

KYRGYZ REPUBLIC

Biodiversity Strategy and Action Plan



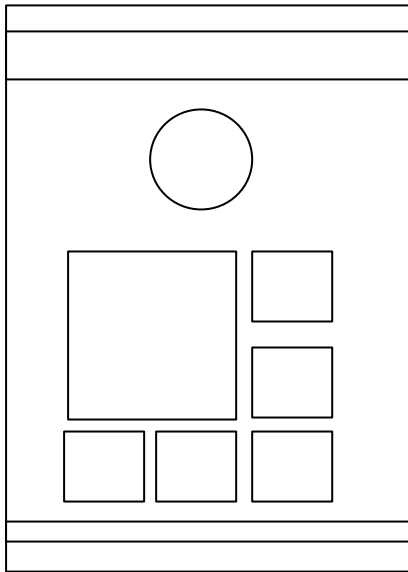
Ministry of Environmental Protection

Kyrgyz Republic

Biodiversity Strategy and Action Plan

Ministry of Environmental Protection
Bishkek

November 1998



Front Cover

1. BSAP Logo. The logo represents the perfection and sustainability of biodiversity and mountains. The background is the traditional Kyrgyz 'world tree' symbol, which combines underground, ground and air elements, its shape represents the wholeness of the circle. Signs of plants and animals are also represented in the symbol's design (e.g. ram's horns). In the foreground are three mountains; these represent the mountainous landscape of the Kyrgyz Republic, the ecological pyramids of healthy ecosystems, and the three main kingdoms of living creatures (plants, animals, and micro-organisms). (Designed by Emil Shukurov)

2. Snow leopard (*Uncia uncia*). The critically endangered snow leopard is of spiritual significance to the Kyrgyz culture. (Rod Williams/Bruce Coleman Collection)

3. Mountain meadow. Meadows such as this contain many plants endemic to the country, support grazing pastures that are an essential to the livelihoods of thousands of people in the country, and harbour many wild relatives of cultivated plants and flowers. (Mike Appleton/FFI)

4. Decorative plant carvings on 11th century Qarakhanid mausoleum, Uzgen, showing the ancient historical link between Kyrgyz culture and biodiversity. (Edward O'Keefe/FFI)

5. Kyrgyz Republic flag. The centre represents the symbolic centre of the traditional nomadic tents or yurts, surrounded by forty rays of light, representing the forty Kyrgyz tribes.

6. Sary Chelek Lake at the heart of Sary Chelek zapovednik. The lake contains an endemic species of fish and the surrounding mountains harbour many other rare and endangered species. (Mike Appleton/FFI)

Greater horseshoe bat (*Rhinolophus ferrumequinum*). Bats are among the least visible of mammalian species diversity, despite having a crucial ecological role. The greater horseshoe bat is endangered across its range due to changes in agricultural practices and loss of forests. (Bruce Coleman Collection)

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Note about the English Version

The Kyrgyz Biodiversity Strategy and Action Plan was produced in Russian. This English version is primarily a translation from the original Russian version. Some alterations have been made to the content and format in order to make it appropriate to the different audience. Compilation and editing of the English version was carried out by Fauna & Flora International. If there is any doubt about differences between the two versions, the Russian version is taken to be the correct and original one.



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Foreword

In the Kyrgyz Republic, despite the social and economic difficulties of the transition period, nature protection issues - particularly protection of the biosphere as a means of supporting life of all living things, including humans - have been made a priority in state policy. For instance, in 1995 the Kyrgyz Republic was the first country in the Central Asian region to develop its National Environmental Action Plan. Environmental issues are highlighted in the Sustainable Human Development Strategy, which was adopted on May 28th 1997 at the Forum of the People of Kyrgyzstan on the initiative of President Akaev. In addition, on July 29th 1998, on the initiative of the President, the Concept of Ecological Security was approved at the meeting of the Security Council of the Kyrgyz Republic.

All of these political documents highlight biodiversity conservation as one of the most important tasks of the state.

The measures and decisions stipulated by the documents mentioned are either already being implemented or about to start. In particular, a number of small pilot projects have been implemented under the Kyrgyz-German 'Issyk-Kul Biosphere Reserve' project. The Global Environmental Facility have approved the West Tien Shan Transboundary Biodiversity Project, implementation of which will start at the beginning of 1999. The Kyrgyz-Swiss Forestry programme is also being implemented successfully. The protected area network continues to function and expand.

The Kyrgyz Republic Biodiversity Strategy and Action Plan represents the next stage of directed nature protection efforts. These projects have been prepared in accordance with the country's commitments under the Convention on Biological Diversity, which was ratified in 1996.

This project outlines the priority biodiversity conservation actions in the country, through the establishment of social, economic, information, legal, institutional and other prerequisites for the sustainable use of biodiversity, for the benefit of present and future generations.

The Kyrgyz Republic fully realises the complexity of the tasks specified in the Biodiversity Strategy and Action Plan given the current economic situation. Nevertheless, the Republic is accepting the challenge of the ecological paradigm of the twenty-first century. This is because there is no other option, especially for our beautiful country, and because we count on assistance from the international community. For our white-capped mountains with their purest waters, beautiful alpine meadows, evergreen spruces, unique fruit-nut forests, high-mountainous blue lakes such as Issyk-Kul, Song-Kul and Sary-Chelek are the property of all mankind.

**Minister of Environmental Protection,
Corresponding member of National
Academy of Sciences of the Kyrgyz Republic**

K.Dj.Bokonbaev

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Executive Summary

The overall aim of the Biodiversity Strategy and Action Plan is: *the protection and rational use of biological and landscape diversity for the sustainable social and economic development of the Kyrgyz Republic.*

The Kyrgyz Republic

- The newly independent state of the Kyrgyz Republic is **bordered by China, Kazakhstan, Tajikistan and Uzbekistan.**
- The Kyrgyz Republic is a small country (**198,500km²**) dominated by mountains, with over **90% of the country above 1000m altitude.**
- These **fragile mountain ecosystems** support a unique assemblage of plants and animals.
- Since independence, the country has undergone political and economic upheaval, resulting in an **economic crisis**: inflation rose above 800% in 1992. However, in 1996 the rate of GDP growth was positive for the first time since 1990, and was one of several indicators of economic recovery.
- This economic crisis has resulted in both **increasing pressures on biodiversity** and a reduction in the effectiveness of existing mechanisms for environmental protection.

Kyrgyz Biodiversity

- Despite its size, the Kyrgyz Republic has a relatively **high species-richness**; possessing nearly 1% of all known species in just 0.13% of the world's land mass.
- Recently **declines in many species** have become evident, and 9.5% of bird species and 18.1% of mammal species are now considered to be **at risk of extinction.**
- A number of rare and valuable ecosystems have nearly disappeared, and **forest cover has declined by over half** in the last 50 years.

The Importance of Biodiversity in the Kyrgyz Republic

The biological resources of the Kyrgyz Republic play an important role in the economy and traditions of the country:

- Many species are **used directly**, either for subsistence or commercial extraction; these include 600 species of wild plants that are used by man.
- The country is a **centre of origin for domesticated fruit crops**, and still possesses a number of wild relatives of these plants (e.g. walnuts, apples, apricots, and pistachio).
- Natural habitats are a vital part of many **traditional land use** practices, e.g. grazing which relies on the maintenance of mountain meadows.
- The **traditions and culture** of the Kyrgyz people are tightly interwoven with the wildlife and landscapes of the country, an example being the ancient Kyrgyz epic 'Koghoghash'.
- The loss of biodiversity has both a direct and indirect impact on people's **welfare and quality of life** – be it changes in water quality, access to natural resources, or erosion of culture and traditions linked to biodiversity.
- The mountains of the Kyrgyz Republic also play an important role in providing **fresh water** to other Central Asian countries.

Current Situation of Biodiversity Conservation

- Almost 4% of the country's area lies within **86 protected areas**, most of which were established during the Soviet era, and some as many as 70 years ago.
- The current protected area system is adapting to the **demands of the new socio-economic pressures**, for which revised approaches have been developed.
- **Good institutional capacity** remains in the government, but has been undermined by recent economic events, which have led to under-resourcing, lack of maintenance, and lack of adaptability.
- The relatively **young NGO community** is growing rapidly, and is gaining experience as it does so, but still requires capacity building in order to implement key conservation activities.
- There is a growing realisation that businesses, including extractive industries, have important **social, as well as economic, responsibility** within the Kyrgyz Republic.

The Strategy and Action Plan

- In 1996, the Kyrgyz Republic **ratified the Convention on Biological Diversity**. As a first obligation under this convention, the country has undertaken the preparation of this **Biodiversity Strategy and Action Plan**.
- This plan has been developed by the **Ministry for Environmental Protection**, with extensive and close collaboration from a **wide range of stakeholders**, representing all key sectors.
- The plan provides a **framework for biodiversity conservation**, and outlines mechanisms to deal with current issues regarding the protection and use of natural resources.
- It aims to **reverse the current declines** in biological resources within the country, whilst ensuring **sustainable economic growth** for the Kyrgyz Republic.
- This document has been produced as an **integrated plan of action**, giving precise details of **time-scales, budgets and targets**.
- Guidelines for **implementation, monitoring and financing** of the plan are also incorporated.

Expected Outcome of the Plan

- This plan provides a mechanism by which biodiversity conservation issues in the Kyrgyz Republic can be tackled at a series of levels.
- This will ensure that the biological resource-base upon which human welfare depends can be maintained.

Acknowledgements

The Biodiversity Strategy and Action Plan was carried out by the Ministry of Environmental Protection. The director of the project was the Mr. K. Bokonbaev, Minister for Environmental Protection. Staff within the MEP are thanked for their involvement and input throughout. The development of the BSAP was carried out with full collaboration of other ministries, including the Ministry of Forestry, and the Ministry of Agriculture.

Funding for the preparation process was provided by the Global Environmental Facility, via the World Bank. Task managers from the World Bank (Andrew Bond, Justin Mundy and Piotr Krzyzanowski) have provided input and advice during the process.

The BSAP preparation has been conducted with assistance of consultants from Fauna & Flora International - Nigel Coulson, Edward O'Keefe and Abigail Entwistle. We would also like to thank Evan Bowen-Jones of FFI for assistance during the editing of the English version of the BSAP.

The UK Environmental Know How Fund provided additional support for the implementation of a public awareness programme linked to the BSAP.

The Steering Committee provided guidance during the preparation and review process. A range of national consultants and counterparts from other government agencies provided important inputs during the development of the document (listed in Annex 1). The project manager was Yrysbek Malenov, and the national advisor for the project was Emil Shukurov. The project was co-ordinated by Chinara Sadikova, with input and support from Fareda Balbakova (Ministry of Environmental Protection), Cholpon Dyikanova and Gula Moldosanova. Office support was provided by Ergina Segizekova, and back up assistance by V.Gorbatuk. Translation support was provided by Bermette Sydygalieva. We would also like to thank M. Suynbaev, T. Makeev, and I. Nasarenko for their input.

We would like to thank all individuals and organisations who participated in, and contributed to, the development of the BSAP, including all those who attended workshops (see Annex 1) and public forums. Their involvement has helped to ensure a balanced and wide-ranging document.

1. Overall Introduction

1.1 The Global Importance of Biodiversity

At the present time, approximately 1.5 million species of living organisms are known to science. However, estimates of the actual number of species on the planet (including those yet to be described) range from 5 to 30 million. This diversity of life, and the complexity of the biosphere and all species within it, is an essential element in sustaining the Earth's life-support mechanisms.

All living organisms are inter-connected, both by their common genetic material, and their ecological inter-relationships. These interactions form the life-supporting mechanisms for the planet. The main features of the environment, such as the composition of the atmosphere, surface water and soil, have been created as a result of the activity of a great number of species over billions of years. It is this diversity of species that ensures the survival of the biosphere. It does this by limiting the effect of global disasters that could endanger more limited, less diverse life-support systems. The extinction of any species (whether a plant or a bacterium) can disrupt this delicate, inter-connecting web of life, and may result in a direct threat to other species, including humans.

Biodiversity provides a range of direct and indirect benefits to mankind (including food, fuel, physical environmental protection, and medicines, as well as aesthetic and spiritual pleasure). Although the vital role of biodiversity in ensuring biosphere function (the support of sustainable environmental systems) is less tangible, this role is potentially more important. Degraded, impoverished or anthropogenic ecosystems cannot fulfill the same functions, and without these mankind is itself threatened with extinction.

As we approach the beginning of the 21st century we have become witnesses to, and participants in, a potentially dangerous global disaster, caused directly by mankind's activities. Even conservative estimates put the current rate of extinction at five thousand species per year, and it may be as high as 30 thousand species per year. For many species, extinction now seems inevitable, because people have removed the habitats and sources of food on which they depend. Many other organisms rely on these threatened species, resulting in the possibility of knock-on effects, and chains of extinction across a wide range of taxa. We are at the threshold of creating a potentially unsustainable environment, and the prevention of further losses in biodiversity could equate to the future survival of mankind.

As well as protecting individual species, it is essential to ensure the survival of inter-connected natural communities of species (ecosystems). Ecosystems not only provide the basis for inter-relationships between species, but for the ongoing evolution of species in the light of changing environments. One of the greatest threats to the global biosphere is the loss of natural ecosystems, which are being replaced by modified or artificial environments. At least 40% of the Earth's land area has been changed by mankind's activities. A range of natural ecosystems have been destroyed and many have almost disappeared from a large number of countries. Elsewhere, small patches of natural habitat are surrounded by highly degraded environment, which impacts strongly on the remaining natural areas. Additionally, areas of ecological instability are increasing in number and now represent approximately a third of the planet's landmass. Given these

conditions, those countries and territories where natural ecosystems and wildlife have been preserved are extremely important. They represent centres for biodiversity protection and for the stabilisation of the world's biosphere. Supporting these areas may provide hope for the rehabilitation of the global environment, and for protection of the balance of the biosphere across the whole world.

What is Biodiversity?
The Convention on Biological Diversity (Rio de Janeiro, 1992) defines biodiversity in the following manner <i>“Biological diversity means the variability among living organisms from all sources, including inter alia, terrestrial, marine and other aquatic ecosystems and ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.”</i>
Biodiversity can, therefore, be considered at three different levels, “genetic diversity” , “species diversity” and “ecosystem diversity” .
<ul style="list-style-type: none"> • Genetic diversity is the variability within a species, as measured by the variation in genes (chemical units of hereditary information that can be passed from one generation to another) within a particular species, variety, subspecies or breed.
<ul style="list-style-type: none"> • Species diversity is the variety of living organisms on earth. It is measured by the total number of species in the world, or in any given region. Only a small genetic difference (less than 10 % of an organism's genes) separates one species from another, but this may represent many thousands of years of evolution. As a result these unique forms cannot be replaced if they are lost.
<ul style="list-style-type: none"> • Ecosystem diversity relates to the diversity of the ecological complexes within which species occur. The processes governed by ecosystems include energy flow and mineralisation, and provide nutrients, water, oxygen, and other chemicals for living organisms. The complex processes of natural ecosystems (such as forests, steppe and swamp), may be restricted in those modified by humans (such as agricultural lands, and man-made water bodies). However, anthropogenic ecosystems can also be considered to be a part of ecosystem diversity, despite their lower environmental 'quality'. Species are uniquely adapted to the ecosystem in which they live, and some will not survive in changed environments. Thus, efforts to conserve species should conserve the ecosystems of which they are a part. As a result, artificial ecosystems cannot be considered an alternative to the natural environment.

1.2 The Convention on Biological Diversity

A recognition of the threat posed to human survival by the continuing extinction of species led the governments of many countries of the world to come together in support of the Convention on Biological Diversity (CBD). This was made available for signing at the Earth Summit in Rio de Janeiro (Brazil) in 1992.

So far, 174 parties have ratified the CBD. Adoption of this convention obliges a country to undertake measures to directly protect biodiversity within its borders. The main concepts, strategies and spheres of jurisdiction for biodiversity conservation are outlined in the CBD. It also provides guidance on general actions for protection and sustainable use of biodiversity, and highlights key approaches to conservation in a global arena. These include monitoring and evaluation, capacity building, public awareness, participation, access to genetic resources and technologies, exchange of information, co-operation, financing mechanisms and other issues connected with the development and implementation of projects on biodiversity. The CBD reiterates the essential value of biological diversity for life and sustainable wellbeing of present and future generations.

1.3 Biodiversity Strategies and Action Plans

A first obligation once countries have ratified the Convention on Biological Diversity is the production of a National Biodiversity Strategy and Action Plan (BSAP). BSAPs set out the government's aims for biodiversity conservation, with clear targets and approaches. A BSAP provides a mechanism by which governments can show how they will meet their obligations under the CBD, and how their progress towards this can be assessed.

Biodiversity Strategy and Action Plans are developed on the basis of the information presented in a Country Study. The Country Study provides an overview of the current status of biodiversity in the country, the extent of current protection and related contextual factors (such as economic, institutional, legal, educational, scientific, and informational frameworks, and the traditional experience and participation of local communities available in the country). Such reviews include analyses of species richness, and status (particularly of threatened species), and of the anthropogenic threats to biodiversity, along with their underlying causes.

On the basis of these analyses an overall aim and specific objectives for undertaking the conservation of biodiversity at a national level are developed, as part of the BSAP. Principles and approaches for biodiversity conservation are then developed, in line with those outlined within the provisions of the CBD, but with reference to the national framework which will implement the plan. Where possible, links should be made to other existing structures (such as the Pan-European Biological and Landscape Diversity Strategy).

Within the BSAP a specific action plan is developed. This outlines the measures required to meet the overall aim and objectives of the BSAP. The action plan needs to be supported by clarification of budgets and time-scales, and should link to other projects currently being implemented or which are planned in the sphere of biodiversity conservation. This action plan provides a basis for identifying clear priorities, for undertaking specific projects which all contribute to an overall goal, and provides a mechanism by which success can be assessed, in relation to obligations under the CBD. Implementation of BSAPs are led by government agencies, but often rely on mobilisation of public support, activities of NGOs, and attraction of external funding.

1.4 Introduction to the Kyrgyz Republic

1.4.1 *Location and size*

The Kyrgyz Republic is located in the centre of Eurasia. It shares borders with Kazakhstan, China, Uzbekistan, and Tajikistan. It represents an area of 198,500 km².

1.4.2 *Geography*

Altitudes in the Kyrgyz Republic range from 132 - 7,439 m above sea level, with the mountain systems of the Tien Shan and the Pamirs making up approximately 90% of the country's area (Annex 2A). Rivers in the country are associated with four non-draining Central Asian basins; the Aral, Tarim, Issyk-kul, and Balkhash basins. Overall, the annual flow of these rivers represents about 50,000 m³.

1.4.3 Climate

The Kyrgyz Republic lies over 3,000 km from the nearest ocean, and displays an arid, continental climate. Furthermore, the presence of high mountains causes wide-ranging differences in local climate. At one extreme is the heat and aridity of the valleys in the foothills with average January temperatures of 0°C, whilst usually exceeding 26°C in July, and precipitation in the same month generally less than 10 mm. At the other of the spectrum are the cold temperatures and high precipitation of the mountains with average January temperatures below -28°C, July temperatures remaining below + 6°C and precipitation in July between 100 – 150 mm. In areas above 3,500 – 4,000 m there are permanent snows and glaciers.

1.4.4 Population

The first humans arrived in the area of the Tien Shan at the end of the late Paleolithic period. During the Neolithic period, the whole territory of the Kyrgyz Republic was occupied. During the following centuries, nomadic tribes inhabited the region and began to settle in the valleys, from where there are records of towns and farming. Later, the Kyrgyz people started to move into the Tien Shan region from Mongolia in the north. This migration finished approximately 1,000 years ago.

Today, the population of the Kyrgyz Republic is around 4.6 million people. This represents a population density of approximately 23 people per km². Overall, 34% of the population lives in urban centres, while the remaining 66% lives in rural areas. For administrative purposes, the country is divided into a series of regions, or oblasts (Annex 2B).

1.4.5 The economic, social and political situation

Until independence, in 1991, the Kyrgyz Republic was part of the former Soviet Union. The break-up of the Soviet Union, with the subsequent political and economic transition, has resulted in an economic crisis across the former Soviet block. Since 1991 economic, social and political reforms have been taking place in the country. New political parties and independent mass media have appeared, but economic difficulties still limit their activity. A referendum in October 1998, led to the institution of private property rights in the Kyrgyz Republic.

Agriculture and industry dominate the economy of the Kyrgyz Republic. Arable land represents about 23% of the territory, of which 64% relies on irrigation to enable production. During recent years both these sectors have been seriously damaged by the economic crises associated with political transition. At present per capita GNP is around US\$600, with agriculture providing 43.4% of GNP income, while industry only represents 15.5%.

Approximately 80% of the population are estimated to live below the poverty level (the official index was 71.3% in 1997). Alongside the growth of poverty, there is an increasing gap between the richest and the poorest in the population, representing a decline in the balance of earnings. The income of the richest 20% of the population is 7.1 times higher than the income of the poorest 20%.

1.5 Biodiversity in the Kyrgyz Republic

1.5.1 *The importance of biodiversity in the Kyrgyz Republic*

Biodiversity is clearly important in the Kyrgyz Republic, not just for the direct use and potential of its species, but for the functions and processes related to the diversity of ecosystems in the country. This is particularly important within the fragile mountain ecosystems.

Ecosystems and functions

In the harsh conditions of the mountains, natural communities play an important role in ensuring an environment that can support life. While biological communities do not vary greatly in the Kyrgyz lowlands, the mountains support deserts, steppes, coniferous and deciduous forests, and alpine meadows, which can all be found within a few kilometres of each other. It is only such high levels of diversity that allow an environmental balance to be maintained effectively under the extreme mountain conditions.

Groups of ecologically co-adapted species have an important role in processes such as the creation and preservation of soils, water distribution, cleaning of surface waters, and atmospheric composition in these areas. The high level of adaptation to these extreme conditions, means that once lost, these species cannot be replaced by other types of organism, and the functions they provide may be lost.

Seasonal pastures are formed by the variable climate of certain areas (e.g. the direction of prevailing winds) and the composition of plant species adapted to grow in those particular conditions. In these areas primary biological production – animal breeding – supports an important sector of the economy upon which the majority of the population depends. This activity, if managed appropriately, conserves vegetation cover, thereby preventing soil erosion on mountain slopes, and reducing the likelihood of flooding. The latter has the potential to cause annual agricultural losses of millions of US dollars.

Species – direct and potential values

The diversity of species existing in the Kyrgyz Republic provides an important genetic resource for the country. This includes the potential to supply highly productive and disease-resistant cultivars; decorative, medicinal, and aromatic plants; as well as raw materials for biotechnology. The Kyrgyz Republic is the centre of origin for many wild relatives of cultivated plants. For example, the fruit and nut forests contain species that may provide important sources for the future selection of commercial fruits and berries. Many people in the Kyrgyz Republic rely on direct use of biodiversity or products from the natural environment. Collection of medicinal plants, berries, mushrooms, together with hunting and fishing, provide an important resource, and income, for some of the population.

Aesthetic and spiritual values of biodiversity

Biodiversity has been at the heart of the spiritual development of the nation, resulting from its origins as a nomadic society. A close relationship and understanding of nature is an integral part of the culture of the nation. Respect for wild animals was recognised early on, as demonstrated in the epic Kyrgyz saga 'Koghoghash'.

The aesthetic and recreational importance of biodiversity in the Kyrgyz Republic is also potentially of direct economic value. The attractiveness of the country is an important factor in promoting the development of tourism, which is rapidly becoming significant to the national economy. Furthermore, the presence of ecosystems with a high concentration of species, make the country of interest in educational and scientific contexts.

Overall, the remaining intact natural ecosystems in the Kyrgyz Republic play important roles in stabilising the environments of both mountains and adjacent lowlands, and may help to mitigate the loss of important functions from land already degraded by man's activities.

1.5.2 General threats to biodiversity

A number of common threats to biodiversity can be identified, all of which result from changes brought about by the activities of people.

Habitat loss and alteration pose an important threat to species and communities. Habitat change usually indicates a use of natural ecosystems for anthropogenic activities (e.g. clearance for agriculture), and a reduction in the area of natural vegetation and species reliant on these habitats. Furthermore, some communities and populations of both fauna and flora are naturally rare as a result of the limited distribution of suitable habitat patches. Where habitat areas are already at the lower limit of size, further loss will lead to a reduction in their species composition, (the so-called 'island effect'). Eventually this can lead to the loss of the whole natural community. Larger-sized species are at particular risk as the amount of suitable habitat falls below that needed to support viable populations.

Fragmentation of natural communities occurs when barriers obstruct the free flow of individuals between different patches of habitat. For example, roads and other man-made features may represent a barrier to the movement and dispersal of species, which may be adversely affected, to the extent of complete absence, up to 500 m away. Such effects have consequences for the ecosystem, as does the appearance of non-native species that may be introduced into areas around roads.

- **Overuse**, such as overgrazing, leads to the degradation of pastures, and may affect wild ungulate populations, which compete for the same food resource as livestock.
- **Over-harvesting**, the taking of more individuals than are produced by reproduction, can lead directly to population declines. Harvesting may include hunting, fishing and collection of plants.
- **Direct mortality** of animals can occur in a number ways, including high voltage power lines, as well as roads.
- **Introduction of non-native species** to an area often has a detrimental effect on native wild species. Invasive species include plants, animals and pathogens, which may act as predators, parasites or competitors, resulting in declines in native species.

- **Environmental pollution**, the degradation of habitat quality through the introduction of toxic chemicals or through other forms of disturbance (including noise and light), affects a wide variety of species, even in natural ecosystems. Fragile habitats (such as mountains) and aquatic systems are particularly vulnerable to pollution.
- **Climate change**, resulting from global atmospheric pollution by carbon dioxide and other chemicals, poses a threat on a number of levels. Changes in weather patterns threaten long-term changes in climatic zones and vegetational patterns, and increased threats of extreme climatic conditions (including droughts and floods).

1.6 The Kyrgyz Republic Biodiversity Strategy and Action Plan

1.6.1 *Ratification of the CBD*

The Kyrgyz Republic ratified the Convention on Biological Diversity on 6th August 1996. One of the first commitments of the Kyrgyz Republic government under the CBD was to prepare a Biodiversity Strategy and Action Plan (BSAP) as an initial stage in biodiversity protection. This BSAP provides a thorough review and assessment of current biodiversity and the factors affecting it within the country. This review has been used to develop an integrated plan that will provide a framework for conservation activities over the coming five years. The detailed plan forms Section 3 of this document.

1.6.2 *Origin of the Kyrgyz BSAP*

The Ministry of Environmental Protection developed the BSAP with technical support and management advice from the international conservation NGO, Fauna & Flora International. A grant for the production of the BSAP was offered by GEF (via the World Bank), and work on its preparation started in February 1998.

The plan has been designed in the light of guidelines produced by UNEP and UNDP. The development of the plan took into account as many of the suggested guidelines regarding participation and appropriateness as possible, with the intention of strengthening the plan, and the likelihood of its effective implementation. The development of the plan, therefore, involved as many stakeholders as possible, and took into account many different viewpoints on biodiversity and its conservation. Information on the current situation of biodiversity in the Kyrgyz Republic was collated from a broad base of over 50 national consultants, and numerous other individuals, who were complementary in their knowledge, covering a full range of cross-sectoral specialisms.

1.6.3 *Process*

The plan was developed over a period of ten months from February-November 1998. A more detailed explanation of the preparation process is included in Annex 3.

The management of the process involved:

- The BSAP Co-ordinating Team who formed the core-focus for the preparation activities.
- The Steering Committee, consisting of senior representatives from key government agencies, academic institutions and NGOs, whose role was to oversee and review the preparation process.
- An international team who worked with the Co-ordinating Team, providing general management and technical assistance.
- Over 50 consultant specialists who were involved in the process by providing their key skills and experience at various stages of preparation.
- Hundreds of other individuals and organisations who were involved through consultations, public forums and planning workshops. Stakeholder participation was widened as the process developed.
- Working with mass media also helped widen stakeholder participation and knowledge.

The BSAP was developed in four stages: preparation; information gathering and evaluation; action planning; and implementation. Each stage involved consultative workshops; public forums; report and plan development followed by review; working group and cross-sectoral meetings; and widespread media coverage.

1.6.4 Explanation of the document

The document is in three main parts:

- **Section 1** provides background information, a general introduction to the BSAP, and to the purpose of the process and the final document.
- **Section 2** is a national study of biodiversity in the Kyrgyz Republic. This reviews and analyses the current status of biodiversity; threats to this biodiversity; programmes to conserve biodiversity; and factors directly and indirectly affecting biodiversity. The review provides the context to consider biodiversity conservation within, by incorporating biological, social, infrastructural and economic factors. In offering a comprehensive collation and analysis of information, this country study provides a basis for future planning for biodiversity, within identified constraints and opportunities.
- **Section 3** of the document outlines an integrated mechanism to tackle biodiversity conservation over the coming five years. This section includes an overall aim for biodiversity conservation, key objectives, and a set of strategies to meet these objectives. These strategies are further expanded into an integrated set of actions, with indicative costs and time-scales. The action plan is supported with further information on methods for evaluating and reporting on progress, and with a framework for implementation of the action plan.

1.6.5 Intended audience of the report

The report is primarily a national policy outline for biodiversity, aimed at mobilising co-ordinated action over a wide range of implementing groups. The audience for the report will include politicians, government officials, representatives of NGOs, businesses, scientists and donors – including national, international, governmental and non-governmental donors, as well as the corporate sector. The full report is, therefore, designed to include information that might be useful to all of these different sectors. Information contained within the report will also be useful to a broader range of the community, such as journalists and teachers, along with all direct and indirect users of biodiversity.

2. Country Study of Biodiversity in the Kyrgyz Republic

2.1 Introduction

The Country Study brings together readily available information on the current situation of biodiversity, and factors affecting biodiversity, within the Kyrgyz Republic. As such it provides an important resource, not just for information, but to enable a full assessment of key threats to biodiversity, and priorities for conservation within the country. The analysis contained within this section lays the basis for further planning for biodiversity conservation in Section 3 (the Strategy and Action Plan).

This document represents the first comprehensive review of biodiversity in the Kyrgyz Republic, and of existing programmes designed to directly mitigate negative effects on biodiversity. Furthermore, this review is contextualised by a thorough examination of the full range of factors – both direct and indirect – which affect biodiversity and its conservation. The Country Study is based on readily available information which was gathered during the document's preparation. It is, therefore, acknowledged that more recent or accurate information may exist which has not been identified or incorporated. Since the BSAP will be up-dated regularly, there will be opportunities to add and correct it as more recent data becomes available.

The Country Study is divided into a number of sections that examine biodiversity and related factors. The first section outlines the present status of biodiversity in the Kyrgyz Republic, and its importance in a global context. In subsequent sections, current activities and programmes protecting biodiversity are reviewed, as are related issues including: the institutional, administrative, research, legislative and policy bases for biodiversity conservation; together with the financial resources available and wider socio-economic issues. All these factors are then integrated through a problem analysis, identifying key constraints and opportunities for the future development of biodiversity conservation in the Kyrgyz Republic.

2.2 The Status of Biodiversity

2.2.1 Introduction

The Kyrgyz Republic contains a great wealth of biodiversity resources – in terms of species, ecosystems and landscapes. Although a small nation by land mass, the Kyrgyz Republic displays a wide variation in elevations and geology, leading to a broad range of habitats, which is reflected in a high diversity of species. The ecosystems represented range from high mountains, to lowland fertile plains and large freshwater systems. The character of biodiversity in the country reflects the high altitude of much of the land, being dominated by montane and alpine species. A range of factors over the last century have had an impact on biodiversity in the Kyrgyz Republic, resulting in declines in many groups, and leading to concern for a growing number of species, including key ones of economic importance. This section provides a clear review and analysis of the current status of biological resources in the Kyrgyz Republic, including priority ecosystems and species in terms of economic value, rarity and threat.

Use of biological resources in the Kyrgyz Republic

Biological resources are extremely valuable to the economy of the country. Pastureland is probably the most important biological resource in these terms, and the livestock that graze these pastures support the livelihoods of thousands of people. The Kyrgyz Republic has approximately 880,800 head of cattle, 4,398,600 sheep and goats, and 303,900 horses (data as of April 1998, from *Social & Economic Situation in the Kyrgyz Republic*).

About 7-8 % of the land is used by people to gather wild berries (such as rowan, buckthorn, barberry, hawthorn, currant, and raspberry), mushrooms (more than 10 edible species), and medicinal plants (several dozen species). Many people, mainly in the south of the country, gather walnuts, and fruits of wild apple, pear, apricot, plum, cherry and other trees.

A small proportion of the population hunt and fish - predominantly for recreational purposes or to supplement their food, rather than as a main livelihood. In the Kyrgyz Republic around 30 species of birds and up to 20 species of mammals are hunted. Marmots (red and grey) and, to a lesser extent, gophers, muskrats, foxes, badgers, wolves, and squirrels are hunted for their fur. In addition, Marco Polo sheep and mountain goats are both hunted, and sold for hard currency. Degradation of forests and arable land, over-collection, and poaching have all contributed to the considerable declines in these species' populations. Commercial fishing in Lake Issyk-Kul and Lake Son-Kul is limited to 200-300kg per year. However, most of the trade is from poaching and, thus, lies outside these official limits.

