland's network of nature reserves and contribute to the maintenance of biodiversity. Long-term prospects for preserving the biodiversity of Finnish forests will also be examined.
(Ministry of Agriculture and Forestry, Ministry of the Environment, Finnish Forest Research Institute, Forestry Development Centre Tapio, Finnish Environment Institute, Finnish Forest and Park Service, 1999-2002)

52. A survey will be conducted on endangered natural habitat-types and habitats defined as having special importance in the Forest Act. The survey will examine their distribution, their current protection status, and the means and cost of their protection.
(Ministry of the Environment, Ministry of Agriculture and Forestry, Finnish Environment Institute, Forestry Development Centre Tapio, regional forest centres, Finnish Forest Research Institute, 1997-2005)

53. The principles observed in the maintenance and use of nature reserves will be revised in line with the Convention of Biological Diversity, EU nature conservation directives and the amended Finnish Nature Conservation Act.
(Ministry of the Environment, Finnish Forest and Park Service, 1997-1998)

54. Resources will be allocated annually for the maintenance, management and ecological restoration (rehabilitation) of sites procured by the State and designated as nature reserves under the provisions of the Nature Conservation Act.
(Ministry of the Environment, Ministry of Finance, Ministry of Labour, Finnish Forest and Park Service, employment and economic development centres, 2000-2005)

55. Finland will draft a revised list of its endangered species, with particular attention to new nature reserves and recent changes in Finnish legislation.
(Ministry of the Environment, Finnish Environment Institute, Finnish Forest and Park Service, 1997-1999)

56. New approaches will be developed for the protection and management of endangered species, and the necessary resources will be allocated for charting sites which host endangered species, and for the drafting and implementation of protection plans.
(Ministry of the Environment, Finnish Environment Institute, Finnish Forest and Park Service, 1997-2005)

57. Cooperation between the authorities will be intensified in the supervision of trade in endangered species, including enforcement of the CITES Convention on International Trade in Endangered Species of Flora and Fauna.
(Ministry of the Environment, Ministry of the Interior, Ministry of Agriculture and Forestry, Finnish Environment Institute, Finnish Forest and Park Service, Frontier Guard, customs and police authorities, 1997-2005)

Ex situ conservation

58. Finland will preserve the genetic diversity of its commercial forests by establishing 'gene pool' forests and other gene banks, and by preserving the genetic diversity of cultivated forest stocks.
(Ministry of Agriculture and Forestry, Finnish Forest Research Institute, 1997-2005)

59. An extensive inventory will be compiled on the ex situ conservation of the original stocks and populations of both wild endangered species as well as cultivated and domesticated species. The inventory will then be reviewed as a basis for future action.
(Ministry of the Environment, Ministry of Agriculture and Forestry, 1998-1999)

60. Endangered species will be placed under ex situ conservation in controlled conditions outside their natural habitats (zoos, special farms, etc.). These species and stocks will then be systematically re-introduced into the wild.
(Ministry of Agriculture and Forestry, Ministry of the Environment, Finnish Game and Fisheries Research Institute, 1997-2005)

61. The genetic diversity of cultivated plants will be safeguarded by drafting a national genetic resource programme, by preserving the genetic material of native plants and cultivated plant stocks, and by contributing actively to the upkeep of the Nordic Gene Bank of agricultural and horticultural species of flora.
(Ministry of Agriculture and Forestry, 1997-2005)

62. The genetic diversity of domesticated species will be safeguarded by drafting a comprehensive breeding programme for populations of farming stocks, by formulating a strategy for the conservation of native breeds and other rare domesticated species, by appointing a working group to coordinate research on sustainable use of the genetic resources of domesticated species and programmes for their breeding and conservation, and also by contributing actively to the upkeep of the Nordic Gene Bank of domesticated animal species.
(Ministry of Agriculture and Forestry, 1997-2005)

63. A set of national ex situ conservation centres will be established and their role will be consolidated in the maintenance and use of biological diversity and related education services.
(Ministry of the Environment, Ministry of Agriculture and Forestry, Ministry of Education, National Board of Education, ex situ conservation centres, 1997-2005)

Regulation of foreign stocks, non-native species and genetically modified organisms

Non-native species

64. A study will be conducted to assess the ecological and economic impact of non-native species occurring in Finland, focusing also on the potential risk of their spreading and means of preventing this.
(Ministry of the Environment, Ministry of Agriculture and Forestry, Finnish Environment Institute, Finnish Game and Fisheries Research Institute, 2000-2002)

65. Finland will strive to prevent non-native species from being released into the wild, and to eradicate those species which pose a potential threat to Finland's indigenous ecosystems, habitats or species.
(Ministry of the Environment, Ministry of Agriculture and Forestry, regional environment centres, Finnish Game and Fisheries Research Institute, 1997-2005).

Genetically modified organisms

66. The environmental hazards caused by genetically modified organisms will be prevented in accordance with the Gene Technology Act.
(Ministry of Social Affairs and Health, Ministry of the Environment, Ministry of Trade and Industry, Ministry of Agriculture and Forestry, Ministry of Education, 1997-2005)

67. The potential risks of experiments conducted in the wild with genetically modified organisms will be assessed in advance, and the environmental impact of modified organisms will be monitored.
(Ministry of Social Affairs and Health, Ministry of the Environment, Ministry of Agriculture and Forestry, Ministry of Trade and Industry, Finnish Environment Institute, Agricultural Research Centre, 1997-2005)

68. Methods will be developed for controlling and monitoring the use of genetically modified organisms, and training will be increased so as to minimize the potential risks involved.
(Ministry of Social Affairs and Health, Ministry of the Environment, Ministry of Agriculture and Forestry, Ministry of Trade and Industry, Finnish Environment Institute, 1997-2005)

69. Authorities and expert institutions responsible for implementing the Gene Technology Act will enhance their capacity to investigate, assess and prevent environmental hazards arising from genetically modified organisms, e.g. through further research.
(Ministry of Social Affairs and Health, Ministry of the Environment, Ministry of Trade and Industry, Ministry of

Agriculture and Forestry, Ministry of Education, Academy of Finland, Finnish Environment Institute, 1997-2005)

Biosafety protocol

70. Finland will participate in international cooperation (OECD and Nordic cooperation) aimed at developing and monitoring risk management and inspections related to the control of genetically modified organisms.
(Ministry of Social Affairs and Health, Ministry of the Environment, Ministry of Trade and Industry, Ministry of Agriculture and Forestry, the Finnish Environment Institute, 1997-1998 or 1999)

71. Finland will contribute to the drafting of the UNEP biosafety protocol on transboundary movement of genetically modified organisms.
(Ministry for Foreign Affairs, Ministry of the Environment, Ministry of Social Affairs and Health, Ministry of Agriculture and Forestry, Ministry of Trade and Industry, 1997-2005)

Ownership of and access to genetic resources

72. Finland will keep abreast of international trends in the patenting of genetic resources and related rights of access and ownership, and Finnish legislation will be revised accordingly.
(Ministry of Trade and Industry, Ministry of Justice, Ministry of the Environment, Ministry of Social Affairs and Health, Ministry of Agriculture and Forestry, 1997-2005)

Protecting the status of indigenous peoples

73. A study will be carried out on the sustainable development of land use in the sub-Arctic regions of northern Finland, including the regulation and compatibility of this development, and how it affects the livelihood of local communities and the Sámi heritage.
(Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry of Justice, Ministry of Trade and Industry, Ministry of Labour, the Sámi Parliament, 1998-2000)

74. The management, use and protection of natural resources in regions inhabited by the Sámi population will be co-ordinated as a cooperative effort between the Sámi Parliament and other authorities so as to ensure the protection of indigenous livelihoods and Sámi culture.
(Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry of Justice, Ministry of Trade and Industry, Ministry of Labour, Finnish Forest and Park Service, the Sámi Parliament, 1997-2005)

Education, public awareness, training and information

75. The maintenance and promotion of biological diversity will be given due attention in drafting the principles of the new national curriculum as part of forthcoming educational reforms.
(Ministry of Education, National Board of Education, 1997-2005)

76. The conservation and promotion of biological diversity will be incorporated into research conducted by specialized institutions of education, and into the curricula of these and other university-level institutions as well as the early education curriculum.
(Ministry of Education, National Board of Education, 1997-2005)

77. The conservation and sustainable use of biological diversity will be incorporated in vocational studies and academic studies in engineering, commerce, economics, social sciences, law and administration.
(Ministry of Education, National Board of Education, 1997-2005)

78. The education authorities will collaborate broadly to formulate syllabuses which promote the protection, management and sustainable use of biological diversity, integrating the study of its ecological, economic and social aspects.
(Ministry of Education, Ministry of the Environment, Ministry of Agriculture and Forestry, National Board of Education, Finnish Forest and Park Service, 1997-2005)

79. Education institutions will cooperate with regional environment centres and municipal environmental authorities in drafting local or regional biodiversity reports, e.g. on the distribution of species of flora and fauna.
(Ministry of Education, Ministry of the Environment, Ministry of Agriculture and Forestry, regional environment centres, nature conservation organizations, 1997-2005)

80. Public awareness will be raised by publishing brochures, handbooks and reports and by constructing new outdoor recreation facilities such as birdwatching towers, boardwalks and barbecue sites.
(Ministry of the Environment, Ministry of Agriculture and Forestry, Ministry of the Interior, Association of Finnish Municipalities, Finnish Forest and Park Service, non-governmental organizations, 1997-2005)

81. Nature reserves will be used more extensively for the purpose of nature education. Visitors' facilities at nature reserves will be developed into centres of education and information.
(Ministry of the Environment, Finnish Forest and Park Service, 1997-2005).

82. The defence forces will incorporate biodiversity in the environmental education provided to conscripts and permanent staff, particularly to those in charge of environmental affairs.
(Ministry of Defence, the Defence Forces, 1998-2005)

Research, monitoring and information systems

Research

83. The Finnish Biodiversity Research Programme (FIBRE) will be implemented under the supervision of the Academy of Finland.
(Ministry of Education, Ministry of Trade and Industry, Ministry of Transport and Communications, Ministry of Agriculture and Forestry, Ministry for Foreign Affairs, Ministry of the Environment, Academy of Finland, Technology Development Centre of Finland, Finnish Forest Industries Federation, Central Union of Agricultural Producers and Forest Owners, and the Maj and Tor Nessling Foundation, 1997-2002)

84. The authorities and expert institutions responsible for implementing the Gene Technology Act will examine Finland's prospects for launching a programme of research to enhance Finnish expertise on genetically modified organisms.
(Ministry of Social Affairs and Health, Ministry of the Environment, Ministry of Trade and Industry, Ministry of Agriculture and Forestry, Ministry of Education, Academy of Finland, Finnish Environment Institute, 1997-2005)

85. Every effort will be made to further the forest certification system, particularly research on its ecological, social and economic criteria.
(Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry of Education, Academy of Finland, Finnish Forest Industries Federation, 1997-2005)

86. Taxonomic and ecological research on lesser known species will be augmented.
(Ministry of Education, Ministry of the Environment, the Academy of Finland, museums of natural history, Finnish Environment Institute, Finnish Game and Fisheries Research Institute, 1997-2005)

87. Research on endangered species will continue, and its content and scope will be determined by conservation priorities.
(Ministry of the Environment, Finnish Environment Institute, Finnish Game and Fisheries Research Institute, 1997-2005)

88. Research on the maintenance of biological diversity will continue, and research on the management and ecological restoration of natural habitats will be augmented.
(Ministry of the Environment, Ministry of Agriculture and

Forestry, Finnish Environment Institute, Finnish Forest and Park Service, Finnish Game and Fisheries Research Institute, Agricultural Research Centre, Finnish Forest Research Institute, 1997-2005)

Monitoring

89. A network will be established for monitoring the status of biological diversity in Finland. Negotiations will be initiated to decide its scale and content, the distribution of costs, and a related system of national and international reporting.
(Ministry of the Environment, all relevant bodies, 1997-2005)

90. Finland will integrate its biodiversity monitoring with that of the Nordic Council of Ministers and the European Environment Agency (EEA).
(Ministry of the Environment, Ministry of Agriculture and Forestry, Finnish Environment Institute, 2000-2001)

91. The work currently done by museums of natural history will be assessed in the light of biodiversity, and a development plan will be drawn up on the basis of these assessments.
(Ministry of Education, Ministry of the Environment, museums of natural history, Academy of Finland, Finnish Environment Institute, 1999-2001)

Information systems

92. A national information system on biodiversity will be established to serve the needs both of those authorities monitoring the state of biodiversity and clients requiring this information.
(Ministry of the Environment, Ministry of Agriculture and Forestry, all relevant bodies, 1998-1999)

93. Information on biodiversity and geographical data on natural resources (which is currently found in a variety data systems) will be pooled to facilitate shared access, starting with the creation of an integrated information system for nature conservation and a distributed data system for biological resources, which is being planned by the Ministry of Agriculture and Forestry.
(Ministry of the Environment, Ministry of Agriculture and Forestry, all relevant bodies, 1997-2005)

94. The register of Finnish nature reserves and the UHEX register of endangered species of flora and fauna will be upgraded in both technology and content, and the entry of basic data will be completed.
(Ministry of the Environment, Finnish Environment Institute, Finnish Forest and Park Service, 1997-2002)

95. A system of bio-resource accounting will be incorporated in the national accounting system.
(Ministry of Finance, Ministry of the Interior, Ministry of Trade and Industry, Ministry of Education, Ministry of Agriculture and Forestry, Ministry of the Environment, Statistics Finland, Academy of Finland, 1997-2005)

96. A national, Internet-based biodiversity data network will be established to facilitate the nationwide distribution of data and to increase international exchange. A register of Finnish experts and expertise on biodiversity will be compiled and updated regularly for global distribution.
(Ministry of the Environment, Ministry for Foreign Affairs, Ministry of Education, Academy of Finland, all other relevant bodies, 1998-2000)

Nordic cooperation

97. Research and monitoring cooperation is to be intensified in joint projects undertaken by the Nordic Council of Ministers in the fields of nature conservation, environmental management and the sustainable use of natural resources.
(Ministry of the Environment, Finnish Environment Institute, 1997-2005)

98. The biodiversity aspect is to be incorporated in other areas of Nordic cooperation, for instance, in Baltic Sea cooperation.
(Ministry of the Environment, Finnish Environment Institute, 1997-2005)

Cooperation in Central and East European (CEE) countries and neighbouring areas

99. The Agenda 21 for the Baltic Sea Region (a plan of action for sustainable development) will be formulated, and a programme of sustainable forestry and biodiversity protection will be implemented in northwest Russia, including the Green Belt project, as part of Finland's cooperation with its adjacent areas.
(Ministry of the Environment, Ministry of Agriculture and Forestry, Finnish Environment Institute, Finnish Forest Research Institute, Finnish Forest and Park Service, 1997-2000)

100. Protection of the Baltic Sea is to be intensified by implementing proposals made by the Baltic Marine Environment Protection Commission, HELCOM.
(Ministry of the Environment, Ministry of Agriculture and Forestry, Finnish Environment Institute, 1997-2000)

101. Projects undertaken with the support or funding of the Finnish government that have a significant impact on the

biological diversity of CEE countries and Finland's neighbouring regions shall be implemented in accordance with Finnish legislation and the principles set forth in Finland's ratified environmental programmes, taking into account the conditions prevailing in the country concerned.
(All relevant bodies, 1997-2005)

102. Environmental monitoring and environmental impact assessment in CEE countries and Finland's neighbouring regions is to be upgraded in conjunction with cooperation with these countries.
(Ministry of the Environment, the Finnish Environment Institute, Finnish Forest and Park Service, 1997-2005)

103. Opportunities for funding biodiversity projects in Finland's adjacent regions through EU programmes (PHARE, TACIS and Structural Funds) will be promoted.
(Ministry of the Environment, Finnish Environment Institute, Finnish Forest and Park Service, 1997-2005)

104. Cooperation between Finland and the Baltic countries will be promoted in the spheres of nature conservation and sustainable forestry.
(Ministry of the Environment, Ministry of Agriculture and Forestry, Finnish Environment Institute, Finnish Forest Research Institute, Finnish Forest and Park Service, 1997-2005)

105. Finland will strive to promote research, development, education and public awareness aimed at capacity-building in the CEE countries and Finland's neighbouring regions for the protection and sustainable use of biological resources.
(All relevant bodies, 1997-2005)

Arctic cooperation

106. The state of the Arctic environment will be monitored through participation in the Arctic Monitoring and Assessment Programme (AMAP).
(Ministry of the Environment, Finnish Environment Institute, 1997-2005)

107. The conservation of Arctic flora and fauna and their habitats will be promoted through participation in the CAFF programme (Conservation of Arctic Fauna and Flora).
(Ministry of the Environment, Finnish Environment Institute, Finnish Forest and Park Service, 1997-2005)

108. The procedural guidelines coordinated by Finland for environmental impact assessment in Arctic regions will be implemented.
(Ministry of the Environment, Finnish Environment Institute, 1997)

109. Environmental protection in the Barents region will be promoted by developing the protection and sustainable use of forests.

(Ministry of the Environment, Finnish Environment Institute, 1997)

Pan-European cooperation

110. Finland will participate in the preparation, implementation and development of the EU Environment Policy and Biodiversity Strategy.
(Ministry of the Environment, Ministry of Agriculture and Forestry, Ministry for Foreign Affairs, 1997-2005)

111. Finland will strive to ensure that the maintenance and sustainable use of biodiversity becomes a key consideration in all major EU decision-making.
(Ministry of the Environment, Ministry for Foreign Affairs, Ministry of Agriculture and Forestry, 1997-2005)

Global cooperation

112. Finland supports the efficient implementation of the obligations set forth in the Convention on Biological Diversity signed at the UN Conference on Environment and Development (UNCED, Rio de Janeiro 1992), as well as all UN decisions related to their implementation.
(Ministry of the Environment, Ministry for Foreign Affairs, all relevant bodies, 1997-2005)

113. Finland supports the development and reinforcement of the Global Environment Facility (GEF) and, with due consideration to international developments, endorses its appointment as the permanent financial mechanism of the Convention on Biological Diversity.
(Ministry for Foreign Affairs, Ministry of the Environment, 1997-2005)

114. Projects undertaken with the funding or support of the Finnish government that have a significant impact on the biological diversity of another country shall be implemented in accordance with Finnish legislation and the principles set forth in Finland's ratified environmental programmes, taking into account the conditions prevailing in the country concerned.
(All relevant bodies, 1997-2005)

115. In the context of the OECD and other international cooperation, Finland will participate in the development of economic instruments for the maintenance of biological diversity.
(All relevant bodies, 1997-2005)

116. Within the UN Commission on Sustainable Development (CSD), Finland will promote the drafting of an international forest convention, with due consideration to international developments in this field.
(Ministry for Foreign Affairs, Ministry of Agriculture and

Forestry, Ministry of the Environment, 1997-2000)

117. Finland will support the development of international law and conventions in accordance with the objectives of the Convention on Biological Diversity.
(Ministry for Foreign Affairs, 1997-2005)

Development cooperation and improvement of access to and transfer of information and technology

118. Finland will strive, in the selection, planning and implementation of development cooperation projects, to improve capacity-building in the developing countries to fulfil the obligations of the Convention on Biological Diversity as regards research, monitoring, administration and the conservation and sustainable use of biological diversity.
(Ministry for Foreign Affairs, Ministry of Agriculture and Forestry, Ministry of the Environment, 1997-2005)

119. Technology transfer and access to information related to the conservation and sustainable use of biodiversity in the developing countries will be increased in the context of development cooperation.
(Ministry for Foreign Affairs, Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry of Trade and Industry, Finnish Forest and Park Service, 1997-2005)

120. Training and education will be increased so as to improve the capacity of Finnish biodiversity experts to work in the developing countries and to participate as partners in international biodiversity projects implemented in developing countries.
(Ministry for Foreign Affairs, Ministry of Education, Ministry of Agriculture and Forestry, Ministry of the Environment, Ministry of Trade and Industry, 1997-2005)

121. The impact on biodiversity of development cooperation projects will be assessed by including biodiversity assessment in the selection, planning, implementation and result evaluation of development cooperation projects.
(Ministry for Foreign Affairs, Ministry of the Environment, Ministry of Agriculture and Forestry, 1997-2005)

122. The implementation of biodiversity projects will be monitored and the quality of development cooperation will be improved, for instance through EIA procedure.
(Ministry for Foreign Affairs, Ministry of the Environment, Ministry of Agriculture and Forestry, 1997-2005)

Prevention of transboundary hazards to biological diversity

123. It will be ensured that fishing practised in Finnish waters in accordance with EU Common Fisheries Policy safeguards the preservation of natural stocks of salmon in

the Baltic Sea.
(Ministry of Agriculture and Forestry, Finnish Game and Fisheries Research Institute, Ministry of the Environment, Ministry of Trade and Industry, 1997-2005)

124. The early warning network stipulated by the Convention on Biological Diversity will be established to monitor hazards to biodiversity and to initiate measures to prevent them.
(Ministry of the Environment, Ministry of the Interior, the Frontier Guard, Finnish Customs and police authorities, 1998-2005)

Follow-up of the action plan

A *national liaison network* comprising representatives of all key sectors of administration, trade and industry will be established to follow up the implementation of the national action plan for biological diversity and to coordinate the national monitoring of biodiversity in Finland. The members of the liaison network will be appointed early in 1998.

Either the liaison network itself or an appointed working group will draft the first progress report on the implementation of the action plan. The report will be based on notes compiled by the members of the liaison network and it will be submitted to the fifth Conference of Parties (COP V) on the International Convention on Biological Diversity, which will be held either in 1999 or early in 2000. The report will also be available for other corresponding meetings on the conservation and sustainable use of biological diversity.

This proposal for a national action plan for biological diversity will be circulated extensively for comments. The parties consulted will be asked to state whether they consider it necessary to submit the action plan for review by the Council of State, and to nominate representatives for the national liaison network.

The national action plan will be implemented at international, national, regional, local and project level. Its implementation will call for broadly based cooperation. Moreover, every sphere of administration, trade and industry must be able to recognize the impact of its actions and to plan its activities so as to minimize potential impacts on biodiversity.

INTRODUCTION

Nature has influenced our cultural history and the identity of our nation. In addition to being a source of the basic necessities for human life, nature is also a source of recreation and enjoyment. The functioning of all living organisms, including humans, is dependent on biological diversity,[1] **which is crucial, for instance, for the regenerative capacity of ecosystems and their ability to adapt to changes in the environment. Reduced biological diversity and thus increased genetic uniformity will eventually make ecosystems more sensitive to disruption and reduce their productivity. Biological diversity thus creates a basis for the continuation of life and also for the well-being of humanity. It is therefore humanity's moral duty to respect and protect the various forms of biological diversity. Protection of and care for biodiversity also improves the quality of human life.**

By becoming a party to the International Convention on Biological Diversity signed at the United Nations Conference on Environment and Development (UNCED, Rio de Janeiro, 1992), Finland undertook to promote the conservation of biological diversity and the sustainable use of resources as part of all social endeavours. The aim of the Convention on Biological Diversity is to protect the biological diversity of the world's ecosystems, plants and animals (organisms) and their genetic material; to promote sustainable use of natural resources and the fair and equitable sharing of the benefits arising out of the use of natural resources.

On December 21, 1995, the Council of State made a Decision-in-Principle o*n Measures promoting the conservation and research of biodiversity*. The aim of the decision is to "promote cooperation between ministries and to define their respective responsibilities in the implementation of the International Convention on Biological Diversity". In accordance with the decision, each ministry is responsible for the conservation and sustainable use of biological diversity within its field of jurisdiction, and will make proposals concerning the necessary measures for doing so. The Ministry of the Environment is in charge of coordinating implementation of the Convention in Finland.

In accordance with this aim, the Ministry of the Environment appointed a *National Commission for Biological Diversity*,

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[1] Biological diversity (biodiversity) refers to the variability among all living organisms on our planet. This concept embraces the inherent genetic diversity of all biological organisms (genetic exchange within species), diversity within and between species, and diversity of ecosystems.

In addition to wild species, the concept of biodiversity also embraces domesticated and cultivated species and natural processes within ecosystems. Often it also includes geological formations.

comprising representatives of all ministries and the most important fields of trade and industry, as well as environmental organizations. The Commission was given the task of drafting a national action plan for the conservation of biological diversity and the sustainable use of its components, including proposals to be implemented by 2005 for tangible measures, sectoral responsibilities and resources required for achieving this end.

A primary motivation that exists for drawing up and implementing the action plan is the growing concern over the reduction of Finland's biological diversity, i.e. the genetic depletion of certain habitats, species and cultivated plants and domestic animals (Chapter 4). A further aim in drawing up the plan is to harness opportunities for promoting business and creating employment through the protection of biodiversity (Chapter 3).

In addition to these national aims, the action plan is also underpinned by EU nature conservation directives and international environmental conventions to which Finland is committed, including the International Convention on Biological Diversity (Appendices 1 and 2).

In keeping with its mandate, the National Commission on Biological Diversity has worked with the ministries and key interest groups in producing *the national action plan for biological diversity in Finland*. The plan is a continuation of the work of the biodiversity working group appointed in 1995 to investigate the national obligations of the Convention on Biological Diversity, the division of related responsibilities and the measures needed. In drawing up the action plan, the Biodiversity Commission used the biodiversity studies drawn up by the ministries for their respective spheres of jurisdiction and additional studies by the Biodiversity Commission's experts and secretariat.

The implementation of the obligations laid down in the Convention on Biological Diversity is the guiding aim of the action plan. The key idea of the action plan is to make the conservation of biological diversity part of all national planning and decision-making in Finland. Amendments to legislation on the use of natural resources will accordingly take into account the conservation of biological diversity and the sustainable use of its components. The implementation of the action plan will stress the practical responsibilities of each sphere of administration, as well as cooperation between them in the protection and sustainable use of biological diversity. This is mainly a question of developing the operations of all spheres of administration, trade and industry so that they take into account the conservation of biological diversity. The ministries do not have access to any notable additional funding for the implementation of the action plan, and will have to operate mainly within the limits of their framework budgets.

The action plan describes the goals and tangible measures to

which the parties of the Commission for Biological Diversity have committed themselves in order to ensure the conservation of Finland's biological diversity and the sustainable use of its components. The development proposals submitted by the biodiversity working group in 1995 are still valid today and have partly been included in the action plan. The action plan also includes a summary of key measures, the bodies responsible for them and their timing (See summary of the action plan).

The action plan also includes a description of the economic potential of biological diversity (Chapter 3) and a summary of the present state of biological diversity in Finland and factors which have influenced it or are at present influencing it (Chapters 2 and 4). A more extensive description is included in Finland's country report, as mandated by the obligations of the Convention on Biological Diversity and published by the Finnish Environment Institute. The changes that have taken place in Finland's biological diversity during the last century are also described in detail in *Suomen luonnon sata vuotta* (Turunen et al. 1997).

The national action plan is an important tool for the structuring and implementation of a policy for biological diversity in Finland. It forms the basis for both short-term and long-term planning in biodiversity policy, for national decision-making and for international operations.

The action plan has been drafted for the period 1997-2005. At the end of this period, the plan will be reviewed and updated with a view to current needs in the conservation of biological diversity and sustainable use of its components, the latest research findings and national and international developments in the field.

A national liaison network comprising representatives of all administration sectors of trade and industry will be set up to follow up the implementation of the national action plan and to coordinate nation-wide monitoring of biodiversity in Finland.

The national action plan for biological diversity and its main proposals for changes and improvements will be circulated extensively for comments. The parties consulted will be requested to state whether they consider it necessary to submit the action plan to the Council of State, and to nominate representatives for the national liaison network.

The action plan will be implemented at international, national, regional, municipal and project level. Its implementation will require extensive cooperation. All sectors of administration, trade and industry should have the resources to recognize the impact of their actions on biological diversity and to plan their operations so as to minimize any threats to biological diversity.

1. THE NATIONAL ACTION PLAN FOR BIOLOGICAL DIVERSITY

1.1 Principles

One of the main challenges in the implementation of the Convention on Biological Diversity is to make the conservation and sustainable use of biological diversity an intrinsic part of all social endeavour. As a Western industrialized nation, Finland is also obligated to help the developing countries and transitional economies build their capacity for preserving biological diversity and ensuring the sustainable use of its components.

The preservation of biological diversity in Finland is based on having a sufficient number of nature reserves and the sustainable use and management of areas in commercial use. The increased attention paid to biodiversity in areas used for commercial purposes will reduce the need to establish new nature reserves. This requires the gradual integration of the conservation and sustainable use of biodiversity with, for instance, legislation, land use planning and the utilization and management of natural resources. The parties to the Commission for Biological Diversity undertake to promote the conservation of biological diversity and the sustainable use of its components under the principle of *sectoral responsibility*. This principle has generally been considered a prudent and successful approach to the conservation of biological diversity and the sustainable use of its components. Under this principle, the ministries and all spheres of administration carry practical responsibility for ensuring that their operations do not conflict with the conservation of biological diversity, while also taking other public interests into account. The concept of sectoral responsibility also includes financial accountability for the preservation of biological diversity.

Sectoral responsibility is, in practice, applied at national, regional, municipal, and project level. Since the various spheres of social endeavour are, in practice, in interaction with each other, and clear sectoral responsibility cannot always be defined, the maintenance of biodiversity requires cooperation between the various sectors and levels of administration. All spheres of administration, trade and industry should have the resources for recognizing their impact on biological diversity and to alter their operations so as to minimize any damage.

1.2 Aims

The aim of the national action plan is to preserve a viable population of indigenous Finnish species and to safeguard the diversity of ecosystems and an adequate range of contiguous habitats for the preservation of species. The action plan is also designed to maintain genetic exchange within species and populations which have adapted to

particular habitats. Preserving the favourable status[2] **of a species requires that a sufficient number of suitable habitats are maintained within the natural range of that species. The biological diversity of damaged habitats can be revived by restoring their natural state and development. It is also important to ensure the continuation of the natural physical, chemical and ecological processes of Finnish ecosystems.**

The action plan will strive to preserve a sufficiently representative sample of the structural variability and species diversity of Finnish biotopes and ecosystems in all bio-geographical zones. The network of protected areas will also include an adequate sample of 'geo-diversity' variation, i.e. geological and geomorphological formations. The aim is also to protect and care for endangered biological diversity so as to prevent the extinction of species, genetic resources and habitat types in Finland (Chapter 6.6). In addition to indigenous species and ecosystems, protection will also be extended to cover the biological diversity of cultivated plants and domestic animal breeds with established importance as a genetic resource (Chapters 6.3 and 6.7).

The action plan strives specifically to promote sustainable commercial use of natural resources and the economic potential of using biological diversity, which may offer significant opportunities for new types of business and job-creation (Chapters 3 and 6).

On the international level, the aim is to fulfil Finland's obligations under the Convention by improving the effectiveness of our operations.

The action plan summarizes measures and guidelines for the implementation of the Convention on Biological Diversity in key sectors of administration, trade and industry, and provides guidelines for sectoral responsibility concerning the conservation of biological diversity and sustainable use of its components.

The implementation, follow-up and revision of the action plan, as well as the costs of its implementation, will be dealt with in more detail in Chapter 8 of this report.

1.3 Structure of the action plan

The national action plan is based on reports or action plans drawn by the ministries for their respective administrative sectors. The organization of this work was left to the discretion of the ministries, since the extent of the

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[2] The conservation status of a species is taken as favourable when its population maintains itself as a viable component of its natural habitat and its natural range is neither being reduced nor is likely to be reduced in the foreseeable future. (The favourable conservation status of species and natural habitats is defined in further detail in Chapter 1, Section 5, of the Nature Conservation Act (1096/1996)).

research needed varied for different ministries and different sectors of trade and industry. The content of the reports was agreed in advance and comprised the following: *Description of present status; Itemized problems; Strategy for eliminating problems; Detailed action plan and Follow-up of the implementation of the action plan*.

Since the national action plan which was put together on the basis of these various reports had to be as tangible as possible, the reports by the ministries were required to include, for instance, detailed measures for the preservation of biological diversity, the division of responsibility for their implementation and the proposed funding and timing of the measures. Representatives of administration, trade and industry were also asked for their views on research needs and their participation in the national programme for monitoring the state of biological diversity.

The reports and programmes of the ministries and other expert reports were then compiled by the Commission for Biological Diversity into a national action plan[3] **during March-June 1997. Some of the proposals submitted by the biodiversity working group in 1995 which had yet to be implemented were included in the action plan. The comments received on the biodiversity working group's report were taken into account in compiling the action plan. The information collected through the LUMO Research Programme on Biodiversity (1993-1996) coordinated by the Finnish Environment Institute was also used as an aid.**

The action plan is structured in line with the articles which bind the signatories of the Convention on Biological Diversity into national (Chapter 6) and international (Chapter 7) obligations. The tangible development measures and proposals for ministries, sectors of trade and industry and interest groups are listed in italics and itemized in consecutive numbering. The measures, their implementing bodies, and their timing are outlined in the summary of the action plan.

Key reports promoting the protection and sustainable use of Finland's biological diversity are: The national action plan for biological diversity in Finland (the publication at hand), Finland's biological diversity - Country report on biodiversity (Finnish Environment Institute, 1997), Report of the biodiversity working group - Priorities and sectoral responsibility in the national implementation of the Convention on Biological Diversity (Working group report 1995:4, Ministry of the Environment), and Comments on the above-mentioned biodiversity working group's report (Ministry of the Environment 1995b). The biodiversity programmes and reports drawn up by individual ministries for the national action plan are also important.

2. CONSERVATION AND USE OF BIOLOGICAL DIVERSITY

The state and development of biological diversity and responsibility for its conservation

Due to our northern location, the range of species native to Finland is relatively narrow. There are an estimated 42,000 species in Finland, of which 378 (3%) are vertebrates, 16,290 (38%) are plants and 25,500 (59%) are invertebrates. Most of the plant and animal species have migrated to Finland after the last Ice Age. These organisms have adapted well to the severity of the climate, but so far there are very few organisms which are endemic to Finland. The extreme seasonal variation in the climate, especially the cold winters, also limit the success of new species. The warming effect of the Gulf Stream nevertheless makes the climate in Finland considerably milder than is usual at the same latitudes elsewhere on the globe.

Biogeographically, most of Finland belongs to the boreal coniferous forest zone. The predominantly forested landscape derives some variation from mires, water courses, seashores and cultivated land. During the last few centuries, Finnish forests have undergone considerable changes. The forests of Finland differ appreciably from natural forests, because of slash-and-burn farming methods, tar burning and shipbuilding in earlier centuries, as well as dimension felling and forestry methods adopted in the early part of this century.

