

**NATIONAL
BIODIVERSITY STRATEGY
of the
REPUBLIC OF CHILE**

**National Environmental Commission
DECEMBER 2003**

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Introduction

I. Background

The Convention on Biological Diversity, signed and ratified by Chile in 1994, defines biodiversity as the quantity and variety of living organisms on the planet, including genes, species, and ecosystems. As human beings depend on biological diversity for their survival, it is therefore possible to say that "biodiversity" is synonymous with "life on Earth." The Strategy presented herein acknowledges the importance of biodiversity as the core of life on earth and focuses on its conservation, including the sustainable use of its components. This commitment also recognizes that biodiversity conservation is in the interest of society as a whole and is an essential component of the development process.

All biodiversity has intrinsic value: grasslands, forests, flora and fauna do not exist only to serve human interests. Nevertheless, as anthropogenic activity exerts pressure on biodiversity far beyond that produced by natural change processes, the present Strategy examines the conservation of biological diversity from a human perspective.

Biodiversity includes ecosystems, species and communities of animal and plant species, their interrelationships and genetic resources. All things living in the sea, freshwater and land-based environments participate in multiple processes that influence climatic balance, water cycles, and soil evolution. Thus, biodiversity fulfills vital ecological functions for the system as a whole: Inhabitants of the soil contribute to the growth of all plants, including crops and break down organic and certain inorganic waste; plants, in all their habitats (from the mountains to the sea bottom) sustain the soil and substratum, provide food for animals, and regulate cycles for drinking and irrigation water.

In recognizing the role of biodiversity, both the direct and indirect services it provides must be taken into account. Direct benefits are primarily in the form of plants and animals from a given ecosystem that provide food and raw materials. Genetic resources also provide direct benefits, with genes improving crop yield or increasing resistance to disease, or as medicinal and other products.

Indirect benefits arise from the interaction and feedback systems among organisms living in an ecosystem. These services include erosion control, water purification and storage by soil-based plants and microorganisms in a particular basin, and pollination and dispersion of seeds via insects, birds and mammals. Although less tangible, there are still other benefits that are of equally high value: scenic beauty, enjoyment of a landscape, the spiritual significance of a forest. Nature as manifested through biodiversity plays a role in the psychological and spiritual framework of human existence.

As a source of wealth and well being, biological diversity is indispensable for human welfare, cultural integrity, the livelihood of populations and the survival of present and

future generations. It plays a decisive role in the country's development and is a fundamental element in the eradication of poverty. For these reasons, the state of biological diversity is directly related to the pressure exerted on it by human activity. Moreover, the important contribution it makes to Chile's development is reflected in the national economy, where 20% of GDP corresponds to the commodity sectors of mining, agriculture and fisheries. In the area of exports, which accounts for 30% of Chile's GDP, natural resources or their derivatives play an even more important role, with mining representing 44% of exports, agriculture 14%, fisheries 9% and forestry 13%, for a total of 79%, compared to only 21% from the industrial sector of Chile's economy. The country's ten principal export products, representing nearly US\$9 Billion, are directly derived from natural resources.

Another important sector of the national economy related to biodiversity and the landscape is tourism, which has been growing in recent years. Information provided by this sector indicates that at least 60% of foreign tourists are drawn to Chile because of its natural environment and wide variety of ecosystems, which range from deserts in the north to rainforests and lakes in the south and finally the steppes and glaciers of the extreme southern zone.

Over the last two decades, Chile has experienced notable economic growth, which has exerted significant pressure on the country's natural heritage. This situation has been addressed through the enactment of laws and standards for environmental protection as well as the implementation of a National Environmental Management System. In spite of the threats to the environment caused by productive activities, notable advances have been achieved over the last decade through environmental legislation as well as due to the participation of environmental NGO's and grassroots organizations. Examples of these may be found in the projects implemented through the Environmental Protection Fund and other funds, notably those originating from the Global Environment Facility (GEF)/ UNDP Small Grants Programme (SGP) and the Fondo de las Américas.

In the area of conservation, Chile has implemented a Hunting Law and a Fishing and Aquaculture Law, both of which contain important provisions for species and ecosystem preservation. The country also has Nature Sanctuaries, Hunting-free areas, RAMSAR sites, Biosphere Reserves, and Marine Protected Areas, among others.