Many people, particularly in rural areas, rely on wild plants for medicinal purposes. Such medicinal plants are collected and sold through special trade-associations. Rural populations also traditionally use a range of natural products for construction, utensils, dyestuffs, etc.

2.2.2 Information review

The diversity of ecosystems in the Kyrgyz Republic

The Kyrgyz Republic contains a very high diversity of ecosystems. High mountains, whose altitudinal variation strongly affects the distribution of ecosystems, dominate much of the country. Their presence also means that many ecosystems are concentrated within a relatively small area.

In total, 22 different classes of ecosystem are recorded in the Kyrgyz Republic. (Table 2.2.1). Most of these ecosystems (14 or 63.6%) are found between 2000-3000 m altitude, although only 30.8% of the territory lies within this range. Furthermore, the range of ecosystems is not evenly distributed throughout the country. Sixteen ecosystems (72.7%) are found in Western and Central Tien Shan, while the Ferghana valley and Southern Kazakhstan biogeographic region have the fewest ecosystems, three and five respectively (Annex 2C). Thirteen ecosystems are represented in Alai, while ten ecosystems are found in other biogeographic regions (Northern Tien Shan and Issyk-Kul).

Despite this high diversity of ecosystems, much of the country is virtually lifeless, due to the extreme climatic and environmental conditions. Twenty-three percent of the country is above 3500 m in altitude and is covered by glaciers and rocks; a further 15% constitutes open rock, gravel or clay; and deserts cover more than 6.8% of the country. Most of the country, as this suggests, consists of unmodified or slightly modified natural ecosystems, and only 7% of the country's territory is composed of man-made ecosystems. Natural ecosystems include various forest types (coniferous, and broad-leaved), a wide range of grassland communities (meadows and steppes), deserts, water-bodies (lakes and rivers) and wetlands (swamps and lakeshores).

Table 2.2.1. Types of ecosystem represented in the Kyrgyz Republic

Ecosystem	Area covered (sq km)	Percentage of total area
Spruce forest	2,772	1%
Juniper forest	2,680	1%
Broad-leafed forest	464	<1%
River forest (tugai)	226	<1%
Small-leafed forest	711	<1%
Mid-mountain deciduous shrubland	970	<1%
Mid-mountain pterophilic shrubland	2,317	1%
Savannah	6,081	3%
Almond and pistachio forest	182	<0.1%
Glacier and subglacier	11,527	6%
Cryophilic meadow	27,242	14%
Cryophilic steppe	21,413	11%
Cryophilic desert	1,911	1%
Mid-mountain meadow	8,764	4%
Mid-mountain steppe	17,643	9%
Mid-mountain desert	2,543	1%
Mountainous dry-farming land (bogara)	2,791	1%
Foothill steppe	823	<1%
Foothill desert	8,768	4%
Pterophilic lowland shrub	181	<0.1%
Lakes and wetlands	393	4%
Cultivated land	12,475	6%

Important ecosystems

The ecosystems of the Kyrgyz Republic are of great economic, recreational, aesthetic and functional importance. These ecosystems have a strong spiritual importance for the Kyrgyz nation, which has strong traditions regarding the relationship between man and the natural world.

There are a number of key ecosystems within the Kyrgyz Republic as defined by their rarity – such as pistachio and almond forests, and fruit and nut forests. These and other ecosystems also have clear economic importance as a resource base for the country, including lowland steppes; high mountain meadows; and canyons and river valleys, which can provide tourist access to natural areas. Forests, in particular, play an extremely important role in protecting both environmental processes, and biodiversity, though they occupy only 4% of the country. (Annex 2D is a map of floristic regions).

Threatened ecosystems

All natural ecosystems are to some degree affected by human activities. Some of them, such as foothill steppes and deserts, have practically disappeared, and the area and species composition of other ecosystems has been drastically altered. A number of ecosystem types are very fragile and threatened by any human activity. The most threatened ecosystems in the Kyrgyz Republic include the fruit and nut forests of the south (threatened by overuse), fragile mountain forest communities, steppes near large human settlements, high mountain meadows (threatened by overgrazing), and some areas of semi-desert and dry steppe (which are easily degraded through grazing). Overall

forest loss has been dramatic over the last decades – fir and juniper forests have declined by over 35%, fruit and nut forests have declined by 50%, and pistachio and almond forests have reduced to only 30,000 ha over the last 50 years.

Diversity of species

Although the biodiversity of temperate regions is generally poor when compared to the tropics, comparison with global indices shows that the biological diversity of the Kyrgyz Republic is not insubstantial. For a small country (0.13% of the world's landmass) the Kyrgyz Republic displays good representation of all terrestrial taxonomic groups. Furthermore, species richness (over 20,000 species, or 0.8% of known species) is higher than expected for a country of this size in this region, with above average species richness for the Central Asian region.

Records for different taxa are uneven. Species richness of higher vascular plants (about 4000) and vertebrates (about 500) is well known. Lower plants (including fungi) and invertebrates have also been studied intensively. The Kyrgyz Republic supports a wide range of interesting species. Among these are 368 types of bird and 83 mammal species, including snow leopards (*Uncia uncia*), wolves (*Canis lupus*), dhole (*Cuon alpinus*), sousliks or ground squirrels (*Spermophilus spp.*) and unique giant Menzbier's marmots (*Marmota menzbieri*). A number of species are found only in the Kyrgyz Republic. These endemic species and subspecies include over 200 plant species, around 3,240 invertebrate species (including 2,760 endemic arthropods) and 17 vertebrate species, as well as a further 47 sub-endemic vertebrates. Almost 30% of arthropods and nearly 60% of molluscs in the Kyrgyz Republic are thought to be endemic. Among vertebrate species, a number of endemic species have been recorded: 12 fish, two reptiles, two amphibians and one bird. In addition, several mammalian species and sub-species are endemic to the region, including the Tien Shan mouse (*Microtus kirgisorum*) and the Tien Shan brown bear (*Ursus arctos isabellinus*). The globally threatened Menzbier's marmot (*Marmota menzbieri*) is also endemic to the Tien Shan region.

Important species

Some of the species occurring in the Kyrgyz Republic have obvious economic or aesthetic importance. For example, the country supports a high diversity of wildflowers, over 70 species (Table 2.2.2); and a range of native and introduced fish species, which form the basis for the country's fisheries (Table 2.2.3). The Kyrgyz Republic's extensive botanical resources also include over 600 species of wild plant that are used by man including 200 species of medicinal plants (Table 2.2.4). Plants with clear economic value include: *Polygonum coriarium*, *Glycyrrhiza glabra*, *Polygonum*, *Berberis*, *Pheum wittrockii*, *Anabasis aphylla*, *Ferula*, *Euphorbia ferganica*, *Onosma* and *Thymus*. In addition, a number of edible mushroom species are collected as a food source (see Table 2.2.5).

Table 2.2.2. Wild flowers of the Kyrgyz Republic

Species name	Species name
<i>Allium aflatunense</i>	<i>Ixiolirion tataricum</i>
<i>Allium altissimum</i>	<i>Juno kuschakewiczii</i>
<i>Allium atosanguineum</i>	<i>Juno orchoides</i>
<i>Allium barszcewskii</i>	<i>Korolkovia sewerzowii</i>
<i>Allium coeruleum</i>	<i>Leontopodium spp.</i>
<i>Allium karataviense</i>	<i>Linum heterocephalum</i>
<i>Allium polyphyllum</i>	<i>Paeonia intermedia</i>
<i>Allium renardii</i>	<i>Polygonum cariarum</i>
<i>Allium semenovii</i>	<i>Primula lactiflora</i>
<i>Allium stipitatum</i>	<i>Primula macrocalyx</i>
<i>Anemone protracta</i>	<i>Primula kaufmaniana</i>
<i>Aquilegia vicaria</i>	<i>Primula longiscapa</i>
<i>Aquilegia karelini</i>	<i>Primula turkestanica</i>
<i>Arum korolkowii</i>	<i>Pyrethrum partheniifolium</i>
<i>Colchicum kesselringii</i>	<i>Scilla puschkinioides</i>
<i>Colchicum luteum</i>	<i>Trollius altaicus</i>
<i>Crocus alatavicus</i>	<i>Trollius dschungaricus</i>
<i>Crocus korolkowii</i>	<i>Tulipa affinis</i>
<i>Eminium regelii</i>	<i>Tulipa anadroma</i>
<i>Eremurus cristatus</i>	<i>Tulipa bifloriformis</i>
<i>Eremurus kaufmannii</i>	<i>Tulipa dasystemon</i>
<i>Eremurus luteus</i>	<i>Tulipa dubia</i>
<i>Eremurus olgae</i>	<i>Tulipa ferganica</i>
<i>Eremurus regelii</i>	<i>Tulipa greigii</i>
<i>Eremurus robustus</i>	<i>Tulipa heterophilla</i>
<i>Eremurus tianschanicus</i>	<i>Tulipa kaufmanniana</i>
<i>Erianthus ravennae</i>	<i>Tulipa kolpakowskiana</i>
<i>Erigeron aurantiacus</i>	<i>Tulipa neustrueviae</i>
<i>Fritillaria walujewii</i>	<i>Tulipa ostrowskiana</i>
<i>Hennigia lactiflora</i>	<i>Tulipa platystemon</i>
<i>Incarvillea olgae</i>	<i>Tulipa rosea</i>
<i>Irididictyum kolpakowskianum</i>	<i>Tulipa tarda</i>
<i>Iris albertii</i>	<i>Tulipa tetraphylla</i>
<i>Iris brevituba</i>	<i>Tulipa tianschanica</i>
<i>Iris loszyi</i>	<i>Tulipa turkestanica</i>
<i>Iris oxypetala</i>	<i>Tulipa zenaidae</i>
<i>Iris sogdiana</i>	<i>Verbascum songoricum</i>

Table 2.2.3. Fish species found in the Kyrgyz Republic

Name of species (and subspecies)	Native	Introduced
<i>Salmo trutta oxianus</i>	+	+
<i>Salmo issykogegarcuni</i>		+
<i>Salmo gairdneri</i>		+
<i>Coregonus lavaretus ludoga</i>		+
<i>Coregonus peled</i>		+
<i>Esox lucius aralensis</i>	+	
<i>Scardinius erythrophthalmus</i>	+	
<i>Rutilus rutilus aralensis</i>	+	
<i>Leuciscus schmidti</i>	+	
<i>Leuciscus bergi</i>	+	
<i>Ctenopharyngodon idella</i>		+
<i>Hypophthalmichthys molitrix</i>		+
<i>Tinca tinca</i>		+
<i>Schizothorax intermedius</i>	+	
<i>Schizothorax pseudoaksaensis tschuensis</i>	+	
<i>Schizothorax p. talassi</i>	+	
<i>Schizothorax p. issykkuli</i>	+	
<i>Diptychus maculatus</i>	+	
<i>Diptychus dubowskii</i>	+	
<i>Abramis brama orientalis</i>		+
<i>Carassius auratus</i>		+
<i>Cyprinus carpio</i>	+	
<i>Silurus glandis</i>	+	
<i>Perca fluviatilis</i>		+
<i>Perca schrenki</i>		+

Table 2.2.4. The most important medicinal plants of the Kyrgyz Republic

Species name	Species name
1 <i>Ephedra equisetina</i>	22 <i>Glycyrrhiza glabra</i>
2 <i>Aconitum songoricum</i>	23 <i>Ononis antiquorum</i>
3 <i>Delphinium confusum</i>	24 <i>Goebelia pachycarpa</i>
4 <i>Thermopsis lanceolata</i>	25 <i>Sphaerophysa salsula</i>
5 <i>Dryopteris filixmas</i>	26 <i>Peganum garmala</i>
6 <i>Equisetum arvense</i>	27 <i>Rhamnus cathartica</i>
7 <i>Juniperus semiglobosa</i>	28 <i>Hypericum perforatum</i>
8 <i>Veratrum lobelianum</i>	29 <i>Hippophae rhamnoides</i>
9 <i>Populus nigra</i>	30 <i>Convolvulus subhirsutus</i>
10 <i>Juglans regia</i>	31 <i>Origanum vulgare</i>
11 <i>Urtica dioica</i>	32 <i>Betonica foliosa</i>
12 <i>Poligonum aviculare</i>	33 <i>Datura stramonium</i>
13 <i>Poligonum hydropiper</i>	34 <i>Hyoscyamus niger</i>
14 <i>Poligonum persiaris</i>	35 <i>Plantago major</i>
15 <i>Paeonia anomalia</i>	36 <i>Achillea millefolium</i>
16 <i>Ranunculus acer</i>	37 <i>Artemisia absinthium</i>
17 <i>Chelidonium majus</i>	38 <i>Helichrisum arenarium</i>
18 <i>Capsella bursa pastoris</i>	39 <i>Inula helanium</i>
19 <i>Descurania sophiae</i>	40 <i>Matricaria chamomilla</i>
20 <i>Padus racemosa</i>	41 <i>Traxacum officinale</i>
21 <i>Rosa sp.</i>	42 <i>Tussilago farfara</i>

Table 2.2.5 Species of edible mushrooms

Species name
<i>Suillus grevillei</i>
<i>Boletus erythropus</i>
<i>Pleurotus eryngii</i>
<i>Lepista saeva</i>
<i>Agaricus bisporus</i>
<i>Agaricus campestris</i> .
<i>Russula delica</i>
<i>Zactarius deliciosus</i>
<i>Zactarius pubescens</i>
<i>Zactarius torminosus</i>

Agrobiodiversity

The increasing agricultural lands of the Kyrgyz Republic contain their own contribution to biodiversity, including a variety of races of livestock and cultivated plants. Furthermore, the botanical diversity of the Kyrgyz Republic represents an important genetic resource for plant breeding. Many ancestors of today's cultivated plants grow wild in the Kyrgyz Republic. These, therefore, represent an important resource for the development of new varieties with beneficial attributes such as pest and disease resistance, and climate tolerance. Wild growing relatives of economic varieties include: walnut (*Juglans regia*), Siever's apple (*Malus sieversii*), Kyrgyz apple (*M.kirghisorum*), several sub-species of myrobalan (*Prunus sogdiana*), odnory pear (*Pyrus communis*), Korzhinski pear (*P. korzhinskyi*), Regel pear (*P. regelii*), Tien Shan cherry (*Cerasus tianschanica*), Magaleb cherry (*C. mahaleb*), barbery (*Berberis oblonga*), odnory almond (*Pistacea vera*), Jungar hawthorn (*Crataegus songorica*), and Turkestan hawthorn (*C. turkestanica*).

The fruit and nut forests in the south of the Kyrgyz Republic are particularly valuable. As well as their high species diversity, they contain many species of economic importance such as walnut (the largest remaining forests), apple, almond, pistachio, and pear. Fruit and nut forests are, therefore, considered to be one of the main centres of origin for cultivated fruit plants and, from this point of view, this ecosystem represents an extremely valuable 'storehouse' of genetic richness.

The gene-pool of many of these plants is now being threatened by anthropogenic impacts. Both populations and species diversity have been reduced, and a number of species are on the verge of extinction.

Threatened species

Approximately 1% of all species in the Kyrgyz Republic are considered to be threatened, including 122 animal and 71 plant species (Table 2.2.6). Of these, all but 25 species are listed in the Red Data Book. Threatened species include the grey monitor lizard (*Varanus griseus*), ibisbill (*Ibidorhyncha struthersii*), marbled polecat (*Vormella peregusna negans*), snow leopard (*Uncia uncia*), Menzbier's marmot (*Marmota menzbieri*) and the Tien Shan brown bear (*Ursus arctos isabellinus*). A number of endemic species are also threatened (such as the mollusc *Siraphoroides moltschanovi*).

The best data are available for vertebrates, and these indicate that populations of amphibians, snakes, large hoofed mammals, mammalian predators and birds are particularly threatened. However, assessments of other taxa are incomplete, and further study is required.

For many species it is not possible to provide a clear indication of status, including dhole (*Cuon alpinus*), otter (*Lutra lutra*), goitred gazelle (*Gazella subgutturosa*), and birds such as great bustard (*Otis tarda*), and imperial eagle (*Aguita heliaca*). Furthermore, a number of plants – including some tulips (*Tulipa nitida*, *T. ostrowskiana*, *T. rosea*) and wild pomegranate (*Punica granatum*) - have nearly disappeared as a result of habitat destruction.

Table 2.2.6. Number of threatened species in the Kyrgyz Republic

Taxa	No. of species in KR	No. of threatened species	No. of internationally threatened species
Lower plants	3676	?	?
Higher plants	3786	71	?
Annelid worms	1282	6	?
Molluscs	168	2	?
Insects	10290	50	4
Fish	75	6	1
Amphibians	4	3	-
Reptiles	33	5	3
Birds	368	35	8
Mammals	83	15	14

Increasing pressures on natural resources

It has been estimated that the biomass of people and livestock in the country now equals the total biomass of wild mammals and birds. This indicates a shift in diversity, with dominance by a handful of species that use between 10 and 200 times as many resources as the other 500 vertebrate species. This situation has forced the most vulnerable wild species to the edge of extinction, including carnivores such as wolves (*Canis lupus*) which come into direct conflict with people and livestock. Furthermore, people and livestock are also degrading a number of habitats, which are becoming less productive. This is coupled with the loss of species that play an important role in environmental stability.

2.2.3 Conclusion

The importance of biodiversity in the Kyrgyz Republic is clear in both a national and international context. The country supports a unique and varied biological resource, with an unexpectedly high species richness given its land area (over 20,000 recorded species), and high levels of endemism in a number of groups. Important genetic resources include wild relatives of economically important species of food plants and trees. Around 1% of species recorded in the Kyrgyz Republic are considered to be threatened at a national level, and a number of internationally recognised threatened, flagship species occur in the country, including snow leopard and mountain goose. There is also a great diversity of ecosystems and landscapes within the country. Many of these sites are critically threatened, endangering the species they support.

Threats to biodiversity

Threats to species include habitat change, pollution, direct competition with livestock, and the spread of invasive species, and diseases. Many of the remaining populations of species listed in the national Red Data Book are at the critical lower limit of viability, from which the populations may not be able to recover. The tiger became extinct in the Kyrgyz Republic at the turn of the century, and now the otter faces a similar fate. Even species thought of as common, such as pheasants and wild boar, were completely exterminated in many regions, but have since been reintroduced in some areas.

Over-hunting has contributed to the decline in a range of ungulate species (mountain sheep, mountain goat, roe deer and red deer), as well as reductions in marmot populations. Marmots have declined significantly over wide areas as a result of over-hunting and eradication campaigns, and have completely disappeared from some areas of their range. During the 1950's and 1960's a campaign was conducted in order to eradicate sources of disease, and over one million marmots were exterminated. Losses in prey species have in turn affected predators such as bears, wolves and snow leopards, as well as large predatory birds such as vultures (including Egyptian, black and griffon vultures).

Declines are reported from many indigenous fish species in Lake Issyk-Kul, as a result of **over-fishing**. In Lake Issyk-Kul declines have also been linked to the introduction of perch-pike.

In addition, populations and habitats of some plants are at risk as a result of **over-collection** (including both wild flowers and medicinal plants). Over-collection of wild flowers and medicinal plants close to towns and villages have led to substantial declines in these species. In many areas, tulip species (including Greig's tulip), early crocuses, and other plants have now disappeared.

Many species have been driven to the edge of extinction, not only through direct extermination, but also through **habitat loss**. For example, many steppe species disappeared when these lands were ploughed, and birds such as bustards and steppe eagles stopped nesting. Felling of trees and shrubs has caused the decline and, in some places, the complete loss of areas of mountain forest. Loss of forest, coupled with deterioration in forest quality, means that some once widespread forest species, such as Tien Shan maral and heathcock, are now restricted to isolated areas.

Wetland habitats have been severely affected by drainage of swamps, river pollution, and direct habitat destruction. Such destruction has had severe effects on species that rely on wetlands, including otters and birds. Waterfowl and other wetland birds, such as cormorants, herons, geese, sandpipers and various duck species have stopped nesting in a number of areas, including the Chui valley.

Losses of vegetation, as a result of felling and overgrazing have led to extensive soil loss, and degradation of whole communities. Fires have also become more frequent and often result in irreversible damage to ecosystems, particularly forests.

Destruction of natural ecosystems, linked to increases in cultivated lands, poses the greatest threat to biodiversity in the Kyrgyz Republic. Fragmentation of natural communities also results from an extensive road-network, much of which connects seasonal or temporary settlements.

Meanwhile, other ecosystems suffer indirect anthropogenic impacts. **Overgrazing** has restricted regeneration in fruit and nut forests, making their future uncertain. It has led to the degradation of pastures, and to drastic reductions in the numbers of wild ungulates. Reductions in ungulate numbers have had knock-on effects on carnivore and scavenger populations, many of which are listed as under threat in the Red Data Book of the Kyrgyz Republic.

Pollution has significantly affected the flora and fauna of rivers and reservoirs, particularly in agricultural zones. In particular, mining enterprises located within highly vulnerable high mountain ecosystems are of concern, given the sensitivity of these environments to pollutants. Wide application of pesticides in natural ecosystems (used for pest control in forests) has resulted in the extinction of many invertebrates, and the decline of populations and reproductive capacity of raptors.

Direct mortality is also linked to anthropogenic changes in the environment. High voltage power lines are a major source of mortality among birds (particularly predatory birds) – e.g. killing more vultures than die through hunting or trapping. Night lighting has been shown to have significant impacts on populations of night-flying insects. Furthermore, roads are a major source of mortality for various species, including hedgehogs, snakes, and birds, particularly during migration seasons.

2.3 Existing Programmes for Biodiversity Conservation

2.3.1 Introduction

At present, measures for biodiversity protection in the Kyrgyz Republic can be divided into a number of key areas. National in-situ conservation is based on the protected areas network, along with forests, and regulations on hunting and fishing. Ex-situ conservation occurs in zoos and botanic gardens. Externally supported projects, and work by NGOs – including public awareness work – are also being carried out.

2.3.2 Information review

Protected areas system

In total, 86 protected areas have been established in the Kyrgyz Republic. These account for 777,300 hectares, or 3.9% of the total area of the Republic. The national conservation system was inherited from the former Soviet Union, and today a multi-functional network of protected areas exists. The network of protected areas consists of six strict reserves (zapovedniks), one national park, five nature reserves, and 71 zakazniks.

All economic activity is prohibited in zapovedniks. In national parks limited land use is permitted. Zakazniks are established to protect specific species or complexes of species.

Each zapovednik has a specific purpose or function. For example, the zapovednik at Sary-Chelek preserves an area of unique nut forests and mountainous landscapes with a picturesque lake. In contrast, Issyk-Kul zapovednik is designed to protect wintering waterfowl, and lake and wetland communities. Naryn zapovednik was set up to protect the maral, while the zapovedniks at Besh-Aral, Karatal-Zhapyryk, and Sarychat-Ertash preserve mid- and high-altitude ecosystems. (Protected areas are shown in Annex 2E).

A resolution adopted in 1984 specified further development of the protected areas network. It focussed on conserving species listed in the Red Data Book and indicated that a series of further protected areas be set up by the year 2000 to protect these species. Most of the planned protected areas have now been set up. All main types of remaining forests are represented in protected areas, and these areas contain an important cross-section of biodiversity whilst playing a key role in maintaining the ecological balance. However, protected areas contain only fragments of several natural ecosystems, while some ecosystems are not included within the network of protected areas at all. The area covered by protected areas is not currently sufficient to sustain viable populations of some of the most important species. Many mammal species require greater areas and migration corridors to move between sites at different times of year.

Financial restrictions have led to staff reductions and have diminished the efficiency of protected areas management. Decreases in the resources available for protected areas has led to a decline in staff, and resultant increases in cases of damage to the natural resources within them. Research carried out within protected areas has also declined substantially, and some scientific departments in protected areas have been closed. In future, one opportunity for zapovedniks to resolve their financial problems might be through the development of economic activities through resource use (such as use of non-timber forest products, wildfowl, etc). National parks, hunting reserves and forest zakazniks face a similar dilemma.

Protected areas have their own independent management. Effective management and protection of reserves is highly dependent on relations between protected area managers and local authorities. Interference by local authorities in the work of protected areas makes it more difficult for them to be effective tools for nature conservation.

Forest areas

Forests make up 4.2% of the total area of the Kyrgyz Republic and they play an important role in biodiversity conservation and in the ecological stability of ecosystems. However, the forest-cover of the Republic has been reducing constantly for the last 50 years. Unsystematic (and arbitrary) forest clearance, conversion to cattle pasture, and logging for high quality timber (such as walnut) have contributed to these declines. Juniper forests have also suffered.

All forests of the Republic are coming under increasing pressure from local human populations. Reductions in forest area, coupled with ageing of forests, application of chemicals, forest fires, collection of wild fruit trees, and commercial development of mountain forests, have led to the disruption of natural regeneration, reductions in the number of useful insects, and declines in other species of animals and plants. Reduction in forest cover across the Republic has resulted in soil erosion, devastation of mountain slopes and an increasing occurrence of landslides. A new national forest policy will form the basis for the restoration and development of forests in the Kyrgyz Republic.

Hunting and fisheries

Lack of regular control, and mistakes in implementing quotas for catches of different fish species, has led to substantial reduction of fisheries in the lakes and rivers of the Kyrgyz Republic. A number of species that have been introduced accidentally now adversely affect other species, e.g. by eating their young. Unique communities and species have been destroyed following the introduction of fish to previously unoccupied lakes and reservoirs. However, in some cases the introduction of productive and valuable fish species into artificial and reservoirs and ponds has increased food production.

Ex-situ institutions

Ex-situ conservation of biodiversity has been conducted through three botanical gardens, five nurseries and two zoos in the Kyrgyz Republic. There is, currently, no effective gene-bank in the country. Some of these institutes have existed since the Soviet era, while others were set up more recently. A range of unique, rare, endemic and threatened species are protected, although the focus of many of these institutions is public education and recreation rather than conservation. In the botanical gardens vascular plants are well represented, but zoos do not contain representative collections. Care and breeding of animals in zoos and nurseries has not been of an appropriate level due to financial restrictions. Reductions in the finances available for zoos have brought them close to closure.

Public awareness programmes

Eco-education programmes in schools and universities have been adopted, and aim to increase the level of ecological education. In addition, NGOs and mass media are acting to help the development of ecological awareness and maturity in the population.

Although the Republic has adopted ecological education, awareness of biodiversity conservation remains low throughout the population. Knowledge of the flora and fauna of the country, and why certain species are important, and protected, is virtually absent.

Little public information about biodiversity is disseminated. TV and radio programmes on ecological topics are boring and ineffective, being organised very formally, and there is no overall plan for generation of public ecological involvement and awareness. There are few analytical or methodological materials available to promote the development of public opinion and positive ecological thinking.

The involvement of communities in conservation activities is very limited, especially among rural populations. There are currently no clear examples of public ecological actions at the local level. NGOs are partly responsible for ecological public awareness and education in the country. However, although most NGOs have a clear understanding of what needs to be achieved, few have practical experience of implementing such programmes.

Although a number of international ecological conferences have been held in the Kyrgyz Republic, general access and publicity on ecological issues is still limited. This results in a general lack of interest in, and involvement of, the general public in decision-making on ecological protection.

2.3.3 Conclusion

Currently, existing programmes focusing on biodiversity conservation are limited in the Kyrgyz Republic. The state system of protection (including protected areas, forestry and levels of use for hunting and fishing) has declined due to the current financial crisis, and enforcement of ecological protection has been severely impacted. In particular, the effectiveness of the protected areas network has been weakened significantly, and strengthening and extending this system is recognised as an important priority. The existing ex-situ centres also provide an important resource for conservation. A number of independent-funded projects are currently active within the Kyrgyz Republic, although few of these are co-ordinated by NGOs. Public awareness at a community level is currently very restricted, and the potential role of NGOs in its development is recognised. Furthermore, issues relating to access to, and involvement by, the general public and NGOs in the ecological decision-making process may be needed to support the development of more independent projects.

2.4 Institutional and Administrative Base

2.4.1 Introduction

The institutional and administrative base related to biodiversity conservation activities in the Kyrgyz Republic is undergoing rapid transformation. Biodiversity conservation activities were very well-resourced under the Soviet Union, and the legacy is an excellent protected areas system, a sophisticated administration and research base, and a range of highly qualified and experienced individuals.

However, the political and economic changes have meant that most organisations are severely under-resourced and are taking time to adapt to the new situation. Both individuals and organisations involved in biodiversity conservation activities are discovering their new roles in this changing environment: the role of state agencies is becoming more focussed; the relatively young NGO movement is becoming more diverse and experienced; and businesses are recognising their social, as well as economic, responsibilities.

2.4.2 Information review

Government agencies directly involved in biodiversity conservation

- The **Ministry of Environmental Protection** (MEP) is responsible for all aspects of managing and protecting the environment, particularly managing zapovedniks and other protected areas, as well as overseeing activities that affect the environment outside protected areas.
- The **State Forestry Agency** (SFA) is responsible for managing all forestry activities in the country, including forestry and botanical zakazniks.
- The recreation department of the **Administration of the President** has management responsibility for Ala-Archa National Park and Tokmok zakaznik.
- The **Chief Division of Hunting Enterprises and Hunting Supervision** and the **Republican Society of Hunters and Fishermen** ('Kyrgyzokhotrybolovsoyuz') have management responsibility for a variety of hunting zakazniks in the country.
- **Oblast and rayon administrations** ('hakimiats') have responsibility for various national parks and zakazniks (including natural and geological monuments).

The MEP and SFA are central to state-run biodiversity conservation, as they manage the most extensive areas of conservation priority and receive the majority of resources allocated directly to biodiversity conservation. However, the other government agencies play a very important role in conserving biodiversity outside these protected areas - a role that is likely to become increasingly important.

National and local non-governmental organisations

In the Kyrgyz Republic there is a significant resource of highly qualified specialists working on biodiversity issues. As well as working within state agencies, academic institutions and businesses, most of them are also active members of different ecological NGOs. Therefore, most NGOs are run on a voluntary and/or part-time basis. They also tend to be very small, consisting of only a few members, with few financial or infrastructural resources available.

Of 160 registered ecological NGOs, 33 deal with biodiversity issues. Most of these are specialist NGOs that focus on particular taxa (e.g. botanical or entomological societies), particular biodiversity resource-use activities (especially hunting and fishing societies) or work in a particular region. Whilst many deal with biodiversity directly or indirectly, very few actively address biodiversity conservation issues, particularly at the national level.

International non-governmental organisations

International NGOs addressing biodiversity issues are still becoming established in the Kyrgyz Republic. Their activities currently focus on building local networks and planning, with a few small-scale on-the-ground activities. Key organisations include: Fauna & Flora International, IUCN, NABU, and WWF.

There are also several other international organisations working in the Kyrgyz Republic, whose activities contribute to (but are not primarily focussed on) biodiversity conservation. These include organisations working in forestry, NGO development, and environmental and social issues. Key organisations include: Counterpart Consortium, ISAR, Peace Corps, and Intercooperation.

In addition, several international organisations provide funding and technical assistance support for projects, these include, the World Bank, Abert Fund for Central Asia, Eurasia Foundation, Soros-Kyrgyzstan Fund, HIVOS, Know-How Fund, UNDP, TACIS, and the Adenauer Fond.

Other institutions concerned with or affecting biodiversity

- The **Ministry of Agriculture and Water Economy** has a variety of national, local and extension departments working throughout the country on all aspects of agriculture and water issues. The importance and extent of agriculture in the country has a considerable influence on biodiversity, both directly and indirectly.
- The **State Agency for Geology and Mineral Resources** also influences the biodiversity of the country, being a key agency in mountain environments, where work ranges from studying to exploiting mineral resources. Mineral extraction involves blast-hole drilling and other activities that may directly affect biodiversity.
- The **State Agency for Surveying and Land Resources** has an indirect impact on biodiversity. This agency provides registration and distribution of land for agricultural use and other economic purposes.
- The **Kyrgyz Union of Hunters and Fishermen** ('Kyrgyzokhotrybolovsouz') and the **Kyrgyz Medicinal Industry** ('Kyrgyzlekrasprom') also directly affect biodiversity.

Sectors directly affecting biodiversity

Industrial sector. Mining activities have caused direct damage to 3,700 ha of the country. Dumped waste and tailings from mining substantially affect mountain areas, which can be left severely degraded. Dangerous pollutants have leached from these dumps, and soil and reservoirs have been polluted with heavy metals, including mercury, antimony, zinc and lead. Industrial and vehicle emissions are also the main sources for atmospheric pollution, the levels of which are highest in the cities of Bishkek and Osh. Processing technology and equipment used by industry is generally outdated, and waste often exceeds safety standards. There are no enterprises processing and removing toxic industrial waste in the country.

Energy sector. Central heating stations, boiler houses and hydro-electric stations are represented in this sector. Coal, gas and diesel are used as fuel for power stations. The high cost of natural gas has led to a reliance on coal, which results in higher pollutant emissions, resulting in major environmental damage. Rural areas rely on private heating - mainly coal and wood. Fuel requirements in these areas, coupled with high costs for coal, have resulted in increased forest loss, and consequent soil erosion from deforested slopes. Although there are opportunities for alternative energy sources (such as hydroelectric power), these may also have negative environmental impacts (through the disruption of biological systems and hydrological systems in rivers).