Nevertheless, Finnish forests are more successfully preserved than is generally the case in forestry-dominated countries in the world. The total forested area has increased and forests are replanted after final felling. Furthermore, the forests are made up of tree species which are indigenous to Finland, and reforestation takes place naturally, or through forestry techniques that simulate natural regeneration processes. In this respect, Finland can be considered to have long complied with the general principles and commitments concerning forests ratified under the Convention on Biological Diversity and the UN Conference on Environment and Development (UNCED, Rio de Janeiro 1992).

Many species of plants and animals have profited from environmental changes caused by man. These changes have nevertheless been extensive and rapid for some species, which have been unable to adapt to new circumstances and are now on the endangered list (Chapter 4 and Table 1).

Finland plays an internationally significant role in preserving the biological diversity of certain indigenous northern ecosystems. Ecosystems of particular importance include the forests of the boreal coniferous zone; the Baltic basin of brackish seawater with its shoreline and coastal zones; northern mires and lakes; and the entire subarctic timber line. Conservation is also imperative for

populations of certain species whose genes have adapted to the Finnish climate, as well as native Finnish species of cultivated plants and breeds of domestic animals.

Progress in the conservation of biodiversity

In the last few years, Finland has made encouraging progress in the conservation of biological diversity and the sustainable use of resources. The key legislation governing the conservation of biological diversity, the Nature Conservation Act (1096/1996), has been revised and updated, and the amendments entered into force at the beginning of 1997. The aims of the Act are to "maintain biological diversity; conserve nature's beauty and scenic values; promote the sustainable use of natural resources and the natural environment; promote awareness of and general interest in the environment; and promote scientific research". It also strives to attain and maintain the favourable conservation status of natural habitats and naturally occurring species. The Act gives considerable attention to aspects related to the conservation of biodiversity.

In order for Finnish forestry to fulfil the requirements of sustainable forest management in the ecological sense, the main instruments in forestry and forest management methods have recently been altered so as to promote biological diversity in commercially managed forests. The changes introduced under the new forest legislation include extensive training of forestry staff and advisory services.

The purpose of the new Forest Act (1093/1996) is to "maintain and promote economically, ecologically and socially sustainable management and use of forests in such a way as to secure a good and constant yield, while also conserving their biological diversity". The incentive measures set forth in the Forest Act is supplemented by the Act on the Financing of Sustainable Forestry (1094/1996). The new forest legislation exerts considerable influence on the conservation of biological diversity in commercial forests.

Finland has also established criteria and indicators for sustainable forestry, and based on these, a system of standards for forest certification has been drawn up as the result of extensive cooperation.

The scope of application of both the Forest Act and the Nature Conservation Act and the system of certification for commercial forests (which is eventually to have nationwide coverage), all supplement each other in the protection and management of Finnish forests. In connection with the reform of the Forest Act and the Nature Conservation Act, amendments were also made to many other acts, within whose scope of application aspects on the preservation of biological diversity will henceforth be taken into account (Chapter 6.2).

The content, targets and obligation of nature conservation in Finland have expanded, partly as a result of the amendments described above. In addition to protecting endangered indigenous species and habitats, emphasis is now also placed on the conservation of common species and their habitats as well as the importance of preventing common species from moving into the endangered category. In addition to conserving the genetic diversity of wild species, the importance of preserving the genetic material of cultivated plants and established domestic breeds is now understood. In this light, increased ecologically sustainable use of areas in commercial use is seen supplementing the function of protected areas in the maintenance of biological diversity.

Although the extensive reform of measures for influencing the use of nature and natural resources have not all taken effect in practice yet, a new attitude has been noted in the actions of almost all operators. A particularly notable step was the new financing programme approved for the implementation of existing conservation programmes approved by the Cabinet Economic Policy Committee. Conservation programmes approved by the Council of State, particularly for the protection of old-growth forests in northern Finland, will substantially improve Finland's prospects for preserving the biological diversity of our indigenous natural environment.

With the extensive reforms described above and the development of an extensive network of nature reserves, the distress of endangered species in Finland should be alleviated considerably in the future. New information on the status of endangered species will be available at the end of this century when the national overview of endangered plant and animal species in Finland is updated.

Bodies involved in the conservation and sustainable use of biological diversity

Ministries and their spheres of jurisdiction

The principles and aspects of the conservation and use of biological diversity defined for the different ministries vary from ministry to ministry depending on their general mandate.

The guiding principle observed by the ***Ministry of the Environment*** is the idea of shared responsibility among all administrative sectors for the conservation of biological diversity and sustainable use of its components. The preservation of biological diversity is accordingly integrated with the functions of various sectors of society and the planning of these functions under the principle of sectoral responsibility, and through the implementation of the national action plan. *The Ministry of the Environment action plan on the conservation of biological diversity* provides a more detailed account of the proposals for the

conservation and sustainable use of biological diversity outlined in the Ministry's National Environmental Policy Programme 2005 and in the report of the biodiversity working group from 1995. The added value of the action plan as compared with earlier programmes and reports published by the ministry lies in the fact that it integrates the biodiversity aspect contributed by all departments in the ministry. The main emphasis is, however, on nature conservation and improved land use planning.

The aim of the ***Ministry of Agriculture and Forestry*** is to safeguard economic growth, particularly in rural areas, in such a way as to ensure the long-term sustainable use of renewable natural resources which fall within its jurisdiction. This entails that the principle of sustainability should become a key priority in the use of renewable natural resources and in the introduction of new resource-applications, and that decisions concerning resource-exploitation are based on current and generally accepted information on the state and use of natural resources. A strategy for sustainable use of renewable natural resources was approved by the Ministry in February 1997. The strategy contains an assessment of changes in the operating environment, aims for 2001, envisaged goals for 2010, and strategic choices and operating guidelines. The separate biological diversity programmes drafted by the Ministry's sub-department contain detailed goals and selected measures concerning the use and management of renewable natural resources in order to safeguard the biological diversity of ecosystems, species and genetic material. The key emphases of the programme include implementation of the environmental programme for forestry (1994-2005) and the application of the new forest legislation. A corresponding environmental programme and breeding programmes have also been drafted for the agricultural sector. The Ministry's biodiversity action plan was based on the reports *Renewable natural resources and sustainable use* and the *Ministry of Agriculture and Forestry natural resources policy*. The report *Agriculture and the maintenance of rural diversity* also supports the promotion of ecologically sustainable agriculture.

The ***Ministry of Transport and Communications*** is responsible for conserving biological diversity within its own administrative sector. This responsibility is mainly concerned with the effect of vehicles and the construction and maintenance of transport infrastructure. At several points, the Ministry's responsibilities overlap with those of other bodies. Environmental protection work is steered by the *Action plan for the reduction of environmental damage caused by transport*. The various offices and departments in this administrative sector have also drafted their own environmental programmes, which supplement and give a concrete form to the transport sector's environmental efforts. Environmental impact assessment (EIA) focuses on, among other things, the effects on biological diversity and ways of preventing its degradation and safeguarding the viability of species. EIA is carried out if there is reason

to suspect that a plan or project is likely to have a considerable impact. Staff training plays an important part in reducing harmful environmental effects.

The ***Ministry of Trade and Industry*** is in charge of promoting the technological innovativeness of trade and industry in Finland. This is important both for promoting business and for sustainable development. Only by harnessing new technologies can we ensure a reasonable standard of material well-being while simultaneously ensuring the safety of the environment. In the ministry's sphere of operations, issues related to biological diversity mainly concern the development and introduction of new technologies, technology transfer and the management of industrial energy and raw material sources. Issues related to biological diversity are also researched by the Technology Development Centre of Finland (TEKES), the Technical Research Centre of Finland (VTT) and the Geological Survey of Finland (GTK).

The jurisdiction of the ***Ministry of Justice*** is defined under section 16 of the Standing Orders of the Council of State. The ministry drafts all legislation that does not fall within the scope of other ministries. Where water legislation is concerned, issues concerning environmental pollution fall within the purview of the Ministry of the Environment. Issues concerning the use of water resources, meanwhile, fall under the Ministry of Agriculture and Forestry, for example water supply, sewage, flood protection, subsoil drainage, drainage, and general matters related to the management of water resources. The Ministry of Justice is responsible for legal affairs related to hydro-engineering and legislation on environmental damage. The procedure for granting permits for hydro-engineering projects is based on a process of weighing up public interests, which includes aspects such as detrimental changes to aquatic habitats and their ecology, and thus also touches on the conservation of biological diversity. Moreover, the Prison Administration, which comes under the jurisdiction of the Ministry of Justice has a direct impact on the conservation of biological diversity in its work to preserve established cultivated plants and Finnish breeds of domestic animals in danger of extinction, as described in more detail in the report *The Prison Administration as a promoter of biological diversity.*

The ***Ministry of the Interior*** has very little direct effect on biological diversity through the legislation and incentive measures under its jurisdiction. Its greatest indirect influence is through the regional development programmes led by the Department for Regional Development and the Rescue Department's instructions on accident prevention and resource and salvage services . The Ministry and its departments participate in the implementation of decisions made in other administrative sectors; the police, for instance, is the authority in charge of law-enforcement. The Frontier Guard also takes part to some extent in monitoring duties concerning the environment. The ministry's own internal operations have an impact on the environment

through, for instance, the use of vehicles and other equipment by the police, the Rescue Department and the Frontier Guard. Legislation within the Ministry's jurisdiction takes into account environmental factors. The Ministry also endeavours to anticipate the environmental impact of its statutory duties and other operations, and its aim is to reduce damage as far as resources permit. There is still room for improvement, however, as noted by the working group preparing the action plan.

From the point of view of the ***Ministry of Social Affairs and Health***, the conservation and sustainable use of biological diversity involves particular health aspects and effects. From the ministry's perspective, the built environment has a particularly great impact here. The ministry also investigates the effect of genetic engineering on biological diversity.

The ***Ministry of Defence*** is in charge of maintaining and developing Finland's defence system. An effective defence force keeps the peace and ensures peaceable social development, which in itself is a basic requirement for nature conservation and the preservation of biological diversity. The aim of the biological diversity working group of the defence administration is to integrate the conservation and protection of biological diversity as a natural part of every sector of operations. The programme lays down basic principles for the protection and management of biological diversity and practical conservation measures for the defence administration. Sites of restricted access and other special locations managed by the defence administration contribute to the preservation of biological diversity. By the same token, various features of the operations of the Defence Forces inevitably cause wear to terrain or other environmental problems, for instance at airports, in areas used for military exercises and at shooting ranges. Yet even in these areas, military operations may benefit certain species, such as endangered insect species.

The ***Ministry of Education***'s responsibility for the conservation and sustainable use of biological diversity extends to research, teaching and pedagogics. Basic research and applied studies in biological diversity are undertaken by the Academy of Finland (Finnish biodiversity research programme FIBRE, 1997-2002) and the universities. In education and pedagogics, particular emphasis is placed on general education and vocational training.

The ***Ministry of Labour*** strives to promote employment and the quality of working life. The Ministry of Labour has only an indirect role in the preservation of biological diversity compared with the bodies directly responsible for it. Nevertheless, the labour administration plays an important role as a regional and national implementing body, and can influence the channelling of funding and the operating principles of both its own organization and others. The labour administration has incorporated environmental impact

assessment as an inherent principle in its operational plan and budget (1997-2000). The aim is to promote conservation of natural resources while improving the employment rate. Knowledge-intensive production and production based on advanced expertise are considered to be best in keeping with the goals of sustainable ecological development and maintaining the employment rate. A number of labour administration operating principles and projects serving these goals are presented in the Ministry's operational plan and budget. Environmental aspects are also important in improving working conditions and the quality of working life. The conservation of biological diversity and other environmental issues give the labour administration new operating potential. Measures which improve the quality of working life and raise the employment rate and other economically feasible measures can be expanded into the sphere of environmental issues in a tangible form, as shown in the programme drawn up by the Ministry of Labour.

One of the tasks of the ***Ministry of Foreign Affairs*** is to promote sustainable development of the environment and the economy, and sustainable use of natural resources. Unlike many other ministries, it does not have particular responsibility for sustainable use and management of natural resources, such as issues related to forestry or water resources. The Ministry of Foreign Affairs' task in environmental issues is mainly to plan, support and coordinate Finland's participation in international operations. In practice, this means alignment of environmental strategies and policy guidelines with Finland's other international policies. The aim is to achieve intensified cooperation and better coordination among the various actors in this field. The Ministry of Foreign Affairs' biological diversity report focuses on the strategic points in its decision-making and preparation process where biological diversity should be taken into account systematically in foreign affairs. The need for improvement of organizational resources is also outlined, along with project-descriptions and details on cooperation with neighbouring countries and development cooperation.

Integrated development in industry

Industry plays an important part in promoting economic and social prosperity. The aim of the *framework programme on sustainable development* drawn up by the Confederation of Finnish Industry and Employers is to promote ecologically sustainable development in a way which also ensures economically and socially sustainable development. The Confederation's member companies, which can be anything from major industrial corporations to SMEs, have specified detailed environmental aims and measures in their own environmental programmes, which have become more widespread recently.

The industrial sector applies the principle of continuous improvement in its environmental protection efforts. In planning environmental protection measures, industrial

companies take into account the *environmental impact of production as a whole*. In product development, this means the *product's entire life cycle*, from the choice and acquisition of raw materials to recycling and waste management. *The entire processing chain* is considered in studying and developing environmental issues.

Environment-conscious company management and corporate culture and standardized environmental management systems have become widespread very quickly. Drafting these systems and putting them into practice has helped companies include environmental matters in everyday routines and make them an intrinsic part of their various functions. Environmental matters are seen as part of the company's *total operations and decision-making*, including research and development, investment planning, production, marketing, training and communications. Looking after environmental matters is part of the company's *overall competitiveness*.

In improving its own operations, Finnish industry has developed products and technology which can be used to solve environmental problems in other countries as well, particularly those economies in transition and developing countries.

The industrial sector aims at minimizing environmental hazards and the consumption of natural resources throughout the product's entire life-cycle, thereby promoting the competitiveness of Finnish industry.

Farmers and rural entrepreneurs support the conservation and maintenance of biodiversity

Rural enterprise based on the use of renewable natural resources exerts an impact on biodiversity throughout most of the country. Forestry and agriculture are the main forms of rural enterprise with the greatest impact on biodiversity, but other types of enterprise that use renewable natural resources are also extensive in rural areas in Finland. Although the range of rural enterprise is quite broad, its negative effects on biodiversity have been rather limited.

Modern farming methods have had certain negative effects on biodiversity (Chapter 4). On the other hand, the practice of rural trades has also created a great deal of variation in the natural environment, as well as the right conditions for species which favour cultivated landscapes. The positive effects of rural enterprise on biological diversity seem to have been at a peak in the 1950s, even if, at this same time, the post-war reconstruction period placed a great strain on Finland's forest resources, and the numbers of many indigenous species were considerably fewer than they are at present.

The use of land and forests in Finland has been small-scale because of the high number of smallholdings and private forest owners. This, in turn, has resulted in the

coexistence and interaction of natural and man-made landscapes. Ways of using renewable natural resources which were once deemed scientifically "efficient", but later proved to be incompatible with sustainable use, did not become very widespread because of land ownership patterns in Finland. Many farmers and forest owners independently decided to preserve and care for small natural sites in the midst of their farmland or forest, which proved instrumental in maintaining biodiversity on a local level. Similar conservationist measures have been taken in other uses of nature as well, even in absence of special regulations or requirements to demand it. In fishing and hunting, which is no longer practised in Finland as a livelihood, sustainable use of game and fish resources was integrated into the livelihood itself as a basic requirement a long time ago.

The situation has changed through the development of rural trades to correspond to contemporary economic demands and, in particular, the integration of Finnish agriculture and fishing into the agricultural and fisheries policies of the EU as of 1995. The preservation of rural businesses may, in future, be regarded as a key criterion for the conservation, care and protection of biodiversity.

The demands of environmental protection began to be taken into account in developing rural businesses as early as the 1980s. The viewpoint of rural entrepreneurs has also been included in the preparation of various environment programmes in an attempt to make the preservation and care of biodiversity a natural part of agriculture, forestry and fishing. As these aims acquire priority, the contribution of agricultural advisory organizations and forestry societies to the maintenance and care of biodiversity has increased.

Agriculture and farmers. About 8% of the total area of Finland, or about 2.5 million hectares, is agricultural land (fields, orchards etc.). About 85% of this area was used for cultivation in 1995. At the time, there were 170,000 farms with an arable land area of more than one hectare. The average size of these farms was about 75 hectares, with an average of 12 hectares of cultivated fields and 45 hectares of forest. About half of all farms were engaged in active production and their average area of arable land was about 20 hectares. At present only about one third of Finnish farmers are 'full-time' farmers (= derive at least 75% of their income from agriculture and forestry). Nowadays most farms derive their income from a number of different sources.

Forestry and forest-owners. Finland has about 23 million hectares of forest (forest and low-yield scrubland, with an annual growth rate of over 0.1 m^3 per hectare), that is, 75% of the country's land area. Out of this, 2.5 million hectares is protected or otherwise subject to restricted production. Private owners own 63% of Finland's forests, the government 23% and companies 9%. The remainder is owned mainly by municipalities or parishes. In 1995, there were 450,000 forest owners in Finland.

Reindeer husbandry and reindeer herders. The northernmost third of Finland is officially designated as a reindeer husbandry area. There are 6,900 reindeer farmers. By now, there are about 700 families whose main source of income is reindeer husbandry, while it is a subsidiary source of income for about 900 families. Over the last two or three decades, reindeer husbandry has become a modern, highly specialized vocation, which has led to an increase in the size of individual farms. The number of reindeer has nevertheless remained at about the same level as before.

Fishing and fishermen. Finland has excellent conditions for fishing, as fishing waters are plentiful, totalling some 5 million hectares in all. Finland has 64 established fish species, 20 of which are fished commercially, and one species of crayfish. In addition to this, four foreign species of fish and one species of crayfish have been introduced into Finnish waters. Both natural and stocked species are fished commercially. The annual catch is about 150 million kilograms, 75% of which comes from marine fishing. There are about 4,000 professional fishermen, out of whom about 1,000 derive their main income from fishing. Professional fishing is concentrated in coastal regions. The number of professional fishermen has declined gradually over the years, while their total catch has increased. About 2 million Finns take part in recreational fishing, about 400,000 of them on a regular basis. There are 750 fish farms in Finland that raise fish for the market or for stocking. Fish farms generate an annual income of about FIM 400 million, where production of market fish accounts for some 75% and production of fish for stocking natural watercourses accounts for 25%.

Game management and hunters. Finland has 60 endemic species of mammal, of which 27 are game animals, while 26 of the 230 indigenous bird species are game birds. There are also two introduced species of game bird and seven introduced game animals. Population densities are usually low and extreme seasonal population fluctuations are typical for small game species. Forest game is a key category. The viability and reproductive capacity of game populations depends largely on the quality and quantity of their habitats. The main responsibility for game management belongs to the hunters themselves. The number of hunters in Finland who pay an annual game management fee has doubled in three decades and tripled since the 1930s. There are now nearly 300,000 hunters and the number is expected to stay at this level. A considerable number of hunters live in urban areas, since only one third live in rural areas. The total amount of game caught in the 1994-95 hunting season came to about 8 million kilograms and the value of the meat and pelts together came to about FIM 302 million. Game is usually no longer sold, but used by the families of the hunters themselves.

Measures by organizations which represent rural businesses and users of renewable natural resources

Producer organizations include the Central Union of Agricultural Producers and Forest Owners and the Central Union of Swedish Agricultural Producers in Finland. Their task is to promote the interests of farmers and forest-owners. Environmental issues feature prominently in the operations of producer organizations, and their members are in direct interaction with nature in their everyday work and thus dependent on it for their livelihood. The organizations have their own environmental programmes, which include measures to promote biological diversity.

Rural enterprise plays a key role in the Finnish economy. The Finnish countryside is a source of high quality timber and pure, safe foodstuffs. Rural businesses also add cultural character to the countryside. Rural entrepreneurs operate on nature's terms through sustainable use of renewable natural resources. Care for the environment is therefore essential for their continued prosperity from one generation to the next.

Forestry is practised in line with the aims of the new Forest Act, and forest owners also apply the producer organizations' own biodiversity recommendations, which are based on the results of the latest research. Agriculture throughout Finland complies with the environmental programme for agriculture and also works to preserve the traditional rural landscapes created by agriculture.

The Federation of Finnish Fisheries Associations is a nation-wide, bilingual central organization for the promotion of fishing. Its sphere of operations includes management of fishing waters, arranging opportunities for fishing for all categories of fishermen, professional fishing and information services. Its main customers are the statutory local fishery associations, which bear the statutory responsibility for fishing waters, cooperative associations between fisheries, fishing areas, professional fishermen's organizations, private owners of fishing waters, and professional fishermen. The organization is the biggest publisher of fisheries education and information material in Finland. It publishes three trade magazines, guidebooks for various sectors of fisheries management and other educational material.

The Hunters' Central Organization is a training and advisory organization which operates within the administrative sphere of the Ministry of Agriculture and Forestry. In addition to this central organization, there are 15 regional game management districts, and 298 local game management associations. The task of the organization is to develop hunting and game management and related experimentation, to promote and implement training and advisory services, to promote and assist in game management, to supervise hunting and any other tasks required by the Ministry of Agriculture and Forestry. The hunters' organization also carries out

other assigned tasks, such as arranging statutory hunters' examinations and marksmanship tests. The central organization publishes and maintains training and advisory materials such as guidebooks, transparencies and brochures. The material is published in Finnish and Swedish, as is *Metsästäjä* (*Jägaren*) magazine, which comes out six times a year and is sent to everyone who pays the game management fee.

The Association of Reindeer Herding Districts is funded under the Reindeer Husbandry Act of June 4, 1948 (444/1948) and the new Reindeer Husbandry Act (848/1990) of September 14, 1990, and its tasks are: 1) to act as a contact between the reindeer owners' associations, 2) to develop reindeer husbandry and reindeer management; 3) to promote research on reindeer husbandry, experimental reindeer management and reindeer breeding; and 4) to carry out other statutory or assigned tasks. All reindeer owners' associations are members of the central organization. In order to carry out its tasks, the organization: 1) provides advisory services on reindeer management and reindeer husbandry; 2) supports and carries out experimental husbandry and keeps an experimental reindeer farm; 3) carries out reindeer breeding and arranges reindeer breeding competitions; 4) acquires information on reindeer husbandry and keeps up with Finnish and international developments in the sector; 5) publishes material on the subject and arranges negotiations, information and training seminars, theme days, reindeer races and shows and produces teaching material; 6) submits proposals concerning reindeer husbandry and reindeer management for legislation and administration; 7) promotes cooperation among reindeer owners' associations and works with business sectors connected with reindeer husbandry in order to ensure the continued existence of the trade; and 8) carries out any other measures required for discharging the tasks of the organization. The organization publishes the trade magazine *Poromies* 5-6 times a year.

The role of environmental organizations

The main aim of environmental organizations is to protect biological diversity. Their channels of influence differ from those of other operators in this context since these organizations have no actual power of decision. Their most important channel of influence is to influence the actions and attitudes of decision-makers, authorities, industrial and commercial enterprises and individual citizens.

The means of influence at the disposal of these organizations can be roughly divided into two main types. In the short term, they strive to prevent irreversible damage caused by human activity in environmentally valuable areas such as old-growth forests. In the longer term, they strive to use means such as promoting new attitudes, amendments to legislation, and, developing and introducing alternative and sustainable modes of operation in areas such as forestry and agriculture. Strengthening people's bonds with nature, especially those of young people and children, is a way of

building a foundation for the preservation of biological diversity in the future.

BirdLife Suomi r.y., BirdLife International's Finnish section, is a service organization for birding, ornithology and bird protection. BirdLife takes part in monitoring the state of the environment by recording the occurrence of birds, something which often reflects the state of entire ecosystems. BirdLife also arranges birding excursions as a way of promoting interest in and knowledge of nature.

Luonto-Liitto r.y. (Nature League) is the youth organization of the Finnish Association for Nature Conservation, and its operating idea is to reinforce young people's and children's bond with nature. The Nature League arranges activities including wilderness camps for young people and children, training for nature guides and activities and material for young people and children. The Nature League's forest group works towards bringing all the environmentally valuable old-growth forests in Finland and its neighbouring areas under strict legislative protection. Work is also undertaken to protect other habitat-types (including mires, shorelines and traditional rural landscapes). The Nature League's wolf group strives to re-establish a viable wolf population in Finland and to prevent the depletion of wolf stocks. The Nature League strives for these aims through influencing opinion and direct action, which is supported by scientific research, study of nature and campaigns in Finland and internationally.

Maan ystävät r.y. is the Finnish branch of the international umbrella organization Friends of the Earth; the Finnish organization is a federation of a number of smaller environmental and development organizations. The Friends of the Earth focuses on promoting the equitable sharing of environmental resources and a fair balance of production and consumption. It strives to protect biological diversity through measures like campaigns to reduce paper consumption.

The World Wide Fund for Nature (WWF, Finland) was founded in order to protect and manage natural landscapes and to preserve endangered species in Finland and abroad. The emphasis is on protection of forests, lakes, sea and seashores, arctic nature and historic farming landscapes. The aim of the WWF is to preserve biological diversity, ensure sustainable management of living organisms and promote measures which reduce pollution and wastage of natural resources. The WWF is actively involved in the protection of endangered species like the lesser white-fronted goose, the Saimaa (ringed) seal, the flying squirrel and large predators. Its mode of operations includes influencing legislation, field surveys and campaigning to influence public opinion. Individual citizens' interest in nature is promoted through, for instance by arranging nature camps and by maintaining a nature information centre at Liminganlahti.

Natur och Miljö r.f. is Finland's Swedish-speaking

community's environmental protection organization. Its areas of emphasis include the protection of the Baltic Sea and its archipelago, as well as its indigenous species. The organization also campaigns for the preservation of meadows and the biological diversity of natural habitats fringing human settlements. Its mode of operation includes influencing legislation, international cooperation and the production of information and campaign material.

The Finnish Association for Nature Conservation is Finland's largest and oldest environmental NGO. The designation of a network of protected areas, including active work for Natura 2000, national park schemes and actions against the projected dam at Vuotos are all integral aspects of the organization's work. Particular emphasis is placed on promoting the protection of forests in southern Finland and the protection of mire habitats, including the restoration of drained mires. The protection of species focuses particularly on the golden eagle, wolf, salmon and the Saimaa (ringed) seal. In addition to conservation, the organization strives to promote the recovery and preservation of biodiversity in areas in commercial use, such as agricultural land, forestry land and urban areas. Its mode of operations includes influencing public opinion and legislation, field surveys and research. Donations are used, for instance, to buy islands where the Saimaa seal can breed. The organization arranges theme weeks and courses as a way of promoting people's awareness of nature and their interest in it.

Other bodies involved in conservation

The promotion of the conservation of biological diversity connects naturally with the general development strategies of local authorities. Since the circumstances of the different local authorities vary, the preservation of biological diversity requires case-by-case assessment and measures adapted to particular situations. Local authorities exert an influence on very varied groups, including entrepreneurs, NGOs, educational institutions and unemployed people. They can influence the preservation of biological diversity either directly, such as through planning, or indirectly, for instance through educational institutions and by creating sustainable operating conditions for companies.

According to the National sustainable development programmes (Agenda 21) of the Association of Finnish Local Authorities, the conservation of biological diversity is one of three major, worldwide challenges which local authorities should strive to answer. The plan proposes that a local Agenda 21 is one of the key tools that a local authority can use in cooperation with local residents, organizations and companies to promote a commitment to protecting biological diversity. Over 120 local authorities in Finland have started drawing up a local agenda. About 60% of the Finnish population live in these 120 municipalities.

Finnish NGOs are drawing up their own action plans for sustainable development, in which the preservation of biological diversity is a key priority. The starting point for the plan includes the economic and social dimension of sustainability. The plan considers issues such as the implementation of the preservation of biological diversity in different sectors of society, such as industry, forestry and the forest industry, agriculture and transport and communications.

The citizen's viewpoint

The role of the individual Finnish citizen as a user and preserver of biological diversity is very important and complex. For instance, biodiversity offers those who work in primary production their tangible livelihood. For most city dwellers, biological diversity is mainly a source of recreation and a chance to get away from everyday routines. Yet the preservation of biological diversity is perceived as something crucial by all Finnish people.

The conservation of biological diversity focuses on protected areas, but also on commercial forests, cultivated fields, pasturelands, shores, watercourses and urban areas where people work and live. The elimination of factors which threaten biological diversity (Chapter 4) requires discussion and good cooperation between different groups of citizens, experts, entrepreneurs, authorities and political decision-makers.

3. OPPORTUNITIES CONNECTED WITH BIOLOGICAL DIVERSITY

Research and development

The conservation and sustainable use of biological diversity is being extensively integrated into research and development and product realization. This is particularly evident in the environmental sector of forestry and in the development of environmental technology, remote sensing and systems of geographical data, but also in biotechnology and the pharmaceuticals industry. The biotechnology industry, plant and animal breeding and the pharmaceuticals industry all look upon biological diversity as a field of considerable new industrial potential, especially due to rapid developments in genetic engineering.

Rapid advances in biological process technology and genetic engineering technology create new opportunities for using the genetic resources of organisms in industry, health care, agriculture and environmental protection.

Especially the applications of genetic engineering are still quite new and there is not much information yet available on their impact on the environment. Therefore, the attendant risks of this new technology should be taken into account in developing and applying genetic engineering technology (Chapter 6.8).

Biological diversity as a source of employment

The conservation and care of biological diversity and the consideration of other environmental issues has proved to be a new source of jobs. This trend can be supported by using job-creation funds for creating employment in various capacities connected with environmental protection and management and by arranging labour market training for jobs connected with the protection, care and sustainable use of biological diversity.

Difficult decisions will have to be made when the direct employment of an area is in conflict with the aim of preserving biological diversity, for instance, in connection with the designation of protected areas. This is the case especially in the parts of the country where it has been difficult to find jobs to replace the old ones lost in primary production. Job-creation and the conservation of biological diversity can, however, be combined and extreme conflicts of interest can be avoided. Integrating these two aims nevertheless requires close cooperation between the labour market authorities and the environmental authorities.

New types of jobs are likely to become available in the sectors of research, development and industries which are based on sustainable use of biological diversity through, for instance, biotechnology. The job-creation potential of

modern environmental protection and use of biological diversity should be studied by the regional employment and economic development centres. Resources should be channelled through the ESF measures of the EU Objective programmes to projects which focus on job-creation and the preservation of biological diversity. In practice, this would mean entrepreneurial and staff training and increased environmental awareness, particularly where SME projects are concerned.

The third sector holds a great deal of job-creation potential in connection with environmental management, for instance through voluntary work for the environment, such as in the general upkeep of natural sites and in helping with field inventories and repair of environmental damage.

Marketing of products

Environmental protection and management has become a marketing advantage both on the domestic and, particularly, on the export market. This has been evident especially in forest industry goods, organic farming and metals and engineering. Finland's main export markets (for instance, Germany, the Nordic countries, the UK, Switzerland, the Netherlands and the US) will probably set even higher environmental standards for products entering their markets in the future.

Environmental protection measures demanded by consumers have become an increasingly important advantage in the marketing of Finnish forestry products. Conservation of biological diversity thus has a clear connection with the country's economy and its employment rate. In the main forest industry countries, the development of a system of forest certification (a system of environmental labelling for forests or forestry products) is underway with the aim of creating a widely accepted system to satisfy the environmental requirements of the market. Finland has answered this challenge by approving the world's first national forest certification system. Consensus has been reached on 37 regional certification criteria for the sustainable management and use of commercial forests. These criteria also suit the Finnish forest ownership structure, which is dominated by small private owners (Chapter 6.4).

The development of modes of operation, products and technologies which spare the environment can create considerable potential for Finnish exports and thus improve or maintain employment. The eco-exports working group, which published its report in 1995, estimates that environmentally sound 'eco-exports' account for an annual total of up to FIM 25 billion of the total value of Finnish exports, FIM 130 billion, where eco-exports include products, technology and environmental expertise. Eco-exports are estimated to grow at a rate where they might equal the present scale of all Finland's exports by 2010.

Eco-tourism and education

Conservation of biological diversity and other environmental protection also improves the operating climate and job-creation potential of food processing and tourism. Finland's network of protected areas is of major importance for teaching, general environmental education and recreational use by individual people, including eco-tourism and wilderness trekking. Finnish nature reserves are still subject to 'everyman's right' (Finland's traditional code of practice concerning public access), including right of access on land and water, which is now forbidden in similar areas in many other European countries. Through controlled management of the various uses of protected areas, however, the preservation of biological diversity can be safeguarded despite allowing activities such as those above to continue.

New pharmaceuticals

Microbes, plants, fungi and animals can yield yet undiscovered drugs and molecular models for new types of pharmaceuticals. The search for and use of secondary compounds in natural organisms in the development of new drugs is again being taken seriously as a form of research and development in the 1990s. In the 1980s, pharmaceuticals industry development work was dominated by what was called rational drug design (RDD), where pharmaceutical molecules adapted to the receptors of the human body are designed by modelling. RDD remains unquestionably the main form of development. Increasingly rapid and automated screening methods for secondary plant compounds nevertheless provide a new impetus for the search for natural compounds. The conservation of biological diversity makes it possible to continue to find compounds in nature for the treatment of illnesses for which there is, as yet, no effective drugs available.

The potential of development cooperation

The Convention on Biological Diversity has created economic initiatives, especially in tropical developing countries. Costa Rica is the first country which has begun to arrange a systematic programme for the sustainable use of its own natural resources, that is, biodiversity prospecting. The programme is implemented by the Costa Rica national institute for biological diversity (INBio), whose operations include the inventories of all forestry products and the opening of forests to research which is profitable for industry. A pharmaceuticals company from the US has entered a funding agreement for research concerning medicinal plants and other organisms. The contract also includes reimbursing the state and the indigenous peoples for benefits gained. In this way, Costa Rica strives to encourage local people to believe in the importance of protecting biological diversity in the forests.

From the developing countries' point of view, the most

important use for natural genetic resources is the genetic substance of cultivated plants. Before the Convention on Biological Diversity, only parties involved in plant breeding were entitled to commercially exploit their products (UPOV; Plant Breeders' Rights).

