DEVELOPING A COMPREHENSIVE CONSERVATION PROGRAM

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None of the threats to Bulgaria's biological diversity can be easily addressed. Complex socioeconomic and environmental forces lie behind them; complex effects issue from them. Neither, in most cases, do the threats act in isolation. In most ecosystems, various threats interact and diminish the ability of species and communities to perpetuate themselves. No single action, it follows, will be able to prevent future losses of biological diversity. To address the many threats to biodiversity in a coordinated and mutually reinforcing manner, a comprehensive conservation program, entailing a wide variety of activities, is needed.

Such a program will need to include many components, from legislative reform and environmental education to biodiversity research and ecosystem restoration. It must encourage and build on actions undertaken at the local level, and involve all those who have a stake in the future of Bulgaria's biological diversity -- farmers and students, land managers and agency officials, recreationists and educators, scientists, advocates, and decision makers. People from many backgrounds, with a wide range of talents, will need to contribute to this program if it is to succeed.

In laying out this new conservation program, recognition should be given to past efforts to protect biological diversity and manage biological resources. Over the last 100 years forest management has allowed Bulgaria to retain and restore a high proportion of its forest cover (especially when compared with other European countries). The existing network of protected areas has succeeded in preserving critically important lands. These previous accomplishments provide a solid foundation on which to build integrated resource management programs that conserve specific biological resources while protecting and restoring biological diversity more generally.

In each of the areas discussed in this chapter, recommendations are offered that emerged in discussions at the National Biological Diversity Conservation Strategy workshop. (Many more specific recommendations were offered by the participants, and are included in the papers from the workshop.) In formulating these recommendations, workshop participants agreed to employ two overriding criteria: these actions are both *urgently needed* and largely *achievable*

with existing institutions, financial resources, and personnel. International support will be needed to carry out fully some of these recommended actions, but most can be initiated, developed, and implemented domestically.

Land and Resource Management

The key to conserving biological diversity in Bulgaria is the adoption of an approach to land and resource management that recognizes the value of retaining and restoring diversity at all scales, on both reserved and nonreserved lands, and under various management regimes. Protected areas are, of course, special repositories of biological diversity and other unique natural features, and strengthening the national system of protected areas is essential. Protected areas exist, however, as components within a broader landscape. The recommendations offered under this category stress the need to better integrate the management of all land, water, and biological resources in order to protect and renew the ecological processes on which biological diversity depends (see Box 9).

Protected Areas

Historically, protected areas have been established to safeguard areas of special biological, aesthetic, and cultural value. The network of protected areas remains the foundation of the nation's biodiversity conservation strategy, but it has many biological gaps and administrative shortcomings. At the NBDCS workshop, participants frequently mentioned several overarching concerns.

- Administrative and jurisdictional responsibilities for managing the protected areas need to be clarified and better coordinated, and management requirements for the different categories of protected areas need to be defined.

- A number of biologically critical areas are not included within the existing system, while several typical ecosystems are inadequately represented. Secondary plant communities are underrepresented. In addition, the network contains many small or isolated reserves that require more effective management to protect their biological diversity.

- Administration of the nature reserves, national parks, and important natural landmarks and protected sites needs to be strengthened, especially as regards law enforcement and land management. Meaningful management plans have been developed for only a few of these protected areas, and enforcement of restrictions within the reserves is inadequate. Many reserves are not staffed at all. Management experience and professional training opportunities are lacking within the system as a whole.

- Scientific information and research programs (especially inventory and monitoring programs) for the protected areas are inadequate.