Agriculture. Agriculture is the biggest sector of the economy in the Kyrgyz Republic, and includes both small-holdings and private farms. Knowledge regarding safe use, transport and storage of chemicals, pesticides and fertilisers is low, with the result of increasing soil and water pollution, including contamination of water with nitrates and bacteria from manure. Much of the cultivated land relies on irrigation, however, effective drainage systems are lacking. This has resulted in salinization of agricultural land across 20% of cultivated land in Chui and Fergana valleys.

Transport. Over 94% of cargo and 99% of passengers in the country rely on road transport. Thus, vehicle emissions (containing lead compounds and oxides of carbon and nitrogen), are the greatest source of pollution in this sector. In addition, extension of the road network has resulted in the destruction and fragmentation of wildlife habitats.

Tourism and biodiversity

The biological and landscape diversity of the Kyrgyz Republic provides immense potential for recreation and for the development of domestic and international tourism. Much of the current tourism focuses on the natural environment. Three international climbing centres operate in the Kyrgyz Republic, and a number of companies arrange tours. 'Activity-based' tourism also includes rafting, caving, walking, and horse riding. Some tourism also focuses on hunting (e.g. of mountain sheep) which represents an important source of revenue, with licenses costing around US\$16,000. At present, there is practically no eco-tourism within protected areas. However, Ala-Archa National Park charges admission, and income from visitors represents one of the main sources of income for the park during spring and summer.

Resorts and sanatoria tend to be concentrated in the Issyk-Kul region (including 88 tourist bases covering 9,400ha). In the south of the Kyrgyz Republic, tourism is focused in the regions of Jalal-Abad and Osh, where museums and historical/architectural monuments are of interest.

In 1996, income from tourism was nearly US\$ 1 million, of which over half came from international tourism. State revenues from tourism were over US\$ 500,000. The beauty of the country and opportunity for activity-based holidays (such as climbing), coupled with its position on the Silk Road and cultural associations provide enormous opportunities for further development of international tourism. However, at present, a lack of modern tourist facilities and services, and poor representation in the international tourist market, are restricting the further development of this industry. The potential for ecotourism needs to be explored further, taking into account sustainability and potential impacts on the environment from intensive tourist use.

Education and biodiversity

Education on ecological issues in schools is generally scarce, unless specialised Zoology/Biology courses are chosen. About 20 schools in the country also run special ecological courses, with greater study time devoted to natural sciences. Teaching of environmental issues is also limited by the availability of textbooks. Insufficient background material is available, and copies of existing textbooks are extremely restricted.

Although there is growing awareness of the need for ecological training within higher education among the scientific community in the Kyrgyz Republic, there have been difficulties in developing a co-ordinated and integrated strategy for such training. The problems stem from the evolution of environmental sciences, which was originally divided across various disciplines under the Soviet education system. Many ecological programmes are offered in universities and other institutions, with a different lecturer focussing on a specific aspect of ecology, without tackling the complexity of the subject through a holistic approach. For this reason, teaching of ecology tends to be rather disparate, and a clear foundation and co-ordination of these courses within the country is needed. Specific issues relating to biodiversity and conservation are included within the new ecological and environmental, 'Fundamentals of Ecology' course. This will cover a range of issues, including social, economic and land use issues.

Professional and teaching staff within the ecological faculties of higher education institutions comprise six professors, 14 assistant professors, and 21 lecturers (including senior lecturers). Approximately 1,200 students have received training in an ecological discipline and two standard courses provide training for professional ecologists ('Ecology and nature use' and 'Environmental protection'). The subject is also taught within undergraduate and MSc courses at a series of higher education institutions in the Kyrgyz Republic. Specialised courses in environmental law and environmental economics are also offered by some institutions. Further qualifications (including post-graduate and doctoral courses) in ecology and biology are also offered by a range of institutions, and further ecological training is available through projects run by donors and NGOs.

2.4.3 Conclusion

A number of institutions and economic sectors have a direct impact on biodiversity and its conservation, be it positive or negative. Although good institutional capacity remains in a number of sectors involved with environmental protection (including government agencies and educational establishments), this has been substantially undermined by recent economic events. In planning for biodiversity, the activities and requirements of these sectors need to be taken into account, to ensure that realistic projections can be made and that impacts on biodiversity can be mitigated.

2.5 Research Programmes and Facilities

2.5.1 Introduction

Biological research has been conducted in the Kyrgyz Republic over a period of 150 years. More than half of these documented species have been recorded within the last 50 years, when work was carried out through local research centres. This history of research has provided an important basis for understanding the biological resources of the Kyrgyz Republic, and for developing appropriate plans for their conservation.

The History of Ecological Research in the Kyrgyz Republic

At least 2000 years ago the Chinese knew the Tien Shan mountains by the name "Tsunlin", which translates as "Onion mountains", in recognition of the many onion (*Allium*) species found there, and demonstrating a clear awareness of the richness of these plants. Since that time, study and documentation of the fauna and flora of the region has continued. For example, in the 13th century the Venetian explorer Marco Polo recorded a range of wild animals, including falcons, and large herds of the wild mountain sheep which were later named after him.

The Kyrgyz Republic is gifted with a long and detailed history of ecological research. Scientific studies in the Tien Shan region started in the middle of the 19th century. An expedition to the north and central Tien Shan in 1856 and 1857 by the Russian geographer P. P. Semenov produced the first description of its fauna and flora. Further research between 1864 and 1879 by N. A. Severtsov produced an almost comprehensive review of bird and mammal species, which has since required only minor modification. The first entomological research was conducted in the region in 1871 by A. P. Fedchenko.

A number of further scientific expeditions were conducted up to the turn of the century – including those of P. R. Osten-Saken (1867), A. V. Kaulbars (1869), A. E. Regel, A. M. Fetisov (1877-1884), A. G. Grum-Grjimaylo (1884-1889), A. N. Krasnov (1886), V. V. Sapojnikov (1902-1915), and V. I. Lipsky (1903-1909). These expeditions provided the foundations for further research into alpine vegetation and ecology during the 20th century. Extensive studies have been conducted since then by over 24 scientists, some of whom have contributed to this report. A summary document entitled "Flora of the Kyrgyz Soviet Socialist Republic" was published under the guidance of E. V. Nikitina.

Up to the 1950's, research on the fauna of the region had been conducted by a number of individuals, including S. N. Alferaki, M. A. Menzibir, V. K. Kozlov, L. S. Berg, V. N. Shnitnikov, D. N. Kashkarov, A. A. Lubishev, G. P. Dementiev, D. P. Dementiev, B. A. Kuznetsov, and P. P. Vtorov. In the second half of 20th century, their work was continued within the Republican Academy of Sciences. In the 1950's, studies started on natural ecosystems and populations of certain taxa. Summaries on birds (1959-1961), mammals (1972), reptiles (1964) and fish (1963) have since been produced. In particular, extensive ecological and taxonomic research has been carried out on ground mammals, fish, and on various groups of invertebrates (carried out by over 39 scientists). Two volumes listing the genetic resources of the Kyrgyz Republic were also published in 1996 (focusing on viruses, protozoa, and invertebrates).

2.5.2 Information review

A thorough knowledge of plants and animals in the Kyrgyz Republic has developed from the very earliest expeditions in the country (see box above). Substantial collections exist, including extensive herbarium material. Research has been collated over the years, and published as maps and scientific papers. All basic results of biological research have now been published.

Many taxa (higher plants, fish, amphibians, reptiles, birds and mammals) have been studied intensively in the Kyrgyz Republic, with full inventories for these groups produced. However, information is lacking for less well-studied taxa, for some regions, and for other species associated with little-known ecosystems and habitats. A full inventory of protected areas has not yet been conducted. Research has focused in only two zapovedniks - Sary-Chelek and Issyk-Kul – and planned research has not yet been conducted in other reserves.

To date, biodiversity research has focused on species inventories, and ecological studies. It now needs to address the question of how to mitigate loss of species. In addition, little research has been published on ecosystems, relationships between organisms, and on the cultural and aesthetic values of biodiversity.

Research on and Conservation of the Mountain Goose

Over the last five years mountain geese have been reintroduced to a nursery in Issyk-Kul State Reserve, as part of a State project to protect this species. This year, nine mountain geese were reintroduced to the site. The migration routes of this species are also being studied, alongside ornithologists from the Bird Ringing Centre (Germany). Satellite tracking was used to help map their migration routes, with information being relayed from the Argos satellite, via the French city of Toulouse, to the Ministry of Environmental Protection in Bishkek. By November 1998, the birds had been tracked as far as Tibet.

Capacity for biological research is high. There are over 200 well-qualified specialists with direct experience of research on biodiversity at both a species and community level. Training in biology and ecology is offered by a number of universities. Several universities and institutes conduct research relating to biodiversity. These include: the Biological and Soil Institute (in Bishkek), the Botanic Garden, the Institute of Forests and Nut Farming, Osh State University, and Kara-Kol University. The largest concentration of researchers is at the Biological and Soil Institute of the National Academy of Sciences (see box). Research is also conducted by NGOs, and by scientific staff in protected areas.

However, since the early 1990s the majority of biological research programmes have been stopped due to lack of finance. The staff of the Institute of Biology and Soils has been reduced, and the average monthly salary for those who remain is US\$20-30. Some ongoing research continues, funded through grants, sponsorship, and participation in expeditions organised by foreign specialists. The lack of a unified programme of research means that the work produced is less effective, and that the human resources of the Institute are under-used. Today, there are almost no ongoing research programmes on biodiversity in the Kyrgyz Republic.

Research conducted by the Biological and Soil Institute

The Biological and Soil Institute of the National Academy of Sciences was founded in 1943, and since then has conducted extensive research into the biodiversity of the Kyrgyz Republic. Over 100 scientists work in the Institute, and over the last 50 years research has been conducted on a range of taxa, species of economic value (such as medicinal plants and game animals), plant and animal communities, as well as studies on ecology (such as bird migration routes). Studies of specific ecosystems (particularly high mountain habitats) and seasonal population censuses of birds and mammals were also initiated in the 1980's. Ongoing research has been focused on work at two permanent research stations, including over 20 years of study of sub-alpine vegetation in the Ala-Too.

The extensive information produced on biodiversity provides an important basis for monitoring populations. Population censuses have been conducted on species of economic importance (game species, medicinal plants and agricultural pests) over a number of decades. In the 70's and 80's, large-scale population surveys of terrestrial vertebrates were carried out in the northern part of the Kyrgyz Republic. However, in other cases trends have been hard to establish because of lack of baseline data on initial population sizes and distributions. A number of institutions and agencies in the Kyrgyz Republic, including several different government agencies, conduct monitoring of biodiversity, and environmental conditions, but, there is no central co-ordination or methodology for these activities.

Since the early 1990's research work and population assessments have practically stopped, due to financial restrictions. For this reason, accurate data on the current situation and trends of biodiversity are no longer available.

2.5.3 Conclusion

The Kyrgyz Republic has a long history of biological study and a strong research base relating to biodiversity. However, recent financial constraints have crippled the scientific institutions, and have resulted in the abandonment of long-term research and monitoring programmes. A strong base of trained and experienced personnel still exists, and this is seen as an important factor that needs to be drawn on in developing conservation projects. The need to ground biodiversity management on good and effective data has been recognised, and investment into appropriate research activities needs to be considered as a necessary component of future biodiversity conservation programmes.

2.6 Legislation and Policy

2.6.1 Introduction

In the Kyrgyz Republic, legal protection of natural resources occurs through a series of laws and legal quotas enforced by the prosecutor's office and courts. In principle, the existing legal base - which is based on Soviet nature protection legislation - covers all elements of the relationships between nature and society. Improvements to the legal nature protection mechanisms have been ongoing since 1961, and, more recently, the country has joined a number of international conventions relating to environmental protection. Regional, interstate co-operation on environmental issues is also developing, and agreements have been signed with a number of other Central Asian states.

2.6.2 Information Review

National legislation

Ecological legislation in the Kyrgyz Republic comprises ten Laws and 70 Acts which regulate activities connected with biodiversity: The following issues are addressed:

- Establishment of provisions for use of natural resources, including plants and animals.
- Prohibition of collection of rare and endangered species of animals and plants.
- Establishment of quotas for amateur and commercial hunting and fishing.
- Identification of licensed activities (hunting, fishing, collection of medicinal plants, etc.).
- Creation of protected areas (national parks, zapovedniks, zakazniks, etc.) with different legal regimes.
- Mitigatory activities required when undertaking economic actions affecting biodiversity.
- Identification of different types of ecological violations and crimes, and related responsibility and enforcement.
- Establishment for recovery of compensation for damage caused by illegal use of nature, including plants and animals.

The Kyrgyz Republic also has legislative documents that regulate agriculture, forestry, fishery, and land and water use, including:

- Commercial clear-felling is prohibited in all forests of the Kyrgyz Republic, which protects mountain forests and their role in water regulation and soil protection.
- Legislation regulates land use and provides opportunities for protection and sustainable use of land, soil protection, and environmental improvement.
- Commercial fisheries are legally obliged to protect habitats, breeding requirements and migration routes of fish.
- Water users are legally required to put in place mechanisms to protect fish populations, and ensure minimum water levels in accordance with ecological and environmental standards.
- Local government and administrations are legally authorised to oversee implementation of legislation on environmental protection and natural resource use. Local administration is also obliged to develop and implement programs for environmental improvement.

Some key legal documents affecting biodiversity conservation are listed in Table 2.6.1. In addition, a series of government resolutions directly affect biodiversity conservation. These include: *Approval of the Kyrgyz Republic National Environmental Action Plan; Approval of regulations on state environmental assessment; Kyrgyz Republic Land Code; Land Reform Law; and National Lands Presidential Decree.*

The nature protection legislation of the Kyrgyz Republic has been reformed and amended in accordance with the new economic situation. The Minister of Environmental Protection has drafted most new laws on nature protection. After discussions and agreement, they are submitted to the Parliament for approval.

Table 2.6.1 Key legal documents relating to biodiversity

Legislation	Date
Animal Life Protection and Use	1981
Atmosphere Protection	1981
Administrative Responsibility Code	1984
Environmental Protection Law	1991
Forestry Code	1993
	(amended 1997)
Specially Protected Areas Law	1994
Water Law	1994
Plant Quarantine Law	1996
Ratification of the Convention on Biological Diversity	1996
Civil Code	1996, 1997
Fishing Law	1997
Mineral Resources Law	1997
Licensing Law	1997
Criminal Code (Chap. 26, Articles 265-279)	1997

A revised law on the protection of animals is currently being considered for approval, and a law on protection of plants is being designed. The criminal and administrative codes of the Kyrgyz Republic have been up-dated to improve accountability and enforcement. However, new laws and codes soon become outdated, and it is necessary to update them annually with additions and changes. For instance, many of the approaches and species identified in the laws are based on old information (such as the Red Data Book) and may need review.

In spite of its legal basis, protected area status alone is not sufficient to ensure protection of these sites. Many difficulties in the management and organisation of protected areas relate to lack of consideration of natural resources protection within land legislation. Zapovedniks may, therefore, need to be given special status. Furthermore, with respect to the economic crisis it is also necessary to develop designations for protection and uses of other areas, to ensure survival of rare and endangered species and their habitats. In this context, restructuring of the nature protection system may be required, taking into account the needs of local communities.

International legislation and regional agreements

The Kyrgyz Republic has always placed importance on its participation in international conventions, and implementation of globally recognised policies in the sphere of environmental protection.

The first international environmental protection agreement ratified by the Kyrgyz Republic was the *Agreement on Co-operation in Ecology and Environmental Protection between Countries of the CIS*, which was signed in June 1992 in Moscow. This agreement identifies the main principles and spheres of co-operation between CIS countries. The next international agreement to be ratified was the *Agreement on Joint Actions to Save the Aral Sea*.

The National Environmental Action Plan (NEAP), developed in 1995, identified that joining further international environmental conventions was a priority for the Kyrgyz Republic. In 1996, in accordance with the NEAP, the Kyrgyz Republic joined the *Basel*

Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal. In the same year, the Kyrgyz Republic ratified the *Convention on Biological Diversity*. The Government is considering joining a number of other conventions relating to biodiversity – including the *Ramsar Convention*, the *Convention on International Trade in Endangered Species of Fauna and Flora (CITES)* and the *Bonn Convention on the Protection of Migratory Species*. Ratification of these conventions is delayed by different procedures in the Kyrgyz Republic, coupled with the current economic situation.

Regional agreements are also considered very important for biodiversity protection. An inter-government agreement for Central Asian countries on the distribution of surface and ground-water, limits the water available to the Kyrgyz Republic, to ensure sharing of this resource. In March 1998, the heads of three Central Asian countries (Uzbekistan, Kazakhstan and the Kyrgyz Republic) signed agreements for co-operation on environmental protection and sustainable use, and for biodiversity protection in the West Tien Shan region.

2.6.3 Conclusion

There is a sound legislative base, but mechanisms for its enforcement are not yet clear, and thus many articles of existing laws have not been applied. However, even if enforced, the existing laws are not extensive enough to ensure full protection of natural ecosystems and biodiversity. Laws need to be developed which have a clear goal of nature protection, and which are based on good scientific and ecological grounds. Currently, laws provide clear regulation of environmental protection and pollution, but they do not consider the ecological consequences of the destruction of whole ecosystems, and the extinction of species. No legal limits are in place to restrict further development of natural ecosystems and legislation does not effectively protect ecosystem function, or take account of its importance for sustainable human development.

2.7 Financial mechanisms for biodiversity conservation

2.7.1 Introduction

The changes brought by independence from the former Soviet Union and the resulting economic transition have had a major effect on the financial mechanisms available to support biodiversity conservation.

Before 1991, biodiversity conservation activities were very well resourced by the state, and focussed upon maintenance of the protected areas system. Support from international sources was minimal, as was support from businesses and non-governmental organisations.

With the reduction in state control, biodiversity conservation activities have started to broaden outside protected areas. This has been accentuated by the dramatic relative decrease in state financing of the protected areas system. This has left key protected areas desperately under-financed, and these may begin to rely on innovative sources of financing to support biodiversity conservation.

2.7.2 Information review

State resources allocated directly to biodiversity conservation

At present, biodiversity conservation is financed from the government budget for environmental protection (6,394,965 som, approximately US\$320,000). A limited proportion of the costs of the protected areas system is met by the Republican Fund of Nature Protection (accounting for 61,900 som, approximately US\$4,000). In addition, limited funds are raised for reserve management from economic activities within the protected areas themselves.

All budgetary funds for protected areas are currently spent on salaries. Despite this, personnel salaries are still below the level necessary for even basic subsistence. Many protected areas staff are therefore reliant on other sources of income to live. In addition, there are virtually no allowances for infrastructure maintenance and development. (Table 2.7.1 & 2.7.2).

Current expenditure per unit area of protected area is 8.3 som/ha (c. US\$0.4/ha). However, each member of protected area staff is, on average, responsible for 1,450ha.

Table 2.7.1 Staffing and budgets for different types of protected area (1997)

Protected area	No.	Area (ha)	No. of staff	Budget (som)	Budget (US\$)
Zapovedniks	6	250,500	241	2,296,700	(c. \$115,000)
Natural parks	6	213,900	208	3,785,000	(c. \$189,000)
Zakazniks	71	312,900	87	313,200	(c. \$16,000)
Total	83	777,300	536	6,394,900	(c. \$320,000)

Table 2.7.2 Financing of protected areas (1997)

Protected area	Number of staff	Budget (som)	Budget (US\$)
Zapovedniks			
Naryn	31	304,600	(c. \$15,000)
Issyk-Kul	47	418,000	(c. \$21,000)
Besh Aral	35	318,000	(c. \$16,000)
Karatal-Japyryk	37	364,100	(c. \$18,000)
Sary Chelek	66	510,100	(c. \$26,000)
Sarychat Ertash	25	381,900	(c. \$19,000)
Total	241	2296,700	(c. \$115,000)
Natural parks			
Ala-Archa	22	300,000	(c. \$15,000)
Karakol	35	134,200	(c. \$6,500)
Kemin	68	2,500,000	(c. \$125,000)
Besh-Tash	27	379,700	(c. \$19,000)
Karashoro	27	379,000	(c. \$19,000)
Kyrgyz-Ata	29	92,165	(c. \$4,500)
Total	208	3785,065	(c. \$189,000)

Fines and incentive mechanisms

The current system for biodiversity conservation includes some measures aimed at mitigating the negative impacts of economic development. Payment levels have been set through a Government Resolution for direct use of natural resources, as well as for indirect impacts relating to habitat change (forestry, clearance for agricultural land, grazing etc.).

However, the current pricing policy does not take into account all the damage caused to the environment or to wildlife. Assessments of the overall fines for use of biological resources or products is based on existing market prices, but does not take into account the costs associated with long-term and indirect environmental damage resulting from such activities. For example, a fine for felling a walnut tree that is based on the market price of the tree does not cover the costs of planting and growing another tree over several decades. It is clear that fines and other state income generated from biological resource use (e.g. taxes) should incorporate the wider environmental costs of use such as: accessibility of the location (remoteness); rarity of the species and purpose of use; the availability of hunting licences for foreign citizens; environmental restoration costs; distribution and population; existing availability of stored material; quantity needed; season of availability; location; labour expenses; (medical) efficacy; and the part of the plant, or animal, that is used. In order to put an appropriate value on biodiversity conservation in an economic context, legislation needs to be developed which takes into account both economic value and ecological damage.

Currently there are no financial incentives for regulating activities that affect biodiversity conservation, e.g. tax relief for industries that install pollution reduction measures, or restore degraded habitats.

Other state resources indirectly supporting biodiversity conservation

Although difficult to quantify accurately, many other state-financed activities support biodiversity conservation indirectly. These activities are dealt with elsewhere in this report (especially sections 2.3 – 2.5). These include activities by state agencies involved in the land use sectors (e.g. mining, forestry and agriculture), research institutions, and education programmes. It is clear, however, that biodiversity priorities have to be integrated with these other activities.

Internationally funded programmes

Biodiversity conservation activities in the Kyrgyz Republic are becoming increasingly reliant upon external sources of finance, whether this is via government, non-government or business organisations. The table below illustrates the scale of some of these projects. Even larger projects have been planned, and await implementation in the near future e.g. the \$10m+ West Tien Shan project (see Table 2.7.3).

Table 2.7.3. Examples of recent internationally financed large-scale projects supporting biodiversity conservation

Financing Source	Project	Amount
World Bank	National Environmental Action Plan	-
World Bank / Global Environment Facility	Biodiversity Strategy and Action Plan preparation	\$108,000
World Bank	Aral Sea Programme	-
GTZ	Development of Biosphere Reserve	DM 5 million
Switzerland	Timber Utilization Programme	\$2 million
Asian Development Bank	Environmental Impact Assessment	\$572,000
Asian Development Bank	Environmental Monitoring	\$1 million

As well as these larger sources, there are many smaller sources of financing. Several international organisations (such as Counterpart, FFI, INTRAC, ISAR, and Soros) have small grants programmes and provide technical assistance for NGOs and local groups. However, most of these do not have biodiversity conservation as their priority. It is, therefore, difficult to assess to what extent these activities contribute to biodiversity conservation.

Private resources allocated to biodiversity conservation

Currently there are virtually no private resources allocated to biodiversity conservation, although there is clearly potential and support for this to happen. Private financing may come from three different areas:

- Businesses that profit directly from conserving biodiversity, e.g. eco-tourism companies, whose activities will directly benefit biodiversity.
- Businesses that use or affect biodiversity, e.g. mining companies. Companies such as these may support biodiversity conservation by reducing their negative effects on biodiversity (e.g. reducing pollution) or by supporting parallel activities that benefit biodiversity conservation (e.g. conducting ecological research or supporting local community conservation initiatives).
- Businesses that have little or no direct link with biodiversity conservation but may contribute to biodiversity conservation activities as part of their social responsibility (e.g. supporting communities or employees) or to raise their public profile.

2.7.3 Conclusion

The process of economic transition has substantially reduced money available to nature protection, while economic activities are proving increasingly damaging to the environment. As a result, there is an increasing need to develop financing mechanisms to both address the massive reduction in state support in real terms, and to actively improve biodiversity conservation and environmental issues outside protected areas.

International financing is helping to provide short-term assistance. However, it is vital that more sustainable mid- and long-term financial mechanisms are sought for continuing biodiversity conservation.

2.8 Economical and Social Issues

2.8.1 Introduction

Since independence in 1991, the Kyrgyz Republic has enthusiastically pursued economic reforms to bring it from a state-planned to a market economy. There have been significant steps made in the transition; private property and businesses are flourishing, the free market prevails in many areas, and the economy has stabilised. However, despite the many reforms implemented, the economy is still in a critical state. The economic situation has in turn had wide-reaching effects on the social situation of the country.

The conservation of biodiversity directly depends on these socio-economic conditions. The state of biodiversity in its turn influences, directly or indirectly, all social and economical sectors of the country.

2.8.2 Information review

Table 2.8.1 Key economic and social indicators (1996 – data from the World Bank)

Indicator	Value
GDP	US\$1.7 billion
GDP annual growth	5.6%
Agriculture (% of GDP)	51.9%
Industry	19.3%
Services	28.8%
GNP	US\$2.6 billion
GNP annual growth	5.5%
GNP per capita	US\$570
Poverty (headcount index)	45%
Urban population	39%
Life expectancy at birth	68 yrs.
Infant mortality	30 (per 1,000 births)
Access to safe water	75%
Illiteracy	3%
Human development index	0.640

The economy is beginning to show signs of emerging from the massive crisis brought on by economic transition: the 1996 rate of GDP growth was positive for the first time since 1990; export and import rates are rapidly increasing; inflation is stabilising, in 1992 it rose above 800% (Table 2.8.1). Despite these positive macroeconomic changes, most areas of the economy have been crippled or been slow in adapting to the new economic climate.

A sharp reduction in the relative amount of state budget income has meant that state-run agencies are able to pay little more than basic salaries. This has led to deterioration of infrastructure such as roads and power supplies. There has also been deterioration in the quality of social services (e.g. health facilities and welfare).

The industrial sector has been badly hit by the economic transition. There has been a sharp reduction in production in the many areas that were oriented towards markets in the former Soviet Union. Many industries have had to close down, resulting in

widespread unemployment. Some industries use out-dated and poorly maintained systems, which cause serious pollution. However, there is not enough capital to bring these systems up to internationally acceptable levels. The lack of industrial enterprises, networks and jobs in Issyk-Kul, Naryn, Talas, Osh and Jalal-Abad oblasts has resulted in local recessions and a decrease in welfare levels.

The economic difficulties have seriously affected both the rural population and agricultural sector of the country. Approximately 38% of the farms in the north of the country and 66% of farms in the south were categorised as poor, based upon living standards, as were similar proportions of farms in Jalal-Abad (64%) and Osh (66%) oblasts. Increasing poverty in the agricultural sector may partly explain the widening gap between rich and poor in the country.

The difficulties in the agricultural and industrial sectors has led to large-scale migration and housing problems throughout the country. People have been moving from the poorer rural areas to urban areas in search of employment. Official figures show that 11,600 people moved from the agricultural south to the urbanised north in 1996-7. Urban problems such as housing, fuel supply and sanitation have been further exacerbated by the influx of refugees from Tajikistan, and from the devastation caused by the landslides and mud-flows in early 1998 in the Suzak region of Jalal-Abad oblast. (These may have been caused partly by environmental degradation). Local and national government agencies have been able to do little about this due to their reduced budgets.

Biodiversity is incredibly important to the livelihoods of many people in the country, especially for the rural poor. In the agricultural sector, pastures where the original community of species has been preserved have the greatest forage value. In crop cultivation, horticulture and forestry, the most stable, and safe, measures against pests are connected with the use of biological control (e.g. natural predators) to limit their numbers. The livelihoods of hunting and fishing enterprises, and the medicinal plant trade directly depend upon the wellbeing of the species on which these activities are based. The diversity of wild ancestors of cultivated plants and species that can be successfully cultivated is an inexhaustible source for genetic material for selective breeding. In many regions, more than half the energy demand for heating and cooking is met by wood. Collection of wild flowers is becoming larger scale and more commercial. Commercial collection of snakes, predatory birds and other animals has become more frequent.

2.8.3 Conclusion

The economic and social situations, highly summarised here, are at the root of the many threats to biodiversity conservation, and form some of the main constraints to its long-term viability.

The economic situation has led to massive habitat degradation, overuse of biological resources, and pollution of the environment. It has also led to widespread social difficulties, and a lowered institutional capacity to respond to problems in the social and environmental arenas.

However, the situation has increased the reliance upon natural resources, especially by the rural poor, where biodiversity provides important subsistence and income opportunities. Biological resources also provide a cornerstone upon which to build economic recovery, especially in the agricultural and service economies (e.g. tourism).

Equity Issues

One of the three central tenants of the Convention on Biological Diversity is *'the fair and equitable sharing of biological resources'*.

Equity in biodiversity conservation concerns the way that biodiversity affects the quality of life of people. Biodiversity may benefit, or cost people, differently depending on individual circumstance. To an extent, uneven distribution is inevitable because of the wide variety and level of interactions that different people have with biodiversity. The CBD highlights the need to recognise the rights of all to equitable sharing of genetic resources, and indicates that countries should design ways in which biological resources can be shared between the many rather than the few. In addition, it recognises the need to ensure that local communities are fairly compensated for extraction of biological resources from that locality, or that they can benefit directly from the use of these resources.

For example, if a large multinational company was collecting specimens of pharmaceutical plants for research into development of specific medicines, how could it be ensured that both national governments, and indigenous communities, gain access to the final products from 'their' biodiversity? In other cases, direct extraction of biological resources may necessitate a broader sharing of the profits – acknowledging the common ownership of resources, and that the value is linked to the resources themselves, and not just to the extraction process.

2.9 Problem Analysis

2.9.1 Introduction

In this section, the information on biological resources and the factors that affect them will be analysed, in order to identify general patterns of impacts. This will include both constraints and opportunities for biodiversity conservation in the Kyrgyz Republic. The process of identifying the key factors affecting biodiversity and implementation of biodiversity conservation programmes provides a context within which to prioritise and assess potential actions which could be taken to improve the current situation for biodiversity.

Stakeholders and their interaction with biodiversity

A wide variety of groups and individuals affect or are affected by biodiversity. They range from direct users (foresters, farmers, hunters, industries etc.), to those involved in direct protection of the environment, to those who value biodiversity as part of their culture. In fact, all individuals in the country can be considered stakeholders in respect to biodiversity. Everybody uses biological resources in one way or another (be it water, timber for houses, or wild-collected fungi), and most people appreciate the aesthetic values of nature. Furthermore, the services provided by biodiversity (ranging from watershed protection to pollination) are crucial to everyone.

Some sectors of society use biodiversity more directly than others do. Even so, relationships with biodiversity are rarely simple – any group interacts with biodiversity in a number of ways. The same organisations that directly use biological resources may be indirectly influenced, in other ways, by changes to biodiversity elsewhere. For example: a medicinal plant collector uses biodiversity directly, but may also suffer the negative impacts of forest loss at high altitudes, leading to soil erosion and increased flooding in his local area.

Thus, it can be expected that the degree of interest in biodiversity is reflected in the extent of participation in the planning process, with those most involved (directly rather than indirectly) participating to a greater extent.

2.9.2 Key impacts on biodiversity

Declines in many species are evident in the Kyrgyz Republic, as is demonstrated by the number of animals and plants listed in the national Red Data Book. In some cases, these declines result from direct population losses, caused by over-hunting and persecution. Marmots have declined through both hunting and eradication campaigns, during development of mountain areas, while wolves are also at risk from persecution, and snakes and other reptiles are declining, due to both persecution and collection for medicinal purposes. Plants are similarly affected by over-collection; for example, marked declines in populations of medicinal plants have been recorded, particularly close to settlements.

However, direct collection only affects a limited number of species with economic value. For many species the biggest cause of decline is significant change and loss of habitat. Natural ecosystems are being completely destroyed as they are adopted for anthropogenic uses, resulting in extinction of most of the species within them. In some cases habitats are altered to such an extent that they no longer support the majority of species which previously used them. This is generally the case when land is used for agriculture, industry (including mining activities) and human settlements, and where roads are developed, or irrigation systems introduced.

Around 10% of the land in the Kyrgyz Republic has been completely changed from its natural habitat type, and some habitat types have been severely reduced by man's activities. Many areas of mountain forest have been lost as a result of felling of trees and shrubs.

Habitat alteration also occurs through pollution, pesticide use, selective removal of particular species, change in irrigation regimes, fires, and loss of primary biomass. All natural ecosystems are affected by some habitat change to a greater or lesser extent.

These changes to habitats and communities have substantial effects on the functions served by ecosystems in the Kyrgyz Republic. Loss of vegetation, as a result of felling and overgrazing, has led to extensive soil loss, and degradation of whole habitats. Outbreaks of fire have also become more frequent. Such fires often result in irreversible damage to ecosystems, particularly forests, as well as posing a danger to life. Continued degradation of natural ecosystems will continue to undermine the balance of ecosystems and the role they serve. There are also increasing threats of soil erosion, loss of soil fertility, and changes to water systems, unless efforts are made to control the current rate of habitat loss.

2.9.3 Ultimate factors affecting biodiversity loss

Many natural ecosystems in the Kyrgyz Republic have been preserved as a result of the sheer inaccessibility of high mountain areas. Furthermore, the lack of permanent settlements and the low density of livestock in most of the country, up to the turn of the century, also protected the environment. Mass settlement of the traditionally nomadic people only started in 1921, with Soviet land reform and loss of private property rights. At this time the first collectivisation took place, with the development of collective farms.