Development projects connected with biological diversity require cooperation in both research and business operations between developed and developing countries. Finland has good opportunities to take part in these operations, because our plant, animal and microbe taxonomy and applied research sectors related to genetic engineering and the use of secondary compounds are of a high standard. These high standards of expertise should be supported. Research institutions, universities and natural history museums are a considerable source of expertise in Finland where biodiversity research projects are concerned. The international importance of these fields has come to the fore particularly in biological diversity research projects concerning developing countries (Chapters 7.5 and 7.6).

In long-term *development cooperation*, Finland's aims should be:

- to increase the efficiency of research on biological diversity in developing countries;
- basic surveys of species occurrence (for instance basic surveys of locations rich in species and areas of endemism;
- applied research and product development on sustainable use of biological diversity, for instance, the use of genetic material (plant and domestic animal breeding, biotechnology, genetic engineering, the use of genetic resources in the pharmaceuticals industry);
- strengthening of national institutions of expertise on biological diversity (including natural history museums, ex situ operations and botanical gardens);
- projects involving management and administration of natural resources;
- support for developing countries' efforts to commercialize their biological diversity resources;
- biological diversity planning and biodiversity management for agriculture and forestry in developing countries;
- connecting the socio-economic expertise (such as environmental economics, social issues related to environmental work) involved in biological diversity with scientific expertise as a part of environmental planning.

Training cooperation and *country reports* coordinated by the UN environmental programme (UNEP) might yield the best forms of cooperation on biological diversity between Finland and the developing countries. In selected developing countries, training cooperation could be aimed at spheres of administration, the private sector and researcher training concerned with biological diversity and at the implementation of special biological diversity training programmes for students from developing countries (for instance in biology, socio-economics, environmental law). The country reports would be easiest to implement in

accordance with the UNEP regulations, and with developing countries which have already been involved in biological diversity cooperation with Finland.

4. THREATS TO BIOLOGICAL DIVERSITY

The depletion of biological diversity is one of the worst environmental problems in the world today. The reduction of various natural environments and threats to their species are primarily a consequence of environmental changes resulting from, for instance, agriculture and forestry, the expansion of urban areas and land and mineral extraction. The volume of such activities has multiplied within the last century. At the same time, the positive effects of certain natural phenomena which support biological diversity, such as floods and fires, have been reduced through the prevention of natural forest fires, regulation of lakes and drainage of wetlands.

Economic growth in industrialized countries and the profits of commercial enterprises are partly reliant on production methods which have an adverse environmental impact. The damage caused by unsustainable use of natural resources has not been taken into account properly when making production-related decisions. Natural organisms have long been considered a common good which may be freely used by anyone and, furthermore, the country of origin or the land owner has not been compensated for their exploitation. Thus the costs of reduced biological diversity and these involved in its preservation and sustainable use have not been sufficiently included in the price of, for instance, agricultural produce, timber, and other raw materials which derive from nature. The value of biological diversity is, on the other hand, difficult to transform into economic value. The people who benefit from biological diversity are numerous, and they include future generations.

The pressure for change which is brought to bear on nature will, at its most extreme, lead to a reduction in populations of species which will then become endangered and finally extinct in a specific area, or even on the entire planet. During the last century, that is, the period for which reliable information on numbers and occurrence of various organisms exist in this country, 138 species of plants and animals have disappeared from Finland. At the moment, there are 217 endangered species, 308 endangered species, and 1029 species which are under special observation (Committee report 1991: 30, Ministry of the Environment).

The majority, or 43%, of Finland's endangered species live in forests. The second most notable type of habitat for endangered species is various types of cultivated environments shaped by traditional agricultural methods (21%). After this are rocky habitats (9%), waters (9%), shores (8%) and mires (5%). The factors which have caused organisms in Finland to become endangered are shown in Table 1.

Forestry

Extensive commercial forestry has led to many forest species becoming endangered because of the reduction in old-growth forests and dead and decaying trees in commercial forests. Finland's old-growth forests are now highly valuable sites of protection due to their intrinsic value and their reduced range. There are five times more invertebrates in old-growth forest than in managed commercial forest. Preserving old-growth forests in an untouched state is also vital for saving endangered forest species.

The protection programme for old-growth forests approved by the Council of State in summer 1996 is a considerable step forward in the protection of these forests in Finland. Due to hundreds of years of forestry throughout almost all of southern Finland, there are almost no protected old-growth forests in this region whose fauna and forest structure answers the description of an old-growth forest of outstanding conservation value. There is reason to fear that the fragmented old-growth forests which still survive are too small to be able to retain their distinctive characteristics for very long.

The future of forests

Conserving the biological diversity of forests depends a great deal on the unit made up of the network of nature reserves, the different types of forest reserves created on State-owned land by the Finnish Forest and Park Service as part of its regional landscape-ecology planning, and the regional forestry aims laid down for all forest owners in regional objective programmes for forestry in accordance with the Forest Act. Other important factors include forest management in commercial forests and forest certification.

These various factors should give an overall picture of the state of forests in different parts of Finland as well as aims for their use, including the preservation of biological diversity. Administrative areas could take into account regional aspects such as vegetation zones and their subdivisions. In the various subdivisions there will furthermore be a need to emphasize different characteristics, giving attention to, for instance, the special features of herb-rich forests. The aims mentioned above for making protection and sustainable use of forests more effective offer considerable potential for improving the conservation status of forests, especially in southern forest zones.

Mire drainage and peat extraction

Finland's original biological mireland area was about 10.4 million hectares, nearly 6 million hectares of which has been drained for timber production. In addition to this, about one million hectares of mireland has been put to use as agricultural land, for peat production or for the needs

of power production as artificial dams. Most of the remaining natural-state mires are in northern Finland. The remaining natural-state mires, 3.5 million hectares or 40 % of the total mireland, are supposed to remain undrained.

Drainage has destroyed a high number of wooded mire types that are rich in species. In the southern half of Finland 23.4% of various natural-state spruce mires still survived in the 1950s, but by 1985 only 3.8% of the peatland area remained in its natural state. By now, the percentage is even lower.

Forest drainage to increase timber production has also altered the water balance in the intermediary zones between mires and heaths. Once there was also hundreds of thousands of kilometres of moist habitats bordering on mires, most of which have now been drained. In the future, peat extraction will probably cause greater changes to natural mires than forestry (Chapter 6.3: "Integration of conservation of biodiversity into sectors of administration, trade and industry: Energy production").

Overgrowth of traditional rural landscapes

Agriculture has influenced biological diversity on the one hand by reducing the amount of forest in the richest growth areas, by fragmenting forests into smaller areas and by creating 'fringe biotopes', but also by bringing in new species and creating new habitats, such as meadows, pasturelands, fields, banks of ditches, roadsides etc., and forest pastures. A great number of species which are dependent on cultivated land or its fringes live in these types of habitat. Biological diversity is at its richest in habitat types affected by cultivation. One fifth of Finland's endangered species belong in cultivated habitats.

Structural change in agriculture, such as increasingly efficient production methods and a decrease in animal husbandry have led to increased uniformity in agricultural landscapes; traditional biotopes (such as wild meadows, grasslands, forest pastures) have become overgrown. Where agricultural production is discontinued, arable land soon becomes forested, either through active reforestation or a natural process of overgrowth. Forestation of arable land 'closes' open landscapes, and many plants and insects, such as butterflies, which require light, will then decrease in numbers.

Eutrophication and water pollution

With the exception of small waterbodies, pollution loads and outright contamination have been the main factors degrading the ecological value of Finland's water resources. Recently it has become possible to reduce industrial and municipal phosphorus loads from their previous levels. Meanwhile, work is only beginning in the reduction of point loads and overall nitrogen loads. Thus, up to 50% of the loads on many

waterbodies which are important for biological diversity may consist of point loads.

The eutrophication of marine waters is very extensive due to endemic sources of nutrient loads or pollution from elsewhere in the Baltic Sea which is carried to the Finnish coast. Increased fish-farming has brought new sources of nutrient loads to areas which had otherwise maintained their water quality.

As a consequence of drainage and cleaning projects on agricultural land and drainage of forest land, only 1-3% of Finland's small waterbodies remain entirely in their natural state. Forestry improvement projects, which were undertaken with great efficiency in the 1960s, have changed the state of small waterbodies to the extent that only about 10% of Finland's original ponds and brooks have survived. Studies carried out in different parts of Finland show that the situation is much the same throughout the entire country, with the exception of Lapland.

Data on the aquatic organisms and habitats of Finland are inadequate. Extensive water regulations and hydro-engineering was carried out without adequate knowledge of the effect of such measures on aquatic habitats. The survey of endangered species which was carried out in 1991 placed 139 aquatic species in the endangered category.

Rapids and other river waters have been harnessed for hydro-electric plants and used as waste-water conduits, and rivers have also been subject to considerable point loading in the clay soils of coastal areas; all these measures have significantly altered the natural state of water courses. The frontier rivers of Tornionjoki-Muonionjoki and Tenojoki are the only major rivers in Finland which retain their original features, yet even their salmon populations are still threatened, mainly by fish diseases and over-fishing.

Timber was formerly floated along many Finnish rivers, as this was an inexpensive form of timber transport. In order to make log floating easier, rivers were altered and cleared. Free log floating has now ended completely and many log floating regulations have been annulled. Watercourses have been restored extensively to their natural state, but opinions on the quality and aims of this work are varied.

Disappearance and eutrophication of waterfowl habitats

Efforts to increase arable land area and pastureland through drainage have eliminated a considerable percentage of waterfowl habitats such as shallow eutrophic lakes, or at least reduced their area a great deal. On the other hand, in some places, lower lake water levels have created new waterfowl habitats. Anti-flood measures and drainage have reduced floods and speeded up the eutrophication of lakes.

Development and filling of bays has also destroyed many waterfowl habitats. Water recreation also threatens the

preservation of the natural ecology of many of these habitats. Furthermore, the Waterfowl Habitats Conservation Programme does not always take into account ecologically functional units. Coastal and wooded meadows are, in particular, excluded from the programme, which affects the management and clearing of waterfowl habitats.

Use and alteration of shorelines

Shorelines and coastal areas are important centres of biological diversity, whose use and alteration should be undertaken with considerably more care than is the case at present. Wetlands, islands and offshore skerries are important, for instance as nesting sites for seabirds and as resting-places during migration. Most Finnish fish species spawn in shallow coastal waters. Finnish shorelines and coasts also have considerable geomorphological and scenic value. The labyrinthine waterways and lakes created by the inland ice of the last Ice Age and its meltwater, the varied island landscapes and uplifted coasts of the Baltic archipelago and the great variety of Finnish mires are unique in the world.

Every year, about 8,000 new summer cottages are built on Finnish shores, and their total is now about 400,000. The ecological impact of holiday homes varies according to the use of the house, its location and other circumstances. The natural state of shorelines is also altered in many places by water level regulation, dredging and embankment and also by increasing boat traffic.

Mineral extraction

Certain geological formations are subject to commercial exploitation, and in some places, they are forced to make way for roads and urban areas. The gravel that can be extracted from eskers and rocks has become a commercially valuable natural resource because of the growing needs of the building industry. The most important groundwater aquifer are also found in and around eskers. There may be considerable need for better integration of the need for gravel extraction, protection of eskers, nature conservation, landscape protection and the need for using and protecting groundwater resources.

Fragmentation of the natural environment

The fragmentation of formerly unbroken natural areas is the main nation-wide impact of public roads and forest roads on the natural landscape. This manifests itself as a reduction in the total surface area of original biotopes, isolation of biotopes, and as the formation of road-fringing zones with an altered microclimate.

The fragmentation of formerly unbroken natural environments and of the habitats of various species and its ensuing effects is one of the biggest problems involved in the

preservation of biological diversity today. As a consequence of the fragmentation and reduction of natural environments and of changes in micro-climates, many species have become endangered, especially in forest habitats. Fragmentation has two main detrimental effects: the general reduction of the surface area of habitats and the separation of the remaining areas into ever smaller 'islands', which become isolated from one another.

Southern Finland has a dense road network, especially in the provinces of Uusimaa and Varsinais-Suomi. Nature conservation and the preservation of regional ecology is threatened in some places because of fragmentation caused by roads. Elsewhere in Finland, the effects of fragmentation are mainly in evidence in the form of local changes to valuable biotopes. Forest roads are a more common cause of fragmentation to natural areas than public roads, especially in northern and eastern Finland.

Endangered species

The total number of endangered species in Finland is estimated at 1,692 species. About half of all Finnish species and half of all endangered species (about 700 species) live in forests. More than half of the endangered forest species are native to herb-rich forests, while another large group thrive only in old-growth forests. The importance of traditional rural landscapes as a habitat for endangered species has also increased. Waters, shores and rocks are each home to about 10% of Finland's endangered species.

The impacts of development and construction on the environment have increased rapidly. These impacts are the primary reason for one out of eight species being endangered and one of the reasons for one out of four endangered species. Chemical hazards, such as water and air pollution, have remained stable since the mid-1980s. As far as is known, the main threat to Finland's endangered species still derives from various forms of land use, rather than from transboundary pollution.

Finland has fewer endangered mammals and birds than most other OECD countries, including the other Nordic countries. During the last 150 years, 138 species of plants and animals have gone extinct in Finland (OECD 1997a).

Table 1. Numbers of endangered species subject to specific threatening factors. The first column shows the number of species for which the factor in question is the main reason for their falling numbers/endangered status; the second column shows the number of species for which the factor in question is a contributing reason for their falling numbers/threatened status. (Committee report 1991:30, Ministry of the Environment.

Threatening factor	Main reason	Partial reason	Main reason, %	Partial reason, %
Forest use in general	692	805	40.9	47.6
Overgrowth of meadows	269	350	15.9	20.7
Building	207	434	12.2	25.7
Chemical hazards	123	211	7.3	12.5
Drainage, peat extraction	87	129	5.1	7.6
Terrain wear	76	158	4.5	9.3
Hydro-engineering	68	139	4.0	8.2
Gravel extraction, mining/quarrying	46	92	2.7	5.4
Hunting	23	29	1.4	2.3
Collection of natural resources	18	62	1.1	3.7
Changes in agricultural habitats	13	33	0.8	2.0
Traffic, disturbance	2	20	0.1	1.2
Other reasons	34	82	2.0	4.8
Unknown reason	34	34	2.0	2.0

Other threatening factors

Biological diversity is also adversely affected by emissions which damage living organisms and their natural ecological balance, for instance, air pollution, which can spread over considerable distances.

Global warming is another phenomenon whose impact on biological diversity is not yet known in any detail. Climate changes may lead to a decrease in boreal species and an increase in the influx of foreign species. New species from the south may nevertheless be hindered from becoming established in Finland by the country's position on the Fennoscandic peninsula and the fact that only species that thrive in bedrock biotopes can successfully establish themselves in Finland.

The depletion of the ozone layer which protects the Earth is another environmental problem which has proved difficult to control. The ensuing increase in ultraviolet radiation from the sun may lead to global changes in biological diversity.

The decrease in biological diversity and similar environmental changes which progress slowly and are caused by a number of different factors are very difficult to control. There is very little detailed information available on the combined effect of factors detrimental to biological diversity. So far, it has been easiest to focus on reducing point-source harmful activities, for instance, the elimination or reduction of sources of pollution, or the protection of areas which are important for biological diversity.

5. REPRESENTATIVENESS OF ECOSYSTEMS PROTECTED BY NATURE RESERVES AND NATURE CONSERVATION PROGRAMMES

Until 1997, the legal precepts of Finnish nature conservation were laid down in the original *Nature Conservation Act* of 1923 (71/1923). Biodiversity has accordingly been protected mainly through the designation of nature reserves and the protection of individual species of flora and fauna. A basic network of nature reserves has been established under the Nature Conservation Act, and this network is supplemented by special conservation programmes drawn up for specific habitat types from the 1970s onwards (Figure 1 and Table 2). The conservation of biodiversity is based, then, on this network of nature reserves, conservation programmes and the protection of individual species.

Finland has worked towards building a system of compensation for reimbursing property owners whose property is expropriated for a nature reserve. The land procured by the State for the purpose of nature conservation chiefly consists of sites that fall under the framework of special conservation programmes and have therefore been designated as statutory nature reserves. At the beginning of 1996, roughly 1300 units of private property had been placed under protection, amounting to a combined area of nearly 700 km^2. Protected areas account for a good 10% of Finland's total land area (counting land incorporated in conservation programmes that have yet to be implemented). The bulk of this protected land lies in the northernmost reaches of Lapland. Meanwhile, in southern Finland, where land use is heaviest, less than 1% of forested land is under statutory protection. The nature reserve network is described in further detail in the Ministry of the Environment's action plan on biological diversity.

Table 2. Conservation programmes ratified by the Council of State, year of ratification and total area (ha). (Ministry of the Environment 1997)

1. Programme for the Development of National Parks and Nature Reserves	1978	831 000
2. Mire Conservation Programme	1979 1981	586 000
3. Waterfowl Habitats Conservation Programme	1982	84 000
4. Esker	1984	98 000

Conservation Programme		
5. Herb-Rich Forest Conservation Programme	1989	5 350
6. Shore Conservation Programme	1990	128 000
7. Rapids Conservation Programme (Act on the Protection of Rapids)	1987	
8. Wilderness reserves (Act on the Protection Wilderness Reserves)	1991	1 500 000
9. Programmes for the protection of endangered species		
10 Landscape conservation areas of national interest	1995	730 000
11. Protection of old-growth forests in southern Finland	1993 1995	35 400
12. Protection of old-growth forests in northern Finland	1996	307 400

Figure 1. (page 47)
Map of statutory nature reserves, wilderness reserves and sites included in conservation programmes ratified by the Council of State (the Programme for the Development of National Parks and Nature Reserves and additional programmes for the conservation of shores, herb-rich forests and mires).

Although Finnish nature-conservation planning is based on a long tradition of scientific research on the regional representativeness of natural habitat types and ecosystems, there are still gaps in our knowledge about the occurrence of certain habitats and species, and certain other ecological questions also remain unresolved. The following is a summary of ecosystems included in Finland's existing conservation programmes and their future development requirements. The suggestions and justifications for the development have been presented in more detail in the Action Plan on Biological Diversity drawn up by the Ministry of the Environment.

Forests. The forested land under statutory protection and ratified conservation programmes is 1.5 million hectares. This accounts for 6.6 % of Finland′s total area of forested

land, which totals for 23 million hectares. In this context the “forested land” is defined as land where the potential annual increment is over 0.1.m3/ha, that corresponds roughly the FAO defintion for “forest” (land with tree cover of more that 10 % and area of more than 0.5 ha.)

Some 86% of Finland's protected forests lie in the northern boreal zone and 3% in the hemiboreal and southern boreal zones. The majority of these protected forests grow in less productive terrain than average. More than half of Finland's protected forests are over 200 years old, but in southern Finland, only 15% of the forests under statutory protection are over 150 years old. In the south, an estimated 10,000 hectares of old-growth forest and other natural woodlands are protected.

In addition to forests that are protected by law or other official decision, a considerable proportion of Finland's forests are subject to felling restrictions. According to the eighth national forest inventory, restricted production applies to an area in excess of 1.2 million hectares, which is more than 5% of Finland´s forested land. The main areas in which felling restrictions apply are the northern high-altitude forests managed by the Forest and Park Service, State wilderness recreation areas, landscape forests protected by decision of the Forest and Park Service and other sites designated for restricted production in regional plans. Moreover, Finnish landowners' associations have made a valuable voluntary contribution to the conservation of biodiversity in their use and management of forests.

The three decisions-in-principle taken by the Council of State on the protection of old-growth forests, which totals 342.800 hectares have marked a vital step forward in forest protection. Protection of old-growth forest has been intensified particularly in the central and northern boreal zones, where relatively extensive expanses of biologically diverse forests have survived. When the programme is complete, roughly 2.9 million hectares of Finland´s forests and wasteland will be protected (11.3%).

The Ministry of the Environment is satisfied that, once the programme is completed, the nature reserves of northern Finland will preserve a sufficiently representative sample of indigenous Finnish nature. Meanwhile, the protection of forests in southern Finland remains inadequate and inconsistent. According to the eighth national inventory of Finland's forests, trees aged 140 years or older cover a combined area of 1.5 million hectares, or 8% of Finland's total forest cover. In the provinces of southern Finland, however, such forests cover an area of < 1% - 2% of Finland's forest cover. The programme for the conservation of old-growth forests will triple the area of old-growth forest protected by State nature reserves in southern Finland.

Because many old-growth forests are fragmented 'islands'

surrounded by commercial forest, their ecological viability is under threat. In the opinion of the Ministry of the Environment, the rehabilitation zones which are to be designated around these fragments of virgin forest, as well as more extensive rehabilitation of contiguous stretches of woodland, will eventually increase the total area of natural old-growth forests in southern Finland, but achieving this is a long-term objective. Herb-rich forests, too, are crucial to the preservation of biological diversity in our forests.

One of the general aims of forest management is to preserve the distinctive indigenous features of herb-rich forests. In addition to preserving the preponderance of deciduous tree species in herb-rich forests, rehabilitation sites should be planned, designated and managed in and around ecologically important herb-rich forest islands, particularly in the hemiboreal and south boreal zones. Cooperation between the environmental and forest authorities is necessary for the implementation of the Forest Act and the Nature Conservation Act, and for developing the management of herb-rich forests.

Future progress. The conservation of biological diversity in commercial forests is a major challenge in the light of the UNCED and the Helsinki Ministerial Conference on the Protection of Forests in Europe. The maintenance and improvement of biological diversity is a key objective in the 1996 Forest Act, in the new guidelines for new forest management practices and in the Finnish set of criteria and indicators for sustainable forest management.

In the inventory system widely applied in Finland, key biotopes are surveyed and their location is recorded in the geographical data system. Also, the Forest and Park Service's planning process is becoming increasingly detailed, including ecological landscape planning in forests and silvicultural planning. The ecological landscape planning introduced in State-owned forests, and additions to private forest management plans, should provide more detailed information.

High-altitude terrain. The distinctive natural features of high-altitude forests and mires have outstanding ecological importance. Owing to their topography, they are rich in natural springs and vegetation fed by runoff, which enhances their biological diversity (e.g. the hilly terrain of Koli and Kainuu). It has often been affirmed that nature conservation, landscape protection and multiple forest use are more desirable than using these areas solely for timber production. High-altitude terrain also holds outstanding importance for forest conservation, first and foremost because of the wide expanses of high-altitude woodlands which have survived in a largely unspoilt state. The programme for the conservation of old-growth forests in northern Finland comprises the country's most expansive and ecologically important high-altitude regions.

Mires. The combined area of mires which are protected by law or corresponding provisions totals roughly 840,000 hectares on State-owned land, and just under 10,000 hectares on private land. This amounts to 8% of the original land area of Finland's mires and roughly one third of all protected land in Finland. The geographical distribution of protected mires is inconsistent, however: more than 90% are in northern Finland. Protected mires account for 13% of the combined area of all mires in Finland. Expansive stretches of mireland that are protected in southern Finland represent only 2% of this combined area. In northern Finland, as much as half the mires outside protected areas remain in their natural state, while the same applies to less than one quarter of those in southern Finland.

Natural hardwood-spruce swamps and pine bogs are under-represented in the existing nature reserve network, and also among those new mire-sites which have been proposed for protection. Furthermore, very few mire ecosystems have survived in a fully untouched state. Open fens make up 63% of all protected mires, and pine bogs 20%. Hardwood-spruce bogs, paludified pine forest, paludified vacc. myrtillus spruce forest and carex fens account for less than 5% each. This deficiency in the protection of herb-rich mire types is reflected in the fact that nearly half of all endangered mire species are native to carex fens and one fifth to pine bogs. Even in their natural evolutionary patterns, carex fens are unevenly distributed throughout the country. Biotopes along the edges of mires, which are highly important in terms of preserving biodiversity, are likewise under-represented. Spruce bogs in particular are affected by drainage in the transition zones between mires and mineral soil, and by ill-planned boundary-demarcation of nature reserves. Nature reserves in southern Finland comprise less than one per cent of the spruce bogs still found in their natural state in the 1950s.

The National Mire Conservation Programme, the Programme for the Protection of Old-growth Forests and implementation of the Natura 2000 network will increase the combined area of mires under statutory protection to nearly 300,000 hectares, marking a particularly healthy increase to mire protection in Ostrobothnia and northeast Finland. Mires interspersed with forests, fens and sloping fens are plentiful in old-growth forests, but relatively scant in nature reserves and mire conservation programmes. As a result of coastal uplift, the Gulf of Bothnia is the site of a unique evolutionary continuum of mires, evolving from simple marshy ecosystems to highly developed mire complexes. No corresponding evolutionary continuum exists within any of Finland's present nature reserves of mire conservation programmes. In the opinion of the Ministry of the Environment, the current conservation status of herb-rich mire types in the southern and hemiboreal zones requires improvement.

The Finnish Environment Institute has compiled an inventory of ecologically important mires which are excluded from existing nature conservation programmes. These mires have a

combined area of roughly 120,00 hectares, and they consist mostly of fragmentary eutrophic fens, herb-rich spruce bogs as well as broader expanses of peatland and forest interspersed with other terrain. In all, 40% of Finland's mires are and will remain undrained, amounting to a combined area of 3.5 million hectares (Commission for the Certification of Forests 1997).

Waterfowl habitats. The National Waterfowl Habitats Conservation Programmes ratified by the Council of State in 1982 comprises 290 sites with a combined area of 85,000 hectares, 59,000 hectares of which is water and 26,000 hectares land. Most of this land area consists of swamp, coastal meadows and scrubland. Forested mineral soil accounts for 2,700 hectares of this area. As yet, only 4% of the conservation programme has been put into effect, owing mainly to complicated land ownership arrangements, and very few waterfowl habitats are preserved in an intact state. In addition, the Shore Conservation Programme preserves a representative sample of coastal uplift habitats which host waterfowl species. The existing network of national parks and mire conservation areas comprise a number of mire complexes and waterfowl habitats of outstanding ecological importance.

Finland aims to fulfill the obligations of the EU Bird Directive and other international conventions (Appendix 2), and to preserve a representative sample of diverse waterfowl habitats and their indigenous species. Sites included in the Waterfowl Habitats Conservation Programme and sites with ecological importance for bird species included in the Shore Conservation Programme will be preserved as an intact ecological unit by applying the provisions of the Nature Conservation Act (1096/1996) and by controlling land use: here, the aim is to maintain waterfowl habitats and their native species both within and outside the immediate confines of conservation areas. Controlling shorefront development is one important means of implementing the conservation of waterfowl habitats.

Waterfowl habitats in Finland are ranked in order of priority, and this ranking system serves as a general guideline for their protection and management. The latest system for defining the conservation status of a bird species is based on a coefficient which indicates the size of the population, the extent to which the species is endangered, and its regenerative capacity. Rapidly advancing biological succession is giving rise to new waterfowl habitats, and the ecological importance of these new habitats has been investigated as part of Finland's *Important Bird Areas* (IBA) project. A broad range of biological and technical expertise as well as international experience and know-how is being tapped for the management and rehabilitation of waterfowl habitats and the creation of new waterfowl biotopes.

Other aquatic habitats. Two reports have been compiled on the preservation of biodiversity in aquatic habitats: *Aquatic habitats requiring special conservation* (Committee report 1977:49) and the *Report of the committee on rapids protection* (Committee report 1982:72). In all, 55 bodies of water, parts thereof or individuals sets of rapids are protected against hydro-engineering under the Act on the Protection of Rapids ((38/1987) or supplementary legislation on the protection of the Rivers Ounasjoki and Kyröjoki (703/1983 and 1139/1991). An inventory covering most of the country has been compiled on small bodies of water of outstanding ecological importance, and the results have been publicized by regional environment centres. At some regional environment centres, this work has progressed more slowly than anticipated. Attention has been drawn to the inadequate protection of small bodies of water in the *Committee report on aquatic habitats requiring special conservation* (Committee report 1992: 62, Ministry of the Environment).

The Act Amending the Water Act (effective as of January 1, 1997) draws special attention to the protection of small waterbodies which represent specific habitat types protected under chapter 1, section 15a, paragraph 1 of the Water Act. Meanwhile, the Water Act (chapter 6, section 1, and chapter 7, section 3) refers to natural features of outstanding ecological importance, yet the Act itself fails to specify how these features are to be defined. The Ministry of the Environment proposes that reports on ecologically important small bodies of water should be compiled throughout the country without delay, on the basis of which a list of nationally important small bodies of water will be compiled.

Shores. Restrictions on the location of waterfront holiday housing were incorporated in the Building Act in 1968. In the opinion of the Ministry of the Environment, however, shorefront planning has not become a standard procedure for regulating shorefront development as widely as originally intended. Only one tenth of new holiday housing lies within an official shore plan. Shore plans furthermore fail to make sufficient provision for land use on neighbouring properties, for public land-use requirements and for the preservation of biodiversity in shorefront zones. Regional plans allocate land for purposes such as nature conservation and recreational use, but in shore plans, insufficient land areas have been allocated for these purposes. Owing to inadequate follow-up implementation, areas originally allocated for nature conservation and recreational use have ended up being used for other purposes.

Master planning in shore zones has proved to be a feasible approach to implementing the Shore Conservation Programme ratified by the Council of State in 1990. In recent years, it has become an increasingly common practice to draft master shore plans. These enable relatively extensive areas of land to be designated for public use, while also making sufficiently detailed provisions for shorefront development. The Ministry of the Environment endorses the drafting of

master shore plans, and nearly 100 master plans incorporated in the Shore Conservation Programme have already been completed or are in the process of being drafted. By the beginning of 1995, 14 of these plans had been approved by the authorities. The Ministry of the Environment oversees the use of shorefront land to ensure that it complies with the principles of sustainable development and to answer the needs of nature conservation, recreation, housing, trade and industry. According to an estimate made by the Ministry of the Environment in 1996, 50% of Finland's shorefront land should be allocated for the purpose of agriculture, forestry and fishery, 35% for urban development and holiday housing, 10% for nature conservation and 5% for special recreational purposes.

The legislative principles for the use and protection of shore zones were laid down in conjunction with the amendment of the Nature Conservation Act. In accordance with the amendment of section 6a of the Building Act at the beginning of 1997, it is now prohibited to erect new buildings in any shore zone, marine or otherwise, without a ratified master plan or a detailed site plan for new construction. It is also prohibited to extract land resources in such zones. The only exceptions to this prohibition are constructions necessary for agriculture, forestry and fishery, national defence, frontier control and navigation, or the erection of a sauna alongside an existing building. The extraction of land resources for ordinary household usage is also permitted.

The amended Nature Conservation Act (section 29) names two specific types of protected shoreline habitat: coastal meadows and sandy shores preserved in their natural state. Treeless and sparsely wooded sand dunes are likewise protected, and these also lie chiefly in shore zones. As these amendments have only recently taken effect, it is difficult to predict future developments in the use and protection of shore zones. In the opinion of the Ministry of the Environment, the biological diversity of coastal species should be monitored in conjunction with the drafting of new shore plans and used as a basis for assessing whether the use of shorefront land can be regarded as a sustainable option for the conservation of biodiversity.

Geological formations. Finland's network of nature reserves is chiefly intended for the protection of living organisms. Particularly in southern and central Finland, they consequently fail to provide adequate protection to some of Finland's most important geological formations, such as ice-marginal formations, eskers and rocky areas. Land and rock formations, other special natural formations and scenic landscapes are protected against land extraction under the Land Extraction Act (1982) and the Land Extraction Decree, which thereby contribute appreciably to the preservation of sites of geological, scenic and, in practice, biological importance. The Land Extraction Act also provides protection to a reasonably representative sample of eskers.

The basis for the protection of eskers improved substantially when the Council of State made its decision to institute the National Esker Conservation Programme in 1984. The programme comprises 159 sites with a combined area of 96,000 hectares, which amounts to 6% of the combined area of eskers throughout Finland. The programme comprises a variety of eskers, ice-marginal formations and ancient coastal formations, stream beds and dunes in esker regions.

There is no corresponding conservation programme, however, for exposed bedrock and other geological habitats. The situation is improving, however, on the part of exposed bedrock habitats. An extensive national inventory of these habitats has been under way since 1989. To date, the inventory has covered Uusimaa, Kymi, Turku and Pori, Häme, Vaasa, Central Finland, and provisional reports have been published on the basis of the inventory. The inventory of exposed bedrock habitats is scheduled for completion by the year 2000. An inventory of other notable geological formations, such as moraine formations, is to be completed by 2001. In conjunction with the overall assessment of Finland's nature reserve network, the geological formations and geological value of existing nature reserves are to be assessed by the year 2001.

Traditional rural landscapes. The Ministry of the Environment has conducted a survey of rural landscapes with heritage value. On January 5, 1995, the Council of State passed a decision-in-principle on landscape areas of national importance and principles for the development of landscape management. In all, 156 sites have been designated as landscape conservation areas, amounting a combined area of 730,000 hectares. This comprises 300,000 hectares of field, which amounts to 12% of the combined field area of Finland. Under the decision-in-principle, these areas are to remain cultivated and their scenic value is to be preserved by designating them as protected areas in master plans and by allocating various forms of special subsidies.

More than a century ago, in the pre-industrial agrarian era, the combined area of meadows and pastures was 1.6 million hectares. The inventory of traditional rural landscapes now in progress shows that this area has been reduced to roughly a few ten thousand hectares. Traditional biotopes of outstanding ecological importance have been reduced to an area of no more than 20,000 hectares. The inventory of traditional rural landscapes is scheduled for completion in 1998. Safeguarding the biological value of Finland's traditional biotopes calls for ongoing management, chiefly by means of regular cutting, grazing, and in special cases, with back-burning, burn-beating and other traditional farming methods.

Agricultural subsidies can be channelled into safeguarding the management of traditional biotopes and preserving their biological diversity. This is highly important for

endangered species native to rural habitats of special importance to biological diversity. According to the Ministry of the Environment, the environmental programme for agriculture should be updated from 1999 onwards so as to provide more comprehensive protection to traditional biotopes of ecological importance. Likewise, action should be taken to prevent the overgrowth of cultivated land and to preserve its biological diversity.

6 NATIONAL PRIORITIES AND MEASURES

6.1 General development objectives

All major sectors of administration, trade and industry shall, as best they can, ensure the conservation and sustainable use of biological diversity in their respective fields, and aim at incorporating the aspect of biodiversity in their normal operations.