Other notable examples of environmental protection measures include the requirement for all new projects that may cause environmental damage to seek approval from the Environmental Impact Assessment System; the entering into force of primary and secondary standards for water and air quality and the biodiversity assessment required for Environmental Protection Fund (FPA in Spanish) projects and in the Ministry of Education's Environmental Education Programs. Lastly, it bears mention that by 2006 Chile will be treating 80% of wastewater thorough an extensive network of water treatment processes and plants for household and industrial wastewater. These measures will positively impact wilderness species and ecosystems and establish the country as a leader in this area in Latin America.

In the area of biodiversity conservation, Chile's substantial efforts to expand protected areas and improve their management is reflected in the fact that these areas presently

cover 18.6% of the nation's territory. In spite of this, to date the country has not put in place an effective national strategy for biodiversity conservation due to a lack of systematic, focused research that would provide detailed baseline information on the state of the nation's natural heritage, including which areas have been lost, recovered or maintained.

The present National Biodiversity Strategy aims to address these existing gaps with a national plan that includes a guiding framework and specific actions to be carried out for the benefit of country's natural heritage. The Strategy is based on the International Convention on Biological Diversity, which mentions that the trend of degradation of the natural environment may be reversed when both society in general and local communities in particular obtain benefits from the conservation and sustainable use of biological diversity. The Convention's objectives include conservation of biological diversity, sustainable use of its components, and the fair and equitable distribution of the benefits derived from the use of genetic resources.

Chile's biological diversity is important because of its special features, namely: the existence of unique species, ecosystems and territories with a high global ecological value (endemism); the presence of global biodiversity *hotspots*; available environmental services; high biological productivity; and the important economic value of its natural resources as the basis of the country's development. The National Environmental Agenda addresses the vulnerability of this natural heritage in the face of pressure from anthropogenic activity and from potential catastrophic natural phenomena such as earthquakes, climate change, ozone layer depletion, the effects of the el Niño current and others. The Agenda establishes the effective protection of the principal components of the natural heritage as one of Chile's fundamental environmental goals.

Historically, threats to the natural heritage and ecosystems have arisen from different sources, including pollution of water resources; unfriendly public and private practices; pressure from urban expansion; introduction of invasive species that alter existing biodiversity by replacement or extinction, or by the introduction of new plagues and diseases; pressure from increased extraction of natural resources for production (native forests, fishing catches, demand for water resources and expansion of plantations, among the most significant); loss of native forest; and the fragmentation of ecosystems and vulnerability of species, among others.

Within this historical context, the vulnerability of ecosystems and flora and fauna species has further increased from other environmental problems. For example, a significant percentage of soils have been eroded by traditional practices (78% of farmland), desertification is on the rise (62% of the national territory), and water resources are too limited for ensuring ecological flow (from the VIIa region to the North). In addition, marine ecosystems have traditionally been exploited unsustainably, native forests have decreased in quantity and quality from substitution, logging and extraction for fuel, and inland waters have experienced extensive point-source pollution and growing non-point pollution. One result of these problems is the fact that 35% of the 684 land-based vertebrate species that have been analyzed present are threatened in some way. Freshwater fish are the most affected group, with 44 species (100%) experiencing serious conservation problems.

Finally, the creation of a National Strategy for Biodiversity will improve the sustainable management of Chile's natural heritage, thus safeguarding its life-giving capacity and guaranteeing access to its benefits for the well being of present and future generations. The Strategy's first priority is to prevent the deterioration of the natural heritage, ensuring conservation of biodiversity on all three levels (gene, species, ecosystem) as well as conservation of relevant soil and water attributes and processes. This approach is simpler as well as more effective, efficient and equitable than recovery after the damage has already occurred.

After the present Strategy is approved by CONAMA's Ministerial Council, which is the highest Environmental Policy body in the country, the formulation of a National Action Plan will commence, to define how and when the proposed Strategy will be implemented. This process will include broad-based stakeholder participation by all interested sectors of society, valuing all contributions and establishing commitments from all parties. The Operations Committee of the National Biodiversity Action Plan will be charged with the Plan's coordination and implementation, and will include representatives from those public services directly involved in biodiversity conservation, with the close collaboration of NGO and private sector representatives, in order to ensure the broadest possible vision and commitment.