The transition to settled life had serious consequences for the environment. Mountain forests were felled to provide timber for house construction, and extensive logging resulted from the further development of industry, transport, communication, and electrification. Much large-scale felling was conducted during and after World War II, with forest being completely removed from the lower slopes. Over the last fifty years, forest cover has declined by over 50%. At the same time, areas of steppe were ploughed to create arable land. Irrigation of these areas had consequences for natural habitats along the previous flow of rivers, with the loss of vegetation, swamps and lakes downstream.

The development of mining operations has destroyed some mountain habitats, resulting in thousands of hectares of barren land. In addition, creation of reservoirs for water supplies has directly affected biodiversity – the only colony of grey herons in the Kyrgyz Republic disappeared when the Toktogul reservoir was flooded. The extension of the road network has made almost all parts of the country accessible.

Within the former Soviet Union, the Kyrgyz Republic had the third highest number of livestock (over 10 million sheep), less only than Russia and Kazakhstan, but much higher densities given the relative land areas of these countries. The effects of overgrazing are still clear today. Increasing livestock densities within limited grazing areas significantly affected vegetation composition, with weeds and poisonous plants becoming more dominant. Up to 25% of pastures have been severely degraded through overgrazing (grazing limits have been exceeded by 5-10 times), and even forest areas have been grazed. In addition, wild ungulates have declined significantly as a result of competition for food with livestock, and through illegal hunting.

Industrialisation led to large-scale pollution. When many industries closed down after independence, pollution emissions decreased, but the threat of leakage of hazardous waste increased. Such waste, including radioactive and toxic materials, occurs in all regions of the country. Such wastes remain within the compounds of these industries, but are not carefully stored or monitored. New owners of these businesses can only dispose of wastes in dumps which are not appropriate to the kind of materials and chemicals involved, and waste disposal remains an important issue to be resolved.

Population density in many regions now reaches over 100 per km². Such population densities cannot be supported sustainably by many of the more fragile ecosystems, and in some areas the effects of overpopulation on the environment are already directly affecting quality of life.

At present one of the key factors affecting biodiversity losses, is the recent economic crisis. Increasing poverty, and limited alternative sources of income, have resulted in a reliance on natural resources to sustain life. In such situations it is difficult to manage these resources in a sustainable manner, and declines are expected. Furthermore, financial constraints limit the opportunity for the appropriate agencies to protect the environment effectively. Increasing investment in environmental protection is likely to be central to reducing current losses of biodiversity, while a recognition of the value of sustainable utilisation in protecting future resources for further development is essential to provide the political weight to implement change.

2.9.4 Review of key contextual factors

A relatively high proportion of natural ecosystems in the Kyrgyz Republic remain intact. Despite some anthropogenic alterations, their viability and wildness has generally been preserved. The majority of natural areas are relatively far from settlements and access to them is limited. In most cases, restriction or alteration of anthropogenic activities, rather than habitat restoration, will be the most appropriate means for biodiversity conservation. However, actions do need to be taken to reduce high levels of anthropogenic impacts across the breadth of the country, before further damage is done to a number of fragile ecosystems.

Major institutional constraints stem from a general lack of funds for biodiversity conservation. International experience indicates that the substantial resources necessary for effective environmental protection are only available within economically developed countries. The Kyrgyz Republic only started to emerge from a deep economic crisis in 1997, before which gross domestic product (GDP) had more than halved. In 1996, the average income per person was only US\$570 (more than 40 times lower than in some developed countries). External debt has also been growing over this period. The period of soft loans has finished, and has been replaced by a situation where loans have stricter repayment conditions. However, the current improvement of economic indices stems not only from the revival of industry, but also from the development of mining, which itself poses a serious threat to the ecology and biodiversity of the country.

Within this economic context limited funds are available for direct biodiversity conservation activities, or supporting work. For example, the financing of biodiversity research has virtually stopped, thus significantly reducing the efficiency of projects.

The institutional and legal framework forms a strong basis for nature protection. However, the institutional capacity for biodiversity conservation is not fully developed, and environmental legislation needs strengthening. Generally, there is a lack of co-operation between government and non-government sectors and local communities. Mechanisms for information access are not well developed and there is an absence of transparency or public participation in consideration of projects that have environmental consequences. However, democratisation of public agencies facilitates co-operation between government institutions and non-government ecological organisations and there is already considerable initial experience of such co-operation. Furthermore, there is enormous potential for international co-operation, and such collaborations have already proved very successful in protection of the biodiversity of the Kyrgyz Republic.

At present ecological education and public awareness of environmental issues are very restricted, and there is very little popular literature, especially about the natural resources of the Kyrgyz Republic. Ecological considerations are rarely incorporated into the political and economic decision-making process, and environmental awareness of decision-makers is poor. The mass media does not currently promote the ecological situation or generate interest in this subject. However, the high literacy level of the population provides a strong basis on which to develop environmental education and public awareness. This will be supported by a well-trained base of teachers and specialists.

The number of highly qualified biodiversity-related specialists in the Kyrgyz Republic is declining, in spite of a relatively high level of education and professional training. This is the result of isolation from up-to-date information, stemming from a lack of special literature and texts. Links with leading scientific centres outside the country have also been lost. Development of new technologies and implementation of projects connected with biodiversity protection will require the participation of highly qualified specialists, and there is a need to reverse the current decline in this field. Targeted financing is needed to allow the revival of scientific research and teaching in biodiversity. New research and qualifications will also facilitate the introduction of advanced technologies, both in agriculture and industry.

2.9.5 Identification of constraints and opportunities for biodiversity conservation

In the sections above (2.9.2 & 2.9.3), the key impacts upon biodiversity and their causes have been reviewed. This has underlined the urgent need to mitigate continued declines in biodiversity. This is particularly clear where the value of biological resources and functions are being directly undermined (e.g. loss of tree cover leading to damage to watersheds and increased risks of mud slides and soil erosion). In order to plan the most appropriate means to resolve such declines, the context in which biodiversity conservation operates needs to be considered, including key constraints, as well as strengths and opportunities for conservation.

A broad review of the current situation in the Kyrgyz Republic is outlined earlier in this document (see 2.3-2.8, and especially 2.9.4). This has been used to identify key common problems and opportunities, which will be relevant across organisations, and will help define the requirements and limitations for biodiversity conservation. In some cases negative factors will need to be changed as part of the action plan, while in other cases this will not be possible, and conservation activities will need to be designed around these constraints. Wherever possible, conservation actions should build on existing strengths or opportunities, in order to maximise their benefits for future activities.

General factors affecting biodiversity conservation activities

The following list contains a number of major factors that have common cross-sectoral implications for biodiversity conservation. Some of the factors mentioned can be considered as constraints, others as opportunities. However, a number of these factors are shown to be both existing constraints and potential opportunities.

Economic and political transition has affected all aspects of biodiversity conservation in the region, particularly through its influence on financial resources and changes in the political systems. This underlies many of the current problems associated with declines in infrastructure and finances. Economic transition has resulted in significant changes to the way in which the economy and political system functions and has also altered people's expectations.

Lack of a strong resource base on which to build the economy (e.g. few natural resources, no major industry) may lead to a further worsening of the economic situation. However, this may also be considered as an opportunity, as biodiversity is a relatively important economic resource, and its wise use will play a key role in helping the country through the transition period and beyond.

Lack of infrastructure and communications results from the mountainous terrain of the country. To keep the minimum communication and transport systems operational in such terrain requires high levels of maintenance, and economic constraints have led to a decline in these systems. The physical isolation and location of the country has resulted in a low level of international awareness about the country. However, improved international connections are rapidly changing this situation.

Long-term environmental problems exist in the region, as a result of massive pollution and over-use of resources, and these may be difficult to mitigate effectively. Furthermore, there is increasing evidence of climate change in the region (as a result of global warming and regional environmental changes, such as to the Aral Sea). Continued industrial impacts on the environment are likely to continue into the foreseeable future, given an economy with a strong reliance on mining, and the general lack of other, less damaging, alternatives for economic development.

The institutional base remains strong, although this is being undermined by continued financial constraints, resulting in lowered salaries, staff morale, and both recruitment and retention of professional staff. In general, an open political system and a high level of literacy provide the potential for sustainable development, and economic growth. In addition, an active and increasing NGO community provides an opportunity to harness the capacities of the broad range of committed individuals within the country.

Sustainable development is a clear opportunity within the Kyrgyz Republic, where there is a clear linkage between biological resources and opportunities for sustainable economic and social development.

The cultural value of biodiversity within the Kyrgyz Republic is clear, and includes a recognition of the importance of traditional patterns of use. This provides an important opportunity from which to build public support for biodiversity conservation. However, up to now little information on biodiversity and its decline has reached the general public, especially in rural areas, as a result of the lack of specific public awareness on this issue and difficulties with communications.

The extensive protected area system, which already exists, coupled with the mountainous and inaccessible terrain of the country, has helped to protect wildlife and wilderness areas, with relatively low levels of investment. However, the current zapovednik system will need to change and adapt to the changing social, political and economic situation.

A strong research base remains a clear positive legacy from previous investment in academia. There is a wealth of information published on the biodiversity of the country, although some of this information is not easily accessible or fully catalogued. Scientific institutions are now suffering from common financial and organisational constraints. However, there are clear opportunities to directly apply existing and future research, and thus to strengthen biodiversity management

A strong legislative base already exists to protect wildlife resources. This provides an important initial basis for conservation, and there is good capacity to develop further legislation. However, there are clear limitations in the extent to which legislation has been applied and enforced, and which undermine the success of the legislative base for nature protection.

Good experience of planning and plan development exists within institutions. However, what is less obvious is evidence of implementation of such plans, especially when involving collaboration or partnership among organisations or institutions.

2.9.6 Specific institutional constraints and opportunities

In analysing the current status of biodiversity in the Kyrgyz Republic a number of specific institutional constraints and opportunities for biodiversity have emerged (see Table 2.9.1). These have been collated and compared in the table below as a first stage in the development of **realistic** objectives, strategies and actions, which take account of the true situation, and are thus more likely to be effective.

Table 2.9.1. Specific institutional and related factors, and associated constraints and opportunities

	Constraints and limitations	Strengths and opportunities
Organisational capacity for biodiversity management	<ul style="list-style-type: none"> Reduced financial resources and budgets have resulted in a reduction of the capacity of government agencies Organisational inertia and historical legacy have led to delays in adaptation to the new economic and social situation 	<ul style="list-style-type: none"> Strong organisational base for biodiversity management still exists. There is high potential for attracting external investment into capacity building and training programmes to raise the skills and develop new technologies.
Human resources for biodiversity management	<ul style="list-style-type: none"> Low morale has resulted from salary reductions in real terms across government agencies, local administration and scientific institutions A reduction in the availability of professional staff for biodiversity management has resulted from the limitations in training and professional development in this field 	<ul style="list-style-type: none"> A core of well-qualified and committed people exists, despite low salaries and difficult working conditions
Equipment and physical resources	<ul style="list-style-type: none"> Very limited investment in equipment and physical resources has resulted in current resourcing being insufficient to meet current and future commitments 	<ul style="list-style-type: none"> Clear opportunities exist to substantially improve the resource base even with limited investment
Experience of international projects	<ul style="list-style-type: none"> A general lack of experience exists in implementing activities in a 'market economy' or international style (e.g. financial accountability, participation, project cycle management, etc.). 	<ul style="list-style-type: none"> Ongoing training programmes are rapidly increasing capacity to meet the needs of international projects, which will be hastened by increasing exposure to such methods of working
Information transfer	<ul style="list-style-type: none"> Limited information transfer has led to inefficiency and lack of co-operation 	<ul style="list-style-type: none"> Availability of new technologies is increasing opportunities for information sharing and transfer between individuals and organisations
Research	<ul style="list-style-type: none"> Research has generally been academically based with little application directly to management of biodiversity 	<ul style="list-style-type: none"> A strong research base exists, which can be applied more effectively as part of directed research programmes.

Co-ordination and partnership	<ul style="list-style-type: none"> Limited co-ordination and communication exists between government agencies and the developing NGO community, particularly in the light of changing roles and responsibilities of these institutions Few case studies exist demonstrating an experience of inter-sectoral collaboration (e.g. government-NGO, or business-NGO partnerships). 	<ul style="list-style-type: none"> The increasing recognition of the need to involve stakeholders in the management of biodiversity will result in greater co-ordination between government agencies and NGOs. Opportunities are developing to work in partnership with the growing private sector, and promote direct involvement in biodiversity management .
Participation	<ul style="list-style-type: none"> There has been a lack of wide stakeholder participation in the planning, management and sustainable use of natural resources. 	<ul style="list-style-type: none"> Pilot models of participatory planning and management of biodiversity are attracting external funding Participatory techniques are now being developed as part of sustainable development programmes
Public awareness	<ul style="list-style-type: none"> Low levels of awareness of the importance of biodiversity and its links with sustainable development exist among rural communities, the general public and decision makers. 	<ul style="list-style-type: none"> Increasing opportunities for enhanced public awareness, supported by more widely accessible communication systems. Raising awareness of the importance of Kyrgyz biodiversity and ecosystem functions (such as watersheds) among decision makers, donors and the international community is likely to encourage further investment.
Legislation	<ul style="list-style-type: none"> Enforcement of legislation has been limited or inconsistent as a result of limited enforcement mechanisms. 	<ul style="list-style-type: none"> A strong and well developed legislative base represents an important strength for further legislative development

2.9.7 Conclusion

This section has demonstrated that there is a wide range of both constraints and strengths, which need to be taken into account in biodiversity conservation planning for the Kyrgyz Republic. In general, the situation of economic and political transition in the region underlies many of the constraints on biodiversity conservation. However, many of the institutional structures remain in place, and along with the growing NGO community, provide an important basis for the development of further biodiversity related activities. In fact, biodiversity itself may prove to be one of the most important resources or assets for economic development in the Kyrgyz Republic, and thus for further support of biodiversity conservation.

2.10 Summary of the Country Study

- The Kyrgyz Republic supports a high density of both species and ecosystems. Many of the species and habitats concerned are of clear economic value to the people of the Kyrgyz Republic. The mountains also fulfil an important role by providing water to the plains of Central Asia.
- Many of the species and habitats of the Kyrgyz Republic, including many of economic and functional importance, have shown dramatic declines over recent years. Forest cover has been reduced by more than 50%, while areas of pasture have been severely degraded. Species of economic importance are disappearing from areas accessible to humans. In addition, habitats have been affected by over-use, extraction of minerals, and pollution. At present 193 species of animals and plants are threatened with extinction in the Kyrgyz Republic.
- Existing state programmes include the protected areas network and forestry service, as well as extensive legislation designed to protect biodiversity, and regulate off-take. A strong research and education base has the potential to support conservation activities, and the growing NGO movement is now taking a more active role.
- Under financing of existing structures reduced their effectiveness, and has restricted the enforcement of legislation. Furthermore, low public awareness of biodiversity issues means that ecological impacts have not been considered at a local community level.
- Biodiversity conservation is intrinsically bound to social and economic development in the Kyrgyz Republic. Investment in strengthening the protection of natural resources will support sustainable use of resources for future generations. It will provide an important means of ensuring improved livelihoods for the people of the Kyrgyz Republic.

Section 3. The Biodiversity Strategy and Action Plan

3.1 Introduction to the Strategy and Action Plan

3.1.1 *Need for the plan*

The existing global threats to biodiversity, and the resulting impacts on the biological resource base and ecosystem functions, demonstrate the need to take immediate action to protect biodiversity. Losses of biodiversity within the Kyrgyz Republic are clearly outlined in the problem analysis above (section 2.9), which also points towards the priorities for action. The development of the Biodiversity Strategy and Action Plan, under the regulations of the Convention on Biological Diversity (CBD), provides an opportunity to promote co-ordinated action to mitigate and reverse impacts on biodiversity.

However, for an such plan to be effective it must be appropriate to the context in which it will be applied, and should take account of the varied constraints on implementation of activities. A series of constraints and opportunities which need to be considered when planning for biodiversity conservation in the Kyrgyz Republic have already been identified within the problem analysis section (2.9.5). By identifying and incorporating these factors, it is hoped that the plan will be appropriate to the context and thus more effective. In particular, the plan accounts for likely constraints on implementation within the planned activities, and also builds, as far as possible, on existing strengths and opportunities for biodiversity conservation in the Kyrgyz Republic.

3.1.2 *Design of the plan*

The Biodiversity Strategy and Action Plan (BSAP) includes three main components. The first of these (3.2) is the Biodiversity Strategy for the Kyrgyz Republic. This explains in general terms the aims and objectives for biodiversity conservation in the Kyrgyz Republic, and develops an integrated strategy based on a series of strategic components, or approaches. The Strategy is further elaborated in the Biodiversity Action Plan (3.3), which contains details of how the strategic components will be realised in the context of the Kyrgyz Republic. The action plan contains a list of specific activities, with costings, time-scales and outputs. The integrated nature of the action plan is demonstrated by the listing of clear inter-relationships between different activities. The final component of the BSAP includes details of how the impact of the BSAP, and its component activities, will be evaluated and monitored (3.4) and how the reporting mechanisms will be related to the BSAP (3.5). This section also deals with implementation arrangements for the BSAP (3.6), including potential implementing organisations, financial mechanisms, and recommendations for the administration and management of implementation of the plan.

Integration with other plans and existing programmes

The process of developing the BSAP has attempted to identify as many existing plans and programmes as possible, and relevant actions are included within this plan. By making such links it is hoped that the plan will be as comprehensive as possible, and will complement existing activities rather than duplicating, or conflicting with, them. Through its relevance to other plans, it is hoped that the implementation of actions will result in wider positive consequences.

The Pan-European Biological and Landscape Diversity Strategy

This Biodiversity Strategy and Action Plan is closely integrated with many other local, national and international programmes, plans and agreements. A good example of how the Kyrgyz Republic BSAP is integrated with an international initiative is the Pan-European Biological and Landscape Diversity Strategy (PEBLDS):

'The Pan-European Biological and Landscape Diversity Strategy presents an innovative and proactive approach to stop and reverse the degradation of biological and landscape diversity values in Europe. Innovative, because it addresses all biological and landscape initiatives under one European approach. Proactive, because it promotes the integration of biological and landscape diversity considerations into social and economic sectors. The Strategy reinforces the implementation of existing measures and identifies additional actions that need to be taken over the next two decades. The Strategy also provides a framework to promote a consistent approach and common objectives for national and regional action to implement the Convention on Biological Diversity.'

(Clearing-House for PEBLDS, 1998)

The Kyrgyz Republic has been closely integrated with PEBLDS. National and international representatives of PEBLDS were consulted closely during the BSAP preparation. The principles guiding the BSAP have been developed from the principles of PEBLDS. BSAP monitoring, evaluation and reporting mechanisms have been designed to be compatible with those of PEBLDS. The actions of the BSAP have been integrated with the action themes identified within the PEBLDS strategic action plan, in particular Action Theme 10: Mountain ecosystems (e.g. *10.10 Establish guidelines for the conservation of the mountain ecosystem in the Tien Shan region*). The BSAP's integration with PEBLDS will lead to recognition of the strong role that the Kyrgyz Republic has to play in biological and landscape conservation in Europe.

3.1.3 Timescale of the plan

The plan is designed to be implemented over a five year period, from 1999-2004. A five-year period is long enough for the outputs from projects to be apparent, but not too long that changing situations will mean that the plan is no longer relevant. An indicative timetable is included within the action plan to give some general guidelines as to the priority of the actions, and whether other actions are dependent on their completion.

Main principles for the Biodiversity Strategy and Action Plan

The main principles for the development and implementation of the BSAP have been adapted from the Pan European Biological and Landscape Diversity Strategy (PEBLDS), which in turn was developed from the principles of the Convention on Biological Diversity. Adoption of these principles links the BSAP with other related strategies, and ensures that approaches in the Kyrgyz Republic are in line with those of other nations in Europe.

- **Careful decision-making.** Decisions are based on the best available research, experience and information and take into account social and economic issues.
- **Impact avoidance.** Environmental Impact Assessments are conducted wherever activities might negatively affect biodiversity, in order to avoid adverse effects, and to allow public participation.
- **Precautionary principle.** Where activities are considered likely to negatively affect the environment, but the link has not been established conclusively, the assumption will be that such activities should be avoided.
- **Translocation.** In cases where environmentally harmful activities cannot be avoided, they should be transferred to other areas where less impact will be caused.
- **Ecological compensation.** Where damage to important areas for biodiversity cannot be avoided, compensatory or conservation measures must be implemented by the party responsible.
- **Ecological integrity.** The ecological processes and habitats upon which species depend should be maintained.
- **Restoration and re-creation.** Where necessary and practical, habitats and biological diversity should be restored and re-created. This could include rehabilitation and reintroduction of threatened species where possible.
- **Use of best available technologies and best environmental practice.** Access to, and where necessary, transfer of appropriate technologies should be facilitated to support biodiversity conservation and sustainable use.
- **Polluter pays.** Measures should be taken to ensure that costs of prevention, control and mitigation of environmental impacts are borne by the party responsible.
- **Public participation and access to information.** Active public involvement and support in biodiversity conservation measures is needed, through the participation of all stakeholder groups, and development of widespread public awareness.

A set of further principles specific to the Kyrgyz BSAP have been developed, based upon other initiatives and the experience of participants in the preparation of this BSAP.

- **'Think global, act local'** – global conservation is achieved through work at a local level.
- **Realistic and achievable objectives** should be set.
- **Flexibility and adaptability should be key criteria** for programmes, in order to allow for the changing conditions and contexts for conservation.
- **Collaboration and co-ordination** between activities of different implementers should be pursued as much as possible, between and within projects.
- **Transparent projects**, with clear and easy access to information, including financial information, should be encouraged.
- **Financially and institutional sustainability** of any actions should be ensured, by putting in place structures to allow independent follow up into the long-term.
- **Cost-effectiveness and efficiency** of activities needs to be maintained.
- **Integrated and consistent activity** should be ensured – with continuity between different stages.
- **Appropriate technology and techniques** using the resources in a specific context should be part of given activities.
- **Endemic species** should be given priority.
- **Indigenous traditions and knowledge** should be the basis for activities wherever possible.

3.2 Biodiversity Strategy for the Kyrgyz Republic

The Biodiversity Strategy for the Kyrgyz Republic comprises:

- An overall aim for biodiversity conservation within the country.
- A series of objectives which express the changes that are expected in key elements of biodiversity and other sectors in support of this aim.
- A set of strategic components, or approaches, which outline how these changes will be brought about. A more specific outline of actions within each strategic component are presented in the Biodiversity Action Plan (section 3.3).

3.2.1 Overall aim

The overall aim of the project is the protection and rational use of biological and landscape diversity for the sustainable social and economic development of the Kyrgyz Republic.

3.2.2 Objectives

The objectives are a quantifiable representation of the overall aim, and an expression of what achievement of the aim will mean. This is given in terms of actual changes in biodiversity or economic status. The objectives are closely related to core indicators for evaluation of the project (section 3.4). The objectives also provide a target towards which all planned activities should contribute, and a clearer focus as to how the overall aim might be achieved.

In brief, the objectives:

- Provide a target against which progress can be assessed.
- May not necessarily be achieved, although they are intended as realistic targets.
- Are not intended to be comprehensive, but just indicative of the general situation and expected trends.
- Are not fixed, but can be modified (if necessary) as the BSAP develops.

Objectives
1. To conserve and restore the most important complexes of species, ecosystems and landscapes required to attain natural and sustainable reproduction.
2. To conserve and rationally use forest resources allowing an increase of forested areas by 0.3% by 2004.
3. To ensure the conservation and restoration of those species most important to natural ecosystems, and valuable for local communities.
4. To extend specially protected areas to an area of 4.8% of the Republic by 2004.
5. To decrease pollution to levels which prevent further damage to natural ecosystems by 2004.
6. To improve the capacity of state natural resource management institutions and non-state groups, in order to support the other objectives.
7. To improve ecological legislation by 2003 in order to provide sufficient protection of biological and landscape diversity.
8. To improve public awareness of environmental issues, ecological education and public participation in decision-making by 2004.
9. To develop economic mechanisms for the protection, and rational use, of biological and landscape diversity.
10. To attract internal and external investments to assist the conservation and rational use of biodiversity.
11. To contribute to the implementation of the government programme to reduce poverty.

3.2.3 Strategic components

The Biodiversity Strategy comprises a number of inter-related strategic components (or approaches to conservation), which when applied together will fulfil the aim and objectives of this plan. These components have been developed in an integrated manner, with inter-dependent actions. Hence, the application of a single strategic component alone will be unsuccessful, without support of actions within other components. The strategic components are:

- A. **In-situ conservation.** This approach recognises the importance of undertaking conservation within the natural environment. It highlights the importance of maintaining communities and ecosystems, both within and outside protected areas.
- B. **Ex-situ conservation.** Conservation away from the natural environment is seen as a back-up to in-situ conservation. This provides a safety net to ensure protection of a wide range of genetic resources, with the aim of eventual reintroduction, wherever possible.
- C. **Sustainable use of biological and landscape diversity.** This approach recognises the importance of biodiversity as a resource, and the dependence of local communities, and others, on this resource. Sustainable use is a mechanism by which conservation can be put alongside these needs, thus reinforcing the immediate value of these resources, and the need for conservation, while also meeting the needs of local people. The concept is a particularly important tool for in-situ conservation outside protected areas, and is closely associated with the development of incentive measures.
- D. **Development of institutional potential and training.** A wide range of changes are proposed in this action plan. The implementation of these changes will rely on parallel capacity building of individuals and organisations to support increased or novel activities.
- E. **Ecological education and public participation.** Any conservation activity requires the understanding and support of the wider populace if it is to be successful and sustainable. Informing the public underlies any activities taking place outside protected areas, and ecological education promotes a wide involvement in conservation activities.
- F. **Identification and monitoring.** For any plan it is important to be able to assess the impacts of new or changed activities. Since biodiversity conservation is the target of this plan, long-term monitoring of species and ecosystems is necessary to enable its impact to be evaluated. This will ensure that future threats are identified as early as possible.
- G. **Research.** In order to manage biodiversity effectively, management decisions (such as those for in-situ conservation and for monitoring) must be based upon the most appropriate and detailed information. A complex biological system requires ongoing research to better understand its conservation needs, and to adjust management practices if necessary.

- H. **Information exchange and accessibility.** For effective conservation, information on biodiversity, and on activities affecting biodiversity, needs to be available to a wide range of people. This ensures that activities are not duplicated and that decisions are made on the best information available, while promoting transparency within conservation. Information may be exchanged at a range of levels – locally, nationally, regionally or internationally.
- I. **Co-operation (technical, scientific, inter-state, technology transfer).** Biodiversity does not observe boundaries – be they between parts of society, communities or states. Effective biodiversity conservation must, therefore, rely upon communication and co-operation to ensure fairness and equity with respect to biological resources. Furthermore, co-operation between neighbouring, and distant, states is important to ensure effective co-ordination of activities towards the common goal of conserving the world's biological resources.
- J. **Impact assessment.** This provides an important technique to monitor the effects of a range of activities on biodiversity. Through monitoring, it is possible to ensure appropriate responses to mitigate negative impacts on biodiversity. Impact assessment also provides a clear basis for assessing appropriate incentive and disincentive measures.
- K. **Legislation.** Any changes in approaches, or activities, in this plan will need to be supported by appropriate regulations. Legal measures will underpin the other strategic components in this plan (including incentive measures). In many cases existing legislation will need to be reviewed or up-dated, in order to enable effective support of the planned activities.
- L. **Incentive measures.** One of the most important factors contributing to biodiversity loss is the lack of true economic value associated with natural resources. The use of economic (and other) incentives and disincentives, allows this to be re-balanced, by linking some of the true value to such resources, and thus promoting favourable conservation behaviour.
- M. **Financial resources.** Implementation of this plan, and its strategic components, will require financial support. The sources of these finances need to be considered within the plan – be it a review of existing mechanisms, or the development of novel funding avenues for conservation.
- N. **Co-ordination of the Biodiversity Strategy and Action Plan (BSAP).** In order to support its successful implementation, the structures for administrating and managing planned actions need to be considered within the plan itself. By identifying the mechanisms for co-ordination of the plan at this stage, an integrated approach can be taken to implementation of all other strategic components. These include clarification of responsibilities for promoting the plan, and mobilising co-ordinated action.

Strategic Components in Relation to Articles of the Convention on Biological Diversity

The strategic components included in the Biodiversity Strategy were developed in an integrated manner at a series of cross-sectoral workshops. The strategies represent a rational interpretation of the most appropriate conservation approaches available, and it is recognised that a holistic or integrated application of these techniques is likely to be most effective.

As a set of approaches the strategic components have many similarities to the articles of the Convention on Biological Diversity (CBD). The issues addressed in articles 7-19 of the CBD are clearly represented within the strategic components listed above, including:

<i>Article 7</i>	<i>Identification and Monitoring</i>
<i>Article 8</i>	<i>In-Situ Conservation</i>
<i>Article 9</i>	<i>Ex-Situ Conservation</i>
<i>Article 10</i>	<i>Sustainable Use of Components of Biodiversity</i>
<i>Article 11</i>	<i>Incentive Measures</i>
<i>Article 12</i>	<i>Research and Training</i>
<i>Article 13</i>	<i>Public Education and Awareness</i>
<i>Article 14</i>	<i>Impact Assessment and Minimising Adverse Effects</i>
<i>Article 15</i>	<i>Access to Genetic Resources</i>
<i>Article 16</i>	<i>Access to and Transfer of Technology</i>
<i>Article 17</i>	<i>Exchange of Information</i>
<i>Article 18</i>	<i>Technical and Scientific Co-operation</i>
<i>Article 19</i>	<i>Handling of Biotechnology and Distribution of its Benefits</i>

The clear linkages between the strategic components of this BSAP, and the articles of the CBD, are seen as an asset when it comes to reporting on implementation of the CBD in the Kyrgyz Republic. In addition, this organisation of strategic components will make it easier to compare this document to BSAPs of other countries and provides an internationally agreed framework for biodiversity conservation.

3.3 Biodiversity Action Plan

The action plan outlines the practical activities to be carried out within each strategic component, in order to fulfil the objectives and the overall aim. Actions are sub-divided into a set of constituent, and inter-related, activities. A number of the listed activities will be implemented under existing plans or projects, whereas others will be designed and developed from scratch. All activities are intended to provide clear outlines for implementation, with indicative costings and time-scales, and defined outputs. Relative **priorities** for activities are indicated through the attached time-scale – high priority activities, including those on which further activities depend, are shown to start earlier in the five-year plan than other, more peripheral, activities.

- **Approximate budgets** are provided in US dollars, and are solely indicative. This represents a rough estimate of likely costs (ranging from \$100 to \$1,000,000) to provide a rough guideline for the expected funds needed for each activity. In some cases, this budget may be associated with more than one inter-related activity.
- **Duration** or time-scales are also indicative. These indicate when during the five years of the plan (1999-2004) each activity should take place, based upon its relative priority and the extent to which implementation of other actions are dependent upon prior completion of that activity.
- **Outputs** are the verifiable achievements for each activity, and provide a basis for evaluation of success or completion. These outputs are proximal achievements, but completion of any activity is also expected to have impacts on wider indicators of success (see 3.4), including the general objectives of the plan.
- **Related objectives** indicate how each activity will help to meet the overall aim of the plan, by showing which of the objectives each activity is expected to contribute towards. The numbers in this column relate to the numbering of objectives in 3.2.2.
- **Related activities** indicate other closely associated activities elsewhere within the plan. In general, activities within the same action are likely to be closely associated, however this information (using individual reference numbers for activities) also allows cross-referencing to other related or similar activities throughout the whole plan.

An Integrated Plan

Since the action plan has been developed in an integrated manner, most of the activities are closely associated with other listed activities, either within the same, or a different, strategic component. These are shown in the “related activities” column.

In some cases activities may be inter-dependent, and the successful implementation of one activity, may rely upon the prior or subsequent implementation of another. Furthermore, implementation of one activity may have knock-on benefits within similar and related actions. For this reason, integration is a key facet of this plan, and it is recommended that the information on related activities be consulted prior to implementation of any action or activity.