Administrative sectors shall take the necessary legislative, economic and administrative measures to maintain biological diversity and promote sustainable use of renewable biological resources. Future reforms of legislation concerning biological resources shall provide for the conservation and sustainable use of biological diversity. Administrative and business sectors shall ensure that all incentives related to their activities and the training and advice given to their staff promote conservation and sustainable use of biological diversity. This principle is in line with the spirit of the United Nations Conference on the Environment and Development (UNCED). The parties shall, as far as possible, allocate funding for the research of biodiversity issues related to their respective fields, cooperate in monitoring biodiversity, and engage in other cooperation as well, on both the national and regional level.

The action plan shall be implemented at national, regional, local and project levels, and it will require broad-based cooperation. Each sphere of administration, trade and industry should have the capacity to recognise its impact on biological diversity and to revise its actions so as to prevent any harmful effects.

The following ten measures are directed at all administrative and major business sectors:

1. All sectors of administration, trade and industry undertake to promote, as best they can, the conservation and sustainable use of biological diversity within their respective spheres of activity. The conservation of biodiversity should ideally become an integral part of their routine operations.

2. All sectors of administration, trade and industry will assess the impact of their actions and decisions on biological diversity and monitor the implementation of their internal strategies, any specific targets pertaining to the maintenance of biodiversity, and the efficacy of measures taken to this end.

3. All sectors of administration, trade and industry undertake to collaborate with research establishments in drafting criteria and indicators for the maintenance and

sustainable use of biological diversity (e.g. inventories of endangered species, protected habitats, fragmentation of habitats, etc.) as part of a broader project to develop indicators of sustainable development.

4. All sectors of administration, trade and industry will intensify cooperation so as to promote new business and job-creation potential based on the conservation and sustainable use of biological diversity.

5. The conservation and sustainable use of biological diversity will be promoted through training, education and information.

6. Financial instruments will be developed with due attention to the need and prospects for promoting biodiversity through financial incentives.

7. Through measures such as building up a sound knowledge base, Finland will enhance its capacity for incorporating the conservation and sustainable use of biodiversity within the standard procedure for environmental impact assessment.

8. Finland will supplement the statutory conservation of biodiversity with new, more flexible approaches to promoting the sustainable use of nature and biological resources in commercially used areas.

9. All fields of administration and key sectors of trade and industry will strive to intensify their efforts to promote the conservation and sustainable use of biological diversity, including any necessary improvements to their environmental management schemes and quality assurance systems (e.g. ISO, EMAS).

10. A national liaison network comprising representatives of all sectors of administration, trade and industry will be appointed to follow up the implementation of the national action plan for biological diversity and to coordinate the overall monitoring of biodiversity in Finland.

6.2 Overview of legislation and necessary reforms

Under the Convention on Biological Diversity, the Contracting Parties are obliged to develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity or, if these already exist, adapt them for this purpose. In accordance with this obligation, conservation and sustainable use of biological diversity should be integrated into relevant sectoral or cross-sectoral plans, programmes and policies (Convention on Biological Diversity. Articles 6, 7, 10, 11, 14; see Appendix 1).

6.2.1 Principles

Because of the general nature of the Convention, it is difficult to transpose generalities into specific legislative measures. Furthermore, some of the obligations in the Convention can be fulfilled through means other than primarily legislative ones. In practice, supplementing the extremely diverse rules and regulations that already exist concerning *the conservation of biological diversity* is the most difficult aspect of implementing the Convention. Reforms may well be necessary, but the Convention does not explicitly specify the precise targets to be attained in national legislation.

From a global point of view, Finland's present legislation on biodiversity is much more advanced than that in many other industrial countries. This does not mean, however, that our legislation needs no further amendment. Possible points needing amendment are examined closer in this and the following chapters; but again, it is difficult to establish clearly what amendments are required for compliance with the Convention. If a signatory party does not meet its obligations to the convention because of a possible oversight in certain aspects of conservation or loopholes in legislation, the aims of the convention may fail to be achieved.

Review of legislation relevant to biological diversity

Section 14 a of the ***Constitution Act*** stresses the responsibility of all Finns for protecting nature, biodiversity, the environment and cultural heritage. The responsibility for nature conservation extends to all sectors of administration, trade and industry, as well as to private citizens.

Finnish legislation on the use of land and natural resources and on environmental protection contains a number of provisions under which the biodiversity aspect must, or at least should, be incorporated in decision-making. Most of these provisions are 'flexible legal concepts', often unspecified, safeguarding public interests concerning nature or the environment.

The new ***Nature Conservation Act*** (1096/1996), which came into force at the beginning of 1997, is the most important legislative measure related to the conservation of biological diversity. The primary purpose of the Act (as provided in section 1) is expressly the protection of biological diversity; in one way or another, all sections of the Act - except perhaps certain provisions related to landscape conservation - concern the maintenance of biological diversity.

For the maintenance of biodiversity, perhaps the most important objective in the Act is the system for establishing nature reserves which is described in chapter 3

of the Act. Although one of the main objectives of the new Act is to broaden the range of nature conservation measures, nature reserves will remain one of the most effective and comprehensive means of conservation in Finland.

Provisions on the conservation of *priority habitats* and *sites where priority species are found* are of particular importance to the protection of biological diversity. Provisions on the conservation of species are also significant for biodiversity, although some important species fall within the scope of the Hunting Act or the Fishing Act.

The most important aspect of all laws branching off from the Nature Conservation Act (including the reform of the Forest Act) is the adoption of a new ideology, whereby biological diversity is to be promoted both through established means of nature conservation and through observance of the goals set for the conservation of biological diversity in commercially used areas.

The objective of the new ***Forest Act*** (1093/1996) and the ***Act on the Financing of Sustainable Forestry*** (1094/1996) is to protect the biological diversity of forests as well as maintain the sustainable production of timber. The amended Forest Act provides the legal basis for the use of forest resources, irrespective of ownership of the forests. The main objective of the Forest Act concerning the use and management of forest resources is to establish the general preconditions for in situ conservation of biologically diverse habits. Priority protection is given to certain habitats with special importance for biodiversity; these habitat types are listed separately in the Act.

Under the section of the Forest Act concerning special permits, a landowner is not obliged to conserve priority habitats if this results in a reduction in forestry yield or other financial loss which is not insignificant. Consequently, the in situ conservation of priority habitats depends greatly on the landowner's responsibility.

The section concerning the aims of the Forest Act specifically mentions biological diversity: "The purpose of this Act is to promote economically, ecologically and socially sustainable management and utilization of forests in such a way that the forests provide a sustainable, satisfactory yield while their biological diversity is being maintained."

The provision does not as such specify the role of the Forest Act in the protection of biological diversity, which is rather more dependent on the content and application of its more concrete provisions, which are so new that their effectiveness has yet to be seen. The following provisions, however, will certainly be important:

a) Each forest centre shall prepare a *regional objective programme for forestry* and follow up its implementation. The

programme shall contain general goals for forest use and management, for measures funded by the State and for regional development of forestry. More detailed provisions on these programmes are enacted in the Forest Decree, under which the programme shall also contain a description of the biological diversity of the forests in question, including nature reserves established under the Nature Conservation Act and areas of restricted felling.

b) The question as to whether *felling* is practised as a means to increasing forest growth (intermediate felling) or for regeneration (regeneration felling) may be significant to biodiversity, as may provisions on replanting. Felling in areas where conservation of biological diversity is particularly important may be allowed as a special exception if it is done in a manner which takes into account the distinctive features of the area.

c) As a rule, all management and use of forests should *safeguard the preconditions for in situ conservation of biological diversity in forests*.

d) *Habitats listed in the Act* as p*riority habitats* are under strict statutory protection. If they are in their natural state or in a near-natural state and are clearly distinguishable from their surroundings, any measures for their management and use shall be carried out with due consideration to their distinctive characteristics.

e) The authorities must be notified of any planned felling or other work affecting habitats which are important for biological diversity as provided by the Forest Act.

To the extent provided by the Forest Act, conservation of biological diversity is supervised primarily by forest centres alongside their other responsibilities.

The elaborate system of decision-making set forth in the ***Building Act*** (370/1958) can have a decisive impact on biological diversity. The partial amendment (1097/1996) of the Building Act in conjunction with the updating of the Nature Conservation Act was a significant turn, as the effect of certain programmes and decisions subject to the Nature Conservation Act now also extend to decision-making under the Building Act. This indirect effect of the Nature Conservation Act on decisions related to planning and construction is yet another factor contributing to the protection of biological diversity.

Perhaps even more importantly, certain key factors affecting biological diversity were simultaneously included in the physical planning provisions of the Building Act. The goals of *regional planning* now include the conservation of *habitats which are important for nature conservation* and also the conservation of the *characteristic features* of naturally occurring flora and fauna. The same applies to the drafting and development of *master plans*. According to the amendment of the Building Act (Section 6a), important

habitats must be taken into account in the planning of shore zones before construction.

The ***Water Act*** (264/1961) and the ***Act on the Prevention of Marine Pollution*** (1415/1994) contain important provisions on the protection of aquatic habitats. The drainage of an important waterfowl habitat, for example, can be prohibited under the Water Act. Although ecological or scenic value is often superseded by other interests, nature conservation may be considered in conjunction with statutory permit procedures and comparisons of interests.

The Water Act applies to a wide range of water resource projects. The legislative measures concerning those projects and permits contain numerous flexibly based provisions which have immediate bearing on biological diversity. Most of the general prohibitions in the Water Act which form the basis of the permit system are related to biological diversity.

Whether a water supply or hydro-engineering project requires a special permit is usually determined by the statutory prohibitions against altering water systems (or the sea). This covers a wide range of changes caused by construction and engineering which are likely to infringe on public or private interests. Examples of harmful effects on biological diversity include damage to fishing, deterioration of aquatic habitats and significant degradation of their scenic value or general amenity.

Statutory in situ conservation within the scope of water laws, as set forth in the new Natural Conservation Act, covers flads and glo-lakes of an area of a maximum of 10 hectares and ponds no larger than one hectare (except in Lapland), which shall primarily be preserved in their natural state.

The prohibition against altering water systems does not apply to *small waterbodies*, such as ditches and wet hollows, which may be altered without special permission. However, under an important new provision in the Nature Conservation Act, which came into effect on January 1, 1997, channels south of Lapland which are smaller than ordinary brooks may not be altered if it threatens their natural state.

The *prohibition against damming rivers* and *certain inland waterways* does not apply to small tributaries; according to the legal definition, this refers to brooks, which can sometimes be quite large, and naturally to small tributaries which are smaller than brooks. This can be considered an oversight in the law, particularly in cases where, for example, stocks of brown trout are prevented from reaching their spawning areas (which include very small waterways) merely because the brook in question is smaller than the legal definition of a river.

Provisions and application procedures concerning discharge of sewage into a watercourse and other pollution of waterways are based on the prohibition against pollution of

waterways. These provisions, in compliance with EU law, today include absolute prohibitions against all discharges into watercourses or the sea which may constitute a violation of public or private interests. Violations affecting biological diversity include deterioration of aquatic habitats, obvious damage to fish stocks and notable degradation of the site's scenic or cultural value. The protection of biodiversity in groundwater areas and natural springs, however, is not based *solely* on permit procedures and other restrictions designed to prevent activities that threaten biodiversity. In this respect, the new provision added to the Water Act in line with the reformed Nature Conservation Act is a significant change.

Certain projects (i.e. construction of a hydropower station, regulation of a watercourse and water supply projects) require a permit under the Water Act, irrespective of the consequences of the project. Building a navigation channel (marine or otherwise) requires a permit from a water rights court. According to provisions on habitats included in the new Nature Conservation Act, a permit must automatically be applied for, regardless of the result of the project, although the decision-making procedure departs from that of a normal permit.

Although the system for permit applications under the Water Act in practice covers all projects which can be regarded as watercourse regulation, and also partly applies to drainage, the chapters on these also include special provisions which bear directly on biological diversity, such as provisions that promote the conservation of the ecological value of wetlands.

In practice, *permits issued under the Water Act* are usually granted on the basis of comparison of the pros and cons of the project as well as public and private interests. Consideration of public interests extends to inconvertible aspects such as losses in scenic or ecological value, which may at times surpass material benefits or losses.

The above comparisons of pros and cons also apply to the *fishing and crayfish industry*, where biological diversity, particularly in species of significant economic or recreational value, can be counted among public interests, while other species can be included among purely ecological interests. Specific stipulations on permits are laid down in the provisions concerning the *fishing industry* and *fish stocks*. It has yet to be seen, however, whether financial considerations and good catch prospects outweigh sustainable natural regeneration of fish stocks. Legal provisions on fishing and fish stocks thus fall into very different categories (e.g. fish stocking provisions vis-à-vis protection of natural fish passages), but there are practical limitations on the legal provisions that can be adopted.

Decisions on permits for construction of hydropower stations are essentially governed by provisions of the ***Act on the***

Protection of Rapids (35/1987) and separate Acts on the Rivers Ounasjoki and Kyrönjoki, which prohibit all construction described in chapter 3 of the Water Act in the numerous watercourses listed in these Acts. These Acts provide strict legal protection to the ecology and biodiversity of watercourses. The Act on the Protection of Rapids alone prohibits construction of new power stations in a total of 53 watercourses or parts thereof.

In the ***Air Pollution Control Act*** (67/1982), air pollution is defined as changes caused by human activity in the composition or properties of outdoor air which create a direct or indirect danger or hazard to health or to the environment, cause detrimental change in the environment generally or economic loss, or decrease the amenity of the environment or constitute other comparable infringements of the public or private good. This definition covers such a variety of impacts on nature that it inevitably includes dangers or hazards to biodiversity, although biodiversity as such is not specifically mentioned in the Act.

Unlike the Water Act, the Air Pollution Control Act does not contain a general prohibition on pollution; air permits for activities which create a danger of pollution are granted on the basis of a list in a separate Decree. Permits are not granted if the activity in question causes a significant degree of pollution, for instance, or unless the pollution is controlled or prevented with the best available technology. The permit then states the necessary provisions on reduction of emissions and other preventive measures. Whether a permit is granted depends on all potential forms of pollution caused by the activity, including those affecting nature and biodiversity. Applications are handled either by regional environment centres or by the appropriate local authorities in accordance with the ***Environmental Permits Procedures Act*** (735/1991).

Implementation of the Air Pollution Control Act has been made more effective by extending the right to instigate proceedings for the use of coercive measures by regional environment centres and local environmental authorities. The right to instigate proceedings now also extends to parties suffering directly from the pollution and to certain environmental organizations. In some cases, this may have a significant effect on safeguarding biological diversity.

Land extraction is governed by the ***Land Extraction Act*** (555/1981). Section 3, in particular, which defines the conditions under which land extraction is entirely prohibited, makes allowances for the conservation of biological diversity. The section prohibits: (1) the disfigurement of beautiful scenery; (2) destruction of a site of significant scenic value or distinctive features; (3) substantial or extensive detrimental changes in natural conditions; or (4) endangerment of the water quality or yield of a major groundwater area or a site otherwise suitable for water supply, unless a permit has been granted for it in accordance with the Water Act. The protection of

scenic landscapes and sites of significant scenic value can indirectly incorporate the conservation of biological diversity. "Distinctive features", on the other hand, usually refer to geological formations, but because they can also be biological, at least in principle, biodiversity may also be regarded as a contributing factor.

The authorities granting permits for land extraction are appointed by local authorities. All residents of a municipality have the right of municipal appeal; regional environment centres also have the right to appeal.

The ***Hunting Act*** (615/1993) does not contain any provisions that specifically protect or otherwise directly concern biodiversity. Nevertheless, some of its provisions have bearing on biological diversity.

The goal of game management is to increase, maintain or improve the game population and the balance between populations of different species by controlling them and safeguarding or improving their living conditions. Hunting should comply with the principles of sustainable development and ensure that game populations are not endangered, nature is not harmed unnecessarily and animals are not caused unnecessary suffering or pain. Maintenance of productive game populations requires systematic game management. From a legal point of view, however, these provisions have little direct significance, as they are not subject to sanctions under criminal law.

One of the provisions in the Act concerns the import and release of non-native species. It is thus directly connected with biological diversity and requires the permission of the Ministry of Agriculture and Forestry, which cannot be granted if the release is likely to cause considerable harm to nature or to species native to Finland.

Other provisions of the Act that are related to biological diversity concern hunting permits and the trapping and killing of unprotected animals.

The ***Fishing Act*** (286/1982) is part of the legislation on biological resources. The main principle of the Act is stated in section 1, which also concerns private holders of fishing rights. Fishing must accordingly be practised in such a way as to maximize the long-term productivity of fish stocks in fisheries. In particular, the fish stocks should be exploited rationally, with due consideration to the perspective of the fishing industry, and the management and regeneration of fish stocks must be attended to systematically. Actions which may harm nature or the ecological balance must be avoided.

This provision seems, above all, to emphasize productivity as a primary objective over biological diversity. On the other hand, if long-term productivity is the goal, the diversity of fish stocks may have an important part in sustaining it, but largely only if maintaining the

productivity of stocks entails the maintenance of a genetically diverse fish stock.

This is closely connected with the provision on avoiding the use of fishing tackle, equipment or methods which injure or kill fish unnecessarily or endanger the fish stock of a watercourse.

Although decisions made under the Fishing Act may be significant to the diversity of fish stocks, the provisions of the Act as such have little direct legal bearing on biodiversity.

The genetic diversity of fish stocks does not depend on decisions and measures under the Fishing Act alone, but often also on decisions made under the Water Act.

Unlike the previous Nature Conservation Act, parts of the new Nature Conservation Act apply to fish species as well, extending statutory protection mainly to species which are not commercially exploited, while economically important species remain within the scope of the Fishing Act alone.

International territorial agreements on fisheries and decisions on the implementation of these agreements (compare section 116 of the Fishing Act) and, more recently, the common EU policy on fisheries and the related provisions and decisions have also had a considerable effect on the diversity of fish stocks in the sea and often, indirectly, rivers.

The ***Public Roads Act*** (243/1954) contains provisions on the effect of several different, often conflicting, interests on road planning, taking into account aspects of environmental protection as well as road safety, transport technology and road construction. The planning and construction of a road should ensure that both the road and the traffic on it cause minimum harm to the environment.

These provisions are broad and transparent, giving the authorities extensive discretionary powers over road construction plans. On the other hand, regional environment centres' right of appeal provided by section 63 of the Nature Conservation Act (1096/1996) applies to road construction plans as well. However, a harmful impact on the environment, nature or biodiversity, does not as such constitute grounds for an appeal, even if the impact is considerable; the appeal must be based on non-compliance with the provisions of the Nature Conservation Act, Nature Conservation Decree or other relevant rules and regulations.

The ***Private Roads Act*** (358/1962) falls within the scope of easement law and is not applied to forest roads, for example, or other private roads which are entirely located within the area of a single register unit and which may not be used by others.

According to the Act, a road may not be constructed if its

construction causes considerable damage to nature or decline in the cultural value of the environment or other comparable violation of public interests.

Road survey decisions concerning the location of roads may be appealed to a Land Court and further to the Supreme Court, mostly by private interested parties on the basis of real property law. Regional environment centres have the same right of appeal based on the Nature Conservation as in the case of the Public Roads Act.

The ***Mining Act*** (503/1965) lays down a straightforward decision-making system for rights of appropriation and mining licences, and the Nature Conservation Act has been taken into account in section 71 of the Mining Act. Section 23a of the Mining Act provides for environmental impact assessment.

The Mining Act cannot have precedence over the Water Act (compare decisions concerning mechanical gold mining in national parks).

The use and commercial exploitation of genetically modified organisms are governed by the ***Gene Technology Act*** (377/1995) and the ***Gene Technology Decree*** (821/1995). General compliance with rules and regulations based on this legislation, particularly in health-related matters, is controlled and supervised by the Ministry of Social Affairs and Health, while the Ministry of the Environment deals especially with the prevention of environmental problems caused by genetically modified organisms. These ministries may also consult the Ministries of Agriculture and Forestry and Trade and Industry.

The Gene Technology Act applies to the use, production, import, sale or other placing on the market of genetically modified organisms and products containing such organisms. The Act also applies to the launch and operation of installations and premises intended to handle genetically modified organisms.

Although the Act does not apply to manipulation of natural genetic material, it is not inconceivable that a genetically modified organism released into the environment - whether deliberately or not - might become established in the wild and compromise the genetic variability and biological diversity of the natural habitat.

According to the ***Act on Environmental Impact Assessment Procedure*** (468/1994), entrepreneurs and authorities must plan their activities in full awareness of the environmental impact of their activities (compare the Convention on Biological Diversity, Article 14; see Appendix 1). If the impact is likely to be significant, the plan requires an environmental impact assessment procedure as provided in the Nature Conservation Act (sections 65 and 66).

The Act on Environmental Impact Assessment Procedure does

not apply directly to the content of decision-making affecting biodiversity, which is always governed by other Acts, nor is the assessment report binding on the instigator of the project or the authorities granting permits. Nevertheless, the procedure may have a considerable indirect effect, depending on the variety and relevance of the aspects of biodiversity incorporated in the assessment. In the Act on Environmental Impact Assessment Procedure, environmental impact is defined as direct and indirect effects on soil, water, air, climate, organisms and their interaction, and biological diversity. Because of the specific mention of biological diversity, this provision would seem to be very relevant.

The statutory environmental impact assessment procedure should be developed further so that the environmental impact of different projects, plans and programmes could be assessed already at the planning stage. Assessment procedures require progress reports on biodiversity and reports on the regional and local environment.

The conservation and promotion of rural biodiversity are also affected, often to a substantial degree, by decisions concerning the guidance and support of agriculture and related industries and rural development. Here, the legislation mostly concerns economic aspects which have an indirect, but relevant impact on biodiversity. Now that Finland is a member of the EU, the common EU agricultural policy is particularly important. The environmental impact of planned projects is also taken into account in national legislation on project financing. The new Act on the Financing of Subsoil Drainage, for example, makes provisions for the designation of new wetlands and stipulates wider protective belts than are otherwise stipulated for drainage under the Water Act.

6.2.2 Measures

The Nature Conservation Act, which is the most important legislative measure concerning biological diversity, was brought up to date at the beginning of 1997. It supports and pays very close attention to aspects related to the conservation of biological diversity. The new Forest Act, too, will contribute significantly to the biodiversity of commercial forests.

The revision of the Nature Conservation Act entailed several amendments to other Acts, which means that any decisions made under these Acts must be in line with nature conservation. Aspects of biological diversity have thus been clearly integrated into other social endeavours. However, there are still certain activities which remain excluded. Provisions on these activities will have to be revised with consideration to the conservation of biological diversity.

11. The conservation and sustainable use of biological diversity will be given due consideration in the reform of all laws related to the use of natural resources.

12. Legislation on water resources will be simplified so as to lay greater emphasis on protecting the diversity of aquatic habitats, particularly small bodies of water.

13. New legislation will be enacted to regulate the deliberate release of foreign species which are liable to establish themselves in the wild and pose a threat to indigenous species.

6.3 Incorporation of biodiversity in the daily routine of administration, trade and industry

The Convention on Biological Diversity obliges the Contracting Parties to develop sustainable use of biological resources. In Finland, conservation of biological diversity shall be integrated into forestry, agriculture, mining, water resource management, energy production, game management and hunting, the fishing industry, reindeer husbandry, civil engineering, transport, national defence, and other use and management of biological resources and related administrative and economic instruments (Convention on Biological Diversity. Articles 8(c)-(d), 8(j), 8(l,) 10(b)-(c) and 10(e); see Appendix 1).

6.3.1 Principles

In the long term, conventional nature conservation measures (chapter 6.6) will not suffice to guarantee the maintenance of biological diversity. Protection and management of biodiversity must be integrated into the activities of all sectors of society. Life-cycle analyses provide an overview of the various effects of not only the life of a single product, but also the overall effects of trade and industry on the environment; these can then be used to draw up

guidelines for necessary environmental measures. *"The forest industry and the environment"* published by the Finnish Environmental Institute in 1997 is the first large-scale life-cycle analysis of this kind.

Development of an ecologically sustainable approach to using biological resources is essential for achieving the goals set for the conservation of biodiversity in the national action plan. The Ministries of Agriculture and Forestry, Defence and Transport and Communications have already prepared and launched their own environmental programmes, which, as a rule, include measures for the conservation of biological diversity.

6.3.2 Measures

Forestry

National Forest Programme

In addition to its economic and social objectives, forestry must comply with forest laws in a manner that guarantees the conservation of biological diversity and the prevention of adverse effects on other ecosystems.

One of the principles approved by the United Nations Conference on Environment and Development in 1992 was that all countries should formulate national forest policies. Accordingly, the Environmental Programme for Finnish Forestry (1994-2005), too, contains a proposal for the preparation of a national forest policy which would include guidelines for the development of the forest industry, goals for timber production, energy policy and employment in forestry as well as environmental issues related to sustainable forestry.

The definition of sustainable forestry is as follows: "'Sustainable management' means the stewardship and use of forests and forest lands in 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" (Resolution H1 of the Ministerial Conference on the Protection of Forests in Europe; see also Resolution H2).

14. Through broadly based cooperation, Finland will formulate a national forestry policy incorporating the aims and measures of the Environmental Programme for Forestry, thereby reconciling the needs of various forest users.

Realization of the Environmental Programme for Forestry

In recent years, instructions for forest management and forestry methods have been reformed both by forestry organizations themselves and on the basis of the Environmental Programme for Forestry, which was ratified jointly by the Ministries of Agriculture and Forestry and the Environment. The successful progress of this development programme is described in detailed annual reports prepared by a broad-based working group, which also makes proposals for reviewing and developing the programme.

Greater consideration for biological diversity has become an important part of the recent changes that have taken place in forestry and forest management. These changes were first observed in the management instructions and operating plans for commercial forests, and today forestry planning combines a variety of goals related to forest exploitation, by promoting both timber production and biodiversity, and by

considering the environmental value of forests.

In the case of commercial forests, the aim is to conserve habitats which are important for biodiversity ('key biotopes' and protected tree stands) and to leave decaying wood in different stages of decomposition in commercial forests so as to form an ecological continuum. The new Forest Act and Forest Decree contain provisions on conservation of the characteristics of particularly important habitats in commercial forests, and 'management of forest ecology' has become a key concept in forestry.

All Finnish forest organizations - the Forestry Development Centre Tapio and the Central Union of Agricultural Producers and Forest Owners, for example - have reformed their recommendations and instructions for forest use to comply with the principles of the Environmental Programme for Forestry, as have forest-industry enterprises and the Finnish Forest and Park Service.

15. The goals, implementation and instruments of the Environmental Programme for Forestry will be monitored and updated in line with the latest research findings and monitoring data. The target status for sustainable forestry outlined in the programme will be revised in the light of new developments.

Regional objective programmes for forestry

To harmonize the various objectives concerning the use of forests, the new *Forest Act* (1093/1996) provides that each forest centre shall draw up a regional objective programme which contains a description of the ecological, economic and social needs and goals of regional development which is revised at least every five years.

The objective programme shall be used for monitoring the state of forestry and forests, for example, and making recommendations for related measures. Regional objective programmes for forestry are essential for the maintenance of biological diversity and reconciliation of other environmental objectives with timber production and employment. In preparing the objective programmes, forest centres shall cooperate with the local forest owners, the environmental authorities and other parties concerned.

Landscape ecological plans

Landscape ecological plans are ecological overviews of large forest areas (between 5000 and 35,000 ha) used for guiding forestry and use of forest resources so as to safeguard the long-term conservation and propagation of naturally occurring local species. The purpose of these plans is to form a network of both officially protected areas and a sufficient number of smaller areas, including ecological corridors and forests which species can inhabit. Landscape

ecological plans can also reduce the fragmentation of contiguous stretches of forest areas through the charting of key biotopes and other sites of natural, scenic and cultural importance, adapting the distinctive structural characteristics of forests in line with those of natural forests, and determination of sites which should be restored to a natural state or where biodiversity should be increased.

On January 22, 1997, the Ministry of Agriculture and Forestry and the Ministry of the Environment agreed that landscape ecological plans would be drafted by the end of 1997 for about a million hectares of state-owned forest managed by the Finnish Forest and Park Service, which shall draw up plans for all important contiguous state-owned forests by the end of the year 2000. The plans will cover 8.0 million hectares of state-owned forests, of which 3.2 million hectares is commercially managed. Landscape ecological plans drafted by the Finnish Forest and Park Service will also be used in the preparation of regional objective programmes of forestry.

16. The diversity of habitats will be safeguarded in the use and management of forests through new forest legislation, implementation of the Environmental Programme for Forestry, development of regional forest planning, drafting of landscape ecological plans for State-owned forests, promotion of research on forest diversity and development of new methods of monitoring biodiversity.

Rural areas and agriculture

Although agriculture has altered natural biodiversity by reducing woodlands in the most fertile areas of Finland, it has also introduced new species and produced new, open habitats such as fields, pastures, meadows, banks of ditches and a variety of fringe areas. Intensification of agricultural production has considerably reduced traditional Finnish crops as well as stocks of native breeds of domestic animals.

At present, there is no mention of the conservation or maintenance of biological diversity in the legislation on agriculture. The EU Regulation (EEC) No. 1467/94 on *conservation, characterization, collection and utilization of genetic resources in agriculture* aims at preventing genetic erosion and promoting the coordination and intensification of measures aimed at the conservation and utilization of genetic resources. Financing for projects (other than basic research) on the conservation and utilization of genetic resources can be applied for under the action plan.

Measures for maintaining the biodiversity of farmland nature are largely based on the *Environmental Programme for Agriculture* for 1995-1999 approved by the EU Commission, in which *environmental subsidies* are in a prominent position.

Over 80% of Finnish farmers have committed themselves to the Environmental Programme for Agriculture, representing about 90% of Finnish farmland.

From the point of view of biological diversity, the programme will considerably increase the populations of important species dependent on agriculture and improve the quality of their habitats:

- management of the banks of ditches and establishment of protective belts (in compliance with the terms of the basic subsidies) helps to conserve and increase the biodiversity of actively cultivated areas, thus contributing to the conservation of biological diversity;
- special measures, especially management of traditional biotopes, wetlands and protective belts, are believed to have a very important role in the promotion of biological diversity.

Increasing the area used for organic farming, too, improves biological diversity through crop rotation, mixed cropping, undersown crops and the use of green fertilizer. Furthermore, there are significantly more wild plants on organic farmland than on conventionally cultivated fields.

The number of farms is expected to decline, while the efficiency of production at remaining farms is expected to grow; the area of farmland, however, is not expected to decline to any significant degree. The environmental programme should prevent any further increase in harmful environmental impacts. From the viewpoint of the environment, it would be better to continue the cultivation of large areas while using less intensive farming techniques and less fertilizers and pesticides. The goals of agricultural policy should include not only profitability, but also conservation of rural areas with scenic value, maintenance of biological diversity and reduction of the environmental load.

17. The goal of rural development is to maintain the viability, biological diversity and natural heritage of rural regions. The diversity of agricultural environments, rural landscapes and domesticated and cultivated species will be maintained and improved in line with the Environmental Programme for Agriculture. New approaches will be developed for maintaining and promoting the diversity of wild species that thrive in agricultural habitats and also that of cultivated and domesticated species used in agriculture. The Environmental Programme for Agriculture will be updated and supplemented with intensified measures for promoting traditional rural landscapes and the biological diversity of rural regions.

18. Traditional rural landscapes and biotopes will be placed under special management as extensively as possible.

19. Organic farming, which is beneficial to biodiversity, will be augmented: the target is to extend its combined area

to 150,000 hectares by 2001.

Mining

Under the prospecting rights described in the Mining Act, a claimant has the right to drain, quarry, conduct test excavations, carry out deep drilling, ore enrichment tests and other similar actions. The claimant also has the right to use the area immediately surrounding the claim for building roads, cabling, plumbing and other activities. According to the Mining Act, these measures are to cause minimum harm or damage to the environment. The actual mining licence may be extended to areas necessary for roads, transport equipment, cables, water pipes and sewers. Finally, the proprietary mining right conferred by the mining licence constitutes the right to quarry and exploit all minerals discovered within the area of the licensed claim.

The decision-making procedure set forth under the Mining Act is straightforward. Once the requirements provided in the Act are complied with, the authorities grant the claimant an exploration licence or decide on granting a mining patent. In practice, the Act itself does not provide for any case-specific assessment of the environmental impact of mining projects, as the claim has to be staked before environmental impact assessment can begin. The EIA report stipulated by the Act on Environmental Impact Assessment is required only for specific applications for a mining patent, and decisions on mining patents must then include a mention of how the EIA report was taken into account. Consequently, the decision-making procedure laid down in the Mining Act fails to give one consideration to issues such as biodiversity and environmental protection.

However, thanks to a recent amendment made to the Mining Act in conjunction with the reform of the Nature Conservation Act, biodiversity will in future be considered alongside certain issues related to nature conservation in mining projects; in other respects, however, they do not receive enough attention in the decision-making process.

Landscaping projects on disused mining sites aim at taking biodiversity into account as well. Nevertheless, their impact could be assessed much more thoroughly on the basis of the results of environmental analyses of mining sites.

20. The adverse effects caused to biodiversity by mining will be reduced as far as this is financially and technically feasible.

Use of water resources

Finland's water resources consist of inland waters (lakes and rivers), seas and ground water. The combined area of inland waters is 33,500 km^2, which is about 10% of the total

area of Finland. About 80% of Finnish lakes are today classified as having good or excellent water quality, and only about 2% are classified as bad or poor because of waste water pollution. Meanwhile, the overall situation for rivers is clearly worse than for lakes. Low-flow coastal rivers in particular are usually in poor condition, while the condition of the great rivers of Northern Finland has remained good. Through its runoff, the quality of inland waters affects the quality of sea water as well (see also "Eutrophication and water pollution" in Chapter 4, "Threats to biological diversity").

Hydro-engineering projects result in both useful, intentional alterations to the environment as well as harmful changes. Increasing the area of open water on overgrown land, for example, benefits local birds, and earth masses stacked above the water level provide new nesting grounds for them. Excavation of shore zones, on the other hand, means an at least temporary deterioration of their living conditions.

According to the committee monitoring endangered flora and fauna, hydro-engineering - hydropower stations, mill and sawmill dams, regulation of water flow, dredging, cleaning and draining of lakes - is one of the reasons why 139 species are endangered, including the European beaver, European mink, Saimaa seal, common otter, diver, dipper, pearly freshwater mussel and all endangered fish species.

Waterways and shores are usually vulnerable, but important to the structure of the landscape. Examples of harmful changes caused by hydro-engineering include depletion of the landscape and loss of important natural scenery. Today, hydro-engineering projects include a simulated landscaping plan to adjust the construction project to the surrounding topography and vegetation as well as possible.