II. Regional Strategies

Prior to the formulation of the Strategy proposed herein, a process to create Regional Biodiversity Strategies was undertaken. Beginning in May 2002, Regional Strategies for Conservation and Sustainable Use of Biodiversity were formulated in each Region of Chile. This process included individual baseline studies on the state of Regional biodiversity conservation, identification of anthropogenic activities affecting it (positively and negatively), and agreements on strategic priorities and lines of action. The process was highly participatory and was designed to incorporate public and private stakeholders (authorities, public services, academics, private sector, and civil society) at an early stage in order to ensure consensus on the proposed actions. The process aimed to produce a structured set of objectives, priorities, agreements and actions for the conservation and sustainable use of biodiversity, defining the role of each stakeholder to fulfill the commitments established.

In all thirteen of Chile's Regions, discussions centered on achieving the best strategy to protect our biodiversity. One part of this dialogue focused on the need to increase the number of protected ecosystems, and to this end the Regional process identified priority sites for conservation for which actions could be undertaken under the present government's administration. Although this process left a large number of important sites for the second implementation phase, participants were able to identify those sites that combine relevant ecosystemic features with elements that are important to local inhabitants. Following this, a plan of action was prepared to effectively protect

biodiversity in each of these sites, which include land-based, marine, freshwater and island environments.

The State of Biodiversity in Chile

The Environmental Framework Law (*Ley de Bases del Medio Ambiente*) (Title I, Article 2) defines biological diversity as “Variability among living organisms which are part of all terrestrial and aquatic ecosystems. This includes the diversity within a single species, among species and among ecosystems.”

Biological diversity in Chile presents unique features that, although perhaps not comparable in richness to other places on the planet such as the tropical regions, are valuable nevertheless for their endemism, a product of the geographic and vegetative exclusivity arising from the country’s isolation by the Andes mountain range, the Pacific Ocean, the Atacama desert and the polar ice caps. This singular diversity, characterized by a geography and latitude ranging from subtropical to sub-antarctic, have created a country of great ecosystemic richness, a land of mountains, valleys, and climates that is unique on the planet.

Conservation efforts in Chile have generally arisen from the State apparatus, the principal instrument being the SNASPE (National System of State-protected Wilderness Areas), along with other legal norms enforced and managed by different ministries and public agencies. Nevertheless, one of the country’s persistent problems is the under-representation in the SNASPE of a significant part of the country’s ecosystems. The fact that many of these are large tracts of land that are officially, though ineffectively, protected aggravates this situation.

Although important instruments do exist, such as the compensation mechanisms currently in force within the Environmental Impact Assessment System—under which more than 50,000 hectares of national territory have been officially protected—the SNASPE as it currently stands is weak, due to postponement of a special Decree that would set adequate staffing levels in CONAF (the National Forestry Service, responsible for managing the SNASPE). Moreover, this situation has remained unresolved for two decades. However, the protection of nature is a task to be shared by society as a whole, and as such the public sector is not the only one called to contribute. Indeed, there has been a notable increase over the last decade in the willingness of those in the private sphere to participate in biodiversity protection efforts through the creation of networks of experts, NGOs and local civil society organizations. The establishment of private reserves, among other initiatives, has also attempted to address the deficiencies of the current public system. At the national level participation has been weak, though it is expected to improve as better legislation and programs to encourage private initiatives are put in place.

Over the last two centuries, scientific studies have accumulated a valuable pool of formal knowledge on the richness and nature of the Chilean biota. However, there is still much knowledge to be gained, as to date we still do not have a reasonably complete overview

of the biological diversity in this country. Deficiencies in taxonomy and classification remain and taxonomic inventories for groups of species and little-studied regions are lacking, especially for those flora and fauna species whose conservation is threatened.

In specific terms, a summary study carried out in the 1990s showed that there were close to 29,000 species in Chile, though this figure is thought to be quite conservative, given the fact that many taxa have not been adequately surveyed. Inventories are greatly lacking for arthropods and microorganisms such as bacteria, protists, nematodes, rotifers, arachnids, **quilópodos** and diplopods, among others. Thus, it is impossible to say how many of Chile's endemic species are currently threatened, and there is still insufficient knowledge of the potential contribution of those that do exist in areas such as medicine, industry or agricultural genetics.