3.3.1 Strategic Component A: In-situ conservation

No.	Activity	Related activities	Related objectives	Duration	Approx. budget (\$)	Outputs
A.1	<i>Increase effectiveness of the protected areas network</i>					
A.1.1	Develop and implement plans for capacity building of the protected area ranger service.	D.3.2, F.4.5, M.4.1	3, 4, 6	1999-2002	20,000	Improved enforcement in protected areas
A.1.2	Develop policies that respect and promote traditional cultures and their relationship with biodiversity within buffer zones.	A.4.3, C.2.1, C.2.6, E.4.1, I.1.1	1, 8, 9	2000	1,000	Policies implemented
A.1.3	Organise joint training workshop for protected areas staff, law-enforcement agencies and regional nature protection committees.	D.2.1, E.3.1, H.2.2	1, 2, 3, 8	1999-2004	6,000	Improved co-operation between groups
A.1.4	Organise ongoing vocational training of protected areas staff	D.1.2, F.4.5	1,2,3,8	1999-2004	50,000	Improved staff vocational skills.
A.1.5	Enhance the ability of protected area staff to control illegal activities (e.g. poaching) through the provision of training and equipment.	C.4.10, L.2.2	1, 3, 6	1999-2002	20,000	Improved control of illegal activities.
A.1.6	Develop and implement management plans for priority protected areas.	A.4.3, G.1, G.2, G.3	3, 4, 6	1999-2004	250,000	Management plans in place and implemented
A.1.7	Co-ordinate the protected areas system in the West Tien Shan region with protected areas in Uzbekistan and Kazakhstan.	A.2.2, H.3.2, I.2.3, I.3.1, L.2.4	1, 2, 3, 4	1999-2004	100,000	Co-ordinated management systems
A.1.8	Include protected areas in the state land register.	A.2.2	6, 9	2000	1,000	Protected areas included in register
A.2	<i>Extension of protected areas management</i>					
A.2.1	Develop mechanisms that incorporate stakeholder and independent expert opinions more effectively within the decision-making process relating to protected areas.	C.1.1, D.1.3, G.1.3, G.2.1, G.4.1, M.1.2	3, 6, 7	1999-2004	86,000	Wider range of expertise contributing to decision making
A.2.2	Integrate protected area management with other government management structures and programmes (e.g. local government, decentralisation).	A.1.7, C.2.3, C.2.4, C.3.1, C.6.1, F.5.4, H.3.2	3, 4, 6, 10	1999-2004	5,000	Integrated and co-ordinated management

A.3	<i>Direct support for protected areas management</i>					
A.3.1	Provide technical support and equipment to Sarychat-Ertash zapovednik.	A.1.1, A.1.5	1, 3, 4, 6	1999-2003	80,000	Technical support
A.3.2	Provide technical support and equipment to Naryn and Karatal-Japyryk zapovedniks.	A.1.1, A.1.5	1, 3, 4, 6	1999-2004	200,000	Technical support
A.3.3	Provide technical support and equipment to Issyk-Kul zapovednik.	A.1.1, A.1.5	1, 3, 4, 6	1999-2004	85,000	Technical support
A.3.4	Provide technical support and equipment to Sary-Chelek and Besh-Aral zapovedniks.	A.1.1, A.1.5	1, 3, 4, 6	1999-2004	600,000	Technical support
A.3.5	Provide technical support and equipment to Kemin and Kyrgyz-Ata natural parks.	A.1.1, A.1.5	1, 3, 4, 6	1999-2003	200,000	Technical support
A.3.6	Provide technical support and equipment to Besh-Tash, Karakol and Kara-Shoro natural parks.	A.1.1, A.1.5	1, 3, 4, 6	1999-2003	200,000	Technical support
A.3.7	Provide technical support and equipment to Ala-Archa national park.	A.1.1, A.1.5	1, 3, 4, 6	1999-2003	50,000	Technical support
A.3.8	Repair buildings in 4 zapovedniks and 6 national parks for the development of library facilities.	E.1.4	1, 3, 8	1999-2001	20,000	Repairs
A.3.9	Provide libraries of zapovedniks and national parks with books and periodicals relating to biodiversity.	A.1.1, A.1.4, D.1.2, D.3.2, E.1.4, F.4.5	1, 3, 8	2000-2001	8,000	Libraries for zapovednik and parks
A.3.10	Promote targeted research in protected areas that will provide information that is useful for improving management practices.	D.3.3, D.3.4, F.4.1, F.4.6, G.1, G.2, G.3	1, 3, 6	2000-2003	5,000	Recommendations
A.4	<i>Extension of the protected areas network</i>					
A.4.1	Develop objective guidelines and criteria for the selection and expansion of protected areas.		3, 4, 6	1999	2,000	Guidelines in use
A.4.2	Use guidelines and criteria to designate sites for protected area expansion and establishment.	A.4.4 – A.4.9	1, 3, 4, 6	1999-2000	5,000	New sites designated
A.4.3	Develop and implement inter-agency management plans to strengthen and expand the biodiversity conservation status of buffer zones around protected areas.	A.1.6, K.1.3, L.2.3	1, 2, 3, 4	1999-2004	300,000	Enhanced buffer zone system
A.4.4	Establish and manage zapovedniks to conserve high mountain wetlands (at Son-Kul and Chatyr-Kul).	A.6.3	1, 2, 3, 4	1999-2004	60,000	New zapovedniks

A.4.5	Establish and manage a natural park to conserve juniper forests.	A.1.6, A.7.2	1, 2, 3, 4	1999-2004	250,000	New natural park
A.4.6	Establish and manage a natural park to conserve fruit and nut forests.	A.1.6, A.7.2	1, 2, 3, 4	1999-2004	200,000	New natural park
A.4.7	Establish and manage zakazniks to conserve pistachio and almond forests.	A.1.6, A.7.2	1, 2, 3, 4	1999-2004	175,000	New zakazniks
A.4.8	Establish and manage seasonal zakazniks to conserve species requiring temporary seasonal protection (e.g. migratory corridors and breeding sites).	A.1.6, G.1.2	1, 2, 3, 4	1999-2004	135,000	Series of seasonal zakazniks
A.4.9	Establish and manage zakazniks to conserve locally important biodiversity.	A.1.6, F.1.1	1, 2, 3, 4	1999-2004	60,000	Local zakazniks
A.4.10	Update and publish maps of the protected areas network, including new protected areas	F.3.1	1, 3	2000-2001	5,000	Maps produced
A.5	<i>Develop a network of smaller protected areas</i>					
A.5.1	Establish and manage a micro-zapovednik network to increase microhabitat variety and species diversity.	A.4.9, G.2.3	1, 3, 4	1999-2004	50,000	Network established
A.5.2	Link the micro-zapovednik network with corridors to facilitate local migration and inter-population exchange.	G.1.2	1, 3, 4	1999-2004	15,000	Corridors established
A.6	<i>Rehabilitation and enhancement of the most important landscapes and ecosystems</i>					
A.6.1	Conserve and rehabilitate riparian habitats, including at Lake Issyk-kul, Chui and Alamedin rivers.	A.6.3, C.1.1	1, 3, 4	1999-2005	150,000	Key sites rehabilitated
A.6.2	Conserve and rehabilitate water-meadow forests	A.6.3, C.1.1	2, 3, 11	1999-2005	88,000	Key sites rehabilitated
A.6.3	Conserve and rehabilitate key wetlands.	A.4.4, G.1.2, C.1.1	1, 3, 4	1999-2004	84,000	Rehabilitated wetlands system
A.6.4	Develop a range of habitats in degraded areas through the development of grazing regimes and tree planting to encourage use by a broader range of species.	C.1.1, C.5.2	1, 3, 4	1999-2004	20,000	More diverse habitats
A.6.5	Provide supplementary animal feed and artificial shelters in impoverished areas.	G.2.2, G.2.3	1, 3, 4	1999-2004	100,000	Habitat enhancement
A.6.6	Enhance fire prevention measures through training, support for patrols, equipment and improving the infrastructure.	A.1.1	1, 3	2000-2004	100,000	Fire prevention measures improved

A.6.7	Develop and implement plans for appropriate mechanisms to control and prevent the spread of introduced species that threaten local ecosystems.	G.1.1	1, 3, 6	2002-2004	50,000	Introduced species controlled.
A.7	<i>Species- and ecosystem- specific protection projects</i>					
A.7.1	Develop and implement species action plans for key endangered species.	B.3.1, G.2.3	1, 3, 4, 6	2000-2004	50,000	Plans implemented
A.7.2	Develop and implement habitat action plans for key endangered habitats, communities and ecosystems.	F.1.1, G.2.5	1, 3, 4, 6	2000-2004	50,000	Plans implemented
A.7.3	Develop and implement projects focussing on flagship species (such as the snow leopard and mountain goose) to generate awareness and focus conservation activities on endangered and fragile habitats.	E.2.6, G.2.2, G.2.3	1, 3, 4, 6	2000-2004	50,000	Projects implemented

3.3.2 Strategic Component B: Ex-situ conservation

No.	Activity	Related activities	Related objectives	Duration	Approx. budget (\$)	Outputs
B.1	Create seed banks					
B.1.1	Develop the infrastructure and technical base for a seed bank.	B.1.2	1, 3	2000-2002	100,000	Seed bank
B.1.2	Collect seed material for the seed bank, using existing collections and traditional forms of collection as far as possible.	G.2.2	1, 3	2001-2004	50,000	Collections
B.1.3	Develop and use guidelines to regulate the collection of material for seed banks.	B.1.2	1, 3	2000	1,000	Guidelines followed
B.1.4	Establish a technical base and a national collection of important microorganism and fungal cultures, focusing upon those closely related to agriculture and other economic activities.	G.2.2	1, 3	1999-2004	150,000	Collection established
B.2	Create nurseries					
B.2.1	Develop plant nurseries for the propagation of, and research on, rare and endangered plants, including trees, improving existing facilities where appropriate.	F.1.1, G.2.3	1, 3, 4	2000-2004	70,000	Nurseries
B.2.2	Develop a plant nursery for the purpose of maintaining wild relatives important for agrobiodiversity (including wild fruit-trees and nuts), improving existing facilities where appropriate.	G.2.2	1, 3, 4,	1999-2004	100,000	Nursery
B.3	Develop a rehabilitation centre					
B.3.1	Develop regulations to restrict the collection of animals for captive breeding and subsequent release of rehabilitated or captive-bred individuals.	A.7.1	1, 3, 6	2000	1,000	Regulations enforced
B.3.2	Develop guidelines for captive breeding which are in line with international efforts (e.g. link to international studbooks).	A.7.1	1, 3	2000	1,000	Guidelines in use
B.3.3	Create a centre for the rehabilitation and captive breeding of endangered native fauna for re-introduction.	A.7.1	1, 3, 4	2002-2004	80,000	Re-introduction centre

3.3.3 Strategic Component C: Sustainable use

No.	Activity	Related Activities	Related objectives	Duration	Approx. budget (\$)	Outputs
C.1	<i>Develop zones for sustainable use</i>					
C.1.1	Survey and identify areas suitable for sustainable use of biodiversity, and recommend appropriate zoning of use in these areas.	C.3.1, F.1.1	1, 2, 3, 5, 9, 11	1999-2001	15,000	Areas and zones identified
C.2	<i>Develop methods appropriate for sustainable use</i>					
C.2.1	Develop policies in all sectors that ensure that the needs of conservation and sustainable use are integrated into national level decision making.	A.1.2, I.1.1, M.1.3	1, 2, 3, 6, 7, 9, 11	1999-2001	5,000	Policies
C.2.2	Review and, where appropriate, produce and implement guidelines and recommendations on the hunting reserves system.	C.2.4	1, 3, 7, 9	200-2003	15,000	Guidelines and recommendation implemented
C.2.3	Develop management structures and practices within the Ministry of Agriculture and Water Economy to promote activities compatible with biodiversity conservation and sustainable use.	A.2.2	1, 3, 5, 6, 9, 10, 11	2000-2004	50,000	Structures and practices established
C.2.4	Develop management structures and practices within the State Commission for Forestry, Hunting and Fisheries to promote activities compatible with biodiversity conservation and sustainable use, in the light of the forest sector review.	A.2.2	1, 3, 5, 6, 9, 10, 11	2000-2004	100,000	Structures and practices established
C.2.5	Develop pilot projects for sustainable use of biodiversity by rural communities.	C.3.3, G.3.2	1,3, 8, 9, 11	2000-2004	300,000	Pilot projects
C.2.6	Promote the regeneration of national traditions which sustainably used or protected biodiversity, through the use of pilot projects and demonstration plots.	A.1.2, E.4.1	8, 9, 11	1999-2004	15,000	Pilot projects
C.2.7	Develop and disseminate guidelines on methods of collection of medicinal plants, based on research into traditional and non-traditional techniques, and sustainable levels of harvesting.	C.3.2, C.4.2, E.4.1	1,3, 6, 11	1999-2000	5,000	Guidelines in use

C.2.8	Develop and implement a programme of pilot projects to demonstrate sustainable forestry practices compatible with biodiversity conservation.	C.3.5, C.4.4, C.5.2, G.3.3	1, 2, 3, 6, 9, 11	2000-2003	45,000	Pilot projects
C.2.9	Develop and implement a program of yak breeding development and other novel forms of sustainable agriculture in regions suffering from overgrazing.	C.4.9, G.3.4	1, 3, 9, 11	1999-2003	30,000	Programme implemented
C.3	<i>Involve local communities in conserving species and ecosystems important to nature and people.</i>					
C.3.1	Develop mechanisms to involve traditional local structures in designing sustainable use regimes.	A.2.2, C.1.1, D.1.3, G.1.3, M.1.2	1, 3, 8	1999-2004	150,000	Local structures involved in designing regimes
C.3.2	In collaboration with local communities, set levels for the collection of economically important plants, and other traditionally used species.	C.2.7, G.1.3	1, 3, 8	1999-2002	2,000	Agreed levels
C.3.3	Provide support and incentives for local communities to conserve and rehabilitate areas to improve biodiversity conservation.	C.2.5, G.1.3	5, 8, 1	1999-2003	80,000	Areas conserved by local communities
C.3.4	Introduce biogas and hydroelectric installations, and other alternative sources of energy, to reduce pressures on forest resources.	C.2.6	1, 8, 10	1999-2004	600,000	Alternative sources of energy introduced
C.3.5	Implement programmes to promote local community woodlot initiatives to reduce pressures on forest resources.	C.2.8, C.5.2	1, 2, 3, 9, 11	1999-2004	125,000	Woodlot initiatives
C.3.6	Develop programmes which involve private businesses within the sphere of sustainable use	K.1.7, K.3.1, K.4.1, K.4.2, L.3.4	1, 2, 3, 9, 10	2000-2003	10,000	Business involvement
C.4	<i>Adopt sustainable levels of use of wildlife resources.</i>					
C.4.1	Review and, if necessary, revise levels for use of wildlife resources, including seasonality and location, and incorporate them as a Government Resolution.	E.3.1	1, 2, 3, 7	1999	750	Limits enforced
C.4.2	Review and, if necessary, revise sustainable levels of use for medicinal plants, including seasonality and location, and incorporate them as a Government Resolution.	C.2.7, E.3.1	1, 3, 7, 9	1999-2001	1,000	Limits enforced

C.4.3	Review and, if necessary, revise hunting and fishery regulations, including seasonality and location, to ensure they are within sustainable limits, and incorporate them as a Government Resolution.	C.2.4, E.3.1	1, 3, 7, 9	1999-2001	1,500	Limits enforced
C.4.4	Review and, if necessary, revise forestry regulations and levels of use, including locality, to ensure they are within sustainable limits, and incorporate them as a Government Resolution.	C.2.8, C.3.1	1, 2, 3, 7, 9	1999-2001	1,500	Limits enforced
C.4.5	Identify appropriate limits for ecotourism, and incorporate them as a Government Resolution	E.3.1, C.6.4	1, 3, 7, 9, 10	1999-2003	2,000	Limits enforced
C.4.6	Identify seasonal limits of use for particular vulnerable or rare ecosystems and landscapes, and incorporate them as a Government Resolution.	A.4.8, F.1.1, F.1.2, K.2.4	1, 3, 7	1999-2004	2,000	Limits enforced
C.4.7	Review and, if necessary, revise limits on discharges and other forms of pollution on vulnerable or rare ecosystems and landscapes, and incorporate into Government Resolutions.	K.2.3, K.2.4	1, 3, 5, 7	1999-2004	2,000	Limits enforced
C.4.8	Review and, if necessary, revise seasonal allowable grazing limits on key ecosystems and landscapes.	A.4.8	1, 3, 5, 7	1999-2004	8,000	Limits enforced
C.4.9	Review and develop limits on industrial and large-scale use of natural resources, habitats and ecosystems.	C.3.6, J.2.1	1, 2, 3, 5, 7, 9	1999-2003	8,000	Limits enforced
C.4.10	Develop mechanisms to enforce levels of use (including vocational training, capacity building, technical assistance, and infrastructure development).	A.1.5, E.3.1, K.2.1, K.2.2	1, 2, 3, 5, 6, 7, 9	1999-2004	100,000	Levels enforced
C.5	<i>Develop plantations to provide alternative sources of wood</i>					
C.5.1	Rehabilitate forests of low hill slopes using fast-growing native species	C.2.4	2, 3, 11	1999-2004	155,000	Afforestation
C.5.2	Reforest key sites, through financial and technical assistance of government, non-government and local community organisations.	C.2.8, C.3.5	2, 3, 11	1999-2004	125,000	Afforestation

C.6	<i>Develop and implement appropriate ecotourism activities</i>					
C.6.1	Develop a structure to promote and regulate ecotourism within the government.	K.1.5	1, 3, 6, 9, 10, 11	1999-2004	5,000	Department of ecotourism
C.6.2	Identify key areas for ecotourism development, taking into account tourist opinions and the relative vulnerability of areas.	C.4.5, C.4.6	1, 3, 4, 8	2000-2002	3,000	Recommendations implemented
C.6.3	Develop and implement plans for ecotourism development, where appropriate including protected areas and buffer zones, with clear assessments of any impacts.	C.4.5, C.4.6	3, 4, 6, 8, 10	1999-2004	75,000	Plans implemented
C.6.4	Develop and implement guidelines on conducting tourism in a sensitive and sustainable manner.	C.4.5	1, 3, 6	1999-2000	1,000	Guidelines implemented
C.6.5	Create and rehabilitate forest and park zones with the participation of the public.	E.2.5, E.5.2	2, 3, 11	1999-2003	100,000	Afforestation
C.6.6	Set up ecological paths and appropriate interpretation at key sites.	E.2.4, E.2.5	1, 3, 4, 6	1999-2004	20,000	Ecological paths and interpretation

3.3.4 Strategic Component D: Development of institutional potential and training

No.	Activity	Related activities	Related objectives	Duration	Approx. budget (\$)	Outputs
D.1	Review organisation of State natural resources management					
D.1.1	Conduct a national management review, and if necessary propose improvements to current structure, and implement appropriate restructuring of State natural resources management.	A.2.2, C.2.3, C.2.4, C.3.1, C.6.1	1,2, 3, 4, 6	1999	30,000	Review and improved structure
D.1.2	Conduct ongoing capacity building and training within staff of ministries and related structures	A.1.1, A.1.4	6	1999-2004	150,000	Increased capacity
D.1.3	Develop mechanisms to involve a wide range of the public, including NGOs, in the decision making process carried out by State institutions.	A.2.1, C.3.1, M.1.2	6, 8	1999	10,000	Increased involvement in decision making
D.2	Organisation of ongoing training for inter-sectoral integration					
D.2.1	Prepare and implement ongoing inter-sectoral workshops to promote information and experience exchange, and to develop institutional links at a range of levels.	A.1.3, A.2.2, G.4, H.2.2	6, 8	1999-2000	20,000	Training workshops
D.3	Vocational and scientific training					
D.3.1	Develop vocational educational courses for schools and higher education institutes relating to conservation.	E.1.1, E.1.3, E.1.6	1, 2, 3, 4, 6, 8	1999-2004	8,000	Vocational courses
D.3.2	Support ongoing training and post-graduate study among Ministry and protected areas staff.	A.1.1, M.4.1	1, 2, 3, 4, 6, 8	1999-2004	5,000	Increased capacity
D.3.3	Promotion of postgraduate training and research focused on biodiversity conservation in the Kyrgyz Republic, particularly within protected areas.	A.3.10	1, 2, 3, 4, 6, 8	2000-2003	6,000	Increased information for management
D.3.4	Develop the capacity of protected areas and Ministry staff to apply conservation biology theory and research with direct implications for management, within the day-to-day decision making structure.	A.3.10	1, 2, 3, 4, 6, 8	2000-2002	5,000	Training courses
D.4	Establish a coalition of ecological NGOs					
D.4.1	Establish a co-ordinated network or coalition of existing NGOs, to optimise resource use, provide a focus for donors and government agencies, and to avoid intra-NGO competition.	A.2.1, D.1.3, H.1.1	1, 3, 5, 8	1999	10,000	More efficient NGO base

3.3.5 Strategic Component E: Environmental education and public awareness

No.	Activity	Related activities	Related objectives	Duration	Approx. budget (\$)	Outputs
E.1	<i>Develop and support an on-going environmental education programme</i>					
E.1.1	Build the capacity to conduct environmental education across a broad range of groups, including teachers, university staff, Ministry and protected area employees, NGO representatives and journalists.	D.3.1	8	2000	25,000	Training
E.1.2	Develop and support a localised network of environmental educators, drawn from a wide range of backgrounds.	C.2.7, C.3.1, D.3.1, E.1.7	8	2000-2004	20,000	Network
E.1.3	Purchase and develop materials (such as textbooks and multimedia) for teaching ecology and conservation in schools and universities.	D.3.1	8	1999-2002	50,000	Materials in use
E.1.4	Create a library containing environmental education resources, and support materials for environmental education methods.	A.3.8, H.1.1	6, 8, 9	1999	10,000	Library
E.1.5	Create a fund to support the ongoing purchase of environmental education and methodological materials.	E.1.4, D.3.1	8	1999-2004	30,000	Fund
E.1.6	Provide information, advice and resources relating to environmental education to the Ministry of Public Education and Culture.	D.3.1	8	2000-2004	10,000	Training and materials
E.1.7	Construct and support environmental education camps for young people at Lake Issyk-Kul, Arslanbob, Issyk-Ata, Naryn, Osh and Talas.	E.1.2, D.3.1, E.2.5, E.5.2	8	2000-2004	60,000	Ecological camps
E.1.8	Develop and support public demonstration plots for environmentally sensitive management practices.	C.2.6	8, 9	1999-2004	40,000	Demonstration plots

E.2	<i>Develop and implement a public awareness campaign</i>					
E.2.1	Review existing public awareness programmes across all organisations, and develop a co-ordinated plan for public awareness.	K.1.6	8	1999	1,000	Plan
E.2.2	Use the mass media (newspapers, radio and TV) to widely disseminate clear ecological messages based upon sound science.	H.2.1	1, 3, 8	1999-2004	13,000	Media coverage
E.2.3	Produce and disseminate specific video-programmes and advertising clips for public education on biodiversity conservation.	E.2.6, E.3.1, E.4.3	1, 3, 8	1999-2004	20,000	TV coverage
E.2.4	Produce and disseminate materials about biodiversity conservation (including posters, leaflets and other resource materials).	E.2.6, E.3.1, E.4.1	1, 3, 8	1999-2004	28,000	Publications
E.2.5	Use public events and participatory activities to raise public awareness of biodiversity conservation and to encourage direct involvement.	K.1.6, M.2.6, M.3.2, E.5	6, 8	1999-2004	20,000	Public events
E.2.6	Use flagship species (such as the snow leopard and mountain goose) to generate awareness of conservation issues, particularly those relating to specific threatened or fragile habitats, through media and information/education leaflets.	A.7.3	1, 3, 8	2000-2003	8,000	Publications
E.2.7	Publish a quarterly magazine "Biodiversity", aimed at the popular science market.	H.2.3	1, 3, 8	2000-2004	8,000	Magazine
E.3	<i>Develop public awareness of laws relating to biodiversity</i>					
E.3.1	Collate and interpret laws relating to biodiversity in the Kyrgyz Republic, and disseminate this information widely using mass media and publications, with regular updates.	H.2.2, K.2.1, L	7, 8, 9	1999-2004	5,000	Legal awareness

E.4	Promote links between biodiversity conservation and national culture					
E.4.1	Produce materials and press releases on the importance of biodiversity conservation to culture in the Kyrgyz Republic, aimed at raising awareness in regional and international sectors.	A.1.2, C.2.6	1, 3, 8	1999-2001	5,000	Publications, media coverage
E.4.2	Use a series of competitions to promote the use of creative arts to disseminate the message of biodiversity conservation.	E.2.4, E.2.6	6, 8	1999-2001	5,000	Series of competitions
E.4.3	Promote awareness of traditional practices linked to protection of biodiversity, using mass media and other means.	A.1.2, C.2.6	8	1999-2002	12,000	Media coverage
E.5	Support national and international action days for the environment					
E.5.1	Produce materials to promote involvement in national and international environment days, and involve mass media in dissemination of information.	E.2.5	8	1999-2004	4,000	Publications
E.5.2	Organise national and local environment action events in which volunteers can directly take part in conservation activities.	E.2.5, K.1.4	8	1999-2004	25,000	Action days

3.3.6 Strategic Component F: Identification and monitoring

No.	Activity	Related activities	Related objectives	Duration	Approx. budget (\$)	Outputs
F.1	Identify priority populations, species and areas for conservation					
F.1.1	Review available information to identify the individual species, habitats and ecosystems that are most vulnerable to human disturbance, and develop recommendations for their protection both within and outside protected areas.	C.4.6, C.3.1	1, 3	1999-2000	5,000	Recommendations
F.1.2	Identify areas or sites of environmental sensitivity and those supporting important ecological systems (e.g. watersheds) which may need further legal protection.	L.3.1	1, 2, 3, 5, 7	1999-2001	6,000	List of sites and recommendations
F.2	Revise and update the national Red Data Book					
F.2.1	Review and revise the status of species listed in the Red Data Book, based upon recent research, and including clarifications of species' status in an international and regional context.	F.1.1	1, 3, 7	1999	1,500	Revised list
F.2.2	Update, publish, publicise and disseminate the national Red Data Book.	I.3.4	1, 3, 7	1999	3,000	RDB dissemination
F.3	Update maps relating to biodiversity of the Kyrgyz Republic					
F.3.1	Update, publish and disseminate maps showing biodiversity and conservation priorities of the Kyrgyz Republic, including new monitoring and research.	A.4.10	1, 3, 8	2000-2001	5,000	Maps
F.4	Develop a biodiversity monitoring system.					
F.4.1	Identify and develop recommendations for appropriate parameters, criteria and methods of monitoring biodiversity, based upon existing methods and resources.	A.3.10, G.2.6	1, 3, 4, 5	1999	5,000	Recommendations
F.4.2	Identify species or taxa likely to be useful indicators for monitoring biodiversity and anthropogenic impacts, and use these species for monitoring.	G.2.6	1, 3, 4	1999-2001	7,000	Indicator species identified and used in monitoring.

F.4.3	Design a national biodiversity monitoring system, including specific programmes for Red Data List species and priority sites.	F.2	1, 3, 4	1999	8,500	System designed
F.4.4	Implement the national biodiversity monitoring system.	F.4.3, F.4.5	1, 3, 4	1999-2004	250,000	Systematic monitoring
F.4.5	Provide equipment and training to support and develop existing monitoring in protected areas.	A.1.1, F.4.4	1, 2, 3, 4	1999-2002	100,000	Equipment and training
F.4.6	Provide on-going support for research directly relating to monitoring, and to improving monitoring efficiency.	A.3.10	1-6, 8	2000-2004	20,000	Recommendations
F.4.7	Develop and implement a programme to directly monitor anthropogenic impacts on natural ecosystems, including the impacts of rural communities.	C.3, J.1.2	1, 2, 3, 5	1999-2004	20,000	Monitoring
F.4.8	Conduct ongoing monitoring of populations and levels of use of fauna and flora, and use this information to revise levels of sustainable use at regular intervals.	C.4	1, 3	2000-2004	4,000	Monitoring and feedback
F.5	<i>Develop a biodiversity information database to co-ordinate and store monitoring data</i>					
F.5.1	Design a biodiversity database that is compatible and integrated with other national and international database systems.	F.4, H.1.2, H.2.1, J.2.1	1, 2, 3, 6, 8	1999	5,000	Database designed
F.5.2	Develop and maintain a biodiversity database, based on compilation of existing information, and ongoing addition of data from monitoring and research.	F.4	1, 2, 3, 6, 8	1999-2004	50,000	Database in use
F.5.3	Organise a biodiversity database network, with equipment and training support, providing access to staff of ministries, research institutions, protected areas, NGOs and others.	G.4.2, H.1.3, H.3.2, I.3.2	1, 2, 3, 6, 8	2000	30,000	Database network
F.5.4	Provide localised access to the biodiversity database network, supported by equipment and training, for staff of ministries and protected areas, NGOs, researchers, and others.	A.2.2, H.1.3, H.3.1	6	2001	30,000	Localised network
F.5.5	Provide technical and training support in the use of GIS, as a tool to examine data collected by the monitoring programme.	F.4.6, G.1.1	1, 6	2000	5,000	GIS capacity

3.3.7 Strategic Component G: Research

No.	Activity	Related activities	Related objectives	Duration	Approx. budget (\$)	Outputs
G.1	<i>Research factors influencing conservation of biodiversity</i>					
G.1.1	Conduct research on the inter-relationships between abiotic, biotic and anthropogenic factors affecting biodiversity, and develop recommendations for the mitigation of these effects.	A.1.6	1, 3, 6	2001-2004	15,000	Recommendations
G.1.2	Conduct research on the factors affecting migratory species and develop recommendations for conservation of migratory corridors and sites.	A.4.8	1, 3	2001-2004	15,000	Recommendations
G.1.3	Develop a programme of participatory socio-economic research to improve understanding and monitoring of causes underlying unsustainable use of biodiversity.	A.2.1, C.3	1, 3, 8, 9, 11	1999-2002	20,000	Research conducted and monitoring of causes.
G.2	<i>Research important components of biodiversity relating to conservation</i>					
G.2.1	Identify gaps in current information required for making informed conservation management decisions, and recommend appropriate research programmes to address these.	A.2.1	1, 2, 3, 4, 6	1999	1,000	Recommendations
G.2.2	Conduct research on the ecological requirements of priority species and communities (including those of economic importance or relating to agrobiodiversity), and develop recommendations for their management.	A.3.10	1, 3, 4, 9	1999-2003	30,000	Recommendations
G.2.3	Conduct research on the ecological requirements of the most endangered (Red Data Book) species, in the context of data needed for the development of species action plans.	F.2	1, 3, 4	1999-2003	15,000	Recommendations
G.2.4	Conduct research on poorly studied taxa and species in order to determine their distribution and conservation status, and assist appropriate management decisions.	F.1.2	1, 3, 4	1999-2004	30,000	Increased knowledge of species

G.2.5	Undertake research to determine the keystone species and their relation to community structure in the most important natural ecosystems, particularly in fragile mountain areas, and provide recommendations for their management.	A.1.6	1, 2, 3, 4	1999-2001	10,000	Recommendations on keystone species
G.2.6	Investigate the vulnerability of different taxa to changes in the environment in order to use them as indicator species in the monitoring programme.	F.4.1, F.4.2	1, 3, 4	1999-2001	15,000	Indicator species identified
G.3	<i>Development of applied conservation research</i>					
G.3.1	Establish a specific inter-disciplinary research group focused on development of applied conservation biology, including appropriate literature and resources.	A.3.10	1, 3, 4, 6	2000	10,000	Conservation biology research group
G.3.2	Develop a research programme to test the relative success of various conservation approaches in protecting biodiversity, including novel projects on community involvement.	C.2.5, C.3	1, 3, 4, 11	2000-2003	14,000	Recommendations for novel conservation approaches
G.3.3	Conduct research on sustainable forestry techniques most appropriate to biodiversity conservation in the Kyrgyz Republic, as part of the forest sector review.	C.2.8	1, 2, 3	2000-2002	5,000	Recommendations for forestry extraction patterns
G.3.4	Conduct research on the applicability of novel, ecologically-sensitive agricultural techniques within the Kyrgyz Republic.	C.2.10	1, 3, 9, 11	2000-2003	10,000	Recommendations
G.3.5	Conduct ongoing research to evaluate precise fisheries extraction rates in freshwater systems; and identify options for the development of aquaculture, along with an evaluation of risk factors, and the potential of this approach to reduce pressures on wild stocks.	C.2.4	1, 3, 9, 11	2000-2004	8,000	Plan for fisheries management and aquacultural development

G.4	Promote dialogue between researchers and conservation managers to ensure research is focused on conservation needs					
G.4.1	Promote an integrated management-research programme, whereby gaps identified by managers and decision-makers are used for focusing research.	A.2.1, A.3.10, D.2.1	1, 3, 4, 6	2000-2004	5,000	Targeted research grants, and recommendations
G.4.2	Provide a forum for researchers, protected areas managers and rangers, and decision-makers to share information, and examine what forms of information are most useful for improving conservation actions.	D.2.1, F.5.3	1, 3, 4, 6	2000	2,500	Cross-sectoral forum
G.5	Develop research relating to use of biotechnology and biosafety					
G.5.1	Develop research on possible applications of biotechnology in environmental protection, particularly for use in pollution clear up.	I.2.5	1, 3, 5	2001-2003	5,000	Recommendations on biotechnology use
G.5.2	Conduct research to identify current and future risks associated with biotechnology, and make recommendations for policy development.	I.2.5	1, 3	2003	2,000	Recommendations