As hydro-engineering projects are becoming more infrequent, and the last large-scale flood-prevention projects are soon to be completed, the emphasis is shifting towards the maintenance of completed projects and development of their use and management. New projects are usually carried out on a much smaller scale and aimed at promoting diverse aspects of the viability of the countryside.

Restoration of waterways aims at promoting the use and quality of waterways and management of their biological diversity. A few dozen restoration projects on disused floatways, following the repeal of log-floating regulations, are still at the planning stage or have yet to be launched. Restoration of watercourses used as floatways frequently includes regeneration of the local fish stock as well.

The research and development begun in the 1980s has greatly increased public awareness of the ecological, economic and social impact of hydro-engineering and regulation of water flow and the various means of reducing damage to the environment. New methods have concurrently been formulated

for assessing environmental impacts. One of the most important development projects on monitoring the state of aquatic habitats is aimed at deriving more benefit from the monitoring of flowing and stillwater habitats. Parallel monitoring projects within a given area will henceforward be integrated. Monitoring changes in aquatic ecosystems should be intensified through monitoring macrozoobenthons and sediments.

21. An action plan will be drafted for preserving the biodiversity of aquatic habitats, including the restoration of waters and the formulation of criteria for assessing the current state of aquatic biodiversity.

22. Finland will define a set of objectives for the prevention of water pollution and assess the need for a comprehensive strategy for preventing environmental hazards caused by water pollution, in accordance with relevant international conventions and commitments.

23. Adverse effects on the diversity of aquatic habitats caused by hydro-engineering will be reduced, for example by timing construction so as to cause minimum disturbance to aquatic species, and by preventing the discharge of solid waste into waterways, particularly during periods crucial to the reproduction of fish and crayfish, and also during fishing season.

24. Restoration projects undertaken for the revival of biodiversity will be augmented in aquatic environments affected by hydro-engineering, agriculture or forestry, particularly in small bodies of water.

Energy production

In energy production, biological diversity and its conservation are mainly affected by the production of fuel peat and acidification, particularly of soil, which is mostly caused by depositions from energy production. The production and transmission of electricity affects Finnish biodiversity both locally and regionally. Construction of power lines has both clearly harmful and some positive effects on biodiversity, while the effects of power stations are mostly negative, at least on the soil, because of acid deposition.

Cooperation between environmental and energy authorities aims at ensuring that an adequate amount and wide variety of mires is preserved from peat production. This has largely been achieved, as protection programmes today cover over 20% of Finnish mires in their natural state. Thanks to cooperation between peat producers, environmental authorities and planning authorities, biologically diverse areas should remain safe from peat production in the future as well. In both the planning stage and the extraction stage of peat production, special attention must be paid to assessment of environmental impact, reduction of harmful

effects and conservation of mires in their natural state which are important from the viewpoint of biodiversity.

Finnish efforts have brought emissions and airborne depositions from energy production down to a fraction of what they used to be a few decades ago: the 1990s in particular have seen a decline in the total acid deposition in Finland from all Finnish and transboundary sources of emissions of sulphur and nitrogen compounds, although critical loads are still exceeded, mainly in the south, but also in the rest of the country. Because transboundary acid deposition is a major contributor to air pollution, it must be reduced further through international cooperation and agreements.

To curb the growth of carbon dioxide emissions, low-emission energy forms, biofuels and other domestic energy sources must be employed on a much larger scale than today, which would also benefit employment and regional policy. However, an increase in the use of wood-based energy, for example, would require integration of the goals of wood production and use, protection of biodiversity and the related research and planning.

Hunting and game management

Most key game species in Finland are native to forests. Field game are mostly found in southern, southwestern and western Finland, where the proportion of field cover is the greatest. Because waters are plentiful throughout Finland, there is also a considerable stock of water birds, making Finland an important waterfowl exporter.

There are 60 species of mammals in Finland and over 230 species of birds; 27 of the mammal species and 26 bird species are counted as game animals. Compared with the rest of Europe, Finnish game populations are usually small, and the size of small-game populations in particular varies considerably every 3-7 years. The most important game animal is the elk. Today, hunting is purely a secondary source of income, and even so only for a few dozen willow-grouse hunters in northern Finland.

Hunting in Finland is based on the principle of sustainable use. Most of the indigenous game animal species are quite plentiful. Populations of large carnivores - bear, wolf, wolverine and lynx - are systematically controlled by hunting. This is done in order to maintain their viability by promoting steady population growth and balanced regional distribution and also to eliminate individuals which cause damage to man or the environment. Hunting of foreign species and regulation of their populations is carried out in such a way as not to pose a threat to native species. Diversity of species is also ensured through appropriate management and improvement of their habitats and through translocation and re-introduction of species that are endangered or extinct in Finland.

Elk populations declined to an all-time low in the first decades of this century; according to some estimates there were only a few hundred left in the whole country. Despite their scant numbers the genetic variety within the species did not diminish: research in the early 1980s showed that the elk population in Finland was much more genetically diverse than in Sweden or Norway.

Maintaining the genetic purity of species is another important aspect of game management. This includes measures for preserving the wild reindeer population, which crosses easily with domestic reindeer, and for eliminating wolf-dog hybrids.

Because agriculture and forestry have a direct impact on game habitats, hunting and game management have lately received closer attention, and the instructions for forest management issued by the Finnish Forest and Park Service and the Forestry Development Centre Tapio include guidelines for managing the habitats of major Finnish game species as well as for timber production, with special focus on key biotopes and endangered species.

The Environmental Programme for Agriculture provides good prospects for improving the living conditions of field game and the biological diversity of the rural environment through fallowing contracts, organic farming and establishment of feeding grounds and other special sites. Field game have also become established in fields that have been left permanently fallow.

Areas primarily considered as waterfowl habitats are mainly found in the south and southwest of Finland. Being suitable for even the most demanding of species, they are important for conserving the diversity of Finnish waterfowl species. For some species, these habitats are protected under the Hunting Act by restricting human presence in specific areas during their nesting season. Several of these protected areas are located in the coastal waters of the Gulf of Finland.

Apart from management of game habitats, game management includes winter feeding, creation and upkeep of nesting facilities, cultivation of fields as feeding grounds, pruning of willow bushes on waste lands, farming of game fowl, translocation of species and pest control.

The Finnish Game and Fisheries Research Institute (RKTL) and its partners cooperate in monitoring annual changes in game populations by conducting wildlife triangle censuses and by monitoring elk, wild carnivores, water fowl and sea bird populations. Plans are under way for monitoring field game populations and game populations in forests interspersed with fields.

As game management is aimed at increasing the amount and productivity of game by improving their living conditions,

it also creates habitats for many other species necessary for biological diversity.

25. Hunting will be regulated so as to maintain the favourable conservation status of animal species within their natural range.

26. The natural habitats of game species will be maintained by safeguarding their ecological requirements in the routine practice of forestry, for example, in line with the measures outlined in the Environmental Programme for Forestry.

27. The diversity of game species will be safeguarded by formulating new methods for estimating game populations and using these as a basis for determining hunting quotas.

Fisheries

The Finnish fishing industry is based on the exploitation of both natural and cultivated fish stocks. Commercial fishing, which mostly takes place at sea, accounts for two thirds of all fish caught.

The fishing industry exploits less than one third of the 64 fish species established in Finland. Intense fishing, which too often includes catches of undersize fish, has clearly harmed the natural breeding of at least some of the more valuable stocks. For many stocks, however, the decline was originally caused by hydro-engineering or untreated sewage. Fishing itself seems to have had a fairly minor impact on the number of Finnish fish species; nevertheless, it has clearly changed local ratios between different species.

Fish farming generates a yearly income of about FIM 400 million; three quarters of production consists of fish for household consumption and about one quarter of fish stocked in natural waters. The species caught in the largest quantities are Baltic herring, perch, pike, houting, bream and vendace. Species caught in smaller amounts, but which are more valuable, are salmon, cod, sea trout and crayfish.

Finnish waters contain both stocks which breed naturally and stocks which are maintained by regular stocking. Sixty native species have permanent stocks in Finnish waters; 37 of these are freshwater or migratory fish, 22 are sea fish, and one is crayfish. About 20 of these native species are fished commercially. In addition, four foreign species of fish and one species of crayfish have been introduced to Finnish waters.

The report by the committee monitoring endangered animals and plants lists nine fish species, forms or stocks which are classified as endangered: wels (already extinct), asp, schelly, salmon, freshwater trout, brown trout, sea trout, Arctic char and vimba. Because only commercially exploited species are monitored, two thirds of Finnish fish species have been left unclassified. The Finnish Game and Fisheries

Research Institute has produced stocks of all endangered species (except vimba), in such large amounts that, on the basis of their present numbers, they no longer belong in the endangered category.

The impact of human activities is manifest in the deterioration of fish habitats and the decline in spawning areas. Aquatic biodiversity in Finland has been reduced by hydro-engineering, pollution, eutrophication, acidification, unsystematic stocking and over-selective fishing.

Only two rivers, Tornionjoki and Simojoki, of the original 18 salmon rivers flowing into the Baltic Sea have maintained their original natural stocks, while spawning populations in the other sixteen have been reduced by damming, intensive fishing and other changes affecting rivers, and may also be threatened by M 74, a disease which will cause an exceptionally high mortality rate among juveniles if the disease persists in marine habitats. To compensate for the lost spawning stocks, 4-4.5 million juveniles are stocked in the Baltic Sea each year, half of them by Finns. In addition, about a million one-year-old salmon are stocked in Finnish rivers. Restoration of natural salmon stocks is also promoted through fishing restrictions. Regulation of sea fishing has resulted in an increasing number of salmon running to rivers and a revitalization of spawning.

Fish stocking has long been the most important method of fishery management, recently with growing emphasis both on maintaining the biodiversity of aquatic ecosystems and on capitalization on the natural productivity and the natural environment in fish stock management. The value of juvenile fish and crayfish stocked in Finland is about FIM 100 million a year.

Restoration of fishing grounds is practised on a fairly extensive basis. Most restoration projects involve restoration of rapids and creation of spawning grounds; other important measures are construction of fish passages, cleaning rivermouths, deacidification and intensive fishing of coarse fish species.

The Finnish Game and Fisheries Research Institute is engaged in an ongoing programme for monitoring the most important food-fish stocks, particularly in those rivers flowing into the Gulfs of Finland and Bothnia which contain salmon, sea trout and houting (notably Tornionjoki, Simojoki, Kiiminkijoki, Vantaa and Kymijoki), in Lake Saimaa, Lake Inari, the River Tenojoki and selected small bodies of water. The success of stocking projects and the development and state of the stocks are monitored in salmon rivers, Lake Saimaa and Lake Inari, and elsewhere.

The data acquired from the monitoring projects is used to maintain and develop a *fish population database*, which will in the future use a geographical information system and be expanded to monitor food fish and endangered stocks.

28. The diversity of fish species will be safeguarded by protecting fish stocks, by applying the principle of sustainability in the fishing industry, by artificially raising declining stocks of important fish species and by promoting the revival of natural fish stocks. Waters will primarily be stocked with species indigenous to them.

29. A sufficient variety of fish species and healthy, high-quality spawn will be made available for the cultivation of declining fish stocks.

30. The habitats of fish stocks and crayfish will be upgraded through the restoration of fishing waters, with special attention to the habitats of declining fish stocks.

31. An effort will be made to reduce water pollution from fish hatcheries (which is potentially harmful to aquatic habitats), to prevent cultivated fish from being inadvertently released into the wild, and to upgrade production and pollution-treatment technology used by fish farms, particularly in marine regions.

32. Scientific data will be compiled as a basis for setting optimum fishing quotas, and for use in the management of fish stocks and aquaculture; new data will be compiled particularly on fish populations and the effects of stocking.

Reindeer husbandry

Reindeer husbandry goes back hundreds of years: the oldest confirmation dates from the late 9th century in Norway. Before their domestication, wild reindeer were important game animals for northern peoples, and they may have also been used as draught and pack animals. The practice of reindeer husbandry in the Nordic countries probably originated among the Sámi people. The earliest mentions of large herds are found in 16th- and 17th-century tax records, although peasants on the coast of the Bothnian Bay are known to have paid church taxes on reindeer husbandry as early as the 14th century.

Finland's reindeer herding area, as defined in the *Reindeer Husbandry Act* (848/1990), covers almost the entire Province of Lapland and roughly the area north of the River Kiiminkijoki in the Province of Oulu, where reindeer may be owned by local reindeer-owners' associations or by any citizen of the European Union permanently residing in the area. There are about 800 families engaged in reindeer husbandry full-time and about 1000 part-time.

Herds are depleted by various predators, especially during the calving season in May and June. The annual number of reindeer killed by beasts of prey varies greatly; in recent years, it has been over 2000 a year.

The condition of pastures is being assessed through field studies and satellite image analyses carried out by the Finnish Game and Fisheries Research Institute and also in conjunction with forest inventories conducted by the Forest Research Institute. An assessment of all pastures in Finland's reindeer herding area will be completed before the end of the decade. The most important aspect of reindeer research is to study and monitor the relationship between the size of herds and the condition of pastures, especially wintertime lichen supply.

Covering nearly one third of the total area of Finland as it does, reindeer husbandry has in many places had a negative effect on biological diversity. Because herds are large and the pasturage systems have changed, many natural pastures are in poor condition. The damage is clearest on lichen-covered grounds, principally in forest and tundra ecosystems. The variety of plant species is declining and regeneration of deciduous forests has proved difficult. Areas used for grazing reindeer have fewer mycorrhizae and soil organisms than elsewhere.

According to the Reindeer Husbandry Act (848/1990), the maximum size of the herd after the annual slaughter, allowed per reindeer herders' association and per each member is subject to the decision of the Ministry of Agriculture and Forestry, and revised at 10-year intervals. These decisions are made to ensure that the number of grazing reindeer will not exceed the sustainable production of forage on the association's winter pastures. Associations, for their part, must ensure that the herd limit is not exceeded.

33. Reindeer husbandry will be developed in line with the carrying capacity of the environment and the maintenance of biological diversity. The condition of reindeer pastures will be improved by reducing maximum herd limits, by regulating the composition of the reindeer population and by upgrading pasture management through pasture rotation and other farming methods. The size of herds will be reduced, especially in northern Lapland.

Transport and urban infrastructure

The construction and running of an urban community has varying effects on biological diversity. Some of the effects are local, some extend further. The essential task of local and regional planning is to find ways to reconcile human needs and activities with the conservation of biological diversity.

Urban nature, too, is part of biological diversity, and parks and plantings greatly enhance the urban environment. Nature's own potential has not been exploited to the fullest, however, in urban development or in the planning and management of parks and plantings. As urban parks seldom form a contiguous network, animal and plant habitats tend to

become fragmented. From the human point of view, these parks have often deficiencies, too: they are often rather small, or difficult to access by foot or public transport. Dense community structures should not result in the destruction of important parks or other natural habitats in the urban environment.

The planning and steering of urban development has a crucial role in the maintenance of biodiversity. Land use is controlled by planning, which has proved an effective way of observing the goals of nature conservation. In many cases, building and other forms of urban development can be reconciled with the needs of nature without seriously compromising the needs of the community.

Traffic and the transport infrastructure have both a direct and an indirect impact on nature. Reduction of vegetation cover caused by construction of traffic routes, land extraction and stacking of surplus excavated material destroys biotypes, which may mean a loss of important habitat types and habitats of rare species. Traffic areas and routes divide and isolate ecosystems and plant and animal populations, which also applies to habitats in which man and nature interact, resulting in altered living conditions for the species native to them. Traffic infrastructure also contributes to the depletion of species, genetic exchange and biological diversity.

The Ministry of Transport and Communications is responsible for mitigating the impact on biodiversity caused by traffic and the construction and maintenance of transport infrastructure. In certain matters, this responsibility is shared with other authorities. An effort is made to mitigate both short and long term environmental damage through immediate counteraction and through broader measures involving international cooperation.

Environmental work in the sphere of the Ministry of Transport and Communications is steered by the *Action plan for reduction of environmental damage caused by transport*. Departments and agencies under the Ministry have also prepared environmental programmes to supplement and specify their activities in the environmental sector. In exercising their sectoral responsibility, the Ministry and its departments and agencies use environmental management systems, environmental impact assessment, legislation, economic incentives, training and monitoring.

Maintenance of road networks and related investment projects have a direct concrete impact on biodiversity. Here, environmental impact assessment examines the project's impact on biodiversity as well as prospects for mitigating the depletion of biodiversity and improving the living conditions of the species affected. Environmental impact assessment procedures must be followed whenever there is reason to believe that a project will have a significant impact.

The National Road Administration has launched its own development projects to develop roadsides into extensions of traditional biotopes and into migration routes for declining species native to meadows and eskers. This is a very important contribution to biological diversity, as the combined area of roadside habitats in southern Finland may well be much larger than that of protected areas or properly managed heritage landscapes.

The Ministry of Transport and Communications aims to systematically develop the monitoring of environmental impact and the production of data as part of the national environmental and natural resource accounting scheme currently under preparation, and to integrate this work with the national monitoring of biodiversity (Chapter 6.12). The Ministry also emphasizes the importance of research in this field.

34. Urban policy will be reformed to safeguard the diversity of urban environments. Special emphasis will be placed on the maintenance of parks and other notable natural sites, sound principles of maintenance will be observed, and urban national parks will be established.

35. The planning, construction and maintenance of transport infrastructure will be carried out with proper consideration for biodiversity and other environmental impacts.

36. The fragmentation of intact natural habitats caused by transport and urban infrastructure will be prevented, for instance by establishing "ecological corridors" and monitoring their efficacy.

National defence

In accordance with the principles adopted by the Ministry of Defence, the protection and conservation of biological diversity shall be integrated into all sectors of the defence administration.

Protection of the most important habitat types and natural sites of special interest in areas under military administration is governed by decision of the Ministry. These decisions seek to combine the operational requirements of the national defence and the conservation of ecology. Data on protected sites and sites of special interest are stored in the defence administration's geographical information system and available to all parties requiring them.

37. The defence administration will incorporate the conservation of biodiversity in the forthcoming reform of its environmental policy and in upgrading its environmental management system.

38. The defence administration will upgrade its centralized system of environmental protection and its network of

environmental representatives, whose duties include issues related to biological diversity.

39. The defence administration will pay due attention to environmental protection in carrying out manoeuvres and in the maintenance of manoeuvre sites.

6.4 Economic instruments and other incentives

A leading principle of the Convention on Biological Diversity is to integrate the maintenance of biological diversity into all economic activity. This requires that the value of biodiversity can be quantified more accurately and that the costs arising from the maintenance of biodiversity are integrated into national economic accounts (Convention on Biological Diversity, Article 11; see Appendix 1).

The Convention on Biological Diversity contains a number of articles which are relevant to incentives and economic aspects related to biodiversity. Article 11 stipulates the adoption of economically and socially sound incentives for the conservation and sustainable use of components of biological diversity. Several other articles also refer, directly or indirectly, to various incentives to achieve the objectives of the Convention. These articles include Article 5 on international cooperation, Article 6 on national strategies and integration of sectoral plans, Article 7 on identification of adverse impacts, Article 8 on species and ecosystems, Article 10 on means of integration of biodiversity into decision-making and Article 14 on national arrangements for responding to environmental impacts. The importance of exchange of data from socio-economic research is explicitly mentioned in Article 17.

6.4.1 Principles

The feasibility of economic incentives for environmental protection has been studied extensively. Since 1993, the OECD has examined the use of economic incentives to promote the conservation and sustainable use of components of biological diversity, in continuation of its earlier research on biological resources and environmental economics. It has also sent questionnaires for country reports on incentives already applied, conducted case studies, acquired supplementary data and published the report "*Saving Biological Diversity: Economic Incentives*" (OECD 1996).

Economic incentives for conservation and sustainable use of components of biological diversity can be classified as follows:

- *Positive incentives* are cash or other incentives to encourage governments, organizations and individuals to maintain biodiversity.
- *Disincentives* are used to discourage production and consumption which is harmful to biodiversity, by imposing the costs arising from the use/depletion of biological resources on the producer and consumer.
- *Indirect incentives* are trade mechanisms and other institutional conventions - creation of markets, definition of proprietor's rights, and so on - used to create new markets or improve price signals in the biological resources market.
- *Negative incentives* - for example, direct and indirect subventions/subsidies, price support, tax incentives and the production of infrastructure - contribute to the depletion of biodiversity (OECD 1996; see also OECD 1997b).

Negative incentives often derive from government-funded measures taken by authorities which in fact contribute to the depletion of biodiversity. Such depletion is normally unintentional, possibly as an inadvertent by-product of some other activity. If biodiversity is to be conserved, however, government policy should be consistent. If uncertainty surrounds any issue related to biodiversity, government policy should observe a cautionary principle, taking care not to overstep minimum 'safe' limits. Consideration for the biodiversity aspect must be integrated into other environmental policies as well.

Any policy of conservation and sustainable use of components of biological diversity - whether based on incentives or not - which fails to address the reasons for the decline of biodiversity, or the pressures on it, will not succeed in the long run. The pressures will remain until changes are made, either in activities causing the depletion of biodiversity, or in the incentives for maintaining biodiversity. One factor often cited as a significant reason for the decline in biodiversity is the failure of market forces to guarantee a favourable equilibrium between social

pressure to alter natural habitats and the need to protect them. But the loss of biodiversity is not always due to a lack of market or price signals; government policy, too, can have an unexpected and harmful impact on biodiversity.

Incentives can be aimed at three major groups: (1) people whose activities restore biological diversity and who bear the costs of these activities; (2) people who benefit from biodiversity commodities and appreciate biodiversity; and (3) people whose activities diminish biodiversity, affecting both groups (1) and (2).

Those who deplete biological resources should in principle bear the costs arising from the damage or from its prevention. Farmers, for example, and other maintainers of biodiversity could receive financial support to encourage use of traditional farming methods.

Economic incentives must be implemented in close cooperation with the relevant interest groups. No single means of policy alone can remove all threats to biodiversity. As a rule, the protection of biodiversity requires combinations of various instruments, in line with the complexity of its objectives. Because the selection of right combination varies with the situation, it is very difficult to lay down any general rules on which particular incentive or combination of incentives should be applied in each individual case.

All policy alternatives must be systematically analysed to minimize both public administrative costs and private costs. Incentives must not become an alternative to laws on nature conservation or to other standard instruments; they should be used to support and supplement other measures.

6.4.2 Measures

Certification

Certification refers to the procedure by which a product, process or service is guaranteed by a third party to meet widely agreed minimum requirements, or standards. A Forest Certificate granted for a forest, timber or forest product by a third party indicates that the production of the raw material, that is, the timber, complies with the principles of sustainable forestry. The certification system is a market-based instrument for guiding the management of commercial forests in an economically, ecologically, socially and culturally sustainable direction, while also promoting the marketing of the forest products. Certification may also increase consumers' interest and participation in the sustainable management and use of forests.

On April 16, 1997, the Working Group on Forest Certification Standards made a *proposal for a certification system for*

sustainable use and management of forests in Finland. The proposal was based on the resolutions of the United Nations Conference on the Environment and Development (UNCED 1992), the resolutions of the Ministerial Conference on the Protection of Forests in Europe (1993), the new Finnish laws on forests and nature conservation, the Environmental Programme for Forestry (1994-2005) and the related monitoring process, and the instructions and recommendations on forestry issued by forest organizations. The broad-based working group consisted of participants from 29 environmental, economic and social interest groups. Their work, which supplements that of the Commission for the Certification of Forests, was launched on June 20, 1996 by the Central Union of Agricultural Producers and Forest Owners, the World Wide Fund for Nature (WWF-Finland), the Finnish Forest Industries Federation and the Finnish Association for Nature Conservation.

The certification system proposed by the standardization working group is wholly voluntary, and gives special consideration to the situation of private smallholders, and it can be applied both at regional and local level and also by individual forest owners. The primary level of implementation would be for all forests within the jurisdiction of forest centres, where regional federations of forestry associations would apply for certification. Alternatively, certification could also be issued for all forests within the jurisdiction of a particular forestry association, in which case the association itself would submit the application. In addition, private forests owners could apply for forest certification individually.

Regional certification is based on 37 criteria for sound management of healthy forests, maintenance and management of the biological diversity of forests, timber production and varied usage of forests. Other aspects of forest certification include the promotion of employment and special issues concerning the indigenous Sámi people. The economic sustainability of forestry and forest use has also been considered in the creation of the certification system. The system will be in force for five years (starting on 16 April, 1997) and subsequently reviewed on a consensus principle. A trial run of the system has been launched in the regions of Pirkanmaa, North Karelia and Lapland.

The certification criteria provide guidelines for the use of commercial forests by ensuring, for example, that forest habitats of ecological importance are preserved, decomposing and other trees essential for biological diversity are left on the site after harvesting, pesticides are not used unless absolutely necessary and damage caused by forestry to water systems is reduced. Regional programmes of objectives for forestry include surveys of regional biodiversity, including proposals for developing the structural features of the forests and redressing significant oversights in biodiversity protection. The programme of objectives will also include an evaluation of the economic impact of protecting biodiversity in commercial forests and provide a

set of measures for the promotion of employment. Application of the criteria will also promote the training and advice given to forest owners and people working in forestry.

40. The practical implementation of the certification system for sustainable use and management of commercial forests will be promoted, and an effort will be made to integrate it with reciprocal international systems of certification.

41. The conservation of biodiversity will be promoted by developing a system of certification proving the origin of goods such as natural products gathered from forests. The system will be developed as a cooperative effort between various relevant bodies.

Other economic instruments

The efficiency and practicability of environmental taxes, emission charges, subsidies and other economic instruments and their impact on biological diversity must be examined thoroughly before their implementation. Although widely adopted in environmental protection, the 'polluter pays' principle has not yet been applied to the conservation of biodiversity. Actual costs arising from environmental damage, however, are incurred by producers and consequently reflected in the prices of their products. The 'polluter pays' principle, however, may be too strict to be applied to problems concerning the erosion of biodiversity. This is a second-generation, or possibly a third-generation environmental problem, which is also closely related to the use of property. Transferring the costs of conservation to consumers, for instance, may prove difficult.

6.5 Maintenance and use of biodiversity at local and regional level

6.5.1 Principles

The conservation of biological diversity must be included in local and regional development programmes and plans. This will require close cooperation in planning between various authorities and interest groups. Regional environment centres, regional councils and local authorities have an important role in assessing the ecological value of areas within their jurisdiction, in taking protected sites into account in local and regional planning, in designating and tending to the management of protected sites and in providing environmental education and information (Convention on Biological Diversity, Articles 6, 7, 8, 10, 14; see Appendix 1).

The regional-level authorities responsible for the conservation and maintenance of biological diversity consist of regional councils formed by local authorities, government administered regional environment centres and the regional administrations of various sectoral authorities.

Regional environment centres and forest centres have a key role in promoting the exchange of information between authorities representing different levels and sectors of society and in the planning and coordination of environmental measures. Other regional authorities represent the Ministry of Transport and Communications, the Ministry of the Interior, the Ministry of Agriculture and Forestry, the Ministry of Trade and Industry, and the Ministry of Defence.

In cooperation with local authorities, other official bodies and representatives of trade and industry, regional councils draw up regional development plans (as provided by the Regional Development Act) which are used to allocate regional development funds and to coordinate the economy of

the region.

Regional councils are also responsible for the development of regional and communal structure. Areas reserved for conservation are indicated in regional plans, and the new Nature Conservation Act provides regional councils with new means of advancing the conservation of landscapes.

At local level, local authorities conserve and maintain biological diversity through land use planning. Apart from reserving areas for conservation, measures to this end include consideration of important habitats in planning the location of urban development, preservation of expansive construction-free land areas wherever possible, conservation of landscapes and preparation of shore plans. Other municipal functions which affect biodiversity include various strategic decisions and plans, management of municipal property and environmental education and information.

National measures for conservation of biological diversity may both enhance and hinder the actions of local authorities. Whether the effects of such measures are perceived as positive or negative sometimes depends on the length of the period under review. For example, improved conditions for business and employment is a positive effect. On the other hand, a decline in tax revenue would be seen as negative. Such losses, which were previously compensated by the state, are now incorporated in the state appropriations paid to local authorities, but their amount has decreased in recent years.

6.5.2 Measures

Regional level

Regional environment centres coordinate information exchange between the authorities, researchers and other groups that use nature for either professional or recreational purposes. Geographical information systems provide a practical tool for closer cooperation between these parties.

To ensure the conservation of biological diversity, regional environment centres cooperate with landowners, forest centres, regional councils, forestry associations, the regional research stations of the Finnish Forest Research Institute, employment and economic development centres, road districts, municipalities and water protection associations. Other important partners include individual citizens, nature enthusiasts, hunting and fishing associations and other interest groups. The aim of this cooperation is to involve these various parties in the planning of biodiversity at as early a stage as possible, providing a basis for measures taken by authorities as stipulated in the Nature Conservation Act and for voluntary measures by landowners to promote biodiversity and forest management. Regional environment centres are also important channels of

information; for instance, they inform local authorities of the obligation laid down in the Nature Conservation Act to consider biological diversity in planning and in processing certain permit applications.

Regional development programmes require further strategic assessment of environmental impacts so as to establish the overall impact of the measures laid down in programmes on biological diversity and other aspects of the environment. Various forms of land use planning should be integrated so as to minimize deleterious effects on habitats and species.

42. Regional Councils will collaborate with environmental authorities to create methods of assessing the impact exerted on biodiversity by regional development programmes and regional planning.

43. Regional environment centres and relevant partners will conduct inventories and compile basic data related to local ecology, on the basis of which they will draft regular progress reports on biodiversity for their respective areas of jurisdiction.

44. Regional Councils will strive to promote trade and industry based on biodiversity by intensifying cooperation with entrepreneurs, local authorities and authorities in the fields of trade and industry, labour, education and the environment.

Local level

As the general coordinators of local development and planners of land use, local authorities have a central role in the protection of biological diversity. Charting sites that are important for biological diversity and taking them into account in land use planning and in development programmes is an essential task. Different forms of land use are integrated through physical planning, which, however, has often been based on inadequate information where biological diversity is concerned. In many cases, physical planning has also lacked the appropriate methods and consistent goals for the conservation of biological diversity.

In recent years, more and more municipalities have begun to prepare local Agenda 21 action programmes for sustainable development, in which the conservation of biological diversity as a global challenge for sustainable development is an integral part. Emphasizing the importance of dialogue, information exchange and local action programmes can provide a new way of increasing people's awareness of nature and the importance of the conservation of biological diversity.

45. The conservation of biodiversity will be integrated with the formulation of local Agenda 21 programmes.

46. Local authorities will chart areas within their

jurisdiction to establish sites of key importance to biodiversity in cooperation with regional environment centres and forest centres.

47. Local authorities will channel job-creation funds into the conservation of biodiversity, such as for the restoration of small waterbodies and other corresponding sites.

6.6 In situ conservation

The primary means of conserving biological diversity is the protection and use of various habitats within the contracting states by protecting the diversity and genetic variety of species in their in situ conditions and natural distribution areas. The concept of in situ conservation includes not only nature reserves but also measures and habitats outside protected areas (Convention on Biological Diversity. Article 8; see Appendix 1).

This chapter focuses on the conservation of biological diversity in nature reserves. The conservation and use of components of biological diversity outside nature reserves (commercial forests, farmland, etc.) is described in chapter 6.3, "Integration of the conservation of biological diversity into sectors of administration, trade and industry".

6.6.1 Principles

The objectives of the in situ conservation of biological diversity can be categorized as follows: (1) development of the network of protected areas, (2) management of protected areas and safeguarding the purpose for which they were originally designated, and (3) protection of species. The principles, objectives and measures for these tasks are presented later in this chapter. The following support measures are also required:

- Creation of a system for collecting data and monitoring biological diversity to assess the conservation status of various species and habitats and to identify and remove threats to them.

- Collection of data on the state of biological diversity and on the diversity of and any shortcomings in the network of nature reserves. The data shall be used as the basis for locating and preserving endangered species and habitats, for expanding the network of protected areas and for planning measures for the conservation and management of protected areas.

- Integration of the conservation of biological diversity within the sustainable use of nature through various forms of management and protection and ecologically sound methods of use. The responsibility for the conservation of

biological diversity outside the network of protected areas lies primarily with the users of the land (chapter 6.3).

6.6.2 Measures

Development of the network of protected areas

Establishing special areas of conservation is an important way of protecting Finnish ecosystems and their genetic resources. The creation of a network of protected areas is aimed especially at maintaining viable populations of species which cannot thrive in commercially used areas. As there is not enough data on the populations and distribution of a large number of species, the network should contain sufficient recurring samples of each habitat type so as to protect localized populations and thereby ensure the favourable conservation status of the entire species throughout all protected areas.

Implementation of ratified conservation programmes

Over the next few years, the designation of new protected areas will focus on the implementation of ratified nature conservation programmes. The difficulties in implementing various conservation programmes are due to problems concerning land ownership and the financial value of land marked for protection. So far, conservation programmes have been realized on about 140,000 hectares of private land, while about 270,000 hectares are waiting for implementation. In addition, the area of adopted regional and municipal plans is estimated to include several thousand hectares of state-owned land where protection has not yet been applied. The State's obligation to protect the habitats of endangered species will require a further few thousand hectares in addition to land included under existing conservation programmes.

To allocate and economize resources and to facilitate and harmonize decisions on individual cases, the State needs a national *strategy for the implementation of nature conservation,* defining the State's objectives for the implementation of conservation programmes, the regional objectives for nature conservation, the intended areas marked for protection, and regional means of protection. The strategy should also ensure the adoption of all the necessary instruments and cooperation with different authorities.

Protection of natural sites of national interest does not eliminate the aspect of nature conservation in planning and regional decision-making. The national network of protected areas and the conservation programmes will be supplemented by the means set forth in the new Nature Conservation Act, which have great relevance to the protection of small biotopes and the habitats of endangered species.

Creation of the Natura 2000 network of conservation areas

To maintain the favourable conservation status of habitats and plant and animal species defined in the EU Habitats Directive, member states shall propose areas requiring special protection under the Natura 2000 network of special areas of conservation. These areas may be nature reserves or other areas whose ecological value is protected by law.

On April 4, 1997, the Ministry of the Environment published a proposal for sites which should be included in the Natura 2000 network on the basis of proposals of regional environment centres. Consultation of landowners regarding the proposal began on 7 May, 1997. The proposal comprises 1,482 sites, with a total area of 4.9 million hectares. Some 3.5 million hectares of this area is on land, covering 11% of the total area of Finland. The largest areas are located in Lapland, but the majority are in the south of Finland. Most of the areas listed in the proposal have already been established as nature reserves or included in various conservation programmes or special plans. Sites other than these included in the proposal total 170,000 hectares. The proposal also includes 100,000 hectares of privately owned, currently unprotected land. The ecological value of sites included in the Natura 2000 proposals will be protected by the relevant Acts on nature conservation, forests, wilderness reserves, outdoor recreation, land extraction, water, rapids protection and building.