As mentioned, although the number of species in Chile's biota is not great, its degree of endemism is outstanding, though it is higher in some regions of the country than in others. Examples of these high levels of endemism can be found in flora—55% of dycotiledon, 33% of gymnosperm and 29% of pteridophyte are to be found only in Chile. In terms of fauna, insect endemism approaches 44% of lepidoptera, 45% of coleoptera, 53% of diptera and 92% of heteroptera. In the area of vertebrates, amphibians demonstrate the highest degree of endemism, which approaches 78%, followed by reptiles at 59%. In contrast, endemism for bird species, the most numerous group, is much lower (only 2%).

For interspecies (genetic) diversity, there is no survey data such as that which exists for species. Inventories of genetic resources from surveys must be improved to provide more detailed knowledge of the many existing subspecies, which could be considered a preliminary indicator of genetic variability of species in Chile. Genetic diversity is an important source of potential wealth for the country in future, for which reason it is most urgent to regulate access to these resources.

In terms of ecosystem diversity, classification is based primarily on physiognomy, vegetation and climatic attributes, and secondarily on the distribution of fauna. Nevertheless, there is no agreed-upon system for classifying ecosystems in Chile; on the contrary, the different systems that exist for classifying biota at both the regional and national level are for the most part incompatible.

Despite not being defined at the ecosystemic level, one of the most widely-used methods for classifying plant life identifies and organizes plant groups into vegetation landscapes, in a hierarchical system with three main levels: regional, sub-regional and vegetation formations. Under this scheme, desert covers the greatest surface area of the country (22%), followed by evergreen forests and **bosques turberas** (18%), high Andean steppe (17%), scrubland and sclerophyllous forest (10%), deciduous forest (8%), Andean-Patagonian forest (7%), Patagonian steppe (4%), and **bosque laurifolio** (3%).

The functioning of ecosystems in Chile has been studied little, and information is incomplete, making it impractical to analyze the diversity and variability of ecosystems at this level. Information is also lacking on the potential of Chilean biota, both specifically and at the ecosystemic level, to respond to possible changes in the global climate.

In the area of conservation, threats to the Chilean biota are recognized as an environmental problem, with species loss and modification of landscapes being noted since colonial times. In fact, a significant portion of the national biodiversity is experiencing problems of conservation, with these threats being expressed throughout the country and reflected in "red books." Categories used to classify species according to their conservation status (extinct, endangered, vulnerable, rare, undetermined, inadequately known) have been widely employed and have become a valuable tool for conservation programs at the national and international levels. However, there is presently no official procedure for classifying species in this way, though the Rules for Classification of Species, established under Law 19.300, are currently seeking approval.

An analysis of the state of conservation of species indicates that most of the Chilean biota has not been adequately studied; however, conservation problems can be identified in almost every one of the many different taxonomic groups. For vertebrates, only marine fish have not been classified as threatened, while amphibians and freshwater fish species have been identified as the most in danger of disappearing in a number of different parts of the country.

Available studies show that the number of threatened species varies from region to region. In general, the central regions of the country (V,VI, VII and X Regions) have the highest number, though different groups face problems in other regions, namely: mammals in the I and XII regions; birds in the V,VI and X regions; reptiles in regions II and V; and for amphibians and freshwater fish, the highest number of species with conservation problems are in the VIII, IX and X regions.

A higher-level analysis of the state of conservation reveals that threats to biological diversity are also expressed in landscapes and ecosystems. For example, deforestation and substitution of native forests in central Chile do not only imply the loss of certain species in a specific region but also the disappearance of the "bosque maulino," a plant formation specific to Chile, which is decreasing at the rate of eight percent per year. Throughout virtually the whole country, land-based ecoregions are experiencing conservation problems.

Thus, although most of the Chilean biota has not been classified for conservation purposes, available information indicates that an important percentage of it is in danger of disappearing locally or globally. The relationship with the biota to ecosystems (analyzed as ecoregions), indicates that these, too, are in a critical or vulnerable state. Thus, the challenge facing the country in the area of biological diversity centers on avoiding its further impoverishment as a result of different anthropogenic actions.

National Biodiversity Strategy

I. Strategic Framework

1. Vision

The goal of this Strategy is that Chile's biodiversity be protected, known and used sustainably by all sectors of society, conserving essential ecological processes of the biosphere and fostering an improved quality of life for present and future generations.

2. Foundation

The National Biodiversity Strategy is based on the country's commitment to the preservation, conservation, recovery and sustainable development of our biological diversity, and is based on the following fundamentals:

Participation: Different social sectors should participate in the definition and implementation of biodiversity conservation Strategies. The State seeks to ensure and promote participation and public consultation with the aim of understanding citizens' interests and needs, in order to build consensus around common objectives and actions.