3.3.8 Strategic Component H: Information accessibility and exchange

No.	Activity	Related activities	Related objectives	Duration	Approx. budget (\$)	Outputs
H.1	<i>Develop a co-ordination and resource centre for environmental NGOs</i>					
H.1.1	Develop a co-ordination and resource centre for environmental NGOs, including technical support and equipment (e.g. information technology) based upon existing facilities wherever possible.	D.4.1, E.1.4	6, 8, 9	1999-2000	20,000	Centre
H.1.2	Develop and regularly up-date a database on environmental NGOs and their activities, linked to the biodiversity monitoring database.	F.4, F.5.3	6, 8, 9	2000-2004	4,000	Database
H.1.3	Equip and support localised co-ordination and resource centres, with information sharing via computer networks, based upon existing facilities wherever possible.	F.5.4	8	1999-2004	15,000	Localised centres
H.2	<i>Develop mechanisms for inter-sectoral biodiversity information sharing</i>					
H.2.1	Review, revise and implement regulations relating to accessibility and sharing of state biodiversity information with citizens.	F.5.1, E.2.2	7, 8	1999	1,000	Improved information access
H.2.2	Conduct national and localised training forums to raise awareness of environmental legislation, involving legislative and executive authorities, lawyers, ecological NGOs, protected areas staff and mass media.	A.1.3, D.2.1, E.3.1, L	7, 8	1999-2002	15,000	Training forums
H.2.3	Regularly produce inter-sectoral bulletins and other publications relating to biodiversity conservation in the Kyrgyz Republic.	E.2.7, G.4	1, 3, 8	2000-2004	10,000	Publications
H.3	<i>Introduce forms of information exchange aimed at the international sector</i>					

H.3.1	Develop and support use of the internet as a mechanism to share Kyrgyz biodiversity conservation information internationally (including access to biodiversity databases).	F.5.4, I.3.2	6, 8, 10	1999-2002	60,000	Increased internet access
H.3.2	Host a series of regional workshops to promote information exchange on biodiversity, and to discuss regional co-operation on conservation, including transboundary conservation issues.	A.1.7, A.2.2, F.5.3, I.2.2, I.3.4, L.2.4	6, 8, 10	2000	15,000	Workshop
H.4	<i>Organise repatriation of information held within other nations</i>					
H.4.1	Develop protocols and submit requests for repatriation of information about biodiversity in the Kyrgyz Republic currently held within other nations by organisations or individuals.	F.1.1, G.2	1, 3, 6	2000-2001	4,000	Requests for information
H.4.2	Develop and implement protocols to clarify rights of accessibility to and ownership of biodiversity information and specimens that are collected by foreign nationals.	I.3.3, I.1.2	1, 3, 6	2000-2004	1,000	Implementation of protocols

3.3.9 Strategic Component I: Co-operation (technical, scientific, inter-state, technology transfer)

No.	Activity	Related activities	Related objectives	Duration	Approx. budget (\$)	Outputs
I.1	<i>Develop and implement policies to promote sharing of biological resources and technologies</i>					
I.1.1	Identify options and develop national policies aimed at promoting equity and fairness in the sharing of biological resources, appropriate technologies, and benefits from their use.	A.1.2, C.2.1, M.1.3	3, 8	2003	1,000	Policy development
I.1.2	Develop international agreements, where appropriate, to ensure fair sharing of biological resources, technologies (including biotechnology), and benefits from their use.	H.4.2	3, 8	2000-2004	1,500	Policy development
I.2	<i>Promote international co-operation and exchange of information, resources and technologies</i>					
I.2.1	Develop and implement a plan for the ratification of further international conventions that complement the implementation of the BSAP (especially CITES, Ramsar and Bonn Conventions).	A.6.3, I.2.4	1, 2, 3, 5, 7, 10	1999-2001	1,000	Ratification
I.2.2	Develop and extend two-way exchange programmes for scientists and conservation managers with institutions in other nations.	H.3.2	1, 3, 6, 8	1999-2004	40,000	Sharing of experience and increased capacity
I.2.3	Identify areas for direct co-operation with other nations, including scientific and management collaboration.	A.1.7, H.3.2, L.2.4, M.4.3	1, 3, 6, 10	2002-2004	2,000	Recommendations
I.2.4	Develop and implement protocols to restrict import and export of endangered species, in line with international agreements.	F.2	1, 3, 6, 9	1999	20,000	Trade controls
I.2.5	Develop and implement protocols that ensure safe transfer and use of genetically modified organisms, including biotechnology, giving particular regard to potential effects on the gene pools of wild relatives.	G.5, L.1.5	1, 3	2004	2,000	Protocols

I.3	<i>Promote regional co-operation and sharing of information</i>					
I.3.1	Develop and formalise regional agreements relating to co-operation in conservation of biological resources.	A.1.7, H.3.2, I.2.3, L.2.4	1, 3, 10	1999	1,000	Agreements
I.3.2	Integrate information management systems to ensure that information is shared at a regional level.	F.5.3, H.3	1, 2, 3, 8	1999-2004	47,500	Information network
I.3.3	Develop and implement protocols to promote foreign research in the Kyrgyz Republic, in collaboration with local scientists and organisations.	H.4.2	1, 2, 3, 8	1999-2004	1,000	Protocols in use
I.3.4	Co-ordinate, produce and disseminate a Regional Green Book listing threatened ecosystems in Central Asia.	F.2	1, 2, 3,10	2000-2001	10,000	Publication

3.3.10 Strategic Component J: Impact assessment

No.	Activity	Related activities	Related objectives	Duration	Approx. budget (\$)	Outputs
J.1	<i>Review impact assessment methods and requirements to take into account specific impacts on biodiversity</i>					
J.1.1	Review and improve impact assessment methodologies and requirements to take full account of impacts on biodiversity by geology-exploration, agriculture, mining (including tailing dykes) and transport activities, power lines, and other sources of pollution or emissions.	C.4, F.1, F.4	1, 3, 6	1999-2000	1,000	Improved methodologies and guidelines
J.2	<i>Develop mechanisms to control impacts of all sectors on biodiversity.</i>					
J.2.1	Create a database of companies with the potential to affect biodiversity, in collaboration with the Ministry of Finance, National Statistics Committee, and State Tax Inspection.	F.5.1, K.1.8, K.1.9	1-6, 8, 9	1999-2000	5,000	Database
J.2.2	Identify and monitor businesses most likely to negatively affect biodiversity.	K.2.4	1, 2, 3, 5, 7, 9	1999	5,000	Monitoring
J.2.3	Develop guidelines and policy to support response to, and mitigation of, environmental disasters.	D.1.2	8	1999-2004	1,000	Guidelines in use
J.2.4	Develop guidelines for, and support implementation of, responses to the impacts of natural disasters on biodiversity, based upon international experience.	D.1.2	1, 3, 6, 8	1999-2004	1,000	Guidelines in use
J.2.5	Develop and implement policies that ensure that the environmental consequences of all proposed government policies or laws are identified and considered within decision-making.	M.1.4	1-7	1999-2004	2,500	Policies implemented

3.3.11 Strategic Component K: Incentive methods

No.	Activity	Related activities	Related objectives	Duration	Approx. budget (\$)	Outputs
K.1	<i>Establish direct incentives to promote positive environmental actions</i>					
K.1.1	Develop and introduce grants for specific habitat improvement (including tree planting and alternative cultivation methods).	A.6, C.2.5, C.3	1, 2, 3, 5, 7, 9, 11	1999-2003	50,000	Grants programme
K.1.2	Provide grants for local communities to carry out direct environment or wildlife protection.	C.3	1, 3, 8, 9, 11	1999-2003	50,000	Grants programme
K.1.3	Provide grants to stimulate co-operation between local communities, local government, Ministries, non-governmental and other sectors carrying out environmental protection.	A.2, A.4.3, L.2.3	1, 3, 6, 8, 9, 11	1999-2003	25,000	Grants programme
K.1.4	Provide grants for volunteers to carry out direct environmental protection, such as cleaning rivers and litter removal.	C.3	5, 8, 9, 11	1999-2003	50,000	Grants programme
K.1.5	Provide incentives for the development of ecotourism, on the condition that it maximises use of local labour, minimises impacts on local culture and biodiversity, and can display some degree of sustainability.	C.4.5, C.6, E.5.2	1, 3, 8, 9, 11	2000-2003	20,000	Ecotourism grants
K.1.6	Widely disseminate information about grant programmes using mass media.	E.2.5, M.2.6, M.3.2	1, 3, 5, 8, 9, 11	1999-2003	5,000	Media coverage
K.1.7	Develop and promote employment opportunities within environmentally friendly activities.	C.3.6, L.1.7, M.3	1, 3, 5, 8, 9, 11	2000-2004	40,000	Employment programme
K.1.8	Identify options for, and if appropriate implement, tax privileges policy for businesses undertaking environmentally friendly methods of operation.	C.3.6, C.4.9, J.2.1, J.2.2	1, 3, 5, 8, 9	2001-2004	1,000 (& lost revenues)	Tax privileges policy
K.1.9	Develop and implement an annual competition for nationally recognised awards for environmentally friendly management by business, supported by wide media coverage	C.3.6, C.4.9, J.2.1	1, 3, 5, 8, 10	1999-2004	10,000	Awards programme

K.2	<i>Establish and publicise disincentives relating to impacts on biodiversity</i>					
K.2.1	Establish and publicise the levels of fines for negative impacts on wildlife and ecosystems, related to levels of sustainable use.	C.4, E.3.1, H.2.2, L.1.1, L.1.2	1, 3, 5, 7, 8, 9	1999-2004	5,000	Fines system established and publicised
K.2.2	Identify mechanisms and develop policies through which businesses can be charged for unsustainable or excessive use of natural resources, in the light of opportunities for private land ownership.	C.4, G.1.1, J.1.2, M.1.6	1, 3, 5, 7, 8, 9	2000	2,000	Policy development
K.2.3	Review legal mechanisms by which financial responsibility for pollution and environmental impacts rests with the polluter.	C.4.7	1, 3, 5, 7, 8, 9	2000	500	Legal review
K.2.4	Develop and implement mechanisms for the enforcement of disincentives, including capacity building in the State Ecological Inspection service.	C.4.10, J.2.2	1, 3, 5, 8, 9	2000-2004	30,000	Disincentives enforced
K.3	<i>Introduction of system of voluntary and compulsory ecological insurance</i>					
K.3.1	Develop and approve regulations for voluntary and compulsory ecological insurance by businesses.	C.3.6	1, 3, 5, 7, 10	2000	1,000	Regulations
K.4	<i>Introduce regular public information sharing about environmental activity and impacts</i>					
K.4.1	Publicise lists of businesses with positive and negative impacts on biodiversity, in the mass media.	C.3.6, J.2.1, J.2.2	6, 8	1999-2004	500	Publications
K.4.2	Conduct public meetings to discuss state and business activity affecting biodiversity.	C.3.6	6, 8	1999-2004	5,000	Public meetings

3.3.12 Strategic Component L: Legislation

No.	Activity	Related activities	Related objectives	Duration	Approx. budget (\$)	Outputs
L.1	<i>Develop or revise a series of laws to support activities protecting biodiversity</i>					
L.1.1	Revise the law on 'Protection and use of wild flora and fauna', incorporating up-dated references to priority and Red Data List species in an annex.	C.4.1, F.2, K.2.1	1, 2, 3, 4, 7, 9, 10	2000	1,000	Improved legislative base
L.1.2	Review and revise legislation relating to hunting and fishing, in the context of other legislative changes and up-dated levels for sustainable use.	C.2.4, C.4.3, K.2.1	1, 3, 7	2000	1,000	Revised legislation
L.1.3	Review and revise legislation relating to forestry, to ensure that it is compatible with, and promotes, biodiversity conservation wherever possible, incorporating levels of sustainable use and priority areas.	C.2.4, C.4.4	1, 2, 3, 7	2000	1,000	Revised legislation
L.1.4	Incorporate and revise clauses promoting sustainable development wherever possible in relevant legislation.	C.2.1	1, 3, 5, 7, 8, 9	2000	1,000	Increased recognition of sustainable development in legislation
L.1.5	Develop and accept a law on 'Import limitations on biological technologies, products and resources potentially dangerous for biodiversity or human health'	C.5, I.2.5	1, 2, 3, 7	2002	1,000	Improved legislative base
L.1.6	Review and adopt legislation relating to the creation of Biosphere Reserves and other new types of designated areas.	A.4.1, A.4.2, A.5, L.2.1	1, 2, 3, 4, 5, 6, 7, 9, 10	1999	1,000	Improved legislative base
L.1.7	Introduce environmental work as an option for 'Alternative military service'.	K.1.7	1, 2, 3, 7, 9, 10	2001	1,000	Opportunities for ecological military service taken up
L.2	<i>Change legislation relating to protected areas</i>					
L.2.1	Review and revise the legislation relating to protected areas, in the light of other institutional changes.	A.1, A.2, A.3, A.5, L.1.6	1, 3, 4, 6	1999	1,000	Up-dated legislation
L.2.2	Review and revise the legal authority and roles of protected areas rangers, in the context of other institutional changes.	A.1.5, C.4.10	1, 3, 5, 6, 7	1999	1,000	Up-dated legislation

L.2.3	Review existing provisions and, if necessary, adopt new regulations on protected areas governed by local government and, if appropriate, on private ownership of wild areas.	A.2, A.4.3	1, 3, 5, 6, 7	2001	1,000	Improved legislative base
L.2.4	Develop and adopt regulations outlining mechanisms for interstate co-operation for issues relating to adjoining national protected areas.	A.1.7, H.3.2, I.2.3	1, 3, 6, 7, 10	1999	1,000	Improved base for regional conservation
L.3	<i>Revise legislation on environmental protection, taking into account the direct impacts on biodiversity</i>					
L.3.1	Develop and approve "Regulation of activities in areas of environmental sensitivity or which support important ecological systems".	C.4.6, F.1.1, F.1.2	1, 2, 3, 5, 7	1999	1,000	Improved legislative base
L.3.2	Revise and approve "Provisions for ecological audits".	J	1, 3, 5, 7, 9	1999	1,000	Improved legislative base
L.3.3	Develop legislation "Financial responsibility of companies for costs associated with environmental damage".	C.4, K.2	1, 3, 5, 7, 9	2000	1,000	Improved legislative base
L.3.4	In the context of possible changes to the legislation on private land-ownership, biodiversity impacts of land-purchase to be identified and protective actions to be included in any relevant legislation.	C.3, K.2.2	1, 3, 5, 7	2000	2,000	Improved legislative base

3.3.13 Strategic Component M: Financial Resources

No.	Activity	Related activities	Related objectives	Duration	Approx. budget (\$)	Outputs
M.1	State budget financing for biodiversity conservation					
M.1.1	Review and revise the state budget for biodiversity conservation, in the context of other institutional changes.	A, C.2.3, C.2.4, C.2.4, D.1	1, 2, 3, 4, 5, 6, 7, 8	1999-2004	1,000	Budget review
M.1.2.	Develop the role of civil society and other institutions in state budgetary-planning.	A.2.1, D.1.3, C.3.1	1, 2, 3, 4, 5, 6, 7, 8	1999-2004	2,000	Increased information sharing
M.1.3	Review non-environmental state budgets and examine options for cross-budget schemes to promote the conservation and sustainable use of biodiversity by other state agencies.	C.2.1, I.1.1, L	1, 2, 3, 4, 5, 7, 9	2000	2,000	Options for realistic costings
M.1.4	Investigate mechanisms by which realistic biodiversity costs of all harmful activities are recognised and incorporated into state budgets.	C.4, J.1.1, J.2.5	2, 3, 5, 7, 9, 11	2000	1,000	Options for realistic costings
M.1.5	Review and, if appropriate, revise budgetary mechanisms to ensure that some proportion of income from fines and other disincentives is used for environmental protection.	K.1, M.2.3	1, 2, 3, 4, 5, 9	2000	1,000	Options for appropriate funding
M.1.6	In the light of possible changes in legislation on private land-ownership, appropriate costings for land should be developed which take into account biological resources and potential for use.	C.4, K.2.2	1, 2, 3, 5, 8, 9	2000	2,000	Options for realistic costings
M.2	Financing of biodiversity projects using grants and interest-free loans					
M.2.1	Develop and implement a system of small grants for specific biodiversity conservation projects.	C.3, K.1	1, 3, 5, 8, 9	1999-2003	(160,000)	Grants programme
M.2.2	Develop a system of interest-free loans and micro-credits.	C.3, K.1	9, 10, 11	1999-2004	1,000,000	Credits
M.2.3	Review and revise the state Environmental Fund priorities and procedures, to ensure that it gives appropriate support to biodiversity conservation.	M.1.5	1, 3, 5, 8, 9, 10, 11	1999-2000	25,000	Revised Fund priorities and procedures.

M.2.4	Appoint and organise a grant/credit commission to approve and disburse monies for biodiversity conservation projects.	K.1	6, 8, 9, 10, 11	1999-2004	10,000	Tender commissions
M.2.5	Organise a grant and credit co-ordinating unit.	K.1	6, 8, 9, 10, 11	1999-2004	20,000	Co-ordination
M.2.6	Provide regular mass media coverage on grant and micro-credit opportunities.	E.2.5, K.1.6,	8	1999-2004	5,000	Media coverage
M.3	<i>Develop an ecological "Food for work" programme</i>					
M.3.1	Organise a programme of public work (including planting and habitat rehabilitation) with targets and levels of food payments (including 'bonuses').	C.3	1, 3, 5, 8, 9, 10, 11	1999-2004	650,000	Programme of activities
M.3.2	Promote the concept of 'Food for work' through the mass media and through the work of local humanitarian organisations.	E.2.5	1, 3, 5, 8, 9, 10, 11	1999-2004	10,000	Media coverage
M.4	<i>Financing by alternative mechanisms</i>					
M.4.1	Conduct a series of training sessions devoted to writing business projects on biodiversity for Ministry and protected areas staff, NGOs, businessmen and others.	C.3.6, A.1.1, D.3.2	1, 2, 3, 4, 5, 6, 8, 10	1999-2003	10,000	Training sessions
M.4.2	Conduct training for Ministry employees and NGOs in developing projects and grant applications suitable for international donors.	C.3.6, A.1.1, D.3.2, N.1.3	6, 8, 10	1999-2003	8,000	Training sessions
M.4.3	Provide ongoing external support in project development and leverage of funds for biodiversity.	I.2.3, N.1.3	6, 8, 10	1999-2000	5,000	Support for grant submissions
M.4.4	Ensure an ongoing review of innovative funding-mechanisms for biodiversity, including inter-sectoral links and international funding opportunities.	N.1.3	1, 2, 3, 4, 5, 9, 10, 11	1999	3,000	Innovative funding-mechanisms

3.3.14 Strategic Component N: BSAP implementation (co-ordination and monitoring)

No.	Activity	Related activities	Related objectives	Duration	Approx. budget (\$)	Outputs
N.1	<i>Establish a BSAP Co-ordinating Unit</i>					
N.1.1	Establish a BSAP co-ordinating office, including office space and equipment.	All	All	1999	5,000	BSAP co-ordinating office established
N.1.2	Maintain a BSAP co-ordinating office, including staffing, running, and development costs.	All	All	1999-2004	50,000	Co-ordinating office staffed and operational
N.1.3	Provide further specialist expertise in identifying and pursuing donors for biodiversity projects.	All	All	1999-2000	8,000	Improved capacity for fundraising and increased income
N.1.4	Disseminate information about the BSAP to a wide range of potential donors and implementers.	All	All	1999-2003	8,000	Range of material disseminated regarding the BSAP
N.1.5	Establish links with a wide range of potential implementers and donors, through meetings, and co-ordinating and supporting the submission of funding proposals.	All	All	1999-2003	1,500	Contact base, training and direct support
N.1.6	Establish an information database on BSAP implementation.	All	All	1999-2004	1,000	BSAP information base set up
N.2	<i>Establish a BSAP Steering Committee</i>					
N.2.1	Design, appoint and agree Terms of Reference for a multi-agency National Steering Committee to oversee progress of implementation of the BSAP, and provide links into a range of government structures, local authorities, scientific institutions and NGOs.	All	All	1999	100	BSAP Steering Group established
N.3	<i>Establish an inter-sectoral BSAP Technical Advisory Working Group</i>					
N.3.1	From within the Steering Committee appoint an inter-sectoral BSAP Advisory and Review Group, including representatives of ministries, other State institutions, academic institutions and NGOs.	All	All	1999	200	BSAP Advisory Group established
N.3.2	Maintain Advisory and Review Group (stipends).	All	All	1999-2004	4,000	Supported Advisory group

N.4	Conduct ongoing review and reporting on BSAP implementation					
N.4.1	Conduct annual review and monitoring of progress against targets, involving the Advisory Group and Co-ordinating Unit, reporting to the Steering Group.	All	All	1999-2004	1,000	Review meetings
N.4.2	Produce and disseminate annual national reports on BSAP implementation.	All	All	1999-2004	2,500	Annual reports
N.4.3	Disseminate information on BSAP implementation to a wider audience including the general public.	All	All	1999-2004	4,000	Public awareness
N.4.4	Produce and disseminate national reports to fulfil international reporting requirements, and link information into the central clearing-house mechanism.	All	All	1999-2004	2,000	International information sharing
N.4.5	Conduct ongoing annual revisions to the plan, to incorporate changes, due to both national context and updated priorities, including a full revision of the plan in 2005.	All	All	1999-2005	1,000	Regular revisions plus a fully revised plan in 2005
N.4.6	Produce a full report on implementation progress at the end of the 5-year implementation period with an indicative outline for the next plan.	All	All	2004	2,000	Produce implementation report and recommendations

3.4 Monitoring and Evaluation

Monitoring and evaluation form the vital link between the implementation of activities, assessment of their success and the subsequent evolution of the plan. Monitoring and evaluation is an integral part of the implementation process; it is not something that is done once the activities have finished.

Monitoring and evaluation:

- Identifies to what extent the plan is being implemented.
- Assesses the impact of the planned activities.
- Helps avoid duplication of efforts.
- Makes use of growing experience.
- Uses experience to avoid making the same mistakes again.
- Allows the plan to evolve with changing situations.

Monitoring and evaluation helps answer some crucial questions:

- To what extent have the planned activities achieved their outputs?
- To what extent have the overall objectives of the plan been achieved through these activities?
- What lessons have been learnt about the factors have made these activities a success or failure?
- What other information has become available that may help the development of the plan?
- What gaps exist in the plan, based on the information and experience that is available?
- How can developing existing activities or adding new ones in the plan fill these gaps?

In order to see how the plan is progressing, it is important to have some means of measuring the progress. These measures have been built into the plan through the set objectives and outputs that together enable objective verification of progress.

Process of monitoring and evaluating the BSAP

The process of monitoring and evaluating the BSAP will use existing structures and readily available information as far as possible, rather than creating new structures or collecting new types of information. ***Monitoring and evaluation needs to be continual and on-going.*** The process of evaluating and monitoring the BSAP will involve a number of different steps:

- The implementing organisation for a particular activity will be responsible for monitoring and evaluating the progress of that activity. This will take place within the existing structures of the implementing organisation, but be measured against the BSAP outputs and objectives.
- The co-ordinating unit will be responsible for gathering information about the implementation of BSAP activities from the various implementing organisations. Information will be collected through regular communications with implementing organisations (including reports and interviews).
- The BSAP co-ordinating unit will be responsible for compiling this information and providing an overall review of the progress of the BSAP. The technical advisory group, and collaboration within the steering committee, will provide an independent source of monitoring and evaluation.
- The results of the monitoring and evaluation will be widely disseminated, especially amongst the implementing organisations. Dissemination will be through the various reporting systems of the BSAP (see the section on Reporting, 3.5), and public awareness activities.
- These results will also be used as a basis for updating the BSAP, particularly through the incorporation of completed activities, identified gaps and lessons learnt.

Core Indicators

In addition to the objectives and outputs, it may be necessary to monitor a range of more general indicators, which assess the actual status of biodiversity. A set of core indicators, with which to monitor the state of and pressures on biodiversity at a national level has been proposed by the Global Biodiversity Forum (*Exploring Biodiversity Indicators and Targets under the Convention on Biological Diversity* Global Biodiversity Forum, 1997).

State indicators

Ecosystem quantity indicators

- 'Self-regenerating' areas (includes natural and semi-natural areas) and 'anthropogenic' areas (heavily modified areas), as a percentage of total area.
- Self-regenerating area per ecosystem type, as a percentage of total area.
- Extent of existing self-regenerating area by size class category (e.g. 100-1,000 ha, 1,000-10,000 ha, etc.).

Ecosystem 'biodiversity quality' indicators

- Distribution or abundance of select indicator species or taxonomic groups, as a percentage of an assumed/known baseline.
- Number of indigenous species of one or more select taxonomic groups, as a percentage of an assumed/known baseline.
- Various 'biodiversity quality' variables as a percentage of assumed/known baselines. These could include: percentage of forest area, percentage of total agro-ecosystem area in natural patches, and percentage of remaining endemic species.

Indicators for threatened and extinct species and habitat types

- Number of threatened species as a percentage of selected taxonomic groups.
- Number of threatened habitats as a percentage of total per country.

Pressure indicators

Habitat loss indicators

- Percentage of self-regenerating areas converted annually into: agricultural production, urban use and other intensively modified land-use activities.
- Percentage of watersheds significantly impacted by dams or formation of channels.
- Percentage of areas with population densities exceeding 100 inhabitants/km².

Over exploitation indicators

- Total number of important species harvested relative to estimate of sustainable off-take levels.
- Average size/weight/age per unit of off-take of a particular taxonomic, or other, group.
- Amount of agricultural area lost in 10 years due to erosion or other environmental degradation, as a percentage of area brought into agricultural production in the same period.

Exotic species indicators

- Total number of exotic species as a percentage of particular taxonomic, or other group.
- Relative abundance/biomass of exotic species as a percentage of a particular taxonomic, or other, group per country.

Pollution indicators

- Average measures of a particular group of substances particularly harmful to biodiversity, compared to the soil, water and air standards for such substances.

Other national indicators

A set of wider national-level indicators can be used to monitor and evaluate a range of factors that have a direct or indirect impact on biodiversity conservation. These may include:

- Demographic figures (e.g. population levels and changes).
- Economic indicators (e.g. GNP, GDP, inflation, trade figures, etc.).
- Education indicators (e.g. literacy, secondary and higher education levels, etc.).
- Health indicators (e.g. mortality levels and causes, access to medical care, etc.).
- Political indicators (e.g. democratic changes, etc.).

3.5 Reporting Requirements

Reports on the implementation of the BSAP will need to be produced for a number of reasons and for a number of different audiences.

Key reports are as follows:

- **Annual national report on progress.** This is produced for initial consideration by the Steering Committee, and by higher-level institutions. This report should include details of all activities undertaken, with details of their success and outputs. The report should include a review of progress against the set targets, an identification of gaps, lessons learnt and any changes required in the light of changing circumstances, at a national or local level. The impact of the plan on a number of core indicators (see 3.4) should be assessed, along with changes in the national economic or political context in which the plan is operating. The audience for this report will include decision-makers, donors, government and ministry officials, implementing organisations, NGOs, scientists, businesses, and all others directly involved in the BSAP and its implementation.
- **Public report on progress.** The public report should contain the information from the national report that is most relevant to the general public, and a wider range of groups or individuals interested in or affected by biodiversity conservation. This should represent a digest of the national report with the key information on progress in a form readily accessible to the wider public, and appropriate to use by mass media.
- **International reports on implementation of the Convention on Biological Diversity.** The CBD Secretariat requires regular reporting on the progress of individual countries with regard to their commitments to the CBD. The first stage of action under the CBD is the production of a BSAP; national reporting will then be required to document the extent of implementation of the plan. International reports will be based on information contained in the national report, and in some cases may represent the same document. However, these reports should ideally be more concise, aimed at a broader international audience, and may also be produced in English. Guidelines for national reporting are available from the CBD Secretariat.
- **Final report on progress.** At the end of the five year period a final implementation review will be produced. This will not only review achievements over this time, but will also outline reasons for success or failures in implementation of various elements in the initial plan, lessons learnt, and recommendations for the next planning period. This document should provide a thorough review of the plan itself as a working document, as well as implementation structures and recommendations for other biodiversity planning processes. This should be based on the experience gained.

Further details of reporting requirements are presented in the next table.

Table 3.5.1. Details of reporting requirements

Report	Contents	Produced by	Audience	Frequency
Annual Report	A detailed technical review of progress during the year and updated plans for the following year, including: Update and analysis of any new information. Extent of progress against outputs, objectives, and other indicators. Other feedback from monitoring and evaluation. Review of BSAP financing. Updated annual plan.	Co-ordinating unit	Steering committee Major implementing organisations. Major financing organisations. Other organisations closely associated with BSAP	Annually
Steering committee briefing papers	Summary reports on: Progress of activities, planning, financing, overall situation, etc from co-ordinating unit. Progress of activities within sectors represented by each steering committee member. Recommendations for updating the plan.	Co-ordinating unit & steering committee members	Steering committee members Co-ordinating unit	Every steering committee meeting
Annual Public Report	A summarised and accessible version of the full annual report.	Co-ordinating unit	All implementing organisations. All stakeholders. General public. International interest groups. Media.	Annually
Sector/issue reports (as required)	Detailed expert reviews of key sectors or issues, as required by the co-ordinating unit, to include: Update and analysis of available information. Review of progress within the sector. Evaluation of progress/lessons learnt, etc. Recommendations for further action and updating the plan.	Technical advisors	Co-ordinating unit. Steering committee.	Annually (before production of annual reports)
Activity reports	Regular reports on progress of individual activities in the BSAP, based on annual reporting requirements and indicators of progress with the BSAP.	Implementing organisations	Co-ordinating unit. Steering committee. Financing organisations.	At least annually
CBD National Report	A modified version of the annual report, outlining progress in the national implementation of the articles of the CBD.	Co-ordinating unit & MEP	CBD Secretariat. Parties of the CBD.	Annually

International BSAP reports	There may be a need to produce reports specifically relating to the process of the BSAP implementation, for BSAP co-ordinating/ networking organisations. These will generally be based on the annual report.	Co-ordinating unit & relevant government agency	Other countries/ organisations planning and implementing BSAPs.	As required
Other international reports	It may be necessary to produce reports to other international conventions, agreements, organisations, etc relating to biodiversity conservation (e.g. Climate Change Convention, Ramsar, CITES, etc). These will be based on the annual report.	Co-ordinating unit & relevant national organisations	Relevant international organisation.	As required
Financing organisation reports	Each organisation financing any BSAP activity will require reports on progress, possibly in addition to annual and activity reports.	Recipient organisations &/or co-ordinating unit	Financing organisation.	As required
Final Report	A detailed review of the implementation of the BSAP, integrating the information from all previous reports. This should form the basis for the production of the new BSAP.	Co-ordinating unit with all stakeholders	All organisations involved in the BSAP.	Before five year period is completed

3.6 Implementation Structures

Basic principles
As far as possible, general implementation structures should be:
<ul style="list-style-type: none"> • Based on existing structures • As simple as possible. • Efficient, in terms of resources required and personnel. • Self-sustaining - using the above principles • Reliant on internally generated long-term financial sources

3.6.1 *Management and administration of the implementation process*

The management and administration of the BSAP implementation process will be conducted separately from the implementation of specific activities.

The actual implementation of activities will be carried out by a wide range of organisations or agencies ('implementing organisations', 3.6.2). However, the main implementing organisation will be the Ministry for Environmental Protection (MEP). Implementation will be supported by funding through a number of existing and innovative financial-mechanisms (3.6.3).

It is envisaged that a BSAP management structure will be required to undertake the following activities:

- To co-ordinate implementation activities (to avoid duplication or replication, and highlight links between activities)
- To promote the BSAP to a wide range of organisations including potential funders, and implementing organisations
- To promote ongoing high-level (governmental and ministerial) support for BSAP implementation
- To motivate and generate activity among the implementing organisations
- To facilitate contact between potential implementing agencies and appropriate financial mechanisms
- To identify needs and organise provision of specific training or technical inputs where appropriate
- To store information on BSAP implementation
- To review and evaluate the implementation of the BSAP on an annual basis
- To up-date the BSAP where necessary, on the basis of an annual review
- To disseminate information on BSAP implementation, on a national and international basis.

It is proposed that there would be four key 'groups' involved in the management and administration of BSAP implementation:

1. BSAP co-ordinating unit

Purpose

- To act as a focal point for the implementation of the BSAP.

Activities

- Motivate and support implementing organisations in finding funds and undertaking activities.
- Co-ordinate and promote financing mechanisms for the BSAP.
- Promote contact between implementing organisations and appropriate financial mechanisms.
- Identify needs, and help provide specific training or technical input, in support of implementation.
- Gather and update all information relevant to the BSAP.
- Co-ordinate assessment of this information.
- Co-ordinate all levels of planning of the BSAP.
- Monitor and evaluate progress of the BSAP, on an ongoing basis, in collaboration with the Technical Advisory Working Group.
- In collaboration with the Technical Advisory Working Group, to provide an annual review of progress on the BSAP, and to up-date the plan where necessary.
- Report to relevant groups on progress of the BSAP.
- Disseminate and publicise information on the BSAP.
- Facilitate and widen co-operation and exchange between all groups involved in the BSAP.

Who

- An individual or small group of people, with a range of skills in project management, information management, and networking. They should be closely linked to the main implementing organisation (MEP), but maintain enough independence to be able to provide objective reviews and monitoring. *(It is important that the group is not involved in implementing any BSAP activities, or that if it is these are separated clearly from its co-ordination role).*

2. Steering Committee

Purpose

- To provide high level support for the BSAP, including guidance to the BSAP process and promotion of the BSAP in all sectors.

Activities

- Regular (but not necessarily frequent) meetings to review BSAP progress.
- Individually provide feedback to the co-ordinating unit.
- Increase awareness of the BSAP within different sectors.
- Co-ordinate BSAP activities and development between sectors.

Who

- High level (Ministers, Directors, etc), respected and interested individuals representing all major sectors (especially government, business, academia, NGOs etc) who are willing to independently (i.e. not necessarily only via committee meetings) provide support to the BSAP. This could be by a) providing advice, expertise and guidance to the BSAP process, and b) promoting the BSAP within the sector they represent. They would have to be actively involved in the sector they represent. They would not be involved in the day-to-day management or co-ordination of the BSAP.