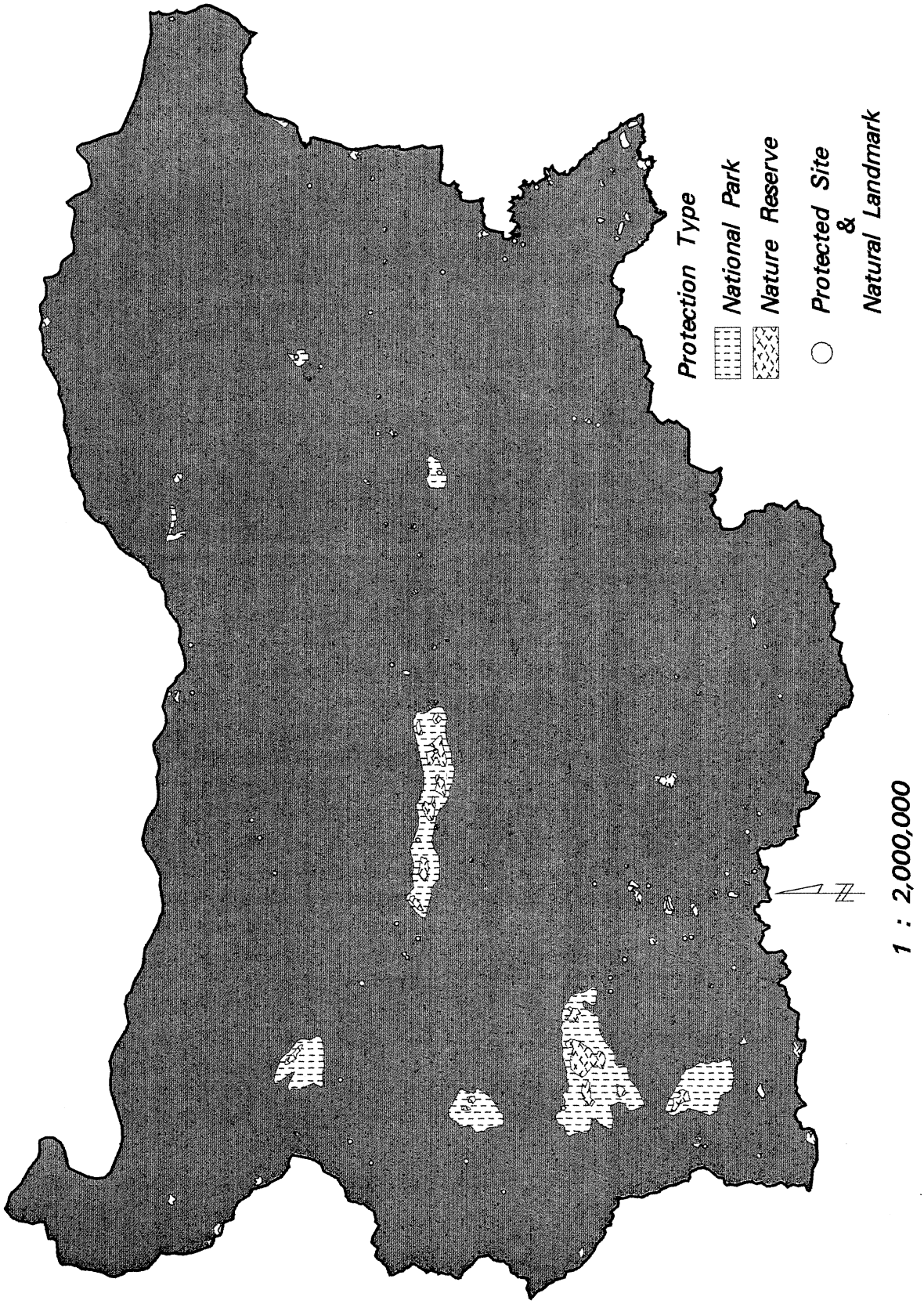
- Public interest in the protected areas as repositories of biological diversity is lacking, as is strong legislative support for the needed reforms.

- Information about the existing protected areas network needs to be made more available, and public education and interpretation programs need to be improved.

- Funds to strengthen the protected areas network have been lacking.

Despite these problems, the system of protected areas has succeeded in safeguarding many important sites and representative areas. The reform and improvement of the network will be one of the most critical components of the NBDCS in the years ahead.

Plans to expand the system of protected areas are advancing. The MOE, for example, has established a goal of designating 7.5 percent to 8.0 percent of the nation's territory in protected areas by the year 2000. Several NGOs have



MAP 6. EXISTING PROTECTED AREAS (100 OR MORE HECTARES)

developed detailed proposals for improving the network. The participants in the NBDCS workshop offered over a hundred recommendations for additional protected areas. These varied from general suggestions (to create, for example, a new national park in the Rhodope Mountains) to highly detailed proposals for new protected sites important for various taxonomic groups. Many other specific proposals for expanding and strengthening the network were offered, while the gap analysis procedure using geographic information system technology has provided an initial filter by which to identify "missing pieces" in the network (see Map 7). Map 7 synthesizes data from the species richness, endemic and rare species assessments, uses this data to rank areas according to their importance (low, medium, high), and overlays the map of existing protected areas of 100 or more hectares. (See Appendix D for a graphic representation of this process.) This procedure identifies areas of high importance for future protection efforts. At the same time, Map 7 should be considered preliminary; refinement of the gap analysis should proceed along with further discussions for strengthening the protected areas network.