The proposed Natura 2000 network contains all biotopes mentioned in the EU Habitats Directive and a considerable number of habitats hosting species of Community interest. However, there is a large number of Finnish species whose habitats have been omitted from the proposal, which is partly because there is very little data available on certain insect species in particular and other species which have largely escaped public attention.

48. Finland will submit its national proposal for sites to be included in the Natura 2000 network to the EU Commission. The network is designed to protect the natural habitats of flora and fauna and to preserve natural habitat types of Community interest.

Representativeness and coverage of the nature reserve network

The network is not yet ideally representative because of the uneven distribution of Finnish nature reserves (figure 1), although the situation has improved slightly in the last few years. Many nature reserves have been established in unproductive areas with little economic value. Moreover, endangered Finnish biotopes have not been evaluated systematically. Some biotopes have always been rare and quite small and therefore susceptible to the destructive effects of human activity. Several vegetation types which

are characteristic of Finland's biogeographical variation are currently underrepresented in protected areas.

The coverage of the network is determined in line with the extent to which the impact of the use of land or biological resources has an impact on nature's own processes and above all by the extent to which factors threatening biological diversity can be eliminated in commercially used areas. The characteristics and ecological value of the target area may also affect the degree and extent of protection. The characteristics considered the most important in a protected area are the size and biological diversity of the area, the degree to which it is preserved in its natural state and the rarity or commonness of the species living there. The more efficient the commercial use of nature is, the more important the designation of nature reserves will become.

Opinion varies as to how large the total area of different habitats, for example, old-growth forests, should be in order to ensure sufficient protection of their native species. At the moment, it seems that at least about 10% of forest land areas should be protected if the decimation of their native populations is to be prevented. This estimate is based on the currently available data on critical population densities caused by regional fragmentation of habitats, the coverage of the network and its capacity to preserve all species belonging to a particular taxon, estimates of the surviving proportion of old-growth forests in Finland's woodlands, and forecasts based on ecological models. It must be noted, however, that the ecological requirements of different groups of organisms may vary greatly. The smaller the protected area and the fewer suitable habitats there are, the greater the impact of other species and the physical and chemical processes in the surrounding areas will be.

When the area of suitable habitats is small, the fragmentation of those habitats has a decisive impact. For example, species native to such a habitat will no longer be found in all suitable isolated habitats, or as densely as earlier, as small populations are at the greater risk of extinction; furthermore, isolated habitats are not likely to attract new individuals that might establish a new local population. Also, certain species may have a highly fragmented regional distribution, which makes the conservation of the remaining natural, often small, habitats, such as herb-rich forest, very important. Conservation of the diversity of species is therefore more important on a regional level (the network level) than in an individual protected area.

The degree to which an area has been preserved in its natural state is a key indicator of whether it needs protection. Unlike natural forests, commercial forests lack the structural variety and special characteristics which are vital for the survival of many endangered and rare species.

Apart from statutory conservation, Finland needs new forms

of preserving biodiversity in order to treat nature with greater respect and caution. The network of protected areas will also require more flexible approaches to conservation enabling sites to be protected for varying periods of time and in various degrees.

Overall assessment of nature conservation

At the beginning of 1997, the Finnish Environment Institute launched a three-year project to conduct an inventory of the current state of Finnish nature reserves and to assess how well various biotopes and endangered or declining species are preserved in the network of protected areas. This will produce a new, more accurate overview of the coverage of Finnish conservation areas and programmes. The results of the project will be used to plan further conservation measures for 2000 and beyond. The project is being carried out in cooperation with the Nature Protection Unit of the Finnish Forest and Park Service and regional environment centres.

The project has eight parts: (1) forest and mire ecosystems; (2) coastal and inland water ecosystems; (3) geological and geomorphological formations and the related ecosystems; (4) the representativeness of the ecosystems in traditional landscape areas and means of protecting them; (5) promotion of the network of protected areas on either side of the Finnish-Russian border (the 'Green Belt'); (6) assessment of the diversity of waterfowl habitats and wetlands of national interest; (7) assessment of endangered Finnish habitats (the 'Red Book' on biotopes); and (8) the final report *"Representativeness and development priorities of the Finnish nature conservation system"*.

49. A national strategy will be formulated for the implementation of nature conservation programmes approved by the Council of State. The strategy will be based on a funding programme drafted in June 1996 by the Cabinet Economic Policy Committee, according to which the conservation programmes will be implemented by the year 2004.

50. In conjunction with a three-year research project launched early in 1997, Finland's network of nature reserves will be assessed to establish the extent to which it preserves a representative sample of Finnish ecosystems, and to gauge its long-term potential for maintaining biological diversity.

51. The role of the Forest Act (1096/96) and the natural management of commercial forests (forest management, funding of forest restoration) will be assessed to establish the extent to which they supplement Finland's network of nature reserves and contribute to the maintenance of biodiversity. Long-term prospects for preserving the biodiversity of Finnish forests will also be examined.

52. A survey will be conducted on endangered natural habitat-types and habitats defined as having special importance in the Forest Act. The survey will examine their distribution, their current protection status, and the means and cost of their protection.

Management of protected areas

Management of protected areas has been intensified in recent years by developing the administration and specifying the general principles of their management. Protected state-owned areas, which form the backbone of the Finnish system of nature reserves, are administered by two organizations, the Forest and Park Service and the Forest Research Institute. The Forest and Park Service has its own regional organization of six park areas to manage protected areas and supervise their use; at the Forest Research Institute, similar tasks are carried out by its regional network of research stations. Administrative rationalization is under way, and questions related to jurisdiction are being clarified.

The management of protected areas on state-owned land and, where applicable, large units of private land, largely follows the principles laid down and approved in 1991 by the Forest and Park Service. In 1994, Finland became the first European country to assess the status of its national protected areas as part of *Parks for Life*, the European action programme for nature reserves. The results of the assessment, along with the forest strategy published by the Ministry of the Environment that year, have had a major influence on recent developments in policy related to protected areas.

As nature reserves also contain areas which for some reason are no longer in a natural state, their ecology and biological diversity can be rehabilitated, for example, through the restoration of mires, or by starting controlled forest fires for natural regeneration of forests. Other measures of restoration or management designed to protect the biological diversity of forests or restore the original forest structure are also being developed in the forests of protected areas.

The main objective in the management and use of nature reserves is to conserve the biological diversity of the area. Increasing the biological diversity and restoring the natural state of former commercially exploited areas is a key priority in the management of state-owned protected areas. Construction of public amenities will focus on national parks and other protected areas which are in heaviest demand, whether as a result of eco-tourism or other reasons. With more new nature reserves being established, however, the present level of resources will not suffice to ensure their proper management and maintenance (chapter 8.4.1).

Demarcation of protected areas

A protected area should form as intact an ecological unit as possible (especially in terms of its hydrology, nutrient chain, geomorphology and microclimate), and, where possible, it should comprise a diverse variety of habitats.

The planning of protection has usually focused on the research of specific habitats and on defining the aims of protection and the demarcation of protected sites (mires, waterfowl habitats, herb-rich forests, etc.). In some cases, however, the results have been unfavourable to the ecology and coherence of the protected area, as various fringe and transitional ecosystems may have become 'fragmented' when only a small part of them is included in a protected area; transitional zones of peatland and mineral soil, for example, have been largely ignored in nature conservation, despite the fact that they have considerable ecological importance and host a significant variety of species. This is one of the problems that is being addressed in the overview of protected areas being compiled by the Finnish Environment Institute, particularly in assessing the extent to which the present network contains a representative sample of Finnish ecosystems.

Activities undertaken outside a protected area may damage its natural state and development, particularly if its boundaries are not demarcated carefully enough. The impact of such activities on the protected area should therefore be assessed at the planning stage, as well as the overall feasibility of using an approach that causes minimum damage to the area.

Occasionally, protected areas require a buffer zone where land use can be adjusted to the existing conditions so as to eliminate any risk to the natural state of the protected area or to the purpose of its protection. This is particularly important in cases of drainage, fertilization, clear felling, preparation of mineral soil or building a permanent forest road in the vicinity of the protected area. In practice, this has often proved difficult, despite the instructions issued by the Forest and Park Service, for example, which emphasize cooperation between forestry and local nature conservation. The need for buffer zones is assessed case by case.

53. The principles observed in the maintenance and use of nature reserves will be revised in line with the Convention of Biological Diversity, EU nature conservation directives and the amended Finnish Nature Conservation Act.

54. Resources will be allocated annually for the maintenance, management and ecological restoration (rehabilitation) of sites procured by the State and designated as nature reserves under the provisions of the Nature Conservation Act.

Measures for the protection of species

The purpose of the protection of species is to conserve viable populations and distributions of both indigenous species and foreign species which have become established in Finland. A further goal is to maintain genetic exchange within species and to preserve isolated gene stocks within a particular region or ecosystem to ensure the ability of the species to adapt to changing conditions. In some cases, in situ conservation of species may require constant attention. The protection of endangered species on state-owned land is the responsibility of the Forest and Park Service in parks under its administration, while regional environment centres and local authorities are responsible for the protection of species on private land.

The core provisions concerning the protection and exploitation of naturally occurring species are contained in the *Nature Conservation Act* (1096/1996), the *Hunting Act* (615/1993) and the *Fishing Act* (286/1982). Application of the Nature Conservation Act focuses specifically on in situ conservation. The Act and other provisions issued under it provide either absolute or regional protection for all wild mammals and birds which are not game or defined as pests under the Hunting Act. The Act also contain provisions on the monitoring and protection of endangered species, conservation plans for priority species placed under strict protection by the Council the State, and the obligation to report sightings of these species.

The Nature Conservation Act prohibits the destruction or deterioration of the breeding sites or resting places of species listed in Annex IV of the Habitats Directive (e.g. the flying squirrel, Arctic fox and Saimaa ringed seal), and the possession, transport and trade or exchange of these species, apart from game species mentioned in section 5 of the Hunting Act.

In addition to other sanctions for violating the provisions on species protected under Finnish nature conservation law, the Ministry of the Environment has set standard monetary values for flora and fauna which shall be pronounced forfeit in the event of a violation (Ministry Decision 1209/1995). This clear set of monetary values makes it easier for courts of law to pass rulings and order compensation for violations. They are also designed to act as a deterrent against deliberate violation of protection provisions. It should be noted, however, that the values set for plants have yet to be confirmed, as comments will be requested from regional environmental centres.

The principle of statutory protection is also incorporated in the Hunting Act. Hunting must comply with the principles of sustainable use and cause no unnecessary damage to nature. Game species are protected during breeding season, otter and wolverine all year round. Important game habitats or breeding sites may be protected as special game

protection sites, and specific rules can be issued on the use of the site and the conservation of its distinctive features.

The protection of species is laid down in other Acts as well. The Fishing Act (286/1983) prohibits the use of tackle which may be dangerous to other species. The *Off-Road Traffic Act* (1710/1995) can be applied to prohibit the use of snowmobiles in a specific area, while the *Water Traffic Act* (463/1996) can be applied to restrict the use of watercraft in a specific water area for a specific or indefinite period, if this is deemed necessary for ecological or recreational reasons, or other public interests. These restrictions have an important role in the protection of seals, particularly the Saimaa ringed seal.

Protection of important habitats

Under the new Nature Conservation Act and Forests Act, habitats important for biological diversity (generally less than one hectare in area), or 'key biotopes' and endangered biotopes, are now protected by law. Such habitats include springs, brooks, ponds and their surroundings, bluffs, herb-rich forests, certain mire types and other rare forest biotopes and their surroundings. The Nature Conservation Act contains a list of protected habitat types (e.g. wild woods rich in deciduous broad-leafed species, hazel woods, common alder woods and juniper meadows).

Protected habitat types and important habitats ('key biotopes') mentioned in the Forest Act can serve as a valuable supplement to the network of protected areas, that is, as ecological corridors or 'stepping-stones' along which species can migrate between larger, more intact natural areas. The overall assessment of the Finnish protected areas being compiled by the Finnish Environment Institute described earlier in this report will produce further information on endangered habitat types and the necessary measures for their protection.

Protection of endangered species

Protection of endangered species is essential to the conservation of biological diversity. In 1991, the number of species classified as 'endangered' in Finland was estimated at about 1,700, with 45% of these species living in forests (Committee Report 1991:30, Ministry of the Environment). Among those species whose decline was due to the commercial exploitation of forests, a significant proportion were species whose survival depends on various degrees of decomposing wood. Once the principles of sustainable use and management of commercial forests are widely adopted in forestry, the decline of forest-based species may be curbed.

At the beginning of 1997, a team of experts appointed by the Ministry of the Environment began a project to update information on the status of endangered Finnish species. The national survey is expected to be completed in 1998, and the regional (or 'bioregional') inventory in 1999. Observing the new classification system for endangered species launched by the World Conservation Union (IUCN), the project will monitor trends in the occurrence of endangered species on the basis of the report of the committee monitoring endangered species of flora and fauna.

The new Nature Conservation Act will facilitate the protection of endangered species, as it prohibits the destruction and deterioration of the habitats of priority species. These sites may be placed under special protection by regional environment centres. Their protection is ensured primarily by monitoring population trends and by taking local species into account in land use, which requires up-to-date information on species occurrence. Priority species will be noted in the new forest certification system as well.

On estimate, endangered Finnish species occur on about 100,000 sites, 22,000 of which have been entered in the UHEX register of endangered flora and fauna, which is maintained by the Finnish Environment Institute and forms part of the Environmental Data System. As yet, no group of organisms is entirely covered in the register, except for vascular plants, 90% of which are accounted for (Table 3). The development of the register has been rather slow because of a shortage of funds; so far, it contains entries on 22,000 established occurrences of endangered species and 34,000 sightings, which is only 20% of the collected data.

A more efficient system of collecting, organizing and storing data in the UHEX register is urgently needed both for commercial forests and nature reserves to facilitate protection of endangered species, the promotion of sustainable forestry and the implementation of the Nature Conservation Act and the Forests Act. Improving access to data in the register is also a priority.

Protection of endangered flora and fauna is based on species-specific protection plans containing proposals for

the management and protection of both the species itself and its habitat. Examples include the white-backed woodpecker, the white-tailed eagle and the Saimaa ringed seal, for which special sites are protected and special conservation measures taken, for example, winter feeding of the white-tailed eagle.

The Finnish Environment Institute also maintains a national register of nature reserves. The most urgent improvements planned for the register concern its expansion and conversion to meet the needs of the EU's Natura 2000 programme.

55. Finland will draft a revised list of its endangered species, with particular attention to new nature reserves and recent changes in Finnish legislation.

56. New approaches will be developed for the protection and management of endangered species, and the necessary resources will be allocated for charting sites which host endangered species, and for the drafting and implementation of protection plans.

Table 3. Endangered species entered in the UHEX register of endangered flora and fauna (status on July 28, 1997). The data below are mainly based on facts and figures presented by the committee monitoring endangered flora and fauna in 1991[1] (Finnish Environment Institute, Nature and Land Use Division). Not available/e-mail version 29.12.1997. Only in the printed version.

[1] Species entered in the register
[2] The number of species reported in recent handbooks on endangered species (bracket fungi, vascular plants, butterflies) differ slightly from those presented by the monitoring committee in Table 3. Apart from bracket fungi, the names of new species and their occurrence data included in these handbooks have not yet been entered in the UHEX register. Nevertheless, the number of species of vascular plants, butterflies, lichens and fungi given in the table are based on the most recent figures, bringing the sum total of endangered Finnish species to 1,724. The updated figures are given in brackets.

CITES

Signed in Washington 1973, the *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (CITES) took effect in 1976 and it has been ratified by 139 states (1997). The aim of the convention is to prevent international trade in endangered species of wild fauna and flora from threatening viable populations of these species. The CITES lists those endangered species whose trade is either prohibited or subject to a valid export or import licence. The Convention includes three Annexes restricting,

to various degrees, trade in these species, and their parts and derivatives.

Species listed in Annex I of the Convention are or may be in danger of extinction because of trade, for example, all monkeys and lemurs, the giant panda, great whales, big cats, elephants, all rhinoceros species, many raptors, cranes, pheasants and parrots, all sea turtles, certain species of crocodile and lizard, cryptobranchuses, and certain species of mussel, orchid and cactus. Species listed in Annex II may become endangered unless their trade is regulated or supervised, for example, primates, cats, whales, fur seals, birds of prey, crocodiles and tropical trees.

The CITES has had a significant effect on the restriction of trade in endangered species, their parts and derivatives (e.g. ivory) and is generally considered as the most effective and feasible of the existing international environmental conventions. There are, however, problems related to its enforcement, for instance in the case of tiger poaching and related illicit trade. Black-market trade in wild fauna and flora is still the largest illegal form of trade after drug trafficking, amounting to billions of US dollars every year. Although initially sceptical, legal traders of wild animals are now in favour of cooperation under the Convention, but the full implementation of the Convention will still need stricter sanctions and supervision, support from the public, more contracting parties and more information on the impact of trade restrictions on populations of endangered species.

The Contracting Parties have each appointed a national CITES management authority (in Finland, these authorities are the Ministry of the Environment and the Finnish Environment Institute) and a scientific authority (the Finnish Museum of Natural History). The CITES is applied in all EU member states (Council Regulation (EEA) No. 338/97 and Commission Regulation (EU) No. 939/97). Membership of the European Union brought certain changes to Finnish rules and regulations concerning international trade in endangered species, as movement of goods within the EU is now governed by different regulations from those related to trade with third countries. The import and export of specimens, parts or derivatives of flora and fauna listed in annexes to the CITES, including furs, skins and products made out of these, as well as their transit transport through Finland, is not allowed without a licence granted by the Finnish Environment Institute. The Institute grants 100-200 CITES licences a year. Within the European Union, the import or export of species listed in the CITES does not require a permit; instead, legal acquisition or import of specimens within the EU must be proved with an EU CITES certificate, which is granted by the Finnish Environment Institute. Compliance with the Convention at borders is supervised by the Customs. Finland has prepared a national action plan on illegal trade and confiscation of illegal goods. This will involve cooperation between administrative and scientific authorities and the Customs and, as necessary, the police,

veterinarians and plant inspectors.

Annual reports on the import and export of species listed in the CITES are sent to the secretariat of the Convention in Switzerland. The work of the secretariat is financed by the contracting states.

The new CITES directive approved by the EU in December 1996 introduces even stricter regulations on trade in endangered species; the directive came into force on June 1, 1997. The directive required amendments to the Nature Conservation Act, for example with regard to provisions on sanctions.

57. Cooperation between the authorities will be intensified in the supervision of trade in endangered species, including enforcement of the CITES Convention on International Trade in Endangered Species of Flora and Fauna.

6.7 Ex situ conservation

Ex situ conservation of biological diversity refers to the conservation of organisms of ecological, cultural and economic interest and their genetic resources outside their original habitats, such as in zoological gardens, wildlife parks, botanical gardens, arboretums, aquariums and gene, embryo and seed banks (Convention on Biological Diversity. Article 9; see Appendix 1).

6.7.1 Principles

Ex situ conservation of genetic material is one of the main points of emphasis in the Convention on Biological Diversity. Maintenance of genetic resources, particularly in developing countries, is arranged through project funding. Maintaining the necessary genetic resources for continued food production in the event of a drastic climate change entails that gene and seed banks contain a gene pool of the original stocks, breeds and varieties of cultivated and domesticated species so as to enable their future cultivation, and also to generally preserve biological diversity. The new genetic applications yielded by ex situ conservation may also help to promote the protection of biodiversity.

6.7.2 Measures

Today zoological gardens are important contributors to the conservation of rare or endangered wild animal species. Korkeasaari Zoo, for example, promotes biological diversity by:

- maintaining a large variety of animal species in as natural conditions as possible and applying the latest know-how in animal care;
- placing special emphasis on rare and endangered species;

- promoting the return of rare and endangered animals to nature;
- maintaining a large variety of vegetation from different parts of the world and emphasizing the importance of plants to the environment;
- providing education to schools and families:
- offering the public a chance to view wildlife; and
- carrying out research in the field.

At the moment, Korkeasaari Zoo is taking part in the ex situ conservation of a few dozen endangered species through the *European Endangered Species Programme* (EEP) launched by European zoos. Individual animals born in zoos will be returned to their original areas, circumstances permitting. The fish farms of the Finnish Game and Fisheries Research Institute breed practically all stocks of migratory fish which are of interest to fisheries, and several other stocks. In addition to endangered species, original stocks from specific waters are also bred at fish farms; this is done to prevent a decline of diversity within species caused by interbreeding of stocks. In 1996, a total of 19 species and 73 different stocks of fish and two species of crayfish were bred. Spawners numbered 109,000, with a biomass of 111 tonnes, 17 tonnes of which was salmon trout. The aim is to provide sufficient genetic variety in spawners of endangered stocks and species, so that stocked fish will represent remaining natural stocks as well as possible.

Keeping spawners at state-owned hatcheries is a significant way of conserving genetic material for fish species, particularly at times when natural breeding is endangered, disturbed or entirely ceased (as is the case with several species of migratory fish). As living gene banks, spawner stocks usually represent several different generations, providing a greater genetic variety of rare and endangered species and stocks than a single sexually mature generation captured in the wild would. Endangered stocks of valuable fish are also bred at privately owned hatcheries, while alevin and spawn are produced mainly at the hatcheries of Finnish Game and Fisheries Research Institute.

Extremely endangered species and species which are useful for horticulture and plant production are conserved at the Nordic Gene Bank. In addition to cooperation with the Nordic Gene Bank since 1989, Finland is participating in a joint Nordic project to create a gene bank in Lusaka, Zambia, for the needs of SADC countries. Launched in 1989, the project is run by the Swedish International Development Agency (SIDA) and is making encouraging progress.

The protection of the genetic diversity of Finnish domestic animals and cultivated plants combines both in situ and ex situ conservation. Certain breeds of domestic animals are conserved both in living populations and in embryo banks.

Ex situ conservation is gaining global importance. Many centres of ex situ conservation are being turned into biological parks or centres for the conservation and

sustainable use of biological diversity. Education services provided by these centres are being increased, as are practical demonstrations of ecosystems and conservation biology. Korkeasaari zoo, for example, has already increased its cooperation with comprehensive schools and will continue to do so, as resources permit.

58. Finland will preserve the genetic diversity of its commercial forests by establishing 'gene pool' forests and other gene banks, and by preserving the genetic diversity of cultivated forest stocks.

59. An extensive inventory will be compiled on the ex situ conservation of the original stocks and populations of both wild endangered species as well as cultivated and domesticated species. The inventory will then be reviewed as a basis for future action.

60. Endangered species will be placed under ex situ conservation in controlled conditions outside their natural habitats (zoos, special farms, etc.). These species and stocks will then be systematically re-introduced into the wild.

61. The genetic diversity of cultivated plants will be safeguarded by drafting a national genetic resource programme, by preserving the genetic material of native plants and cultivated plant stocks, and by contributing actively to the upkeep of the Nordic Gene Bank of agricultural and horticultural species of flora.

62. The genetic diversity of domesticated species will be safeguarded by drafting a comprehensive breeding programme for populations of farming stocks, by formulating a strategy for the conservation of native breeds and other rare domesticated species, by appointing a working group to coordinate research on sustainable use of the genetic resources of domesticated species and programmes for their breeding and conservation, and also by contributing actively to the upkeep of the Nordic Gene Bank of domesticated animal species.

63. A set of national ex situ conservation centres will be established and their role will be consolidated in the maintenance and use of biological diversity and related education services.

6.8 Regulation of non-native species and stocks and genetically modified organisms

The Contracting States shall, as far as possible and as appropriate, develop or maintain the necessary legislation against release of non-native species or genetically modified organisms into nature which may form permanent populations and threaten the existing ecosystems, habitats or original species in the contracting States. In accordance with Article 8(h), such species shall be eradicated

(Convention on Biological Diversity. Articles 8(g), 8(h), 19(3) and 19(4); see Appendix 1).

6.8.1 Principles

Non-native species

In Finland, the need to experiment with new species - mainly cultivated plants and domestic animals - dates from as early as the 18th century. During the 20th century, several non-native species of game animals (e.g. muskrat, white-tailed deer and Canadian beaver) have been introduced to create naturally breeding populations. Some species have been introduced unintentionally, for example, among cattle feed or seeds of cultivated plants. Some species never survive beyond the first season; others have remained in Finland since the Viking Age. Despite the large number of non-native species of plants and animals, we have little knowledge of their possible harmful impact on ecology. In most cases, non-native species have not displaced native Finnish species or harmed the ecosystems; nevertheless, there is evidence of certain negative effects.

Finnish legislation on non-native species has recently been amended. According to the Nature Conservation Act (section 43), non-native species may not be released into the wild if there is cause to suspect that they may became established permanently. Non-native plant species may not be planted or sown outside a garden, field or other built area. If an non-native species is known to spread into nature and constitute a risk to human health or the environment, stricter regulations may be provided to restrict the spread of the species.

Genetically modified organisms

Biotechnology has been used for thousands of years, as leavening for bread and for brewing beer, for instance. In the last few decades, however, new technology has been developed to produce genotypes which could not be produced naturally through mating or crossbreeding. With gene technology, the genes of different organisms can be transplanted from one species to another. For example, the genes of microbes or animals can be transplanted into plants or vice versa. Gene technology can reinforce or suppress the original properties of an organism or change them so much that the organism effectively becomes a new species.

Releasing genetically modified organisms (GMOs) - or living modified organisms (LMOs) - into the environment may harm its original biological diversity, as modified organisms may be more competitive than natural organisms and thereby take over their natural habitats. Crossbreeding with natural species may transfer genes from the modified organism to natural organisms, thereby reducing their genetic variety. In some cases, problems related to modified organisms are

similar to those caused by non-native species. The first genetically modified plant species are already arriving on the market.

Finland has a licensing system for genetically modified organisms. To prevent any harmful impact on the environment, the environmental risks caused by such organisms must always be assessed before their release into nature. Risk assessment is required even if the organisms are meant to be used in closed systems only.

Using genetically modified organisms may present indirect problems as well. In agriculture, the use of such organisms may accelerate the trend towards highly intensive agriculture. In certain cases, using plants which are immune to pesticides may lead to increased use of pesticides. On the other hand, gene technology may provide an alternative to conventional chemical forms of pest control.

The competent authority in charge of risk management related to gene technology is the Gene Technology Board administered by the Ministry of Social Affairs and Health. The Gene Technology Board must be notified of all sites where modified organisms are used and of any activities undertaken on such sites which may involve risks to human health or the environment. Any environmental experiments related to genetic research and development also require the Board's permission. A product which contains or consists of modified organisms may not be released into the Common Market unless the competent national authority is notified, and the member states shall decide jointly on its release by a qualified majority.

As the identification and prevention of environmental risks caused by genetically modified organisms has only just begun, the risks must be assessed case by case. Environmental experiments involving modified organisms have been conducted for less than ten years. Risk assessment requires information on the modified organism and its behaviour in nature, on the modification itself and on the surrounding environment. Special research should be done on modified organisms which are related to and may breed with species native to Finland.

6.8.2 Measures

Non-native species

Finland has paid very little attention to the harmful environmental effects of non-native species, although information on some individual species in plentiful. The entry of non-native species is now controlled to prevent any harm to Finnish species. This aim should be an overriding priority in nature reserves. It should also be noted that although the regulation of non-native species is laid down by law, they may nevertheless spread into the wild accidentally or through negligence.

64. A study will be conducted to assess the ecological and economic impact of non-native species occurring in Finland, focusing also on the potential risk of their spreading and means of preventing this.

65. Finland will strive to prevent non-native species from being released into the wild, and to eradicate those species which pose a potential threat to Finland's indigenous ecosystems, habitats or species.

Genetically modified organisms

The objectives of the national action plan for biological diversity include prevention of risks arising from the use of biotechnology and gene technology and promotion of the development of these technologies for the use of environmental protection. Important areas in biotechnical research include waste water treatment, cleaning of contaminated soil, development of clean technology for industry and risk assessment for biotechnology. Research in these fields requires cooperation between various institutions.

Adequate consideration for the environment is a key aim in all development of gene technology. Environmental risks caused by genetically modified organisms must be recognized and prevented without disturbing the natural ecological balance or reducing biological diversity. To this end, methods of risk assessment concerning genetically modified organisms are being developed with specific attention to Finnish conditions.

Risk assessment and prevention requires active supervision and control of R&D experiments and products released onto the market. Development of the risk assessment system in cooperation with the producers makes risks easier to predict, while also raising the producers' awareness of these risks.

Experiments in the research and development of gene technology and their impact on nature are monitored in line with the Gene Technology Act. The producer must include a monitoring plan in his notification and report the results of the experiments to the competent authority. These reports may then be used to monitor the effects of individual experiments; to ensure the safety of modified organisms in the long term as well, determination of any wider impact requires an improved system of supervision and monitoring.

Assessment of any harmful effects resulting from gene technology requires both background information on the current situation and data on changes caused by modified organisms. The use of modified plants and animals in agriculture is fairly well charted, but there is still little information on the possible spread of genetically modified organisms in the wild and their ecological impact.

The distribution and behaviour of micro-organisms in nature is largely unknown, which makes it very difficult to monitor and supervise them.

Assessment of the environmental impact of genetically modified organisms must consider indirect effects as well.

We need better resources for research, particularly on the long-term environmental effects of genetically modified organisms on the Finnish environment. This research should include the indirect effects of such organisms on biological diversity. Resources are also needed for basic research on microbe ecology and the environmental effects of genetically modified micro-organisms.

66. The environmental hazards caused by genetically modified organisms will be prevented in accordance with the Gene Technology Act.

67. The potential risks of experiments conducted in the wild with genetically modified organisms will be assessed in advance, and the environmental impact of modified organisms will be monitored.

68. Methods will be developed for controlling and monitoring the use of genetically modified organisms, and training will be increased so as to minimize the potential risks involved.

69. Authorities and expert institutions responsible for implementing the Gene Technology Act will enhance their capacity to investigate, assess and prevent environmental hazards arising from genetically modified organisms, e.g. through further research.

Biosafety protocol

In November 1995, the Second Conference of the Parties to the Convention on Biological Diversity decided to begin the preparation of an international biosafety protocol in accordance with Article 19(3) of the Convention. The purpose of the protocol is to regulate transboundary movement of genetically modified organisms.

Through the EU, Finland has been an active participant in the preparation of the international biosafety protocol, emphasizing the principles of risk management as a cornerstone of the protocol. Finland is supporting negotiations on the biosafety protocol and aims at having the draft of the protocol finished in 1998. Finland also promotes the development countries' expertise and administrative capacity to supervise biosafety.

70. *Finland will participate in international cooperation (OECD and Nordic cooperation) aimed at developing and monitoring risk management and inspections related to the control of genetically modified organisms.*

71. Finland will contribute to the drafting of the UNEP biosafety protocol on transboundary movement of genetically modified organisms.

6.9 Ownership of and access to genetic material

The Convention on Biological Diversity aims at safeguarding the sovereign rights of states over their genetic resources and to facilitate access to information and technologies related to genetic resources and their use. The aim is to ensure that the countries of origin of genetic resources will be compensated for the benefit arising from commercial use of their genetic resources. This is done to motivate the countries of origin, particularly developing countries, to protect their biological diversity. On the other hand, the Convention also ensures that industrial countries will have access to the genetic resources of developing countries so as to meet the needs of the biotechnical industry, for example. The Contracting Parties shall also, as necessary, take legislative, administrative or policy measures to ensure that any country providing genetic resources for the purpose of biotechnical research, particularly if it is a developing country, is given the opportunity to participate in this research. Moreover, this research should preferably be carried out in the country providing the genetic resources. Each Contracting Party shall take every practical measure to promote fair and equal access to the results and benefits derived from biotechnological research based on genetic material provided by the Contracting Parties, particularly when this is a developing country (Convention on Biological Diversity. Articles 15, 16(3) and 19(2): see Appendix 1).

6.9.1 Principles

Discussion on the future implementation of the Convention has frequently addressed the question of *ownership* of genetic resources, but legally speaking, this does not present a real problem. Although the Convention contains certain obligations concerning the distribution of benefit from genetic resources, these obligations only have legal effect *between the Contracting Parties*, in compliance with the international law.

None of the stipulations of the Convention requires changes to *national* property laws, nor are the contracting parties obliged to create civil laws governing ownership of natural genetic resources. Nevertheless, Finland must obviously have recourse to any legal action as might be required to ensure the fair distribution of benefits between states, particularly in the case of developing countries.

It is a wholly different matter again if the creation or reinforcement of ownership rights and other comparable rights are used as *incentives* for the use of genetic resources. Here, however, the contracting states have wide

discretionary powers.

The Convention on Biological Diversity recognizes the contracting parties' sovereign right to treat their natural organisms as biological resources and procure income from products derived from these organisms. In other words, organisms are placed in the same category as mineral or oil resources. Use of genetic resources in the pharmaceutical and biotechnical industries may be agreed on between the country using the resources and the country of origin.

The right to use genetic material is defined in the national laws of each country of origin. The Convention on Biological Diversity does not oblige the Contracting Parties to make special national provisions on the ownership of natural genetic resources.

At the moment, Finnish legislation does not contain any provisions on the ownership of natural genetic resources. *The Penal Code* (769/1990) lists those natural products which, under provisions on public right of access, may be freely gathered, even if these products are found on private land. Except for species referred to in the Nature Conservation Act, Hunting Act and Fishing Act, the gathering and commercial use of wild species is unrestricted for both Finnish citizens and foreign nationals (compare the *Act on Special Restrictions Concerning the Gathering of Natural Resources* (332/1955)).

6.9.2 Measures

The European Union is preparing a directive on the legal protection of biotechnical inventions. The proposed directive includes an article which permits any invention that is of significant benefit to the public good. The proposed directive does not, however, contain provisions on the distribution of benefit gained from genetic resources, nor are such provisions being drafted.

72. Finland will keep abreast of international trends in the patenting of genetic resources and related rights of access and ownership, and Finnish legislation will be revised accordingly.