3. Technical advisory working group

Purpose

- To provide an ongoing technical review of progress of BSAP implementation, and to guide the further evolution of the plan.

Activities

- In collaboration with the co-ordinating unit, to assess information on implementation of activities, and evaluate progress on an ongoing basis.
- To evaluate and report directly to the Steering Committee on technical aspects of implementation.
- To conduct an annual review of progress on the BSAP, identifying activities completed, and gaps and lessons learnt in the implementation of the BSAP.
- To annually up-date activities or priorities within the plan, in relation to activities achieved, lessons learnt, and changing situations.

Who

- The Technical Advisory Working Group would ideally represent a subset of the Steering Committee, comprising those individuals with the most appropriate technical expertise (particularly scientists, biodiversity managers, media/public awareness representatives etc.) who would be willing and able to commit time to the evaluation and assessment process.

4. Technical specialists

Purpose

- To provide specialist expertise wherever necessary to the co-ordinating team, particularly with respect to fundraising and technical aspects of implementation.

Activities

- To gather information within the given field of expertise.
- To independently monitor and evaluate BSAP progress in specific areas.
- To provide general overviews and recommendations in specific areas.
- To provide direct training in relevant activities, including grant writing and monitoring, in support of the co-ordinating unit.

Who

- A range of consultants available to work on short-term, specific contracts. These experts would basically be available to supplement the general project management skills of the co-ordinating team with specific skills, not available elsewhere in the implementation groups.

3.6.2 Implementing organisations

For to ensure effective implementation of this Biodiversity Strategy and Action Plan the BSAP co-ordination unit (3.6.1) will need to communicate effectively between the main implementing organisations and groups - including government agencies, local administrations, NGOs, academic institutes, and local communities.

The organisations and groups likely to be directly involved in the implementation are listed below:

Implementing organisations	
<p>Government agencies, including:</p> <ul style="list-style-type: none"> • Ministry of Environmental Protection • State Committee of Forestry, Hunting and Fishing • Ministry of Agriculture • State Committee for Sport and Tourism • Ministry of Finance • GomcosInvest • Prime Minister's Office <p>Local authorities, including:</p> <ul style="list-style-type: none"> • Oblasts • Rayons • Community representatives <p>Non-government organisations (NGOs) in the following sectors:</p> <ul style="list-style-type: none"> • Ecological • Environmental • Sustainable rural development • Social • Education • Renewable energy • International 	<p>Institutions, including:</p> <ul style="list-style-type: none"> • Academy of Sciences • Institute of Biology • Universities • Technical Colleges • Schools <p>The media, including:</p> <ul style="list-style-type: none"> • National and local newspapers • National and local television • National and local radio <p>National and International Projects, including:</p> <ul style="list-style-type: none"> • Aral Sea Basin Project • West Tien Shan Transboundary project • Swiss Forestry Project • Issyk-kul Biosphere Project • Agricultural Outreach Projects • Forestry Sector Review

A key activity for the BSAP co-ordinating unit will be ensuring that activities carried out by different organisations are complementary, and that work is not replicated. This co-ordination and integration of activities will rely on good dissemination of information, through the mechanism provided by the co-ordinating unit. Given the constraints linked to current resource availability and investment in infrastructure, coupled with the broad commitments of the BSAP co-ordinating unit, such information dissemination is likely to rely on locally appropriate, low cost, techniques. Where a single implementing organisation is responsible for an action, or where implementation is already underway or planned within existing projects, straightforward information dissemination will ensure co-ordination with other, separate, activities.

A greater challenge for co-ordination of activities will be posed where several organisations undertake implementation of a set of related activities within a single integrated project. This will require good partnership and collaboration between the different implementing agencies. Further capacity building is required at all levels to help support the creation of such partnerships, and to create a framework to facilitate

greater collaboration between different sectors and agencies. This will also require investment in the infrastructure and information systems. Any model developed to promote an integrated approach to the management of biodiversity could then be applicable to a wide range of other areas and issues across the country.

An inter-sectoral Steering Committee, to oversee the implementation of the BSAP, is seen as a first stage towards such an integrated management approach.

3.6.3 Financial mechanisms

The financial resources to implement the BSAP will partly be met from existing sources. However, to implement the extensive actions planned over the next 5 years a review of current financial mechanisms will be essential, as will be the procurement of new sources of finance (see 3.3.13). These measures will provide the increased investment and resources to ensure that the BSAP moves from being a well-designed plan, to become a sustainable process.

The BSAP co-ordinating unit (see section 3.6.1) will be the focal point for the development of revised and innovative financial mechanisms, and will also be responsible for co-ordination between donors, and the development of links between donors and implementing organisations. The co-ordinating unit will require external support during the first year of implementation to ensure that these financial mechanisms and networks are established. There will also need to be sufficient capacity among implementing organisations, to ensure that government agencies, NGOs, local authorities, and local communities can access and use funding effectively.

A number of potential financial mechanisms for BSAP implementation are outlined below:

State budget

The overall state budget has reduced in real terms since the country became independent, and this has restricted funding available to government ministries, including that for salaries. The proposed activities within the BSAP, coupled with other institutional changes, will necessitate the review, and likely increase, of budget allocations. These will need to reflect the importance of biological resources in the light of sustainable development. The fundamental importance of biological resources for economic and social development, needs to be reflected in the way that conservation revenue is raised and distributed.

The Environment Fund

The current review and strengthening of this fund provides an opportunity for the governance to become more transparent and responsive. This fund will potentially become an important internally-funded means of managing biodiversity, and related environmental issues.

Oblast budgets

Implementation of actions at a local level will make Oblast-level funds available to biodiversity conservation, and will encourage ongoing investment into the sustainable use of biological resources.

Micro-credit

As programmes of micro-credit are developed they will provide an opportunity to fund small-scale actions relating to both biodiversity conservation, and local economic activity.

Small grants

These will be needed to start off, and in some cases maintain, local initiatives and will be an important means to develop local capacity for environmental protection within communities as well as organisations.

'Food for Work' programmes

Habitat restoration projects can be included as part of employment schemes to relieve local poverty. This measure demonstrates the potential for job opportunities within the environmental field.

Disaster relief funds

Recognition of the role of natural vegetation in watershed and soil erosion management is likely to lead to greater pre-emptive and proactive responses to threats of flooding and landslides. Such mechanisms could provide support for biodiversity actions with long-term protection benefits.

Donor funded projects

Given the broad range and impact of activities listed in the BSAP - including social issues, sustainable economic activity, rural development, and direct biodiversity conservation - there are many opportunities to develop projects with varied national and international donors. An important initial stage of implementation will require capacity building within government agencies and NGOs, to support and enable them to develop project concepts, proposals, grant applications and project management systems which are appropriate to international donors.

Potential national and international donor organisations	
This list is only indicative at this stage, and is not intended to be comprehensive. It includes organisations currently operational within the Kyrgyz Republic which may be able to provide support for a wide-range of projects - of different size, cost and focus. Careful consideration is needed to identify the most appropriate source of funding for a particular project.	
Counterpart Consortium Eurasia Fund	Soros Foundation TACIS
Fauna & Flora International FINNIDA GTZ IUCN	UK Know How Fund UNDP USAID World Bank

Global Environment Facility (GEF)

One of the main aims of the GEF is the management of globally-important biodiversity. This provides an opportunity to implement projects of global as well as national importance, such as the West Tien Shan Project. A range of funding mechanisms are available within the GEF (including small and medium sized grants programmes).

Loans

Where international loans are applied for in future, it is important that the clear links between biodiversity and sustainable development in the Kyrgyz Republic are considered in the design of the loan, and are also reflected in the subsequent legal agreement.

Private Sector

As both private sector and corporate interests develop further in the Kyrgyz Republic, there is an increased potential to develop partnerships, and sponsorship, in support of improved biodiversity management.

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Abbreviations

BSAP	Biodiversity Strategy and Action Plan
CBD	Convention on Biological Diversity
CIS	Commonwealth of Independent States
CITES	Convention on International Trade in Endangered Species
EIA	Environmental Impact Assessment
EKHF	Environmental Know How Fund
EU	European Union
FFI	Fauna & Flora International
GDP	Gross Domestic Production
GEF	Global Environment Facility
GNP	Gross National Production
IUCN	World Conservation Union
MEP	Ministry of Environmental Protection
NGO	Non-governmental organisation
PEBLDS	Pan-European Biological and Landscape Diversity Strategy
TACIS	Technical Assistance for the CIS
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development
WWF	World Wide Fund for Nature

Glossary

Agrobiodiversity	The range of the variety of life in cultivated and domesticated species of plants and animals. This includes the variety of species, breeds, cultivars, wild relatives, etc.
Anthropogenic	'Man-made'. Any factor or influence resulting from human intervention or activity, for example farmland is an anthropogenic landscape.
Biodiversity	Biological Diversity. The total range of the variety of life on earth or any given part of it. The definition given by Article 2 of the Convention on Biological Diversity is: 'The variability among living organisms from all sources including inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems'.
Biogeography	Study of the geographic distribution of organisms.
Biological community	All the organisms – plants, animals and microorganisms – that live in a particular habitat and affect one another as part of the food-web, or through their various influences on the physical environment.
Biomass	The total weight of living organisms in any given area.
Biosphere	The part of the earth which includes living organisms.
Biotechnology	The emerging technology involving the use of living organisms and their genetic structure (e.g. biological control of pests, genetically modified crops, and fermentation).
Bonn Convention	The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) aims to conserve terrestrial, marine and avian species over the whole of their migratory range.
Conservation	Techniques used to sustain biodiversity and the natural processes that produce it, in the face of human-caused environmental disturbance.
Convention on Biological Diversity (CBD)	The Convention on Biological Diversity's objectives are "the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilisation of genetic resources." The Convention is, therefore, the first global, comprehensive agreement to address all aspects of biological diversity: genetic resources, species, and ecosystems. It recognizes - for the first time - that the conservation of biological diversity is 'a common concern of humankind' and an integral part of the development process.

Earth Summit	The United Nations Conference on Environment and Development held in Rio de Janeiro in 1992. Agreements such as CBD, Agenda 21 and the Convention on Climate Change were amongst its outputs.
Ecology	The scientific study of the interaction of organisms with their environment, including the physical environment and other organisms living in it.
Ecosystem	A community of interdependent organisms and the physical environment which they inhabit.
Ecotourism	Tourism focussed on attractive and interesting features of the natural environment, including plants and animals.
Endangered	A population, species or habitat that faces a quantifiable risk of extinction.
Endemic	A native species or race that is confined to a particular region or country.
Environment	The surroundings of an organism or species, including both the physical environment and the other organisms with which it interacts.
Equity	Fairness, in terms of distribution of the benefits and costs of biodiversity use and conservation.
Ex-situ conservation	Conservation of plants and animals away from their original habitat (e.g. in a zoo or botanic garden).
Fauna	All the animals found in a particular place.
Flagship species	Attractive and charismatic species used to promote the wider conservation of species and habitats with which they interact.
Flora	All the plants found in a particular place.
Gene	The chemical unit of inheritance in animals and plants.
Gene-bank	Establishment to conserve genetic diversity (e.g. storage of seeds or embryos).
Gene-pool	All the genes in all the organisms belonging to a population.
Global Environment Facility (GEF)	A fund set up in 1992 and managed by the United Nations to help developing countries conserve their environment.
Habitat	A place in which a particular plant or animal lives. Often used in a wider sense, referring to major assemblages of plants and animals found together.
In-situ conservation	Conservation of habitats, species or populations in their original situation.

Introduced species	Species which have been introduced by humans, either accidentally or intentionally, and are not native to a given area.
Invertebrates	Animals without a backbone (e.g. insects, spiders and worms).
Keystone species	A species that plays a key role in the ecosystem in which it lives. Its removal results in a significant shift in the composition of the community, and even in physical structure of the environment.
Landscape Diversity	The inter-relationship between differing ecosystems and land uses in a given area at a given time.
Migratory species	Species whose life-cycles require physical movement from one area or habitat to another in order to be able to survive and breed.
Native species	Species that occur naturally in a given area.
Natural/national park	A designated protected area whose status is deemed of high national importance, and in which controlled economic activity is permitted.
Oblast	A regional, district-level, administrative unit.
Pasture	An area of grassland used for grazing cattle, sheep or horses.
Population	A group of organisms belonging to the same species within a defined area.
Ramsar Convention	The Convention on Wetlands of International Importance especially as Waterfowl Habitat -- commonly called the Ramsar Convention (from its place of adoption in Iran in 1971) is the intergovernmental treaty, which provides the framework for international co-operation on the conservation and wise use of wetland habitats and resources.
Rayon	A sub-regional administrative unit (smaller than an oblast).
Red Data Book	Catalogues published by IUCN, or national authorities, listing species that are rare or in danger of becoming globally, or nationally, extinct.
Restoration	The regeneration of plant and animal communities, aimed at the enlargement or restitution of threatened ecosystems.
Riparian	The land and habitat immediately adjacent to a river.
Seed-bank	A central facility for the storage of seeds, representing a diversity of species and genetic strains, especially of domestic plants and their relatives.

Species	A group of unique organisms that share the same genetic and physical characteristics, and form a separate inter-breeding unit.
Steppe	Dry, grassy, generally treeless and uncultivated habitat found in the lower altitudes of the Kyrgyz Republic.
Sub-endemic	Species which are endemic to a biogeographic region (which, in this case, includes the Kyrgyz Republic).
Sustainable development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
Sustainable use	Use of a natural resource at a level within the rate of natural production, so that it remains viable in the long-term.
Taxa	General term for classificatory groups at any level (e.g. species, subspecies, genera).
Threatened	Category of risk of extinction that implies some short-term viability but longer-term problems if population trends are not reversed.
Viability	Capable of surviving in the long-term.
Wildlife corridor	Landscape features linking one suitable habitat to adjacent habitats through less suitable areas of land. They are designed to permit animal movement and seed dispersal.
Zakaznik	Small protected areas designed for specific species, populations, or seasonal requirements of those organisms.
Zapovednik	Strict protected areas designed for scientific research and the protection of nature in its unaltered state.

Annex 1. List of Participants

Name	Organisation
Parliament	
Apasov Y.	Parliamentary Representative
Makeev T.	President Counsel Secretary
Ministries	
Abduvasiev A.	Ministry of Agriculture
Akineev J.A.	Deputy Minister, MEP
Alamanov A.	Ministry of Tourism
Bashkoev D.	Ministry of Environmental Protection
Bakushev M.	Ministry of Environmental Protection
Davitashvili S.	Ministry of Tourism
Kasiev K.	Ministry of Environmental Protection
Maytskaya I.	State Hydrometeorology Agency
Musuraliev T.	State Forestry Agency
Stamova N.	Ministry of Finance
Sudugalieva B.	Ministry of Foreign Affairs
Zamoshnikov B.	State Forestry Agency
Donors and International Projects	
Adushev Dj.	UNDP
An M.	Soros-Kyrgyzstan Foundation
Botobaeva G.	TACIS
Charder T.	Issyk-Kul Project (GTZ)
Cooper J.	Counterpart Consortium
Dolgova E.	Counterpart Consortium
Emilio Valli	TACIS
Hudaybergenov A.	UNDP
Imankulova J.	Netherlands Co-operation Programme
Makeeva A.	Turkish Embassy
Makela A.	Environmental Monitoring Project
Muller U.	Kyrgyz Swiss Forestry Support Programme
Zybanov V.	TACIS
Businesses	
Evseeva E.	Kyrgyzaltyn
Ozgekhan A.	Coca-Cola Bishkek Bottling Company
Shaildaeva T.	Kumtor Operating Company
University and Research Institutions	
Baisalova G.	Academy of Music
Begaliev Sh.	Researcher from Issyk-Ata
Botbaeva M.	Pedagogical University
Ionov V.	Biology and Soil Institute
Jymaliev A.	NAS Institute of Philosophy and Law
Karabaev S.	National State University
Kasiev S.	Biology and Soil Institute
Kinderbaeva A.	NAS Forestry Institute
Krivoruchko V.P.	NAS Botanical Garden
Manuilenko Y.I.	Ecology Institute
Prihodko S.	Biology and Soil Institute
Saryeva K.	NAS Institute of Philosophy and Law
Shanasarov A.	International University
Non-Governmental Organisations	
Abdukerimova D.	Local Naryn NGO
Abdygulov A.	BIOM
Asylbaeva Sh.	Alyene
Bakchyev T.	Local Kara-Kol NGO

Kravsova N.	BIOM
Osmonova M.	Local Talas NGO
Ryskylova G.	Tree of life
Vanin V.	Nature Lovers Club

Mass Media

Akmatov B.	Kyrgyz TV
Alaeva S.	Kyrgyz-Ruhu Newspaper
Beksultanova A.	TV Piramida
Klevsov S.	TV Piramida
Madylbaev T.	Kyrgyz-Ruhu Newspaper
Popov B.	TV VOSST
Putalova E.	Vecherniy Bishkek
Raev S.	Kyrgyz-Ruhu Newspaper
Tabaldiev K.	Kyrgyz kabar

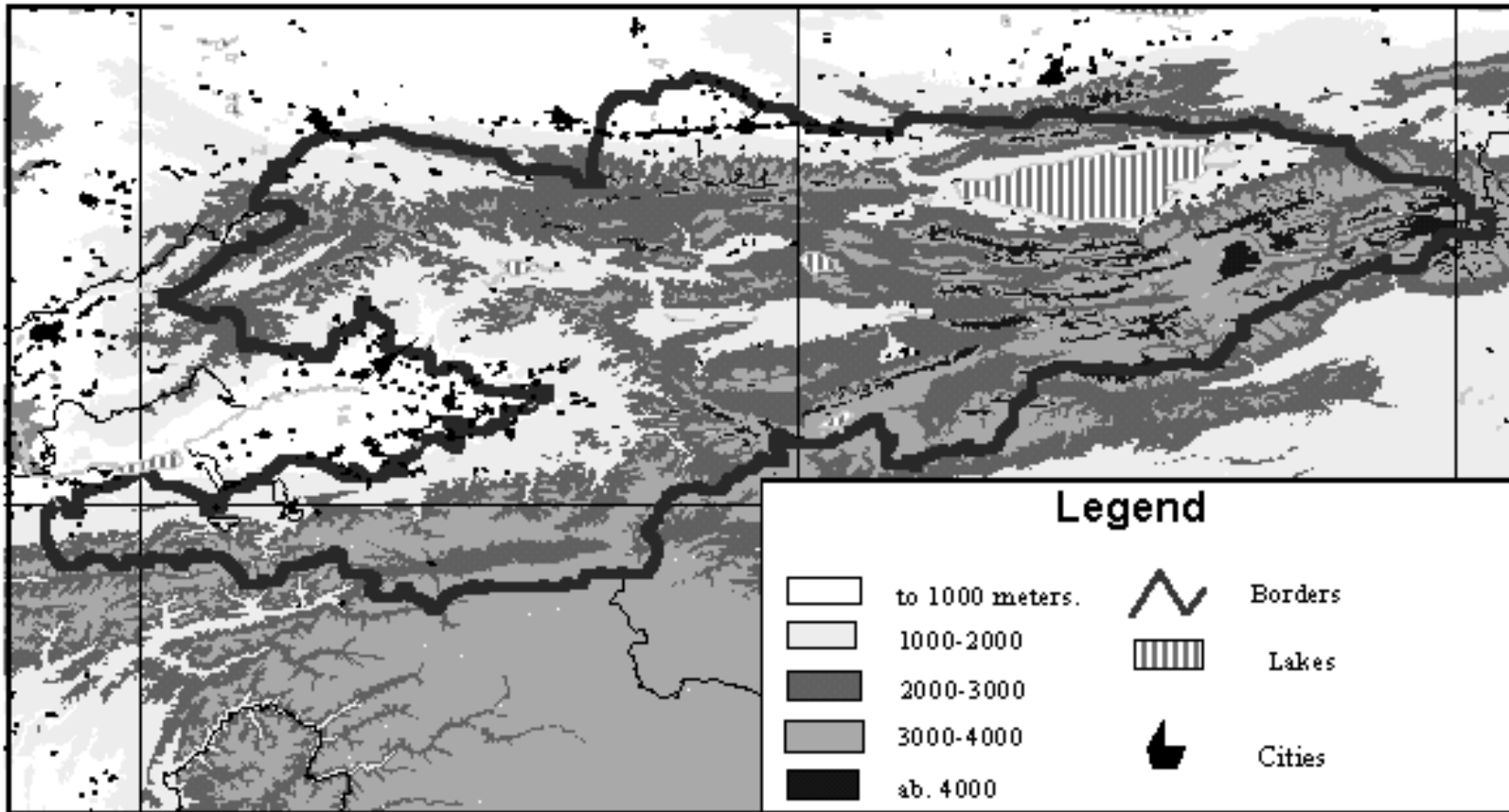
Zapovedniks

Bondarev E.	Sarychat Ertash Zapovednik
Choroev B.	Karatal-Japyryk Zapovednik
Dybanaev A.	Sary-Chelek Zapovednik
Kurmankojoev N.	Karatal-Japyryk Zapovednik
Sagunbaev S.	Issyk-kul Zapovednik
Shakeev N.	Sarychat Ertash Zapovednik
Syltanbekov K.	Besh-Aral Zapovednik
Toktaliev R.	Naryn Zapovednik

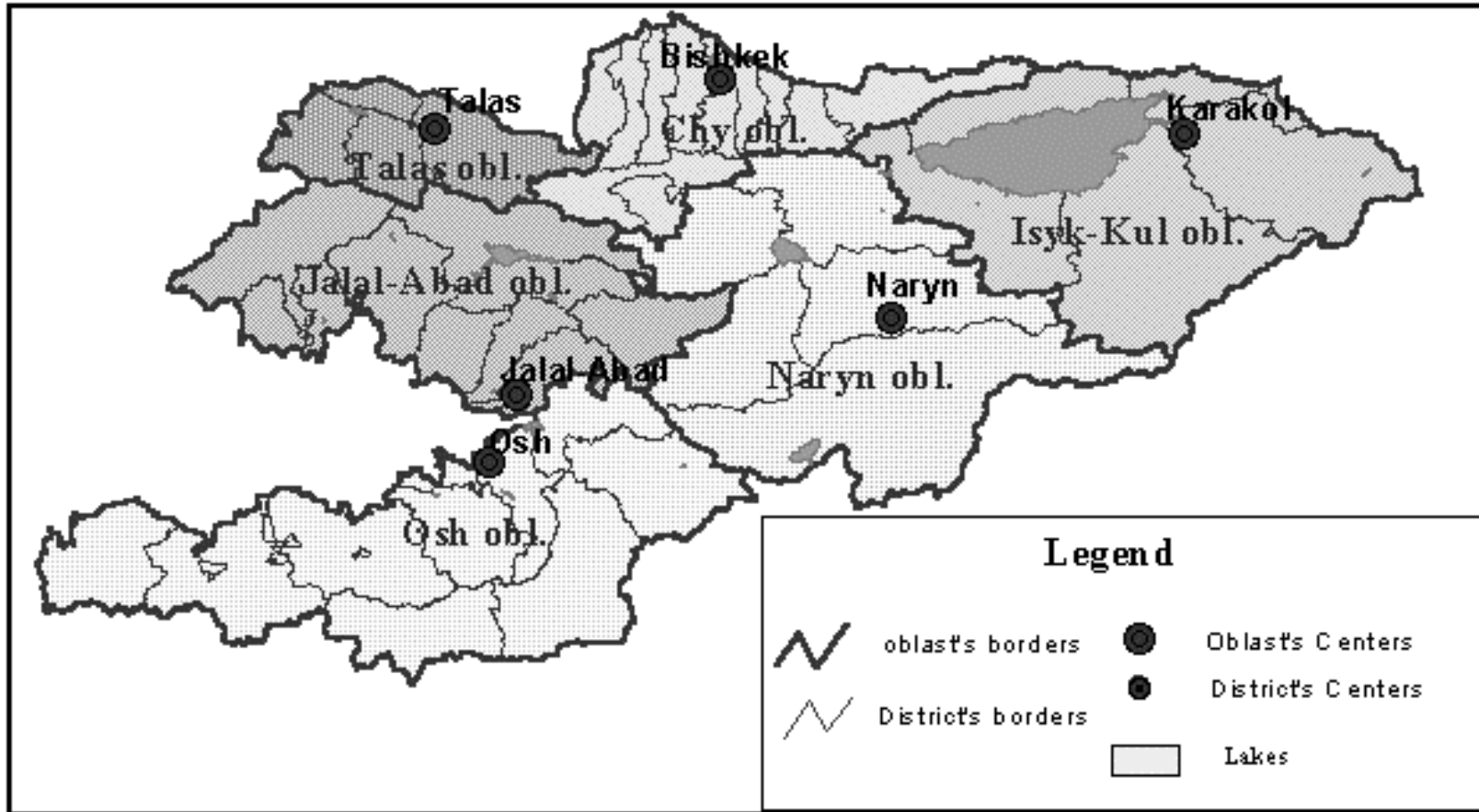
Consultant Specialists

Aknazarov B.	Agricultural Academy
Bakirov A.	Tourism company
Bekturganov K.	Study and Research Centre
Chebotova N.	Parliament
Doolotkeldieva T.	Agricultural Academy
Dyikanova Ch.	International University
Gorbatuk V.	Ecoinfocentre
Idrisov N.	International University
Karbos uulu T.	National University
Korotenko V.	BIOM
Koshoev M.T.	GIS Laboratory
Kosmynin A.	NAS Forestry Institute
Kudabaeva G.	International University
Kurmankulov A.	Biology and Soil Institute
Lebedeva L.	Biology and Soil Institute
Mamutova A.	Management Academy
Moiseeva S.	Biology and Soil Institute
Moldobaeva N.	National Bank
Moldosanova G.	International NIS Phytocentre
Orolbaeva L.	Mountain-metallurgical Institute
Osmanalieva R.	Independent Sociological Research Group
Sultanova B.	Biology and Soil Institute
Syunbaev M.	Bishkek Business School
Tarbinski Y.	Biology and Soil Institute
Titova L.	Hydrometeorology
Toktoraliv B.	Osh Technological University
Toychybaev T.	Independent consultant
Tukmergenov T.	Biology and Soil Institute
Tuleberdiev O.	Independent consultant

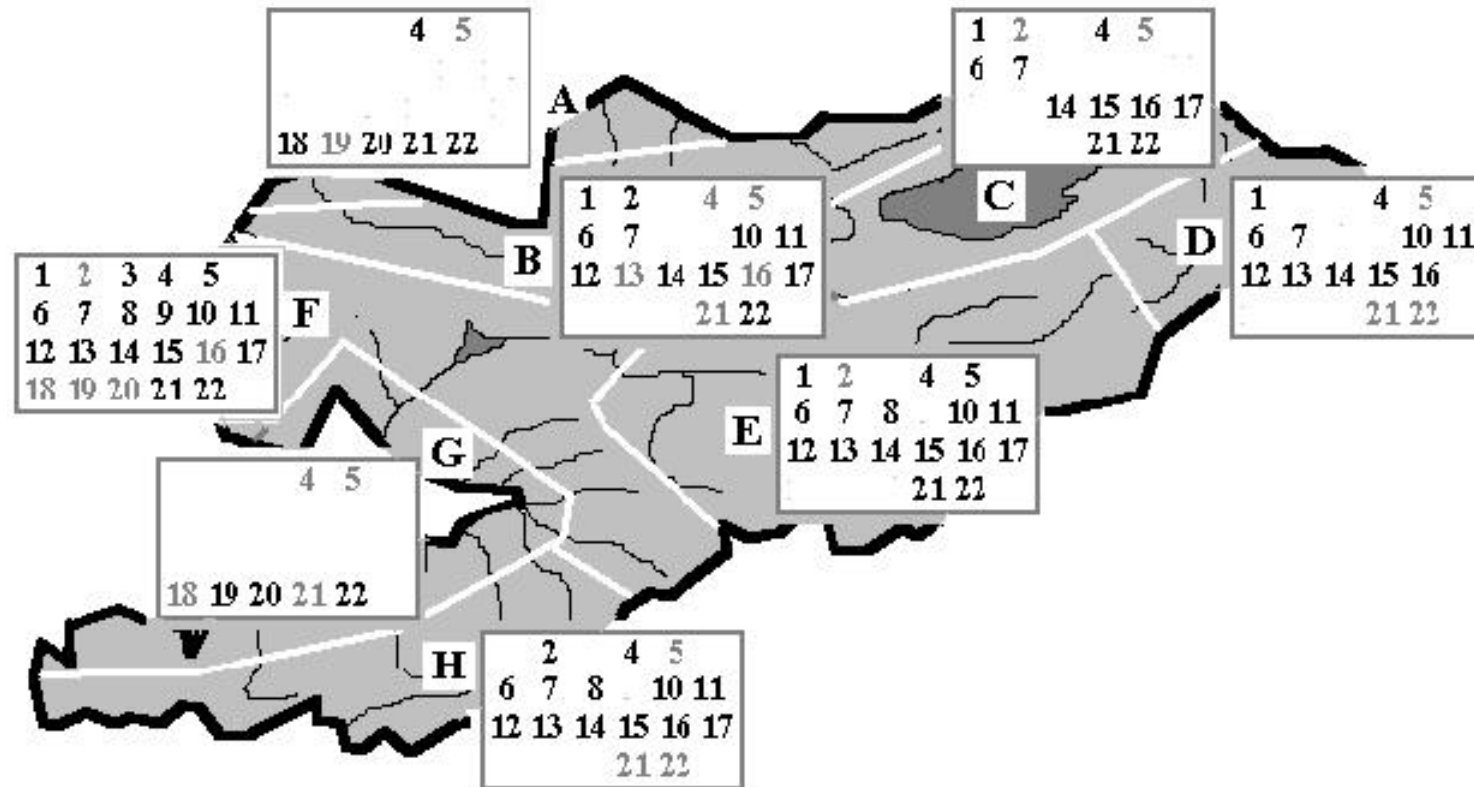
Annex 2A. Physical Map of the Kyrgyz Republic