The NBDCS workshop was not designed to reach consensus on specific boundaries for new protected areas, but it did lay the foundation for further discussion and agreement. High-priority regions for considering future protected areas include

- the Rhodope Mountains;
- the eastern Stara Planina Mountains;
- the Black Sea coast;
- Strandzha Mountain;
- the Strouma River valley; and
- smaller areas surrounding and connecting the existing national parks of the Rila, Pirin, Vitosha, and Stara Planina mountains.

Plans for improving the administration of the protected areas network are also advancing. A new protected areas act is being developed that will include general provisions for improving the system as well as specific requirements for managing the different categories of protected areas. As of April 1994, this act has been approved by the Council of Ministers and is awaiting further action in the Commission on the Environment of the Parliament. The creation of the new National Nature Protection Service also provides opportunities to strengthen protected areas administration within the MOE, and to better coordinate interagency management activities. New funding sources are being tapped to support expanded opportunities for planning and enforcement, training of personnel, scientific research, and public education. Finally, Bulgaria is participating in the development of the *Action Plan for Protected Areas in Europe*, which provides guidance on protected area management for policy makers and administrators under the auspices of the World Conservation Union.

Immediate steps should be taken to advance these efforts, and further discussions held to consider in greater detail the many proposals for expanding the network of protected areas and for improving administration (see "Priorities for Immediate Action and Support" later). In this process, actions should be taken to address the following specific recommendations.

Recommendations

- Evaluate the effectiveness of the existing network of protected areas and establish new areas as needed to protect key habitats across the country.
- Employ emerging principles of conservation biology and landscape ecology to redesign reserves where necessary, to designate effective buffer zones, and to connect and coordinate reserves at the broader landscape scale.

MAP 7. INITIAL GAP ANALYSIS

"Map synthesizes data from the species richness, endemic and rare species assessments, uses this data to rank areas according to their importance (low, medium, high), and overlays existing protected areas of 100 or more hectares to reveal those areas of importance not under any type of protection."

- Adopt standardized habitat description and classification systems that are in harmony with those used in other European countries.

- Institute a program of long-term biodiversity research and monitoring within the protected areas. Studies undertaken under this program should provide information on issues related to reserve management and biodiversity protection, and should be coordinated to build a comprehensive, accessible data base.

- Strengthen the management and enforcement capability in protected areas and national parks to ensure protection of important species and communities. In particular, opportunities for training reserve personnel are needed.

- Finance improvements in managing protected areas by establishing a Nature Protection Fund. The fund should serve to reinvest revenues from new sources (e.g., user and visitor fees, debt-for-nature agreements, and ecotourism facilities) in conservation activities.

- Develop innovative partnership programs to improve the administration of parks and other protected areas.

- Provide the public and government officials with more information about the protected areas network as a whole -- the existing reserves, their role in conserving the nation's biodiversity, management guidelines and regulations, and opportunities for public involvement. Specifically, a directory of protected areas should be published and distributed to all government agencies.

- Provide opportunities for better public understanding of the individual protected areas through expanded education and interpretation programs.

Nonreserved Lands

Protected areas will be able to safeguard only a small fraction of Bulgaria's land base. Even if the goal of including 7.5 percent of the country's land base in protected areas is met, the network will still be able to protect only a small portion of the nation's biological diversity. Furthermore, the fate of protected areas and of the biological diversity they support is influenced to a great degree by their geographical context -- the broader landscape in which they exist. Retention and restoration of biodiversity are also important to the sustainable management of croplands, pastures, commercial forests, and other lands devoted primarily to economic uses, as well as aquatic ecosystems and the fisheries they support. Finally, even lands whose biological diversity has been depleted or displaced retain value for conservation purposes, including habitat restoration, watershed protection, and buffer zone management. For these reasons, greater attention must be paid to the management of lands beyond the protected areas, especially those that are soon to be returned to private or municipal ownership. To promote conservation on nonreserved lands, the following actions are recommended.

Recommendations

- Establish incentive programs to involve individual citizens and private landowners in conserving important remaining resources and habitats and restoring degraded habitats.

- Develop, as a high priority, a coordinated program of incentives, information, technology dissemination, and management guidelines to address the need for rehabilitation of contaminated agricultural lands.