6.10 Protecting the status of indigenous peoples

The Contracting Parties to the Convention on Biological Diversity shall recognize the close and traditional dependence of many indigenous and local communities on biological resources, and the desirability of sharing equitably the benefits arising from the use of traditional knowledge, innovations and practices relevant to the conservation of biological diversity and the sustainable use of its components (Convention on Biological Diversity. Article 8j; see Appendix 1).

6.10.1 Principles

In the interests of biodiversity, the sustainable use of biological resources in the northern hemisphere, and the traditional rights of the indigenous Sámi people, the use of natural resources should be subjected to careful scrutiny as an aspect of land use in the northern parts of Finland.

This pertains particularly to reindeer husbandry, fishing, hunting, gathering and other traditional Sámi forms of land use in relation to forestry, mining, trekking, tourism and the regulation of land use in large protected areas within the Sámi region (more than half of the land area of the region) (see also Chapter 6.3).

6.10.2 Measures

73. A study will be carried out on the sustainable development of land use in the sub-Arctic regions of northern Finland, including the regulation and compatibility of this development, and how it affects the livelihood of local communities and the Sámi heritage.

74. The management, use and protection of natural resources in regions inhabited by the Sámi population will be co-ordinated as a cooperative effort between the Sámi Parliament and other authorities so as to ensure the protection of indigenous livelihoods and Sámi culture.

6.11 Education, public awareness, training and information

The Contracting Parties, taking into account the special needs of developing countries, shall establish programmes for scientific and technical education and training in measures for the identification, conservation and sustainable use of biological diversity and its components and provide support for such education and training for the specific needs of developing countries (Convention on Biological Diversity. Articles 12 and 13; see Appendix 1).

6.11.1 Principles

The conservation of biological diversity should be based on broad public support and sharing of responsibility. The successful conservation and sustainable use of biological diversity starts with people's personal awareness of, interest in and relationship with nature and their understanding of the importance of biological diversity to mankind. Creating such awareness and interest is one of the greatest educational challenges of our time.

Integration of the conservation and sustainable use of

biological diversity into all fields of education may in the future provide better opportunities to create jobs in environmental management and develop commercial environmental technologies.

6.11.2 Measures

The education authorities have scientific and educational responsibility for promoting the conservation and sustainable use of biological diversity. Scientific responsibility refers to basic and applied research on biological diversity, which is financed by the Academy of Finland and the universities involved.

According to the development plan for education and academic research approved by the Council of State for 1995-2000, the principles of sustainable use shall be observed in the curricula and teaching provided at various levels of education. Environmental studies and research on biological resources will increasingly aim at identifying the prerequisites for sustainable development. The Ministry of Education has urged all universities to examine how their research programmes these principles into account.

The education authorities have actively advanced the conservation and promotion of biological diversity. Its main channels of influence include the Finnish Biodiversity Research Programme (FIBRE) coordinated by the Academy of Finland (1997-2002), current legislation on general and vocational education and the principles laid down in the national core curriculum.

The educational objectives concerning biological diversity are emphasized in both general and vocational education. General education should provide citizens with the knowledge, skills and attitudes necessary for the conservation and promotion of biological diversity; vocational training should provide the basic knowledge, skills and attitudes for the conservation and sustainable use of biological diversity in the practice of one's occupation, which applies equally to all levels of vocational specialization.

Cooperation between the educational authorities and defence forces and the Ministry of the Environment will be extremely important in biodiversity education, as will cooperation between the Ministries of the Environment, Agriculture and Forestry, Trade and Industry and Transport and Communications. Indeed, wide cooperation is required in the preparation of study programmes and training packages related to the conservation and sustainable use of biological diversity.

75. The maintenance and promotion of biological diversity will be given due attention in drafting the principles of the new national curriculum as part of forthcoming educational reforms.

76. The conservation and promotion of biological diversity will be incorporated into research conducted by specialized institutions of education, and into the curricula of these and other university-level institutions as well as the early education curriculum.

77. The conservation and sustainable use of biological diversity will be incorporated in vocational studies and academic studies in engineering, commerce, economics, social sciences, law and administration.

78. The education authorities will collaborate broadly to formulate syllabuses which promote the protection, management and sustainable use of biological diversity, integrating the study of its ecological, economic and social aspects.

79. Education institutions will cooperate with regional environment centres and municipal environmental authorities in drafting local or regional biodiversity reports, e.g. on the distribution of species of flora and fauna.

80. Public awareness will be raised by publishing brochures, handbooks and reports and by constructing new outdoor recreation facilities such as birdwatching towers, boardwalks and barbecue sites.

81. Nature reserves will be used more extensively for the purpose of nature education. Visitors' facilities at nature reserves will be developed into centres of education and information.

82. The defence forces will incorporate biodiversity in the environmental education provided to conscripts and permanent staff, particularly to those in charge of environmental affairs.

6.12 Research, monitoring and information systems

The Convention on Biological Diversity obliges the Contracting Parties to identify components of biological diversity important for its conservation and sustainable use, monitor the components of biological diversity through sampling and other techniques, paying particular attention to those requiring urgent conservation measures and those which offer the greatest potential for sustainable use. Meeting these obligations and expanding and using knowledge and skills concerning biodiversity and its sustainable use require greater cooperation in interdisciplinary research and improved opportunities for researchers specializing in biodiversity. Furthermore, setting measurable targets for conservation and sustainable use of biological diversity requires wider knowledge of the different components and functions of biodiversity, the related threats and approaches for the sustainable use of biological diversity. The Contracting Parties should identify those production

sectors and operations which have a considerable harmful effect on biological diversity, coordinate monitoring systems for such effects and maintain and organize the data gathered from monitoring these effects (Convention on Biological Diversity. Articles 7, 12, 17 and 18; see Appendix 1).

The Contracting Parties shall promote and encourage research which contributes to the conservation and sustainable use of biological diversity, particularly in developing countries, in accordance with decisions of the Conference of the Parties (COP) taken in consequence of recommendations of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) (Article 12). The Contracting Parties shall cooperate and promote, in keeping with the provisions of Articles 16, 18 and 20, in the use of scientific advances in biological diversity research in developing methods for conservation and sustainable use of biological resources (Article 12). Each Contracting Party shall endeavour to develop and carry out scientific research based on genetic resources provided by other Contracting Parties with the full participation of, and where possible in, such Contracting Parties (Article 15).

6.12.1 Principles

The Convention on Biological Diversity recognizes that there is a general lack of knowledge and information concerning biodiversity and a need to develop the scientific, technological and administrative capacities to plan and implement measures for the conservation and sustainable use of biological diversity. The sustainable economic exploitation of biodiversity and the encouragement of job creation also require research and development.

Research

The national action plan emphasizes that research data on biodiversity should be interdisciplinary, easy to apply and of a high international standard. This way, new research can be applied more readily in the ever-increasing amount of international cooperation and decision-making that concerns biodiversity.

The *LUMO Research Programme on Biological Diversity* coordinated by the Finnish Environment Institute, launched in 1993 and concluded at the end of 1996, served as a national clearing-house mechanism for the coordination of biodiversity research in universities and research institutes, particularly in non-traditional fields, and also for the exchange of information. However, all targets set for the programme were not achieved due to insufficient funding. Nevertheless, the basic data gathered under the programme proved useful in the preparation and follow-up of the Environmental Programme for Forestry (1994-2005), for example, and in the work of the Biodiversity Working Group

appointed by the Ministry of the Environment in 1995.

The priorities in the research of conservation and sustainable use of Finnish biological diversity include:

- Research, inventories and monitoring of Finnish species, genes and biotopes;
- Laying the foundations for effective conservation measures;
- Development of methods for the sustainable use of nature, and promotion of their implementation;
- Development of methods related to the restoration, regeneration and management of destroyed ecosystems and endangered species;
- Development of methods related to the assessment of the effectiveness of measures taken to conserve biological diversity.

Planning efficient measures for the protection of nature reserves and endangered species must be based on sufficient knowledge of the habitats and distributions and interactions of different species, and the risks affecting them.

Key points requiring further information and development in the research of biodiversity in forestry are presented in the third follow-up report of the Environmental Programme for Forestry (1994-2005).

Issues related to the conservation and sustainable use of biological diversity cannot be restricted to research on ecology or forestry alone. Socioeconomic aspects, too, are becoming increasingly important, and it is already obvious that most of the practical problems related to the conservation and sustainable use of biological diversity will be more of a socioeconomic than biological or ecological nature; research into the development of economic incentives, in particular, will be important. Interdisciplinary cooperation is essential in the implementation of the Convention on Biological Diversity as well.

Monitoring

The conservation of biological diversity and nature's regenerative capacity, and the protection of a safe, healthy environment requires up-to-date, reliable information on pressures being exerted on the environment, the state of the environment and the sustainable use of biological resources. Monitoring the state of the environment means continuous or regular collection, evaluation and reporting of data on natural changes and fluctuations in nature, pressures caused by human activities, and the impact of these changes and pressures on nature and human communities.

At the moment, the national monitoring of the state of Finnish biodiversity is rather poorly coordinated: current monitoring projects provide an incomplete overview of the

situation, and analysis of the material accrued from them is often inadequate in terms of biodiversity. While the monitoring system concerning the biodiversity of commercial forests is currently being developed under the national inventory of forests, as yet there are no special programmes for monitoring genetic diversity. A wholly new system of sample plots is needed for monitoring trends in endangered species and other rare natural occurrences. At the moment, most research on biodiversity is carried out by the Finnish Museum of Natural History, the Forest Research Institute, the Finnish Game and Fisheries Research Institute and the Finnish Environmental Institute. The Agricultural Research Centre, the Institute of Marine Research and several universities are also involved in the implementation of monitoring programmes.

The overall responsibility for monitoring the state of biological diversity and for evaluating the adequacy of the set conservation targets and the effectiveness of conservation measures lies with the environmental authorities. According to the Nature Conservation Act (1096/1996), the Ministry of the Environment must establish appropriate monitoring systems for the conservation of wild Finnish species and their habitats, so that their conservation status can be reliably assessed. The environmental administration supervises the organization and implementation of the national monitoring of biological diversity in cooperation with the Finnish Environment Institute, other ministries and research institutes under them. In order to ensure a cost-effective division of labour, the monitoring process must be carried out on a networked basis between different sectors. The responsibility for coordination of monitoring biodiversity lies with the Finnish Environment Institute.

The *European Environment Agency* (EEA, administered by the European Commission) and the European Information and Observation Network coordinated by the EEA produce non-biased, reliable and commensurate information for all institutions involved in planning, implementing or developing European environmental policy. The EEA works actively on issues related to biological diversity and bases its operations on long-term work programmes or more detailed one-year work programmes. The EEA is yet in the process of creating monitoring systems, which are partly to be based on existing data.

The European Topic Centre for Nature Conservation, which is run by the EEA, examines national proposals for sites to be included in the Natura 2000 network and the feasibility of maintaining the favourable conservation status of habitats and species of community interest by means of the proposed network. The assessments concerning Finland should begin at the end of 1997.

The EEA issues reports on the state of the European environment at three-year intervals on the basis of reports and information submitted by the member states. The first

report on the state of the European environment (*Europe's Environment, The Dobris Assessment*) was published in autumn 1995; one of its themes was the inadequacy of European environmental data.

The Finnish Environment Institute functions as the national focal point for environmental information, and is in charge of coordinating the exchange of information between Finland and the EEA. The Ministry of the Environment strives actively to participate in and influence the EEA's work, particularly its monitoring programmes, assessments and reports. The function of national focal points subordinate to the EEA is to gather both existing environmental data and new data on forests, inland waters, seas, coastal areas and topsoil.

Information systems

The contracting parties to the Convention on Biological Diversity are obliged to facilitate the exchange of information from all publicly available sources which is relevant to the conservation and sustainable use of biological diversity, taking into account the special needs of developing countries. Such exchange of information shall include exchange of technical, scientific and socioeconomic research findings, as well as information on training and surveying programmes, specialized knowledge, and indigenous and traditional knowledge. It shall also, where feasible, include repatriation of information.

Rapidly increasing international cooperation in biodiversity has created a global need for uniform collection and exchange of data. The *Biodiversity Information Network* (BIN 21), founded by scientists within the context of the Biodiversity Convention and Agenda 21 aims at disseminating biodiversity information worldwide to distributed databases via the Internet. This global data network compiled of national networks could be used to realize the objectives of the UNCED and particularly as a forum for scientists and authorities working on biodiversity. So far, however, the development of the network has been very slow.

The most important task for a *national biodiversity data network* would be to improve the exchange of information between ministries, research institutes, universities and other bodies. As a common information channel and discussion forum, the network could enable instant exchange of information on innovations related to biodiversity research worldwide. As part of the global network, the national network could:

- Provide information on past, current and future research projects on biodiversity in Finland;
- Function as one of the transmission networks for biodiversity data;
- Provide a forum for discussion and information for scientists, authorities and ecologists.

In addition to an *Internet-based national biodiversity network*, Finland needs a *distributed geographical information system on biodiversity and biological resources*, which could be used for information exchange between land-use planners.

The maintenance and dissemination of data files on molecular biology and gene technology in Finland is handled by a single supercomputer centre, the CSC Center for Scientific Computing, which acts as the Finnish node for the *European Molecular Biology Network* (EMBNet). CSC is run by the Ministry of Education and the State Computer Centre.

On May 5, 1994, the Council of State made a decision which sets forth aims, principles, measures and responsibilities for information management within government administration. The decision emphasizes the compatibility of the data systems used by various units of State administration and the elimination of overlaps in data collection so as to reduce unnecessary expense. The ministries are in charge of implementing the decision.

6.12.3 Measures

Research

The Council of State emphasizes the importance of developing resources related to biological diversity through an extensive interdisciplinary research programme (Decision of the Council of State, December 21, 1995). On June 5, 1996, the Administrative Board of the Academy of Finland approved the national *Finnish Biodiversity Research Programme (FIBRE)* for 1997-2002 proposed by the Council of State.

The aim of the research programme is to generate scientific data on biological diversity and its conservation and on the sustainable use of biological resources. Hopefully, the programme will also provide more information on social, legal and economic issues related to biodiversity and advance Finnish know-how in sectors defined in the Biodiversity Convention. The programme should also aim at bringing together the various scientists and research teams working on biodiversity and the conservation and use of biological resources, and to train experts to meet national and international requirements related to the conservation and sustainable use of biological diversity. The themes of the programme are: conservation of biological diversity as part of sustainable use of biological resources; conservation biology and the socioeconomics of nature conservation as a means of conserving biological diversity; and biotechnology and the maintenance of genetic biodiversity.

The research budget for the programme for 1997-1999 funded by the Academy of Finland is about FIM 30 million. The programme is also partly funded by the Technology

Development Centre (Tekes), the Ministry of Transport and Communications, the Ministry of Agriculture and Forestry, the Ministry of Foreign Affairs, the Ministry of the Environment, the Maj and Tor Nessling Foundation, the Central Union of Agricultural Producers and Forest Owners and the Finnish Forest Industries Federation, bringing the research funds for the first three-year period (1997-1999) to a total of about FIM 62 million, which is allocated to 58 different research projects.

Three years after the launch of the Biodiversity Programme, the need for information on biodiversity will be reassessed, and funding will be reallocated accordingly. The second round of applications for 2000-2002 will take place in 1999. Current project-implementers will have first priority to apply for extended funding. The research programme was launched in May 1997 and it is coordinated by the Department of Biology at the University of Turku.

83. The Finnish Biodiversity Research Programme (FIBRE) will be implemented under the supervision of the Academy of Finland.

84. The authorities and expert institutions responsible for implementing the Gene Technology Act will examine Finland's prospects for launching a programme of research to enhance Finnish expertise on genetically modified organisms.

85. Every effort will be made to further the forest certification system, particularly research on its ecological, social and economic criteria.

86. Taxonomic and ecological research on lesser known species will be augmented.

87. Research on endangered species will continue, and its content and scope will be determined by conservation priorities.

88. Research on the maintenance of biological diversity will continue, and research on the management and ecological restoration of natural habitats will be augmented.

Monitoring

Systems of environmental monitoring must be developed to yield more information on the state of and trends in biological diversity, biological resources and landscapes. Environmental monitoring, inventories of biological resources and the compilation of related statistics should provide the foundation for a system of biological resources accounting. Monitoring procedures should be further developed in cooperation with the other Nordic countries, and the commensurability of the results should be improved, using Nordic surveys and reports on endangered species and biogeographical research information on specific areas.

In its management strategy for 1997, the Ministry of the Environment entrusted the Finnish Environment Institute with the task of preparing, in cooperation with other State research institutes, a national programme for monitoring biodiversity. Monitoring procedures stipulated by EU directives on nature conservation will be planned and launched alongside this programme, which the Ministry will use as a basis for drafting a national system for monitoring biological diversity in 1997-1998.

As a part of the national programme, the ministries represented on the National Biodiversity Committee are responsible for monitoring the state of biodiversity within their respective spheres of jurisdiction. This will be done by developing existing programmes on environmental monitoring to serve the monitoring of biodiversity, by coordinating the centralized handling of data gathered by research institutes, universities, municipalities and environmental and forest authorities, and by drafting new monitoring programmes.

The coordination of biodiversity monitoring requires closer cooperation and a clearer division of labour. Setting up an extensive inventory system in turn requires a sound system of national coordination, and more resources may also be needed. The extent of the monitoring and the precise responsibilities of the various units of administration should be agreed on. The present system of monitoring and any perceived shortcomings in it must also be examined and used as a basis for proposals on future monitoring targets. A standard system for reporting data and distribution of costs must also be agreed on. Any questions concerning the ownership of these data and charges levied for their use must also be resolved. Development of the monitoring and reporting systems must be in line with related Nordic and European development work, particularly the work of the European Environment Agency (EEA).

Nordic cooperation in monitoring biodiversity is coordinated by the *working group on environmental monitoring and information* appointed by the Nordic Council of Ministers. The working group has also provided background information for the development of monitoring systems for neighbouring countries, and aims at making the Nordic systems widely known within the EU. Finland supports the intensification and improved coordination of the monitoring and development of criteria and indicators in the Nordic countries and the EU and in cooperation with its neighbouring countries. It is essential that the needs of biological diversity are supported by research and monitoring in all sectors.

The global environmental policy is mainly based on international agreements and their implementation, where Finland emphasizes the monitoring and assessment of their effectiveness. The United Nations Environmental Programme (UNEP) and the United Nations Economic Commission for Europe are important promoters of environmental monitoring as well. Finland takes an active role in the development of

monitoring within various organizations. The special characteristics of northern nature and its biological resources, for example, the boreal coniferous zone and the Baltic Sea, must be taken into account in preparing an international system of environmental monitoring and reporting.

89. A network will be established for monitoring the status of biological diversity in Finland. Negotiations will be initiated to decide its scale and content, the distribution of costs, and a related system of national and international reporting.

90. Finland will integrate its biodiversity monitoring with that of the Nordic Council of Ministers and the European Environment Agency (EEA).

91. The work currently done by museums of natural history will be assessed in the light of biodiversity, and a development plan will be drawn up on the basis of these assessments.

Information systems

For decision-making and other purposes the government, enterprises and various other organizations require up-to-date, high-quality data on biodiversity. The conservation and sustainable use of biological diversity, too, requires a common information system. The information base for the planning and administration of municipal land use should be improved to support the conservation and monitoring of biological diversity. Because of the huge amount of data and highly complex calculation routines, the management of biodiversity data on nearly all user levels calls for a *geographical information system*.

The information systems used for the administration of nature conservation have been developed over a period of ten years, applying a cross-sectoral approach deriving from the need to monitor nature conservation and biological diversity.

On February 6, 1997, the Ministry of the Environment set up a working group to plan and implement an *information system for nature conservation* based on the needs arising from the implementation of the new Nature Conservation Act. In addition, the Ministry of Agriculture and Forestry set up a working group to prepare a *distributed information system for natural resources*. The working group is expected to prepare a strategy for a geographical data system by the beginning of March 1998. The strategy will be used to promote the coordination of geographical data produced under the new Forest Act, for example.

The integration and standardization of national, regional and local geographical data systems and the development of common access to these data will require careful coordination by government authorities.

The following aspects must be considered in the development of the information systems: the needs of various users of the information, division of labour concerning data management, questions of ownership and access, information security, charges levied for use of the data, and the distribution of costs; in short, detailed 'rules of play' need to be established. To ensure that joint-access data are accurate and reliable, quality assurance must be paid special attention when data are collected from various sources.

92. A national information system on biodiversity will be established to serve the needs both of those authorities monitoring the state of biodiversity and clients requiring this information.

93. Information on biodiversity and geographical data on natural resources (which is currently found in a variety data systems) will be pooled to facilitate shared access, starting with the creation of an integrated information system for nature conservation and a distributed data system

for biological resources, which is being planned by the Ministry of Agriculture and Forestry.

94. The register of Finnish nature reserves and the UHEX register of endangered species of flora and fauna will be upgraded in both technology and content, and the entry of basic data will be completed.

95. A system of bio-resource accounting will be incorporated in the national accounting system.

96. A national, Internet-based biodiversity data network will be established to facilitate the nationwide distribution of data and to increase international exchange. A register of Finnish experts and expertise on biodiversity will be compiled and updated regularly for global distribution.

7 International obligations and cooperation

Finland has ratified over 100 international environmental agreements. These include several agreements committing the signatories to preserving biological diversity both in and outside protected areas. Furthermore, we have a commitment to fulfil the nature conservation directives of the EU, the aim of which is to safeguard the favourable conservation status of species and natural habitats of Community importance (Appendices 1 and 2).

The International Convention on Biological Diversity was signed at the UN Conference on Environment and Development (UNCED) in Rio de Janeiro on June 5, 1992. The convention entered into force internationally on December 29, 1993. Finland ratified the convention on July 27, 1994. To date, 168 countries have ratified the convention.

As an interim financing arrangement, the funding of the Convention on Biological Diversity is managed by the Global Environment Facility (GEF). Setting up this fund was a significant tangible result of the UNCED process. The fund supports projects undertaken to implement UN conventions on climate change, ozone and biological diversity. Funding is also allocated for the protection of international waters. The industrialized countries in particular would like to see the GEF converted into a permanent structure for financing the Convention on Biological Diversity as soon as possible.

In international cooperation, the conservation and sustainable use of biological diversity is of central importance particularly in bilateral and multilateral development cooperation, in the work of financial institutions supporting the UNCED process, such as the GEF, and in EU cooperation with developing countries that have joined the Lomé Convention. The cooperation focuses above all on the implementation of investigative and supportive measures in developing countries with a rich but vulnerable reserve of biological resources. Finland is seeking an active role in this kind of cooperation. It would be particularly important to undertake capacity building in developing countries in the area of biological diversity.

7.1 Nordic cooperation

7.1.1 Principles

Nordic cooperation on biological diversity is channelled through the Nordic Council of Ministers, which steers and administers Nordic cooperation. The focus and tangible goals of this environmental cooperation are outlined by the environment ministers of the five member states and set forth in a joint Nordic environmental strategy which is updated every two years.

Important areas for cooperation include protection of biological diversity and the marine environment, reduction of transboundary air pollution, environmental information and monitoring, cooperation with Central and East European (CEE) countries and neighbouring areas and environmental protection in land use. The inclusion of natural diversity protection in agriculture, forestry and fishing, for example, is being promoted through joint Nordic efforts.

The working group on nature conservation and recreation appointed by the Council of Ministers has funded several biological diversity projects. Finland has been actively involved in projects gathering experience in the implementation of the Convention on Biological Diversity in the agriculture and forestry sectors. Finland and Sweden have cooperated in drawing up a list of boreal habitats to be protected under the EU Habitats Directive. A monitoring working group appointed by the Council of Ministers is currently preparing a joint Nordic biological diversity monitoring programme (cf. section 6.12).

The Nordic countries are active in promoting preservation of biological diversity in CEE countries and neighbouring areas, particularly in the Baltic and Barents regions. Important areas of cooperation include improving the safety of nuclear power stations in these regions and of the handling of nuclear waste generated by these and other sources. In addition to Nordic financing, other international financing, particularly from the EU, will be sought to promote biological diversity in these regions.

7.1.2 Measures

97. Research and monitoring cooperation is to be intensified in joint projects undertaken by the Nordic Council of Ministers in the fields of nature conservation, environmental management and the sustainable use of natural resources.

98. The biodiversity aspect is to be incorporated in other areas of Nordic cooperation, for instance, in Baltic Sea cooperation.

7.2 Cooperation in Central and East European (CEE) countries and neighbouring areas

7.2.1 Principles

The state and future of biological diversity in Finland and Fenno-Scandinavia depends on cooperation in nature conservation, promotion of the sustainable use of natural resources and other environmental protection measures undertaken in our adjacent areas. In areas of Russia bordering on Finland there are old-growth forests and other unique natural features whose preservation should be

safeguarded. For example, Russian Karelia has a larger percentage of virgin primeval forests than any region in western Europe.

Safeguarding the viability of Finnish species not only requires measures in Finland, but also the preservation of migration routes, particularly towards Russia, a source of replenishment for Finnish species. This is particularly evident in the increased diversity of species towards eastern Kainuu. The taiga, still thriving in Russian Karelia, extends to northern Karelia and eastern Kainuu, making these border forests extremely valuable from the point of view of nature conservation.

The current goal is to set up an internationally credible network of protected areas covering the whole of Northwest Russia. The conservation of biological diversity should also be taken into account in developing commercial forestry methods.

Finland is assisting its adjacent areas to rehabilitate their environment, while also attempting to reduce transboundary environmental hazards that are exerting a harmful impact on Finland. The main target areas in this cooperation are Northwest Russia and the Baltic states. Individual cooperative projects also involve countries in Central and Eastern Europe, such as Poland and Belarus.

HELCOM

The Baltic Marine Environment Protection Commission (HELCOM) is an intergovernmental organization founded in conjunction with the Helsinki Convention of 1974. It has continued its work after the signing of the revised Helsinki Convention in 1992 (Appendix 2). The work of HELCOM is undertaken by the signatories of the convention, i.e. countries on the Baltic rim, and the EU. A number of international intergovernmental organizations and non-governmental organizations also participate as observers. The commission is administered by a secretariat based in Helsinki. The chairmanship of the commission rotates at two-year intervals through the signatories in alphabetical order. At the moment it is held by the EU, and at the end of June 1998 it will pass to Finland for the next two-year period.

HELCOM meets annually to examine the implementation of the Helsinki Convention and to promote the goals of the Convention through its decisions. The aim is to reduce pollution in the Baltic Sea by agreeing on the phase-out of all sources of pollution. The preservation of biological diversity in the marine environment was incorporated as a new goal in the 1992 convention (Appendix 2).

HELCOM also holds meetings of environment ministers to support and further the implementation of the Convention and the Baltic Sea Joint Comprehensive Environmental Action Programme. Ministerial meetings have been held in 1984, 1988, 1992 and 1994. The next ministerial meeting will be

held in spring 1998.

HELCOM has set up four expert committees. The Environment Committee deals with the monitoring and assessment of the state of the marine environment, the Technological Committee with pollution from land-based sources, the Maritime Committee with pollution caused by shipping, and the Combatting Committee with pollution from accidents at sea.

Scientists from various countries gather information in cooperation under HELCOM about the state of the Baltic Sea and its coastal waters (water quality, plants and animals) and the nature and amounts of substances polluting the sea. Summaries of these studies are published in the Baltic Sea Environment Proceedings series. The most recent assessment data on the state of the Baltic Sea have just been published (1989 — 1993). These data are used in drawing up programmes of action and recommendations for improving the state of the Baltic Sea.

The achievements of HELCOM cooperation include the revitalization of the sea eagle and seal populations thanks to a ban on environmentally harmful substances such as DDT and PCB in the Baltic Sea area. Lack of funding and negative attitudes towards environmental protection are, however, a recognized problem.

7.2.2 Measures

The Cabinet Foreign and Security Policy Committee approved the operative strategy for Finland's cooperation with CEE countries and neighbouring areas in May 1996. One major goal in this strategy is to reduce environmental risks in areas neighbouring Finland. Giving support to neighbouring areas in the field of biological diversity is also seen to be in our immediate national interests.

In 1997, Finland allocated about FIM 60 million for environmental projects in its adjacent areas (the entire environmental budget being FIM 220 million). The sustainable forestry and biological diversity development programme in Northwest Russia is a major project that will receive a total of FIM 5.7 million in 1997. This programme includes a network of nature reserves to be founded on both sides of the Finnish-Russian border (the Green Belt project).

Finland is participating in the preparation of Agenda 21, the plan of action for sustainable development in the Baltic Sea area. This work stems from the agreement signed by the environment ministers of the Baltic countries in Kalmar in October 1996. The programme includes a sustainable forestry development programme being prepared jointly by Finland and Lithuania. Finland is also in charge of integrating local programme work into the regional programme (Local Agenda 21). The plan of action will probably be completed in spring 1998. The Ministry of the Environment and the Ministry of Agriculture and Forestry have set up monitoring networks for this purpose.

The most important environmental requirements in CEE countries and Finland's neighbouring areas are: to reduce emissions polluting the Baltic Sea and air pollution causing acid rain; to improve the safety of nuclear reactors and nuclear waste handling; to strengthen environment administration, legislation, training and awareness; and to enhance environment protection in Arctic areas, particularly the Barents region. These measures will indirectly improve biological diversity and contribute to the preservation of viable ecosystems. The development of nature reserves and sustainable agriculture also have high priority.

Finland's programme of *environmental projects in its neighbouring areas* aims to reduce the amount of transboundary pollution affecting Finland. Implementation of this programme is to be harmonized with the Baltic Sea Joint Comprehensive Action Programme. The programme promotes joint environment protection projects in CEE countries and Finland's neighbouring areas. HELCOM is in the process of drawing up a list of threatened habitats in the Baltic Sea area.

Various forms of financing will be sought for the implementation of environmental projects in CEE countries and Finland's neighbouring areas, such as joint funding provided by international financial institutions, recipient countries and various contributing countries. Guarantees for loans to be granted for environment projects will also be promoted. In the future, more attention must be paid to the cost-effectiveness of these projects than with domestic investments. It is also important to involve the private sector in joint projects.

Finland has considerable expertise in the biological diversity of CEE countries and our neighbouring areas. This expertise should be supported and further developed, since knowledge of the biological diversity of our neighbouring areas is clearly linked to assessing future needs in the conservation of Finnish biological diversity. Protection cooperation in the Baltic Sea area is important, for instance, in planning the network of coastal and marine protection areas. Developing research cooperation concerning the biological diversity of the marine environment is also important.

99. The Agenda 21 for the Baltic Sea Region (a plan of action for sustainable development) will be formulated, and a programme of sustainable forestry and biodiversity protection will be implemented in northwest Russia, including the Green belt project, as part of Finland's cooperation with its adjacent areas.

100. Protection of the Baltic Sea is to be intensified by implementing proposals made by the Baltic Marine Environment Protection Commission, HELCOM.

101. Projects undertaken with the support or funding of the

Finnish government that have a significant impact on the biological diversity of CEE countries and Finland's neighbouring regions shall be implemented in accordance with Finnish legislation and the principles set forth in Finland's ratified environmental programmes, taking into account the conditions prevailing in the country concerned.

102. Environmental monitoring and environmental impact assessment in CEE countries and Finland's neighbouring regions is to be upgraded in conjunction with cooperation with these countries.

103. Opportunities for funding biodiversity projects in Finland's adjacent regions through EU programmes (PHARE, TACIS and Structural Funds) will be promoted.

104. Cooperation between Finland and the Baltic countries will be promoted in the spheres of nature conservation and sustainable forestry.

105. Finland will strive to promote research, development, education and public awareness aimed at capacity-building in the CEE countries and Finland's neighouring regions for the protection and sustainable use of biological resources.

7.3 Arctic cooperation

7.3.1 Principles

Finland is involved in Arctic environmental protection through the Arctic Council, founded in September 1996, in accordance with the Arctic Environment Protection Strategy approved in Rovaniemi in 1991 (the Rovaniemi process), and under the environment programme of the Barents Euro-Arctic Council.

The environment ministers of the countries involved in environmental protection cooperation under the Barents Euro-Arctic Council (Finland, Norway, Russia, Denmark, Sweden and Iceland, plus the EU Commission) decided in 1995 to include promotion of projects aiming at preserving biological diversity in the Council's work. This action is focused on environmental problems and hazards in Russia, but also includes protection of flora and fauna. The ministers of the Barents region approved the environment programme for the region in summer 1994. In its implementation, Finland emphasizes the protection and sustainable use of forests in the Russian portion of the Barents region and supporting the development of the Russian environmental administration in the region, for instance in connection with the Russian environment programme of the World Bank.

One aim of the programme is to curb emissions from industrial installations on the Kola Peninsula. Attempts are being made to channel loans from international financial institutions to the area. Finland is acting as chairman of the environment group until October 1997, when the chair

passes to Russia. Finland is also leading the forest protection project.

The Barents Euro-Arctic Council has no funding of its own; its principal role is in promoting preparations and in acting as an intergovernmental agreement mechanism. This multilateral work will require not only the contributions of the participating countries but also the harmonization of the activities and interests of national and international organizations, funding programmes and financial institutions. Russia's commitment is of vital importance in these projects.

7.3.2 Measures

106. The state of the Arctic environment will be monitored through participation in the Arctic Monitoring and Assessment Programme (AMAP).

107. The conservation of Arctic flora and fauna and their habitats will be promoted through participation in the CAFF programme (Conservation of Arctic Fauna and Flora).

108. The procedural guidelines coordinated by Finland for environmental impact assessment in Arctic regions will be implemented.

109. Environmental protection in the Barents region will be promoted by developing the protection and sustainable use of forests.

7.4 European cooperation

7.4.1 Principles

The ***Council of Europe*** is the most significant organ of cooperation for nature protection in Europe. It has conducted negotiations on the Convention on the Conservation of European Wildlife and Natural Habitats (also known as the European nature conservation convention or the Bern Convention). The Council has also prepared the Pan-European Biological and Landscape Diversity Strategy. The European meeting of environment ministers (Sofia 1995) assigned the task of finalizing this strategy to the Council of Europe and to the European office of UNEP, which plays an important part in integrating countries outside the Council of Europe in environment protection. The aim is to promote the preservation of biological diversity in CIS countries and other transition economies through concrete measures including the provision of international funding. The implementation of this programme is part of the Environment for Europe process coordinated by the ***UN Economic Commission for Europe*** (UN/ECE).

The Council of Europe's environmental strategy sets forth practical measures for implementing pan-European goals

related to biological and landscape diversity. Several liaison groups have been set up; they will report to the next ministerial meeting in Århus, Denmark in 1998. At that meeting, results achieved thus far will be assessed and any further measures decided upon. Finland is already at a fairly advanced stage of implementing the eleven points in the strategy.