Justice and Equity: The benefits arising from the sustainable use of biodiversity and the costs of conserving it should be fairly and equitably distributed among social, ethnic, gender, and generational groups.

Respect: All life forms and the different ways of knowing and using biodiversity sustainably that now exist and have been passed from generation to generation should be respected.

Commitment: A commitment should exist to preserve, recover, conserve and use biodiversity sustainably.

Responsibility: Society as a whole, and in particular all those involved in the present Strategy, should act responsibly for its effective implementation.

Principles

The following principles shall guide the implementation of the National Biodiversity Strategy:

Prevention. The prevention of the deterioration of our biodiversity is less costly and more efficient, effective, and equitable than its recovery and replacement.

Individual and Collective Responsibility. All Chileans have the obligation to ensure sustainable use and to encourage conservation of the Chilean biodiversity.

Cooperation among actors. Complementary actions between private, public and civil agents are essential for the sustainable management of the biodiversity.

Informed Decision-making. Sustainable use of biodiversity should be founded upon accumulated experience and the best available information, with clearly established levels of risk.

Global Responsibility. The country reaffirms its international environmental commitments and its willingness to contribute to resolving global problems and to encouraging international cooperation.

Sustainable Use. There is a growing need to find, on the one hand, sustainable extraction methods for productive activities and, on the other hand, non-extractive alternatives for biodiversity that are both sustainable and profitable.

Environmental Education and Public Awareness. Ensuring that citizens value biodiversity will facilitate the implementation of local-level protection actions as well as foster the approval of policies and regulations at the national level.

Respect for Traditional Knowledge: All life forms and different types of knowledge and sustainable uses of biodiversity that are generated and transmitted from generation to generation should be respected.

Respect for public, private and common rights. Biodiversity management requires recognition of existing rights, whether private, public or community-based. At the same time, rights holders should respect and incorporate the concepts of environmental and social services provided by said biodiversity into their use of it.

Consideration of environmental services provided by biodiversity. The contribution of biodiversity as a source of wealth that sustains the many and varied productive activities of society and the general well being of the population must be taken into account.

3. General Objective

To conserve the country's biodiversity by fostering sustainable management to safeguard the life-giving capacity of biodiversity and guarantee access to its benefits for the well being of present and future generations.

4. Specific Objectives

To the extent possible, natural habitats and ecosystems shall be maintained and recovered, and those ecosystems modified in productive and urban settings shall be protected.

Actions shall be proposed towards the long-term survival of the representative biodiversity at the ecosystem, species and genetic levels, beginning with the protection of at least 10% of the surface area of each of the most relevant ecosystems before the year 2010.

Conditions and lines of action shall be set to ensure that viable populations of flora and fauna are maintained in natural environments; actions that allow for ex situ conservation shall be implemented.

Incentives shall be created for actions that demonstrate the value of biodiversity conservation and therefore encourage changes in the behavior and decision-making of economic actors directly involved in the use of biodiversity.

Extraction methods that prevent over-exploitation of resources and allow for sustainability of production shall be encouraged; at the same time, alternative non-extractive uses of the biodiversity that are sustainable and economically profitable shall also be encouraged.

The present coordination of the public administration system for biodiversity shall be strengthened and improved, in particular by the creation of a National System of Protected Areas, that is both public and private and land-based and aquatic, by enhancing the legal and institutional framework and by developing new management instruments such as land-use plans, different types of protected areas, standards, incentives and others.

Research activities required for building knowledge on conservation and sustainable use of the country's biodiversity shall be strengthened.

Currently available information systems and educational programs and their application to policy design and administration shall be strengthened, harmonized and integrated, with mechanisms established to provide opportunities for participation by different stakeholders wishing to access and/or support the system.

Knowledge shall be passed on through formal and informal education to strengthen citizens' relationship to and contact with biodiversity, thus facilitating learning on the

sustainable use of the natural heritage and knowledge of the attributes and functions of the biological diversity.