- Encourage closer collaboration between agricultural programs and biodiversity conservation programs, especially to promote the preservation of rare breeds, local varieties,

Box 9. Integrating Resource Management in Bulgaria

In Bulgaria, as in other countries, the management of natural resources has traditionally been divided along well-defined disciplinary and departmental lines. Training, research, and administration in agriculture, forestry, game and fisheries management, natural areas management, tourism and recreational development, civil engineering, resource policy and economics, education, urban and regional planning, and other fields have tended to obscure the fact that all of these are interrelated and exist within a unified spatial context (be it a municipality, watershed, landscape, or other geographic unit). As a result, conservation activities have usually focused on particular resources, projects, or reforms in isolation, and overlooked the need for coordination.

Because biological diversity serves as a common denominator for many different fields, and because many professions affect the status and fate of biological diversity within the landscape, conservation efforts must begin to bring specialists together and to build connections between them. The NBDCS workshop itself was designed to incorporate expertise from diverse fields and to include a broad range of scientists, officials, and NGO representatives. This openness will continue to be a vital part of the strategy process. To protect and manage biological diversity, biologists, educators, administrators, foresters, farmers, other land managers, NGO representatives, and other citizens will need to share their own expertise and draw on the expertise of others. Because such collaboration often runs counter to prevailing administrative procedures, new modes of collaboration will need to emerge.

Bulgaria is well positioned to take such steps. Because it is a relatively small country and its institutions are accustomed to working with one another, the foundations for such integration already exist. The Bulgarian Academy of Sciences has long served as an important unifying force in the sciences, especially as they relate to environmental issues. Furthermore, as political reforms have taken hold, they have opened up the organizational structure of the government and presented new opportunities to coordinate conservation planning. As reforms continue, all sectors should seek opportunities for cooperation and integration.

and wild relatives of domestic crops and fruit trees.

- To protect the biological diversity of aquatic systems, which will only rarely be included in protected areas: take steps to regulate fishing methods and catch levels; control pollution, especially through international agreements; encourage adoption of sustainable agriculture methods; control urban runoff; protect stream corridors; and limit construction in and near waterways.

- To protect the natural and cultural features of the Bulgarian Black Sea coast, state agencies, municipalities, private businesses, and nongovernmental organizations should be involved in, and support, efforts to develop and implement an integrated coastal zone management program.

- Require modified benefit-cost analyses and environmental impact assessments for dams, highways, and other major land use and construction projects.

- Adjust national economic policies, including tax rates, subsidies, incentives, and fees, to discourage destruction of habitats, and to promote sustainable land use practices.

Sustainable Resource Management

The management of economically important species, habitat types, and soil and water resources has far-reaching effects not only on the resources in question, but also on other members of the biotic communities in which they occur. In Bulgaria, these economically important resources include timber trees, edible fungi, medicinal plants, game animals, Black Sea and

freshwater fish, and crop and pasturelands. To ensure that these biophysical and biological resources are managed in a more sustainable manner, the following steps should be taken.

Recommendations

- Develop new laws to regulate the use of species for domestic trade and export, and establish new regulations, based on the most current knowledge and concepts in resource management, to adjust the level at which species are taken for commercial or recreational use.

- Improve the state of Bulgaria's fisheries through ecologically based management practices. Unilateral actions should be taken to protect the Black Sea's pelagic, littoral, and coastal communities from pollution, overexploitation, development, and oil and gas exploration. These actions should include the establishment of protected zones, restrictions on detrimental construction projects, enforcement of existing prohibitions on bottom trawling, improved monitoring of pollution, controls on introducing nonindigenous fish species, and the restoration of degraded areas. The development, improvement, and adaptation of mariculture and aquaculture facilities should be considered as an option for recovering stocks of indigenous commercial species such as mussels (*Mytilus galloprovincialis*), mullets (Mugilidae), and turbot (*Psetta maxima moeotica*), but such measures should be based on an integrated understanding of the genetic diversity, population ecology, and ecological needs and roles of these species. In addition to these unilateral actions, region-wide efforts to regulate commercial fishing, monitor and control pollution, and improve land use practices in the Black Sea watershed should be intensified.