Annex 2B. Administrative Map of the Kyrgyz Republic

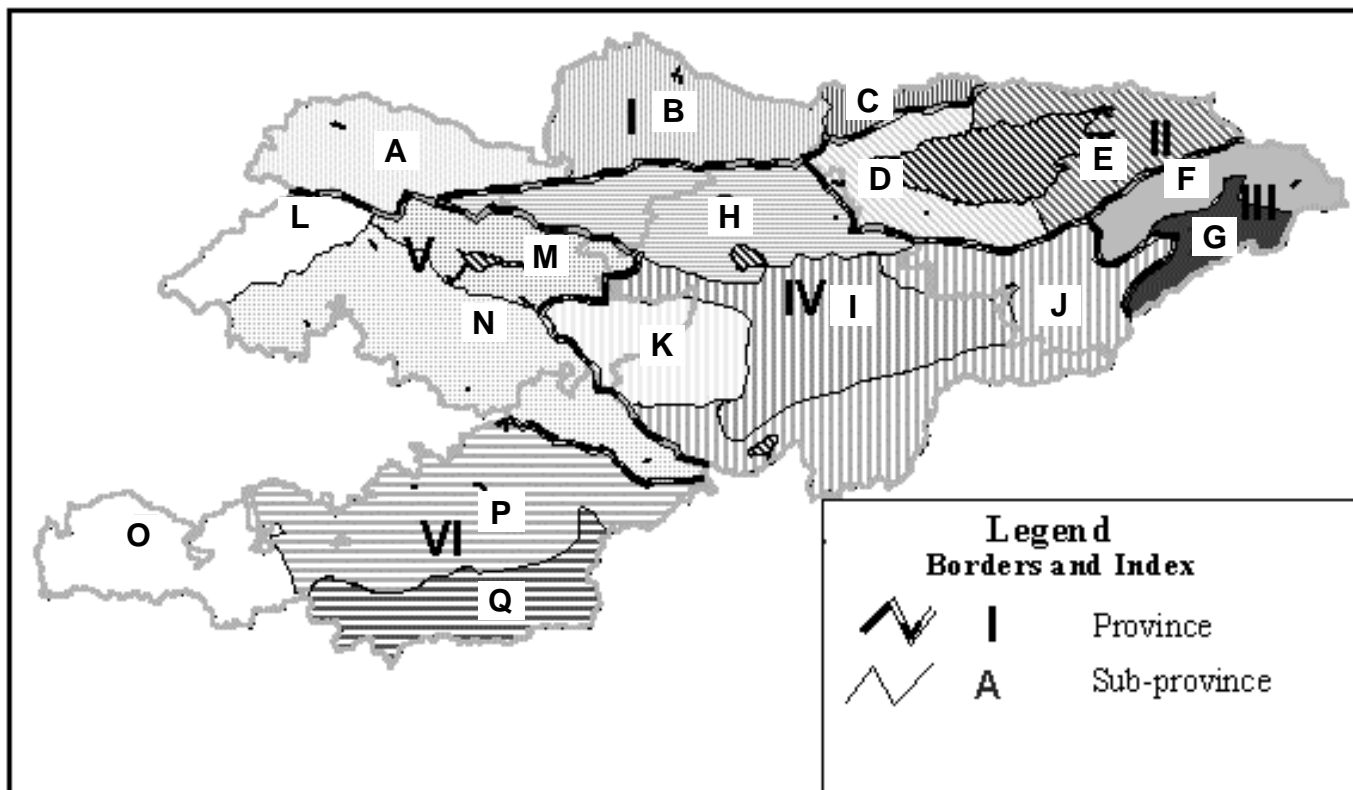


Annex 2C. Ecosystem Map of the Kyrgyz Republic



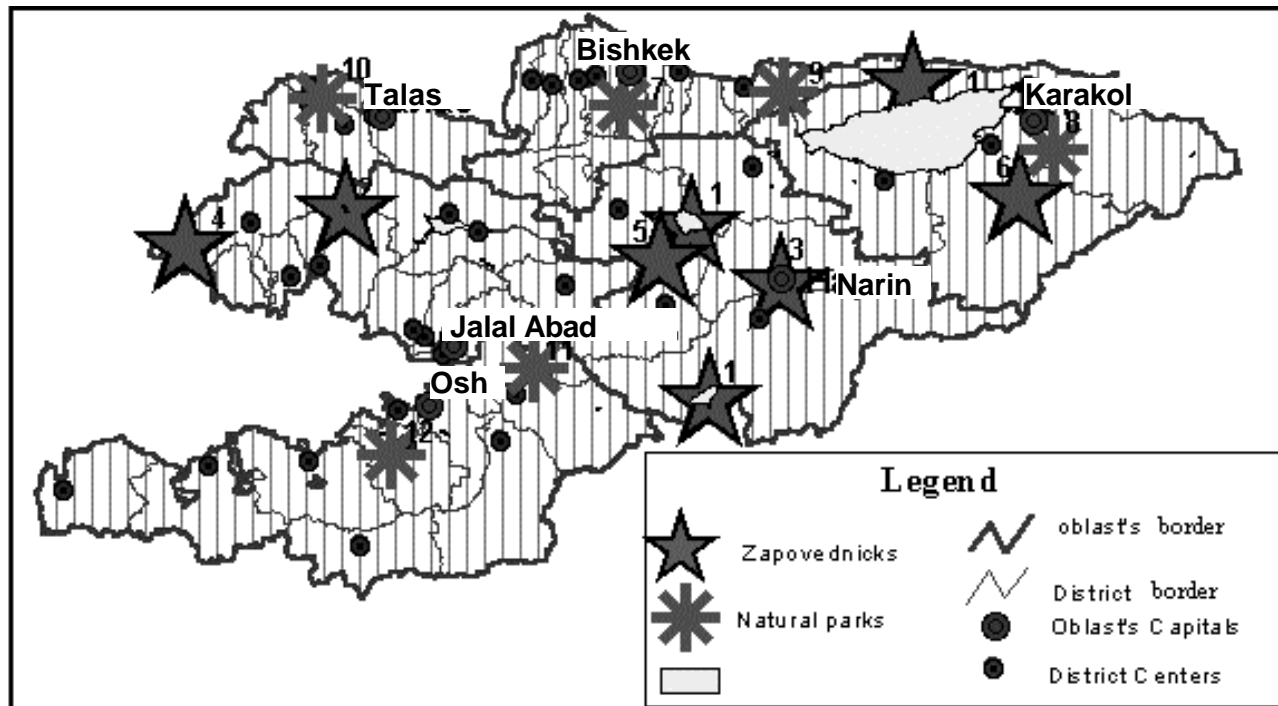
Biogeographical regions		Ecosystem classes			
A	South Kazakhstan	1	Spruce forest	12	Cryophilic steppe
B	North Tien Shan	2	Juniper forest	13	Cryophilic desert
C	Issyk-Kul	3	Broad-leafed forest	14	Mid-mountain meadow
D	Central Tien Shan	4	River forest (tugai)	15	Mid-mountain steppe
E	Inner Tien Shan	5	Small-leafed forest	16	Mid-mountain desert
F	West Tien Shan	6	Mid-mountain deciduous shrubland	17	Mountainous dry-farming land (bogara)
G	Ferghana	7	Mid-mountain pterophilic shrubland	18	Foothill steppe
H	Alai	8	Savannah	19	Foothill desert
		9	Almond and pistachio forest	20	Pterophilic lowland shrub
		10	Glacier and subglacier	21	Lakes and wetlands
		11	Cryophilic meadow	22	Cultivated land

Annex 2D. Floristic Regions Map of the Kyrgyz Republic



I	North Tien-Shan province	III	Central Tien Shan province	V	South-eastern Tien Shan province
A	Talas region	F	North Sary-Jas region	L	Chatkal region
B	Chui region	G	South Sary-Jas region	M	Ketmen-tebe region
C	Kemin region	N	Inner Tien Shan province	N	Fergana region
II	Issyk-Kul province	H	Syysamyr-Karakydjyr region	VI	Turkistan-Alay province
D	West Issyk-Kul region	I	Mid-Naryn region	P	Alay region
E	East Issyk-Kul region	J	Aksay Upper Naryn region	Q	Chon-Alay region
		K	Togus-Aktala region		

Annex 2E. Protected Areas Map of the Kyrgyz Republic



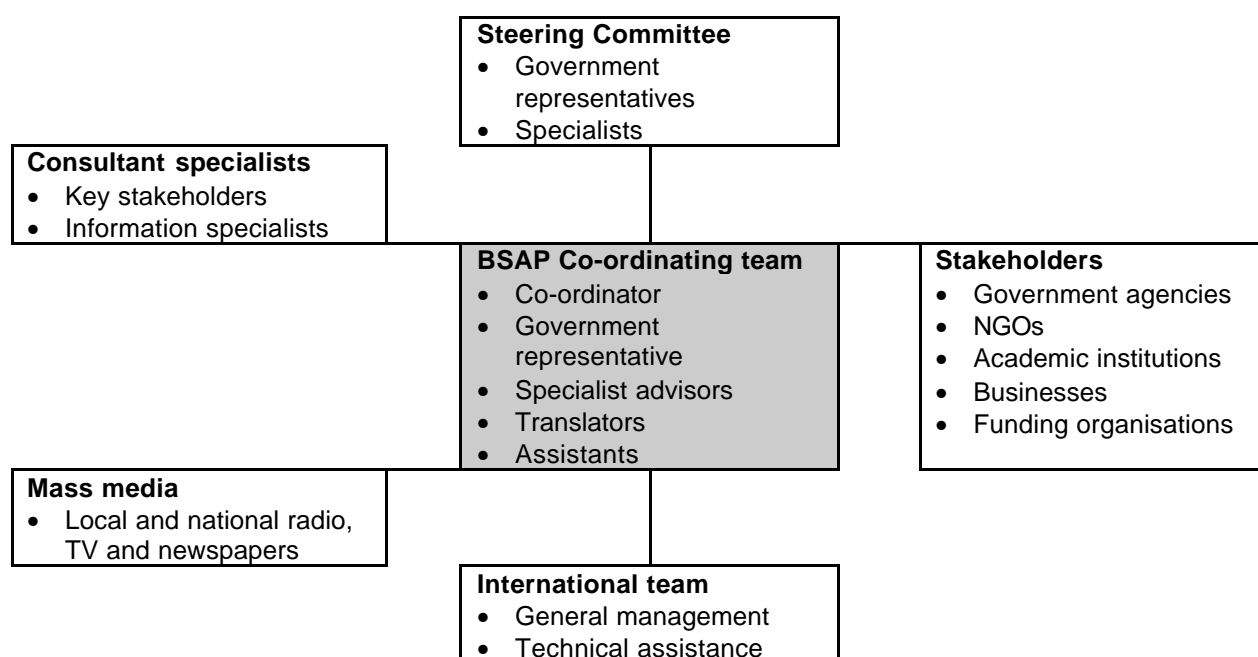
Zapovedniks	National parks
1. Issuk-kul	7. Ala-Archa
2. Sary Chelek	8. Karakol Natural park
3. Naryn	9. Kemin
4. Besh-Aral	10. Besh-Tash
5. Karatal-Japaryk	11. Karashoro
6. Sarychat-Ertash	12. Kyrgyz-Ata

Annex 3. The BSAP Preparation Process

The way in which the Biodiversity Strategy and Action Plan was prepared is important in understanding the context of the plan. The process was designed to fit in with procedures in the Kyrgyz Republic, and build on the experience of biodiversity planning in the country, regionally and internationally. The lessons learnt from the preparation of the BSAP have been incorporated into the design of the plan. It is important that the implementation of the BSAP builds upon the information, participation and experience developed during its preparation.

Process Management

The BSAP preparation process involved the management and co-ordination of the following groups:



BSAP Co-ordination Team

The BSAP co-ordination team formed the core focus for the preparation process. The team consisted of:

- **Co-ordinator.**
- **Government Representative:** A biodiversity and protected areas specialist from the Ministry of Environmental Protection.
- **Specialist Advisors:** Various specialists, including biodiversity, education and public awareness, and economics and institutions.
- **Translators and assistants:** Various specialists assisted the work of the other team members.

Steering Committee

The BSAP preparation process was overseen by the Steering Committee (SC). The SC was made up of senior representatives of key government agencies (Environment, Forestry, Finance), academic institutions, and NGOs. The SC was chaired by the Minister of Environmental Protection. The SC provided overall guidance, approval and political support for the key stages of the preparation process.

International Team

The Ministry of Environmental Protection invited the UK-based conservation NGO Fauna & Flora International (FFI) to provide general management and technical assistance to the BSAP preparation process. The three members of the FFI team worked with the BSAP co-ordinating team at all stages of the process.

Consultant Specialists

Over 50 specialist consultants were involved in the preparation of the BSAP. Most were involved for short periods of time to lend their skills and experience to the project. At various stages of the process, these consultants formed smaller working groups, to work together to look at different issues. However, due to the inter-disciplinary nature of the project, the focus was on maximum collaboration between as many different stakeholder groups as possible, rather than being confined to fixed working groups.

Stakeholders

Hundreds of individuals and organisations were involved in the preparation of the BSAP (see Annex 1). The range of stakeholders widened as the process continued, and stakeholders were encouraged to increase their level of participation (from being kept informed of progress, to taking the initiative themselves in planning and implementing activities). The national and far-reaching importance of the BSAP meant that many stakeholders had an input into the project as part of their job, rather than being employed specifically for the BSAP project.

Mass Media

Wide public awareness of the BSAP was an important part of the process. In particular this helped stakeholders participate in the process from an informed position, and widened awareness of biodiversity conservation issues in the Kyrgyz Republic. Representatives from mass media (TV, radio and newspapers) were encouraged to attend and even participate in many of the preparation activities. A national environmental public awareness programme (funded by the British government's Environmental Know How Fund) was run parallel to the BSAP preparation with guidance from FFI.

The Process

Stage 1: Preparation (Months 1-2)

- Recruit general project manager.
- Local consultation with Ministry of Environmental Protection and key stakeholders and specialists.
- Develop and agree work-plans.
- Develop and agree terms of reference.
- Recruit BSAP team (co-ordination team, national consultants).

Key outputs

- *Working procedures established.*
- *BSAP team established.*

Stage 2: Information Gathering and Evaluation (Months 3-4)

- Consultant briefing on BSAP and information needs.
- Preliminary information gathering.
- Planning and training workshop.
- Further information gathering.
- Public forums (Bishkek and Osh).
- Country study preparation.
- Country study distribution.
- Country study presentation forums (Bishkek and Osh).

Key outputs

- *Country Study produced.*
- *Increased stakeholder awareness and involvement.*

Stage 3: Action Planning (Months 5-9)

- Action planning workshop.
- Draft action plan production.
- Draft plan review and agreement.
- Final plan production.

Key outputs

- *Final plan produced.*
- *Wider stakeholder involvement.*

Stage 4: Implementation (Month 10 onwards)

- Draft plan launch.
- Financing search and allocation for actions.
- Establishment of BSAP co-ordinating mechanisms.
- Implementation of BSAP actions.

Key outputs

- *Start of implementation of BSAP actions.*
- *Co-ordination of implementation.*

Underlying Principles

Important principles for national biodiversity planning have been highlighted elsewhere (especially in 'National Biodiversity Planning: Guidelines based on early experiences around the world (WRI/UNEP/IUCN) and within various outputs related to the Convention on Biological Diversity). The underlying principles outlined below are those which were key to the preparation process in the Kyrgyz Republic.

Stakeholder participation

Stakeholder participation in the BSAP preparation is vital for a number of reasons:

- The implementation of the BSAP will affect and be affected by a wide range of institutions, policies and plans.
- An enormous range of groups will implement the plan. Their awareness, support and input to the preparation are essential.
- Although many people are stakeholders in biodiversity conservation, it is not a priority for many of them. Successful implementation of the plan relies upon goodwill, support and approval.
- Although the plan will become official government policy, there will be few mechanisms for enforcing the implementation of the plan.

Different levels of participation were appropriate for different groups, depending on:

- The importance of biodiversity to them.
- How much they could be involved in implementing the BSAP.
- The level of influence they could have on biodiversity conservation (positive or negative, financial, political, direct use, etc.).
- The scale of their activities (the BSAP is a *national* level plan, hence it was not necessarily appropriate for stakeholders at the international or local scale to have a high level of participation).
- Stakeholders' willingness to participate in the process.
- Available time and resources (although wider stakeholder participation was sometimes quicker and cheaper).

The BSAP preparation process was designed to accommodate the need for different levels of participation, but also to encourage stakeholders who started with a low level of participation to become more involved.

Planning as a process

The main output of the preparation process was the production of the Biodiversity Strategy and Action Plan. However, the main aim of the process was, ultimately, to improve biodiversity conservation in the Kyrgyz Republic, and hence produce a plan that would be implemented. Thus, an important aspect of the project was *how* it was produced, not only *what* was produced.

This meant that there was a continual balance to be struck between the quality of the *content* of the final plan, in terms of:

- Detail.
- Comprehensiveness.
- Accuracy.

And the quality of the *process* of its preparation, in terms of:

- Likelihood of implementation of actions.
- Stakeholder input into the process.
- Stakeholder ownership and consensus.
- Appropriateness of the actions.
- Awareness of the plan.

The quality of both process and content was often complementary, although there were times when one would inevitably compromise the other. For instance, the cost of producing a 'glossy', high quality version of the country study would mean that less could be produced, hence reducing the number of stakeholders who obtain a copy.

Building the capacity of existing institutions

The principle of building the capacity of existing institutions was critical in beginning to address a number of problems, including:

- Many of the formerly well-resourced institutions are suffering from the current problems resulting from the transitional political and economic situation.
- The changing situation has also meant that these institutions have high capacity in some areas (e.g. academic excellence), but are lacking in others (e.g. project cycle management skills).
- The limited financial resources available for biodiversity conservation means that the BSAP would be more effective if it focused on more efficient use of existing resources, rather than creating new institutions.
- The institutional sustainability of the BSAP would be ensured by building existing institutions.

This principle was applied to a number of activities in the process, including:

- Skills development (e.g. project cycle management, computer use, language, workshop facilitation. Furthermore, links between government and NGOs were developed).
- Network building (the excellent level of networking in the Soviet Union was partly re-established, e.g. the workshops enabled many protected areas managers to work together again for the first time since Soviet times).
- Ownership (stakeholders were encouraged to take active responsibility for all aspects of activities in the action plan, creating a sense of ownership of the BSAP).
- Using existing structures (e.g. ensuring that all actions in the BSAP were integrated with existing policies and legislation).
- Working language (the working language at all stages was Russian, and translations of key information into Kyrgyz were made available, although due to the international nature of aspects of the plan some information was required in English).
- External assistance (the international team, along with further external facilitation and advice, was made available in response to needs expressed by the national institutions involved, rather than dominating and dictating the direction of the process).

Flexibility

The principle of flexibility was applied at a number of scales in the process:

- The timetable and format of the process was adaptable to the changing situations as the project continued, especially as the needs of different of stakeholders were identified more clearly.
- Feedback from stakeholders was received continuously, and was an important part of this overall flexibility.
- The transitional nature of the Kyrgyz Republic's social, political and economic situation meant that the BSAP had to be designed to adapt as necessary to changes over the coming years.
- Flexibility was encouraged between stakeholders, as preparation of the plan often required conflict resolution and negotiation to deal with differing perspectives.

Annex 4. List of Endemic Species of Plants

Family **PINACEAE**

Abies semenovii B. Fedtsch.

Family **POACEAE**

Achnatherum saposhnikovii (Roshev.) Nevski

Stipa magnifica Junge

S. talassica Pazij

S. tianschanica Roshev.

S. alaica Pazij

S. breviflora Griseb.

S. bungeana Trin.

Puccinellia nudiflora (Hack.) Tzvel.

Festuca tschatkalica E. Alexeev

Littledalea alaica (Korsh.) V. Petrov ex Nevski

Family **ARACEAE**

Eminium regeli Vved. *Subendemic(SE)*

Family **LILIACEAE**

Eremurus alaicus Chalkuziev

E. zenaidae Vved.

E. zoae Vved.

Gagea talassica Levichev

G. toktogulii Levichev

G. rufidula Levichev

G. davlianidzeae Levichev

G. ferganica Levichev

G. michaelis Golosk.

G. circumplexa Vved.

Allium pskemense B. Fedtsch. *SE*

A. oreoscordum Vved.

A. jucundum Vved.

A. leptomorphum Vved.

A. alexandrae Vved.

A. semenovii Regel

A. glomeratum Prokh.

A. litvinovii Drob. ex Vved.

A. elegans Drob.

A. oreophiloides Regel

A. ferganicum Vved.

A. filidentiforme Vved.

A. viridiflorum Pobed.

A. dasyphyllum Vved.

A. dodecadontum Vved.

A. alaicum Vved.

A. altissimum Regel

A. gultschense B. Fedtsch.

A. saposhnikovii E. Nikit.

A. zergericum F.Khassanov et R.M.Fritsch

Tulipa affinis Z.Botsch. *SE*

T. greigii Regel *SE*

T. korolkovii Regel *SE*

T. rosea Vved. *SE*

T. ostrowskiana Regel *SE*

T. kolpakowskiana Regel *SE*

T. zenaidae Vved. *SE*

T. platystemon Vved.

T. ferganica Vved. *SE*

T. tetraphylla Regel *SE*

T. kaufmanniana Regel *SE*

T. subbiflora Vved.

T. dasystemonoides Vved.

T. neustrueviae Pobed.

Family **AMARYLLIDACEAE**

Ixiolirion ferganicum Kovalevsk. et Vved.

Ungernia ferganica Vved. ex Artjushenko

Family **IRIDACEAE**

Juno narynensis (O.Fedtsch.) Vved.

J. kuschakewiczii (B.Fedtsch.) Poljak.

J. zenaidae Vved.

Iridodictium kolpakowskianum (Regel)

Rodionenko *SE*

I. winkleri (Regel) Rodionenko

Family **CYPERACEAE**

Carex unguensis Litv.

Family **SANTALACEAE**

Thesium ferganense Bobr.

Family **POLYGONACEAE**

Calligonum calcareum Pavl.

C. santoanum Korov.

Polygonum atraphaxiforme Botsch. *SE*

Family **CHENOPODIACEAE**

Corispermum piliferum Iljin

Salsola flexuosa Botsch.

S. tianschanica Botsch.

S. roshevitzii Iljin

S. pachyphylla Botsch.

Halothamnus ferganensis Botsch.

Anabasis tianschanica Botsch.

Family **CARYOPHYLLACEAE**

Arenaria ferganica Schischk. *SE*

A. talassica Adyl. *SE*

Silene adenopetala Raik. *SE*

S. sussamyrica Lazkov

S. ladyginae Lazkov

S. schischkinii (M.Pop.) Vved.

S. obovata Schischk. *SE*

- S. fetissoyii* Lazkov
S. korshinskyi Schischk. *SE*
S. eviscosa Bondar. et Vved.
Melandrium fedtschenkoanum (Preobr.) Schischk.
Bolbosaponaria intricata (Franch.) Bondar. *SE*
Acanthophyllum coloratum Schischk.
A. paniculatum Regel et Herd. *SE*
A. gypsophiloides Regel *SE*
Family *RANUNCULACEAE*
Paraquilegia scabrifolia Pachom.
Paeonia hybrida Pall.
Delphinium keminense Pachom.
D. nikitinae Pachom.
D. knorringianum B.Fedtsch.
Aconitum angusticassidatum Steinb.
Pulsatilla kostyczewii (Korsh.) Juz.
Ranunculus ovczinnikovii Kovalevsk.
Family *BERBERIDACEAE*
Berberis kaschgarica Rupr. *SE*
Family *PARAVERACEAE*
Corydalis pseudoadunca M.Pop.
Roborowskia mira Batal. *SE*
Fumariola turkestanica Korsh.
Family *BRASSICACEAE*
Sisymbrium isfareense Vass. *SE*
Erysimum alaicum Novopokr. ex E.Nikit.
E. clausioides Botsch. et Vved.
Neuroloma tianschanicum (E.Nikit.) Botsch.
N. album (E.Nikit.) Pachom.
N. simulatrix (E.Nikit.) Botsch.
N. botschantzevii Pachom.
N. korovinii (A.Vassil.) Botsch.
N. pulvinatum (M.Pop.) Botsch.
Chorispora insignis Pachom.
Iskandera alaica (Korsh.) Botsch. et Vved.
Draba vvedenskyi Kovalevsk.
Subendorffia botschantzevii
R.Vinogradova
Family *CRASSULACEAE*
Sedum berunii Prato
Pseudosedum ferganense Boriss.
Rosularia schischkinii Boriss.
Family *SAXIFRAGACEAE*
Saxifraga vvedenskyi Abdullaeva
Family *ROSACEAE*
Sibiraea tianschanica Pojark.
Sorbaria olgae Zinserl.
Spiraeanthus schrenkianus Maxim. *SE*
Pyrus korshinskyi Litv. *SE*
P. regelii Rehd. *SE*
Malus niedzwetzkyana Dieck *SE*
Crataegus knorringiana Pojark.
C. ferganensis Pojark.
C. isfajramensis Pachom.
Amygdalus susakensis Vass.
Cerasus alaica Pojark.
Family *FABACEAE*
Sophora korolkovii Koehne
Ammopiptanthus nanus (M.Pop.) Cheng. fil.
Colutea brachyptera Sumn. *SE*
Caragana pruinosa Kom. *SE*
C. laetevirens Pojark. *SE*
Calophaca tianschanica (B.Fedtsch.) Boriss. *SE*
C. pskemica Gorbunova
Chesneya quinata Fed.
Ch. villosa (Boriss.) R.Kam. et R.Vinogradova
Astragalus aflatunensis B.Fedtsch.
A. kenkolensis B.Fedtsch.
A. fetissoyii B.Fedtsch.
A. imetensis Boriss.
A. litvinovianus Gontsch.
A. tianschanicus Bunge
A. merkensis R.Kam. et Kovalevsk.
A. korotkovae R.Kam. et Kovalevsk.
A. kirgisorum Gontsch.
A. devestitus Pazij et Vved.
A. lavrenkoi R.Kam.
A. duanensis Saposhn. ex Sumn.
A. caudicosus Galkina et Nabiev
A. bosbutooensis E.Nikit. et Sudn.
A. reverdattoanus Sumn.
A. dianthoides Boriss.
A. rarissimus M.Pop.
A. involutivus Sumn.
A. keminensis K.Isakov
A. kugartensis Boriss.
A. irisuensis Boriss.
A. isphairamicus B.Fedtsch.
A. infractus Sumn.
A. excelsior M.Pop.
A. allotricholobus Nabiev
A. sandalascensis E. Nikit.
A. dschangartensis Sumn.
Oxytropis masarensis Vass.
O. ruebsaamenii B.Fedtsch.
O. chantengriensis Vass.
O. transalaica Vass.
O. fedtschenkoana Vass.

- O. tschakalensis* L. Vassil.
O. aurea Vass.
O. arbaeviae Vass.
O. schachimardanica Filimonova
O. scabrida Gontsch.
O. susamyrensis B.Fedtsch.
Hedysarum krasnovii B.Fedtsch.
H. kirgisorum B.Fedtsch.
H. chaitocarpum Regel et Schmalh.
H. santalaschi B.Fedtsch.
H. turkestanicum Regel et Schmalh.
H. macrocarpum Korotk. ex Kovalevsk.
H. parvum B. Sultanova
H. acutifolium Bajt.
H. gypsaceum Korotk.
H. poncinsii Franch.
H. cumuschtanicum B.Sultanova
H. daraut-kurganicum B.Sultanova
H. narynense E.Nikit.
H. talassicum E.Nikit. et B.Sultanova
H. pulchrum E.Nikit.
H. enaffae B.Sultanova
H. setosum Vved.
Family RUTACEAE
Haplophyllum monadelphum Afan.
Family EUPHORBIACEAE
Andrachne pygmaea C.Koss.
Family THYMELAEACEAE
Stelleropsis issykkulensis Pobed.
S. tianschanica Pobed.
Restella albertii (Regel) Pobed.
Family APIACEAE
Schrenkia pulverulenta M.Pimen.
Aulacospermum tenuisectum Korov.
Prangos lipskyi Korov.
P. gyrocarpa Kuzmina
Bupleurum gulczense O. et B.Fedtsch.
B. rosulare Korov. ex M.Pimen.
 et *Sdobnina*
B. ferganense Lincz.
Elaeosticta ferganensis (Lipsky) Kljuykov,
 M.Pimen. et V.Tichomirov
E. knorringiana (Korov.) Korov.
Hyalolaena intermedia M.Pimen.
 et Kljuykov
Mogoltavia sewerzowii (Regel) Korov. *SE*
M. narynensis M.Pimen. et Kljuykov
Seseli eryngioides (Korov.) M.Pimen.
 et V.Tichomirov
S. korshinskyi (Schischk.) M.Pimen.
S. fasciculatum (Korov.) Korov.
 ex Schischk.
- S. unicaule* (Korov.) M.Pimen.
S. tenellum M.Pimen.
S. depauperatum (Schischk.)
 V.Vinogradova
S. giganteum Lipsky
S. luteolum M.Pimen.
S. valentinae M.Pop.
Ferula vicaria Korov.
F. korshinskyi Korov.
F. aitchisonii K.–Pol.
F. angustiloba M.Pimen.
F. czatkalensis M.Pimen.
F. lipskyi Korov.
F. minkwitzae Korov.
F. fedoroviorum M.Pimen.
F. subtilis Korov.
F. rubroarenosa Korov.
Dorema microcarpum Korov.
Pastinacopsis glacialis Golosk. *SE*
Family PRIMULACEAE
Primula eugeniae Fed.
Family LIMONIACEAE
Acantholimon compactum Korov. *SE*
A. alaicum Czerniak. ex Lincz.
A. alexandri Fed.
A. borodini Krasn.
A. karadarjense Lincz.
A. ruprechtii Bunge
A. langaricum O. et B.Fedtsch.
A. sackenii Bunge
A. knorringianum Lincz.
A. sarytavicum Lincz.
Ikonnikovia kaufmanniana (Regel)
 Lincz. *SE*
Limonium kaschgaricum (Rupr.) Ik.–Gal.
L. hoeltzeri (Regel) Ik.–Gal.
L. tianschanicum Lincz.
Gentiana susamyrensis Pachom.
G. transalaica Pachom. et Tajdshan.
G. saposchnikovii Pachom.
Family CONVULVULACEAE
Convolvulus krauseanus Regel et
 Schmalh. *SE*
C. grigorjevii R.Kam.
Family LAMIACEAE
Scutellaria nepetoides M.Pop. ex Juz.
S. urticifolia Juz. et Vved.
S. knorringiae Juz.
S. xanthosiphon Juz.
S. kugarti Juz.
S. popovii Vved.
S. lanipes Juz.

- S. toguztoraviensis* Juz.
S. andrachnoides Vved.
Nepeta pseudokokanica Pojark.
Phlomis cephalariaifolia (M.Pop.) Adyl.,
 R.Kam. et Machmedov
Ph. korovinii (M.Pop.) Adyl.,
 R.Kam. et Machmedov
Ph. ferganensis (M.Pop.) Adyl.,
 R.Kam. et Machmedov
Ph. tythaster (Vved.) Adyl.,
 R.Kam. et Machmedov
Ph. urodonta (M.Pop.) Adyl.,
 R.Kam. et Machmedov
Ph. knorringiana (M.Pop.) Adyl.,
 R.Kam. et Machmedov
Phlomis hypoleuca Vved.
Ph. drobovii M.Pop. et Vved.
Alajja anomala (Juz.) Ikonn.
Lagochilus drobovii R.Kam.
 et Zuckerwanik
L. turkestanicus Knorr.
Otostegia schennikovii V.Scharaschova
O. nikitinae V. Scharaschova
Salvia korolkowii Regel et Schmalh. *SE*
S. vvedenskyi E.Nikit.
S. schmalhauseni Regel
Ziziphora vichodceviana V.Tkatsch.
 ex Tuljaganova
 Family **SOLANACEAE**
Physochlaina alaica E.Korot.
 Family **BORAGINACEAE**
Arnebia paucisetosa A. Li
Onosma azurea Schipcz.
O. brevopilosa Schischk. ex M.Pop.
O. ferganense M.Pop.
O. trachycarpa Levin.
Lepechiniella ferganensis M.Pop.
Lappula physacantha Golosk.
L. ulacholica M.Pop.
Stephanocaryum popovii R.Kam.
Tianschaniella umbellifera B.Fedtsch.
 ex M.Pop.
Rindera tschotkalensis M.Pop.
R. ferganica M.Pop.
R. oschensis M.Pop.
R. glabrata Pazij
 Family **SCROPHULARIACEAE**
Linaria fedorovii R.Kam.
L. saposhnikovii E.Nikit.
L. alaica Junussov
Nathaliella alaica B.Fedtsch.
Euphrasia macrocalyx Juz.
Pedicularis tianschanica Rupr.
P. gypsicola Vved.
P. alaica A. Li
 Family **BIGNONIACEAE**
Incarvillea olgae Regel *SE*
Asperula botschantzevii Pachom.
Lonicera anisotricha Bondar.
L. paradoxa Pojark.
 Family **CAMPANULACEAE**
Campanula eugeniae Fed.
Ostrovskia magnifica Regel
 Family **ASTERACEAE**
Chondrilla ornata Iljin
Lactuca alaica Kovalevsk.
Kovalevskiella kovalevskiana (Kirp.)
 R.Kam.
Sonchus longifolius (C.Winkl.) R.Kam.
Taraxacum alpigenum Dshanaeva
T. syrtorum Dshanaeva
T. heptapotamicum Schischk.
T. alaicum Schischk.
T. oschense Schischk.
T. promontorium Dshanaeva
Echinops fastigiatus R.Kam.
 et Tscherneva
Olgaea vvedenskyi Iljin
O. longifolia (C.Winkl.) Iljin
O. spinifera Iljin
Lamyropappus schakaptaricus
 (B.Fedtsch.) Knorr. et Tamamsch.
Hypacanthium echinopifolium
 (Bornm.) Juz.
Cousinia pentacantha Regel et Schmalh.
C. abolinii Kult. ex Tscherneva
C. korshinskyi C.Winkl.
C. caespitosa C.Winkl.
C. tamarae Juz.
C. omphalodes Tscherneva
C. waldheimiana Bornm.
C. margaritae Kult.
C. jassyensis C.Winkl.
C. carduncelloidea Regel et Schmalh.
C. knorringiae Bornm.
C. schischkinii Juz.
C. stellaris Bornm.
C. gulczensis Kult.
C. laniceps Juz.
C. subappendiculata Kult.
Saussurea involucrata (Kar. et Kir.)
 Sch. Bip.
S. karaartscha Saposhn.
S. alberti Regel et C.Winkl.

S. schachimardanica R.Kam.
Jurinea macranthodia Iljin
J. schachimardanica Iljin
J. abolinii Iljin
J. stenophylla Iljin
J. caespitans Iljin
J. androssovii Iljin
J. trifurcata Iljin
J. densisquamea Iljin
J. nivea C.Winkl.
J. grumosa Iljin
J. poacea Iljin
Rhaponticum aulieatense Iljin
Rh. namanganicum Iljin
Rh. lyratum C.Winkl. ex Iljin
Centaurea alaica Iljin
Serratula aphyllopoda Iljin
Pseudolinosyris microcephala (Novopokr.)
Tamamsch.
Asterothamnus schischkinii Tamamsch.
Aster tolmateshevii Tamamsch.
Tanacetopsis korovinii Kovalevsk.

T. setacea (Regel et Schmalh.)
Kovalevsk.
T. ferganensis (Kovalevsk.) Kovalevsk.
Cancrinia tianschanica (Krasch.) Tzvel.
Artemisia saposchnikovii Krasch.
ex Poljak.
A. knorringiana Krasch.
A. nigricans Filat. et Ladygina
Brachanthemum kirgisorum Krasch.
Ajania korovinii Kovalevsk.
A. abolinii Kovalevsk.
Pseudoglossanthis aulieatensis
(B. Fedtsch.) Poljak.
Trichanthesis aurea Krasch.
T. paradoxos (C. Winkl.) Tzvel.
Ugamia angrenica (Krasch.) Tzvel. SE
Pyrethrum mikeschinskii Tzvel.
P. kovalevskiae Ikonn.
P. leontopodium (C. Winkl.) Tzvel.
P. sovetkinae Kovalevsk.
P. brachanthemoides R.Kam. et Lazkov
Lepidolopha komarowii C. Winkl. SE