II. Strategic lines of action proposed for each objective

1. To ensure ECOSYSTEM CONSERVATION AND RECOVERY to significantly slow the loss of biological diversity before 2010.

- a) Ecosystem classification and establishment of conservation priorities: Open a discussion on ecoregions and ecosystems in order to prioritize and define where protection efforts will be concentrated, given that a significant percentage of ecosystems are not represented in the existing system of protected areas.
- b) Foster conservation, sustainable use and integration, as areas with environmental value or biogeographic wealth, all ecotone (transition) zones, such as the vegetation transition areas between the VII and X Regions of Chile.
- c) Control invasive species: apply a precautionary focus by using risk analysis in the introduction of potentially invasive exotic species. Improve existing tools for controlling invasive exotic species and establish eradication programs for these species, especially for fragile ecosystems, thus averting their propagation. Enhance mechanisms for authorizing the entry, handling and monitoring of exotic species in Chile.
- d) Establish biological or ecological corridors to ensure connectivity between protected zones and areas with significant biodiversity, with the aim of counterbalancing habitat fragmentation. These corridors shall allow for boosting the size and survival potential of the smallest populations.
- e) Promote the protection of publicly owned ecosystems not currently under official protection through the granting of concessions to third parties (including communities, NGOs and scientific research centers) in territories having high ecological value. The use of these areas must be compatible with their conservation.
- f) In ocean islands (Juan Fernández archipelago and Easter Island): strengthen measures and programs for eradicating invasive species, recovering endangered species and restoring ecosystems.
- g) Implement a strategy for conservation and sustainable use of Wetlands in Chile, which will allow the fulfillment of our commitments under the Ramsar Convention. Identify and correct legal gaps and strengthen institutions with environmental responsibilities. Strengthen existing initiatives, mainly in the North of the country, that are coordinated by public as well as private institutions and NGOs, thus increasing the potential of current preservation mechanisms and actions undertaken

in wetlands identified as priority conservation sites in regional biodiversity conservation Strategies.

- h) Conserve biodiversity in arid zones: Strengthen programs and policies for preventing and combating desertification and for mitigating the effects of drought. Ensure the full implementation of the National Action Plan to Combat Desertification.
- i) Mountain ecosystems: Formulate and promote programs, policies and approaches that integrate the environmental, economic, and social aspects of the sustainable development of mountainous zones, such as the Chilean Trail Project, and reinforce international cooperation for poverty eradication. Carry out programs to combat, where appropriate, deforestation, erosion, soil degradation, loss of biological diversity, the alteration of watercourses, and glacial retreat.
- j) Forests: Achieve sustainable extractive and non-extractive exploitation of forests, combining different sustainable uses of native forests: logging and extraction of other products and non-extractive uses such as nature tourism and preservation programs.
- k) Arrest the degradation of soils, thus allowing for conservation of the biological diversity that depends on this element and reducing sedimentation in riverbeds and estuaries and as a result decrease negative impacts on aquatic flora and fauna.
- l) Marine and coastal ecosystems: Develop a system of multiple use protected marine areas to promote conservation and sustainable use, taking into account their relation to land-based conservation.
- m) Integrate and validate the SNASPE System of State-protected wilderness areas that results from compensation schemes for investment projects submitted to the Environmental Impact Assessment System.

2. To ensure the preservation of SPECIES AND THE GENETIC HERITAGE

- a) Prioritize endangered species: enact Rules for Threatened Species Classification, creating an official State-supported categorization of species that will serve as a basic instrument for directing conservation efforts. Define the institutional structure needed for assigning species conservation responsibilities.
- b) Resolve institutional gaps for assuming conservation of endangered species. Implement a program for maintaining healthy populations of species forming part of the Chilean biodiversity, integrating and strengthening existing efforts.
- c) Review and enhance the current threatened species classification system, taking into account internationally accepted classification systems and the special features of the Chilean biodiversity.

- d) Ex situ conservation: establish an ex situ conservation program as a tool for recovering populations of flora and fauna species where feasible.
- e) Establish conditions for the development of genetic resources: Adopt regulatory frameworks to ensure access to genetic resources as well as the fair and equitable distribution of the benefits derived from their use. Strengthen local and national capacities in this area.
- f) Establish effective mechanisms and procedures for preventing or minimizing the environmental impacts of biotechnology development so as to ensure the safe transfer, handling, and use of every living organism modified in this way. Additionally, take steps to safeguard and enhance the benefits derived from the Chilean genetic heritage of nutritional and medicinal significance.