Work is being done in the framework of the Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention) to create a network of protected areas (the EMERALD Network), which corresponds to the Natura 2000 network, but also incorporates protected areas in the countries of Central and Eastern Europe. This project is particularly important since it will involve the countries of Central and Eastern Europe in the practical work of preserving biological diversity. The EU will support the development of this network through its LIFE-Nature programme.

The ***European Union***, as a signatory to the Convention on Biological Diversity, is preparing a strategy to be published in 1998 as a Communication of the European Commission on a European Community Biodiversity Strategy.

A lack of coordination has been the major problem with environmental protection in the EU. The biodiversity strategy will improve this situation. The fundamental issue, however, is the need for assigning greater priority to biological diversity in all decision-making.

The EU's current environmental priority is the development of the Natura 2000 network of protected areas. Most Member States intend to make their national submissions for the Natura 2000 network, in accordance with the Habitats Directive, during 1997. The aim is to maintain the favourable conservation status of commonly defined habitat types and species by using the Natura 2000 network and other national means. The national submissions will be scrutinized in joint meetings involving the EU and the Member States. The EU will allocate funds from the LIFE-Nature fund to the development of the Natura 2000 network. Over three years of membership, Finland has received a total of about FIM 80 million for furthering nature protection.

The role of the EU in biological diversity cooperation with CEE countries and developing countries will be specified during 1997.

Biological diversity research is becoming a new area of focus for the EU STD programme. The biological diversity principles of forest and environment projects implemented by the EU have been defined in the Guidelines for Forest Sector Development Co-operation: Forests in Sustainable Development, Vol I-II (ECSC-EEC-EAEC, Brussels) published in spring 1997. The biological diversity cooperation of the EU will be primarily aimed at countries that have signed the Fourth ACP-EC Convention of Lomé.

7.4.2 Measures

The Fifth Environment Action Programme of the European Union 1992-2000 ('Towards sustainability') is currently being reviewed to ensure that its goals will be attained. The major issue in this review is the incorporation of environmental matters in agriculture, industry, energy production, transport and tourism. The review is also intended to improve the implementation of legislation, to enhance the use of instruments, to increase environmental awareness and to support the active role of the EU in international cooperation in the sphere of environmental protection.

For Finland, the important points in this review are to enhance EU measures in the protection of the Baltic Sea and in the sustainable development of the Baltic Sea area. Finland has emphasized the introduction of economic incentives and the reinforcement of environmental aspects in various sectors of the economy, particularly agriculture, transport and energy. Biological diversity should be considered in various spheres of the economy in the development of incentives, in raising environmental awareness and in the Community's international activities.

Increasing attention is being given to the implementation and monitoring of EU legislation in all Member States. EU regulations should be defined as minimum requirements wherever possible so that Member States can individually apply stricter legislation without hindering the functioning of the internal market. Provision should be made for the application of the 'environment guarantee' principle in harmonization regulations so that the vulnerability and other special characteristics of Finland's natural environment can be taken into account.

Finland is actively persuading the EU to take an active role in coping with global environmental problems such as the decline of biological diversity. Finland considers it important that the Council of Europe be used as a forum to develop actions aimed at preserving biological diversity in Europe, particularly so that the Russian Federation and other countries in Central and Eastern Europe can be involved. Finland is also participating in the preparation, development and implementation of the EU biodiversity strategy.

The aims in developing EU biodiversity policy are:

- Increased use of economic instruments wherever necessary so as to promote nature conservation. Subsidy systems that have an adverse effect on biological diversity will be discontinued and subsidies reallocated so as to give greater emphasis to biological diversity.

- EU subsidy programmes (PHARE, TACIS and the Structural Funds) will be strengthened so as to enable the

EU to contribute efficiently towards the alleviation of pollution in the Baltic Sea area and Finland's other neighbouring areas, the protection of biological diversity, improvement of the safety of nuclear power stations in Finland's neighbouring areas and the safe placement and handling of nuclear waste.

- The environmental impact assessment procedure adopted by the EU will be developed to promote the conversation of biological diversity and the sustainable use of its components. EIA will be extended to cover not only projects but various economic and political plans and programmes. EIA will be mandatory for all decisions concerning the use of EU funds or investments.

110. Finland will participate in the preparation, implementation and development of the EU Environment Policy and Biodiversity Strategy.

111. Finland will strive to ensure that the maintenance and sustainable use of biodiversity becomes a key consideration on all major EU decision-making.

7.5 Global cooperation

7.5.1 Principles

The implementation of the Convention on Biological Diversity is being guided and followed up by the Conference of Parties (COP), which has met annually since 1994. The COP has, in accordance with its first three-year programme, systematically gone through the articles of the Convention and launched further measures for each of them. The COP aims to discuss equally all three aims of the Convention — biological diversity protection, sustainable use and equitable benefit sharing. The next meeting (COP IV) will be held in Bratislava in May 1998.

The COP is assisted by the Subsidiary Body for Scientific, Technological and Technical Advice (SBSTTA), which meets annually. The COP, and the SBSTTA in particular, have promoted the development of national reporting and other monitoring systems related to the conservation of biological diversity and the sustainable use of its components, and the development of monitoring methods such as classification systems, criteria and indicators. The parties have set up a clearing house mechanism on the Internet to promote information exchange concerning monitoring, research and technology transfer.

In their work concerning the conservation of biological diversity and the sustainable use of its components, the parties have adopted an ecosystem approach. In 1995, the COP launched the preparation of a programme of work on marine and coastal biological diversity. In 1996, the COP approved a programme of work on agricultural biological diversity,

which stresses close cooperation between the FAO and the Convention. In 1996, the COP decided that the Secretariat of the Convention on Biological Diversity should begin to draw up a programme of work on forests and biological diversity that is meant to focus on developing biological diversity criteria and indicators and on surveying the impact of human activities, particularly forest management methods, on biological diversity in forests. The draft programme of work will be discussed at COP IV in spring 1998. Further measures on the biological diversity of inland waters will also be discussed. Liaison groups consisting of national experts are used in the preparation and implementation of programmes of work; the members for these are selected from rosters of experts submitted by the parties. Finland cooperated with the secretariat in organizing a meeting for preparing the programme of work on forests and biological diversity in Helsinki on May 25-28, 1997.

Work on the equitable sharing of the benefits of biological diversity has begun with the preparation of background reports and by encouraging parties to exchange information through the clearing house mechanism, specifically information on access to genetic resources, immaterial property related to biological diversity and national measures related to technology transfer. Further work on immaterial property will, in the short term, concentrate on information exchange concerning national practices and on the launch of cooperation between the Secretariat of the Convention, the World Intellectual Property Organization (WIPO) and the World Trade Organization (WTO). The stance of the developing countries is that issues related to the equitable sharing of benefits arising from the use of biological diversity, particularly from the use of genetic resources, such as technology transfer promotion and immaterial property, should be given priority in further work.

In 1995, the COP initiated negotiations for a protocol (the 'biosafety protocol') aimed at ensuring the safe handling, use and transboundary transfers of genetically modified organisms (see section 6.8). This protocol is scheduled for completion in 1998. Implementation of the protocol requires capacity-building related to know-how and administration of biosafety issues in developing countries.

In 1996, the COP began work on examining the role of indigenous peoples and local communities in the protection and sustainable use of biological diversity. Also, equitable sharing of economic benefits derived from the knowledge and practices of indigenous peoples and local communities with regard to biological diversity will be examined.

The conservation and sustainable use of biological diversity and the equitable sharing of benefits derived from natural resources requires that the biological diversity aspect be treated as an integrated aspect of international conventions and other cooperation concerning the environment and development. These aims should also be included in the work

of international organizations, in accordance with article 6b (the sectoral responsibility principle) of the Convention on Biological Diversity.

The Global Environment Facility (GEF)

The first phase (GEF I) ran from 1991 to 1994, the funding volume for the period being about FIM 6 billion. GEF II, whose funding plan for 1995-1997 is about FIM 11 billion, is halfway through to completion. About 40% of the funds are allocated to the biological diversity sector. The GEF is mainly being funded by OECD countries, and the principal beneficiaries are developing countries. The administration of the GEF is distributed between the World Bank, UNEP and the UN Development Programme (UNDP).

Environmental projects related to the Convention on Biological Diversity are being funded in developing countries and in transition economies. Funding is also allocated for the protection of international waters. The GEF has rapidly emerged as a central source of international funding for biological diversity research. Scientific research on biological diversity, above all taxonomy, systematics and ecology, occupy a central position in GEF projects. Although Finland has an exceptionally high level of expertise in these fields, Finnish expertise has not been used very much in GEF projects to date. GEF projects are mainly implemented by research institutions, consultant companies, universities and natural science museums.

GEF projects have focused on drawing up country-specific plans for the protection of species, the basic ecological, taxonomic and biogeographical mapping of biological diversity, and biotechnology development. Typical projects funded by GEF II include country studies and projects aiming to safeguard the biological diversity of globally important ecosystems. These include programmes for founding strict nature reserves in Mexico and Brazil, surveys of species endemism in the coral reefs of Eritrea and indigenous species in the Seychelles, a plan for the protection of the forested area of Bialowieca in Poland and a botanical survey of the rainforests of Choco in Columbia. There are about 50 projects under way at present. GEF projects are typically implemented on a very large scale. The funding for individual projects is on the order of FIM 4 to 80 million (USD 3 to 10 million).

The GEF was reorganized in 1994 and it is now an interim financing mechanism for the Convention on Biological Diversity. The first few years of the fund's existence went towards revising the GEF's operative strategies and procedures; the actual project work did not begin until 1996.

GEF funding priorities in the near future will be on enabling activities, including support of country studies and national strategies in biological diversity, and capacity building. In the long term, funding will be

allocated to support action plans affecting different ecosystems. The work of the GEF as a financing mechanism for the Convention on Biological Diversity will be assessed at COP IV in 1998.

The priorities of GEF biological diversity funding are:

In accordance with the Convention on Biological Diversity, partnerships will be set up between OECD countries on one side and developing countries and transition economies on the other to conduct national biological diversity surveys in the latter.

GEF national projects. The GEF will support national biological diversity survey projects in countries not involved in partnerships.

GEF Eastern Europe projects. Preparations are being launched for creating an environment protection plan in Russia (USD 20 million). Finland is well placed to participate in environment protection planning in the western taiga and in basic surveying of biological diversity.

GEF research projects (coordinated by UNEP). Site-specific research projects involving endangered species and ecosystems.

Regional biological diversity surveys. Projects under preparation include the Ocean Island Biodiversity project concentrating on the protection of endemic island species.

Inventory and sustainable use of biological resources. National studies will be carried out on the use of biological resources (genetic resources) in the farming of domesticated and cultivated species, and in the biotechnology and pharmaceuticals industries (e.g. the INBio project in Costa Rica). This will also be included in all national biological diversity surveys.

UNGASS

The UN General Assembly Special Session (UNGASS) was held in New York on June 23-27, 1997. The purpose of this session was to assess how well governments and international organizations have progressed in implementing the decisions taken at the Conference on Environment and Development (UNCED) five years earlier. The aim was also to guide the work of the UN Commission on Sustainable Development (CSD) and to select priorities for the near future in the promotion of sustainable development. Key emphasis was laid on forests, climate change and financing of measures to be undertaken to help developing countries.

UN Member States remain committed to attaining the goals agreed in Rio, but no new significant commitments to combat environmental problems were made. In terms of solving global environmental problems, the session was fairly unproductive. In the final report of the UNGASS, the outlook for

sustainable development is considered worse than five years ago. It was observed that the world's forested area is still shrinking and pollution levels are still rising. No agreement was reached on curbing emissions contributing to global warming; this decision was postponed until the Climate Conference in Kyoto in December 1997. Also, no commitments were made regarding further funding for environment protection measures in developing countries.

The UNGASS also failed to reach a decision about starting negotiations on an international forest agreement; instead, the assembly agreed to set up an open Intergovernmental Forum on Forests under the CSD. This Forum is intended to support the implementation of the suggestions for action submitted by the Intergovernmental Panel on Forests (IPF), which was set up under the CSD in 1995 and finished its work in February 1997, to monitor and report on progress in sustainable forestry and forest protection, and to assess outstanding issues in the work of the IPF, including trade and environment issues, technology transfer and funding. The Forum on Forests will report to the CSD in 1999. At the 2000 session of the CSD, a decision must be taken on future approaches to international forest affairs and, possibly, when to begin negotiations for an international forest convention.

7.5.2 Measures

Finland assigns key importance to the inclusion of biological diversity in global cooperation on the protection and sustainable use of forests, such as in the work of the Intergovernmental Forum on Forests and eventual negotiations concerning an international forest convention. Finland also stresses the promotion of sustainable forestry, the revision of production and consumption patterns and the development of economic instruments. Also, Finland emphasizes the harmonization of international trade and environmental objectives and the integration of sustainable development with various sectors of the economy. Furthermore, Finland lays emphasis on the efficient implementation of the Convention on Biological Diversity and the Desertification Convention, the continuation of Climate Convention negotiations, the protection of the seas and the importance of water ecosystems, the development of indicators of sustainable use of the natural environment in cooperation between various fields, as well as funding schemes and technology transfer.

Finland is taking an active role in drafting and implementing the programme of work on forests and biological diversity, while also supporting surveys on the interaction between biological diversity and forest ecosystems as well as the development of criteria and indicators for biological diversity, which is being done in cooperation with the Secretariat of the Convention on Biological Diversity and the Intergovernmental Forum on Forests and its successor.

Finland is supporting efforts to protect and maintain the

knowledge, innovations and practices related to the maintenance and sustainable use of biological diversity among indigenous people and local communities, and equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices. It is also important that the Sámi people participate in this cooperation together with other organizations representing indigenous peoples.

Finland is supporting the work of the Subsidiary Body for Scientific, Technological and Technical Advice (SBSTTA) of the Convention on Biological Diversity by promoting development of the information clearing house mechanism and by investing in the development of Finnish research in biological diversity, international exchange of information and cooperation.

112. Finland supports the efficient implementation of the obligations set forth in the Convention on Biological Diversity signed at the UN Conference on Environment and Development (UNCED, Rio de Janeiro 1992), as well as all UN decisions related to their implementation.

113. Finland supports the development and reinforcement of the Global Environment Facility (GEF) and, with due consideration to international developments, endorses its appointment as the permanent financial mechanism of the Convention on Biological Diversity.

114. Projects undertaken with the funding or support of the Finnish government that have a significant impact on the biological diversity of another country shall be implemented in accordance with Finnish legislation and the principles set forth in Finland's ratified environmental programmes, taking into account the conditions prevailing in the country concerned.

115. In the context of the OECD and other international cooperation, Finland will participate in the development of economic instruments for the maintenance of biological diversity.

116. Within the UN Commission on Sustainable Development (CSD), Finland will promote the drafting of an international forest convention, with due consideration to international developments in this field.

117. Finland will support the development of international law and conventions in accordance with the objectives of the Convention on Biological Diversity.

7.6 Development cooperation, improving access to and transfer of information and technology

Under the obligations of the Convention on Biological Diversity, the contracting industrialized countries are

responsible for funding the incremental costs arising from the implementation of the Convention in the developing countries, as calculated in accordance with principles determined by the Conference of Parties (COP). It is vital to the successful implementation of the Convention in the developing countries that the industrialized countries honour their commitments vis-à-vis funding and transfer of information and technology concerning the protection and sustainable use of biological diversity in developing countries. The Contracting Parties shall also promote cooperation in personnel training and expert exchange. (Convention on Biological Diversity. Articles 6, 7, 10, 11, 14, 18; see Appendix 1.)

7.6.1 Principles

The Convention on Biological Diversity is a 'new generation' environmental agreement in that it is as much a development cooperation agreement as an agreement on environmental conservation and nature protection. The main international sector that the convention involves is multilateral and bilateral development aid from industrialized countries to developing countries. This mechanism will help to support the developing countries in preserving their biological diversity and using it sustainably.

The developing countries should be reimbursed for the benefits derived from the use of their biological diversity. The industrialized countries should offer reimbursement in the form of financial aid and transfer of know-how and technology related to the protection and sustainable use of biological diversity. The convention involves a reciprocal obligation to adopt the preservation of biological diversity as a component of national decision-making and various spheres of trade, industry and government. It is hoped that the Convention will provide new motivation for protecting indigenous habitats as gene pools with potential economic value, particularly in the developing countries. This procedure should set a precedent: for the first times ecologically important habitats will be assigned intrinsic economic value in land use planning.

Developing countries are being assisted in the procurement of environmental technology and biodiversity expertise through the clearing house mechanism; also, support is being given to the efforts of developing countries to set up biotechnology industries that use biological resources sustainably and for the transfer of environmental technology.

The developing countries are required to compile country studies on biological diversity (species, genetic resources, major nature conservation sites) as a condition for extensive further funding through the GEF. In these country studies, the developing countries set their national priorities for the conservation of biological diversity and the sustainable use of its components. The main role of UNEP is to coordinate the implementation of country studies and

reports and to organize partnerships. The UNEP Guidelines on Country Studies were approved in 1994.

The preparedness of developing countries to receive help from the World Bank, the GEF and other financial institutions in the biological diversity sector will be limited until they complete their country studies and national strategies. Although most developing countries have begun work on them, their completion has been delayed. Funding decisions by the GEF are increasingly being hampered by a lack of preparation on the part of the recipient countries.

For the developing countries, the Convention on Biological Diversity:

- initiates increasing cooperation with OECD countries in the protection and sustainable use of the living natural environment;

- initiates the surveying of genetic resources;

- initiates development cooperation related to technology transfer (e.g. geographic information systems, remote surveying, biotechnology) through the clearing house mechanism;

- initiates development cooperation with industrialized countries aiming at the surveying of biological resources in a selected developing country, planning their economic use and developing protection systems (twinning).

The implementation of the Convention on Biological Diversity and the national action plan falls within the purview of the Ministry for Foreign Affairs, the Ministry of Trade and Industry and the Ministry of the Environment. The Ministry of Trade and Industry in particular, but also the two other ministries, are participating in the preparation of issues connected with technology transfer, technology commercialization, trade policy and immaterial rights related to biological diversity arising in the Convention and its follow-up.

The research programme on biological diversity coordinated by the Academy of Finland (1997-2002) includes research projects involving developing countries. FINNCHURCHAID could provide a further channel for development cooperation in the sphere of biodiversity.

7.6.2 Measures

Since the mid-1980s, Finnish development aid cooperation has aimed at supporting the efforts of developing countries to alleviate their environmental problems and take environmental aspects into account in all endeavours, for instance by conducting environmental impact assessments of projects. In the most recent strategies, such as the

development cooperation strategy for the 1990s (1993) and the Decision-in-Principle of the Council of State concerning development cooperation (1996), emphasis has been laid on helping the developing countries fulfil international environmental obligations.

It is a stated condition of the Finnish development cooperation strategy that the recipient country must participate in combating global environmental hazards. In bilateral development aid, the measures undertaken to combat the depletion of biological diversity are surveyed in cooperation with the target country.

The amount of aid allocated to target countries varies greatly according to the level of development or state of ecosystems in that country. Whenever possible the following points are considered in deciding the amount of aid to be given:

- support for the monitoring of biological diversity and for planning its protection and sustainable use;

- capacity building through training and research cooperation;

- sustainable use of biological resources and technology cooperation;

- support for *in situ* and *ex situ* conservation of biological diversity.

In order to include measures aiming at preserving biological diversity in developing countries an integral component of Finland's bilateral development aid cooperation, a fundamental analysis of the challenges posed by international conventions and a systematic survey of needs and opportunities for cooperation are needed as part of development cooperation programming. The monitoring of environmental targets in development aid cooperation also requires more work.

The protection and sustainable use of biological diversity has already been a long-standing component of certain cooperation projects in the forestry sector. In recent years, however, projects have been launched and prepared that primarily focus on preserving biological diversity in developing countries. Examples of this in official development cooperation include the protection of rainforests in the mountains of Tanzania, the development of forestry and forest protection in Laos, the forest project in Vietnam, the protection project for the Machu Picchu area in Peru, and regional cooperation to promote sustainable development in the forests of the Amazon. Support has been given to biological diversity research in the Peruvian Amazon as well as certain nature protection projects undertaken jointly by Finns and international non-governmental organizations. In 1997, new joint projects related to the Convention on Biological Diversity are being

planned with Nicaragua and Peru. Development projects for environmental monitoring are being prepared with Mozambique, Namibia and Kyrghyzstan. These projects include monitoring of biological diversity.

Projects based on bilateral grants always aim to improve the capacity of the recipient and to involve the beneficiaries of the projects and the people affected by them in the planning, implementation and monitoring. Transparency is ensured in project planning and implementation. The equitable sharing of the benefit derived from genetic resources is given special consideration when allocating funds for potential projects.

Finland provided about FIM 41 million per annum in funding for GEF projects in the three-year period 1994-1996 (total FIM 124 million).

The biological diversity projects of the Ministry for Foreign Affairs were listed for the first time in 1995.

118. Finland will strive, in the selection, planning and implementation of development cooperation projects, to improve capacity-building in the developing countries to fulfil the obligations of the Convention on Biological Diversity as regards research, monitoring, administration and the conservation and sustainable use of biological diversity.

119. Technology transfer and access to information related to the conservation and sustainable use of biodiversity in the developing countries will be increased in the context of development cooperation.

120. Training and education will be increased so as to improve the capacity of Finnish biodiversity experts to work in the developing countries and to participate as partners in international biodiversity projects implemented in developing countries.

121. The impact on biodiversity of development cooperation projects will be assessed by including biodiversity assessment in the selection, planning, implementation and result evaluation of development cooperation projects.

122. The implementation of biodiversity projects will be monitored and the quality of development cooperation will be improved, for instance through EIA procedure.

7.7 Prevention of transboundary hazards to biological diversity

7.7.1 Principles

Although the Convention on Biological Diversity affirms that all States have sovereign rights over their natural resources, any action undertaken within or beyond the national jurisdiction of any State must not exert an adverse

impact on the biological diversity of another State. If such damage is caused to another State, the Conference of Parties (COP) shall examine, on the basis of studies to be carried out, the issue of liability and redress (e.g. restoration and compensation).

The convention obligates the Contracting Parties to promote bilateral and regional cooperation and information exchange on issues and problems related to actions taken within the jurisdiction of one Contracting Party that may have an adverse impact on biological diversity of another State. Potentially affected States must be notified immediately, and action must be initiated to prevent or minimize hazards. As prescribed in the Convention, an intergovernmental biological diversity monitoring system or *early warning network* should be set up to monitor any potential threats to biological diversity, to notify States of them and to initiate measures to prevent them.

The early warning network would monitor established cultivated plant species and domestic animal species; gene banks, individuals or organizations handling genetic material; the genetic uniformity of cultivated plant species; climatic hazards to biological diversity; the introduction of foreign species; emissions and other ongoing sources of pollution; rapid habitat depletion; and overuse of species.

7.7.2 Measures

In this area, the implementation of the Convention on Biological Diversity and the national action plan is being undertaken as a joint effort primarily between the Ministry of the Environment, the Ministry of the Interior and the Ministry of Defence. Planning and preparation is the responsibility of the Ministry of the Environment, while implementation is the responsibility of the Ministry of the Interior.

In accordance with the Decree on the Frontier Guard, the Frontier Guard cooperates with the police in monitoring transports of hazardous substances, the prevention of water pollution and the observance of hunting and fishing regulations. These duties are included in the normal patrol and other monitoring activities undertaken by the Frontier Guard.

The official duties of the Frontier Guard, such as monitoring environmental damage at sea, could also include monitoring of significant damage to biological diversity, as well as participation in the creation of the early warning network described above. The Defence Forces could also participate in this work alongside their normal duties. The biological diversity early warning network to be set up in Finland should later be linked to the international early warning network.

123. It will be ensured that fishing practised in Finnish

waters in accordance with EU Common Fisheries Policy safeguards the preservation of natural stocks of salmon in the Baltic Sea.

124. The early warning network stipulated by the Convention on Biological Diversity will be established to monitor hazards to biodiversity and to initiate measures to prevent them.

8 Implementation, follow-up and revision of the action plan

8.1 Implementation of the action plan

Finland has recently made encouraging progress in the conservation and sustainable use of biological diversity, particularly in forestry and forest legislation. However, the changes that have occurred earlier are so extensive in some respects that there remains cause for concern regarding the future of Finland's biological diversity. The various branches of administration should continue to cooperate in efforts to preserve biological diversity, and their areas of responsibility in this work should be clarified.

The aim is that the measures proposed in the national action plan for biological diversity will gradually alter the functions of society in a direction more favourable for the conservation of biological diversity and its sustainable use. Furthermore, this should be achieved in a way that will not impair Finland's economic competitiveness in the long term. Achieving sustainable development as far as biological diversity is concerned above all requires a change in production and consumption habits with seriously harmful environmental effects. The national action plan outlines the basic approach that Finland should adopt. The development measures proposed here have been made as tangible as possible so that their implementation can be gauged or otherwise assessed.

The national implementation of the obligations of the Convention on Biological Diversity can be described as an adaptation process as shown in Figure 2.

Deeper and broader cooperation and networking are needed for implementing the action plan (Figure 3). New interactive preparation procedures are needed for planning and decision-making; such procedures are already being developed in some sectors, e.g. in agriculture and forestry. In addition to the environment administration, a key role is being played in this work by other branches of administration, trade and industry, the scientific community as well as citizens and non-governmental organizations. The action plan also needs the support of local administration, non-governmental organizations and individual citizens in order to succeed.

International measures and cooperation with international organizations are also important.

Some local authorities have already prepared their own biological diversity programmes. Local authorities can influence the implementation of the action plan in land use planning, in making official decisions, in monitoring the state of the environment and biological diversity in their municipalities, in implementing various environmentally oriented projects and in raising environmental awareness. The environmental administration and the internal affairs administration are cooperating in efforts to empower local authorities to maintain biological diversity.

It is important that the national action plan be widely publicized. For this purpose, the summary of the action plan is being prepared for both domestic and international use.

8.2 Monitoring the implementation of the action plan

The development measures proposed in the completed national action plan form the basis for monitoring its implementation and subsequent revision. Further information is needed, however, on the state of biological diversity, trends in the pressures affecting it, the realization of measures contributing to biological diversity and the effectiveness of the incentives chosen. This information is being generated through multi-disciplinary research, monitoring, control, statistics, accounting systems and various reports. The results of monitoring will be used as input in revising the action plan and in drawing up a new action plan when the time comes. As necessary, Finnish environmental policy will be subjected to international assessment to gauge its effectiveness; these assessments will also cover biological diversity.

By monitoring the implementation of the national action plan for biological diversity, we can estimate how well Finnish ministries, trade and industry have succeeded in changing trends that are harmful to biological diversity. The ministries and sectors in question will assess the implementation of the action plan in relation to action plans and strategies that they have themselves drawn up. The programmes and reports produced by the ministries also support their own work and the implementation of the national action plan.

National liaison network

A national liaison network comprising all branches of administration, trade and industry will be set up to follow up the implementation of the national action plan for biological diversity and to coordinate the national monitoring of the state of biological diversity in Finland. This liaison network will be set up early in 1998 at the latest.

This network or a separate working group will prepare the first progress report, which will be based on information submitted by the members of the network. This report will be available for the fifth Conference of Parties (COP V) to be held in 1999 or early 2000 or indeed for any other monitoring conference concerning the conservation and sustainable use of biological diversity.

The proposal for a national action plan for biological diversity will be extensively circulated for comments. The parties consulted will be asked to state whether the action plan needs to be debated in the Council of State and to nominate their representative for the national liaison network on biological diversity.

8.3 Duration of the action plan

The national action plan for biological diversity covers the period from 1997 to 2005. Thereafter it will be revised and updated at five-year intervals. The revision process will take account of monitoring data on the state and development of biological diversity and of new development areas such as the implementation and revision of EU environment programmes, updated Scandinavian environment strategies, the implementation of the recommendations of the UN Conference on Environment and Development (UNCED) and other international developments in the field.

8.4 Costs and resources

The implementation of the national action plan for biological diversity mostly involves developing the functions of branches of administration, trade and industry so as to allow for the maintenance of biological diversity. The ministries do not have significant extra resources available for implementing this action plan; rather, they will be functioning within the framework of their existing budgets. The costs of the measures proposed depend largely on how well these measures can be harmonized with other planning and development measures. The proposed measures and goals should in fact be considered at the initial planning stage.

Meanwhile, as the funds allocated to State administration decrease, so do resources available for environmental monitoring. Thus, it is vital to enhance biological diversity monitoring and to concentrate resources on areas where monitoring is vital.

The costs of *in situ* biodiversity conservation and the implementation of the proposed measures will be achieved largely within the framework budget of the Ministry of the Environment. However, the action plan proposes a further allocation for the management and maintenance of nature reserves acquired by the state under the Nature Conservation

Act, as justified below in section 8.4.1.

8.4.1 In situ conservation: costs and resources

Acquisition of nature reserves

Up to the beginning of 1996, about FIM 1050 million had been spent on land acquisitions and compensation paid under conservation programmes. In all, government land worth about FIM 280 million has been acquired for nature conservation purposes. The implementation of conservation programmes received a significant boost when the Cabinet Economic Policy Committee confirmed the nature conservation funding programme for 1996-2007 on June 4, 1996. Under this funding programme, a total of about FIM 3.2 billion will be spent on acquiring land for the State and for paying compensation to landowners. The aim is to ensure the resources needed for implementing the nature conservation programmes so that those programmes ratified by the Council of State can be implemented by the year 2004. Thus, the timing of this funding programme would coincide with that of the EU Natura 2000 network. The aim is to reach an agreement with the owners of land falling under the conservation programmes concerning the sale or exchange of, or compensation for, these land areas by the year 2000 so that funding will continue until 2007.

The funding programme not only makes provisions for nature conservation programmes but also for other comparable obligations incurred by the government, for instance through protected areas allocated in plans already ratified, particularly for the protection of endangered species and old-growth forests. Provisions have also been made for certain other future costs, such as those arising from the Natura 2000 network.

The budget for the funding programme is strongly weighted towards its beginning. Thus, regional environmental centres are well placed to respond to initiatives, offers of sale and applications for compensation from landowners within reasonable time, a point important for safeguarding the rights of the landowners.

As set forth in the Nature Conservation Act (1096/1996), landowners have the right to demand that land falling under a nature conservation programme be purchased by the state within a given time. The protection of Natura 2000 sites must be implemented through legislative, administrative or other measures within six years of the site being approved for inclusion in Natura 2000. This legal right does not apply to land areas approved for inclusion in the scheme before the Act came into effect. However, the option for rapid implementation of the scheme in such land areas is also provided for in the funding programme.

Sufficient annual resources for establishing protected areas under this funding programme were included in the second

supplementary State budget in 1996 and in the State budget for 1997. Slightly over FIM 300 million is available in 1997 for the implementation of conservation programmes. Also, FIM 200 million of the allocations for future years can be committed this year. (Figure 4).

Supplementary funding from the EU LIFE fund is available for protecting priority natural habitat types and the habitats of priority species referred to in EU nature conservation directives. In 1995-96, Finland received a total of FIM 45 million from this source. Preliminary data show that in 1997 FIM 35 million in EU funding will be received for similar projects. The funding opportunities offered by the EU Habitats Directive should also be used in the protection of priority species and habitats.

Maintenance of protected areas

Present resources are insufficient for the proper management and maintenance of the increasing number of nature reserves. The rapidly increasing number of new protected areas is creating pressures to increase the maintenance budget, particularly as existing protection programmes are still being funded out of the same programme described above. Furthermore, the decision-in-principle taken by the Council of State in summer 1996 concerning the protection of old-growth forests in northern Finland designates major expanses of new protected areas and extensions to existing ones.

In taking this decision to protect old-growth forests, the Council of State also decided on compensation for the effects this has on incomes and employment. According to the compensation plan, annual cumulative compensation of FIM 1.5 million will be paid from the allocation for the management and maintenance of nature reserves for use in northern Finland. In 2006, this cumulative compensation will have grown to FIM 15 million per annum. This will seriously hinder the quality of maintenance in nature reserves in southern Finland if the total allocation is not increased.

New protected areas contain an increasingly large proportion of natural environments and heritage environments that have been in commercial use and have thus lost their original ecological character. The restoration of their natural state and its continued management, and the maintenance of heritage environments, are the most expensive kind of maintenance work because they are labour-intensive. Increasing the overall allocation is also important because the availability of employment funds for nature reserve maintenance has become more difficult each year.

Nature reserve management and maintenance allocations will be increased by FIM 6.0 million per annum between 2002 and 2005.

In situ protection under the Forest Act: Costs and resources

Section 10 of the Forest Act (1093/1996) specifies seven habitats of outstanding importance for biological diversity. If such habitats are in their natural state or in a state closely resembling it, their management and maintenance should be undertaken so as to preserve their indigenous features.

No comprehensive inventory of priority habitats has yet been compiled. Preliminary surveys show that they account for about one per cent of the land area of commercial forests. The decrease in felling caused by protection of such habitats would be under one per cent, since it is usually possible to carry out limited fellings in protected areas. One per cent of the total stumpage price income amounts to about FIM 50 million per annum.

The costs of preserving the indigenous features of priority habitats are primarily borne by the landowner. Compensation is only available if such costs cause a major loss of income to a single landowner in a given area. The threshold level is usually four per cent of the income generated by the forest; the landowner is entitled to compensation for loss of income above this. Alternatively, the landowner can apply for a special permit as per section 11 of the Forest Act to manage and use the forest in such a way that his loss of income remains minor.

According to section 19 of the Act on the Financing of Sustainable Forestry (1094/1996), a landowner can apply for environmental subsidies for major extra costs and loss of income caused by use of the forest for purposes other than timber production. Environmental subsidies are not confined to priority habitats, but these take precedence in granting environment subsidies. According to section 20 of the Act on the Financing of Sustainable Forestry, funding can also be granted for individual forest management projects. About FIM 5 million is available in environmental subsidies for forestry in 1997. Preliminary estimates show that this allocation is sufficient for environmental subsidy applications concerning priority habitats.

Biological diversity protection in agricultural environments: Costs and resources

A summary of the extent of measures funded under the environmental programme for agriculture aiming at the management and maintenance of biological diversity in agricultural environments (1995-1999) will be obtained once the final report of the monitoring group for this programme is completed in March 1998. Preparations for the new environmental programme for agriculture will begin in 1998, but the impact of this programme in funding the management of biological diversity has not yet been assessed.