3. To promote SUSTAINABLE PRODUCTION PRACTICES that safeguard biodiversity

- a) Generate and validate experiences in the sustainable use of the biodiversity that are replicable throughout the country. Carry out this task in such a way that the private sector and local communities have control over their cultural and natural resources; that they organize themselves to make known their preferences and assessments of these resources and take ownership of the "business of conservation;" that they have access to information technologies and financial resources for these tasks.
- b) Sustainable Tourism: Promote the development of sustainable tourism, including nature tourism and ecotourism, with the aim of increasing the benefits experienced by host communities, establishing appropriate practices and responsibilities for the communities, tourism operators, tour companies and tourists (clients) of tourism services. At the same time, maintain the cultural and environmental integrity of said communities and further protect ecologically sensitive zones and the natural heritage. Promote the sustainable development of tourism and capacity building in this area to strengthen rural and local communities, to provide opportunities for growth in this economic sector, and to make an important contribution to ecosystem protection.
- c) Sustainable agriculture: Foster programs of sound, effective, and efficient practices for improving soil fertility and for combating agricultural pests and disease. Continue the policy of minimizing the use of agrochemicals and encouraging their effective use, and promoting organic agriculture, tree farming, biological control and integrated pest control, control of non-point water pollution, no-till farming and organic certification.
- d) Sustainable fishing: strengthen considerations for biodiversity protection in fishing and address the issues of pollution and introduction of exotic species through the National Aquaculture Policy, Rules for the Creation of Protected Marine Areas and the first Supplementary Resolution to the Environmental Aquaculture Rules (RAMA).

Maintain or recover fish populations to satisfactory levels, including those of depleted populations where possible, by the year 2015.

- e) Introduce the environmental and conservation variable in benthic resource management policies, spurring the creation of special areas for the exploitation and management of these resources. Implementation of "Areas for exploitation and management of benthic resources" should be encouraged in zones where they have not previously been implemented, and efficient mechanisms created for assisting small-scale fishermen in accessing these areas should be put in place.
- f) Sustainable Mining: increase compliance with environmental standards to promote mining operations that are responsible and respectful of the environment. Foster the highest environmental performance in all existing and future smelters.
- g) Sustainable forestry: recover over-exploited forests and strengthen forestry monitoring mechanisms, encouraging environmental certification for forestry and the sustainable management of native forests.
- h) Encourage and enforce compliance with current standards in all areas of production and foster fulfillment of commitments made under Clean Production Agreements and other mechanisms such as voluntary agreements, certification, green labels and Corporate Environmental Responsibility.
- i) Foster harmony between urban and peri-urban areas used for housing, industry and social infrastructure and areas having natural value or relic ecosystems representative of local or regional biodiversity. In this context, promote the integration of housing projects with conservation efforts, incorporating nature conservation areas in their design, or through indirect methods.

4. To strengthen INTERINSTITUTIONAL AND INTERSECTORIAL COORDINATION for the integrated management of biodiversity

- a) Improve the SNASPE: improve its legal framework and its future expansion. Clarify its legal status and officially link it to the country's Environmental Management System. This institutional clarification should be accompanied by efforts to increase the protection of lands under the SNASPE and their interconnection with other protected areas.
- b) Generate a model for the protection and administration of marine biodiversity that joins public and private efforts in the management of Marine and Coastal Protected Areas.
- c) Implement and strengthen the program for sustainable basin management so as to protect the biodiversity of freshwater ecosystems.

- d) Define clearly and reinforce institutional faculties for species protection, defining and strengthening institutional coordination to optimize wildlife conservation management and remedy institutional gaps identified.
- e) Land-use plans: at different levels, ensure that land-use plans or other territorial planning mechanisms incorporate conditions or establish spaces to safeguard marine and land-based biodiversity.
- f) International treaties: integrate interests and increase the potential for complying with international environmental agreements. Work towards full implementation of the most relevant biodiversity conventions. Promote regional and international cooperation for biodiversity conservation. Strengthen Chile's national position and active participation in international negotiations to ensure the inclusion of national interests and to participate in the design of the policies and instruments arising from these bodies.

5. To establish the FORMAL AND INFORMAL MECHANISMS required for optimal management of the biodiversity.

- a) Public-private cooperation: The primary strategic line of action for achieving the central aim of in situ conservation is the promotion and facilitation of public-private cooperation, in particular, initiatives that combine productive activities and nature conservation. In this context, instruments shall be developed for public-private agreements that encourage sustainable use and conservation in large tracts of land with high ecosystem value. Innovative management proposals shall be generated through legally-binding agreements to integrate public-private efforts for a common goal: environmental protection of a given territory that includes sustainable use (allowing uses that are compatible with conservation of the existing biodiversity). Protected zones may be combined with those having other uses, including productive activities: Parks for Multiple Use and Sustainable Activities.
- b) Generate information to support the formulation and enactment of secondary environmental quality standards and compliance with current environmental standards that aim to decrease pressure on biological resources.
- c) Enact Rules for Threatened Species Classification, which will provide an official classification mechanism for species conservation to serve as a framework for guiding conservation efforts.
- d) Rules for Private Protected Wilderness Areas: To ensure the success of this strategic line of action, it is essential to enact Rules for Private Protected Wilderness Areas and encourage the greatest number of incentives for private conservation efforts.
- e) Land-Use Plans shall recognize areas where natural resources are protected, including those areas within the National System for State-protected Wilderness Areas, wetlands, private protected wilderness areas, and any geographically delimited piece

of land placed under protection for conservation of its natural resources by an act of public authority. Methods of designating specific types of protected areas shall be reviewed and harmonized with existing land-use planning instruments.

- f) Legal instruments shall be formulated to regulate access to genetic resources to ensure fair participation in and equitable distribution of the benefits derived from their use.
- g) Native Forest Law: In recognition of the anthropogenic effects described above, the Native Forest Law, including its provisions for biodiversity protection, shall be brought into force.
- h) Protected Marine Areas shall be declared that take into account provisions for protection contained in fisheries administration instruments such as the Fishing Law and other existing mechanisms.

6. To strengthen ENVIRONMENTAL EDUCATION, PUBLIC AWARENESS AND ACCESS TO INFORMATION on biodiversity.

- a) Promote environmental education and public awareness for increasing environmental responsibility in the citizenry.
- b) Chilean Trail Project: the Chilean Trail shall be built, used and managed as a program that aims to provide opportunities for local sustainable development, global protection of the natural and socio-cultural heritage of the Andean foothills through educational opportunities involving the local community along segments of the Trail.
- c) Introduce education and public awareness of threatened species. Include biodiversity protection and conservation in the National Environmental Certification Program for educational establishments. Said Program shall generate teaching instruments for including this issue on school curriculums and, at the same time, promote the interrelationship of schools with their natural and cultural surroundings.
- d) Review and reformulate mechanisms that provide information on biodiversity, so as to ensure public access to this information, in particular that generated using public funds.
- e) Establish agreements among institutions that manage information on biodiversity to facilitate access to this information by civil society.
- f) Maintain national and regional biodiversity information systems. Make available indicators for the state of biodiversity and its management. (CHM and IABIN, among other indicators).
- g) Create a clearinghouse of information on the conservation of Chilean species, particularly those threatened.

7. To strengthen and coordinate RESEARCH to improve knowledge of conservation and the sustainable use of the biodiversity.

- a) Focus research efforts on subjects that are relevant to biodiversity protection, such as threatened species, taxonomy, and classification, so as to build knowledge on the real conservation status of each species.
- b) Strengthen University-based research centers that specialize in these issues, foster the creation of a body to coordinate and integrate research on biodiversity to serve as a national baseline.
- c) Foster the development of human resources specializing in biodiversity, with special emphasis on those areas with conservation problems.
- d) Create a Landscape Inventory and identify and describe marine and land-based ecosystems and their priorities for conservation.

8. To consolidate the FUNDING mechanisms required for adequate conservation of the biodiversity.

- a) Define the requirements needed to create a biodiversity conservation fund.
- b) Establish tax benefits and other incentives for donations towards biodiversity conservation.
- c) Create the necessary conditions for incorporating into official protected areas those tracts of land resulting from the compensation mechanism of the present Environmental Impact Assessment System, as a way of increasing the National System of Protected Wilderness Areas.
- d) Study and promote the adoption of new mechanisms for funding conservation, such as payment for environmental services and biodiversity and the implementation of tradable permit schemes.
- e) Encourage the creation of public-private agreements and international cooperation pacts for funding biodiversity conservation.
- f) Extend tax benefits to include donations for the purpose of biodiversity conservation and for contributions and donations to the Environmental Protection Fund.