- Review the status of biological diversity in Bulgaria's forests and the effect of historic and current forest management practices -- including silvicultural treatments, reforestation planning procedures, pest control, and harvesting methods -- on species composition and ecosystem functions. This review should involve a wide range of forest experts, including ecologists, other biologists, economists, and administrators. It should cover both protected and unprotected forestlands, and should explicitly consider the externalized costs of current management practices and the status of biological diversity within a landscape context (i.e., at scales larger than the individual forest stand). This review should make recommendations to place forest management on a sustainable basis, with full consideration given to the role of biological diversity in the healthy functioning of forest ecosystems. Finally, the review process should analyze the effects of current economic policies on the forests and explore alternative policies that enhance forest conservation, taking into account the value of nontimber forest products and the ecological services that forests provide.

- Promote a balanced system of wildlife management that protects, restores, and maintains populations of indigenous species and subspecies; serves to conserve nongame as well as game species (including invertebrate animals and plants); and integrates wildlife management practices with other resource management methods to maintain healthy ecosystems and communities.

- Stimulate the adoption of sustainable agricultural systems and practices -- including integrated pest and nutrient management, crop diversification, crop rotations, soil conservation techniques, improved pasture management practices, wildlife habitat restoration, and the cultivation of rare crop varieties and landraces -- through educational programs, economic incentives, and the removal of perverse policy incentives (see

Box 10. Economic Incentives for Conservation

Bulgaria's shift from a centralized command economy to a market economy holds great potential for improving environmental conditions. Under the former regime, the state-run monopolies did not encourage innovation or efficiency, and public access to information and technologies was limited. These conditions are now changing rapidly and could have positive effects on conservation. However, there is no guarantee that efforts to conserve biological diversity will be rewarded under a free market system. To protect and promote the public interest in biodiversity conservation, market reforms must be coordinated with other institutional changes, and government policies must reflect these needs.

One method of accomplishing this is to establish a system of incentives to conserve biological diversity and disincentives to discourage its degradation. In addition, perverse government incentives that encourage overexploitation of natural resources should be removed. Under socialism, prices for natural resources were kept artificially low to boost industrialization, leading to high depletion rates and inefficient use of resources. Energy-intensive heavy industries were also promoted under socialism, with little regard for the high levels of pollution they produced. By liberalizing most prices, Bulgaria has removed some of these perverse incentives.

Incentives and disincentives are not exclusively economic in nature. Some incentives may take advantage of social needs and values. To conserve a natural area rich in biological diversity, local people need to be convinced that wise stewardship of the area is in their best interest. In Bulgaria this is especially important, since financial resources for park maintenance and protection are scarce. In this case, incentives for the local people may not only include revenues from tourism, but employment opportunities in or near the parks and easy access to important natural features. It is important, in such circumstances, that local people be closely involved in the planning and decision-making process.

Other examples of conservation incentives include tax credits for private owners who conserve biological diversity or endangered species; access to credit for industries that use pollution control devices and sponsor conservation activities; credit for farmers who adopt sustainable agriculture practices; tax allowances for companies that invest in environmentally friendly technologies; and tax exemptions for private landowners who work with or through NGOs in advancing conservation on their lands. International incentives can play an important role through, for example, encouraging energy conservation and improvements in public transportation systems. Debt-for-nature swaps (see Box 12) can also be considered a form of international incentive. They also illustrate the point that incentives can be initiated not only by the government, but also by private organizations. Fines for destroying or harming endangered species are a form of disincentive. More effective use of these and other types of incentives and disincentives should be considered as part of a national effort to encourage more efficient use of resources.

Boxes 8 and 10). This effort should also include diversification of seeds and seedling materials, protection of soil-improving pasture species, restoration of damaged agricultural lands, and appropriate controls on the use of fertilizers and pesticides.

- Include, in all efforts to strengthen controls on pollution sources, explicit reference to the need to prevent further degradation of biological resources. Similarly, all efforts to mitigate the effects of past pollution should entail, as an explicit goal, the restoration of biological diversity and productivity.

Habitat Restoration

Extensive areas of Bulgaria -- especially wetlands, forests, lands supporting intensive crop agriculture, pastures, riparian zones, and industrial zones -- have been degraded or even destroyed in the past by unwise management prac-

tices. To restore biological diversity, vitality, and productivity to these lands, greater investments of time, labor, skill, and knowledge are required. This emphasis is in keeping with the provisions of the Convention on Biological Diversity, which directs signatory countries to take measures to rehabilitate and restore ecosystems and to promote the recovery of threatened species. The convention further stipulates that such measures must involve assistance to, and the participation of, local citizens.

The science and practice of restoration ecology is still quite new in Bulgaria. The government has undertaken several specific reintroduction and restoration projects (for example, the reintroduction of *Lynx lynx,* which was extirpated from Bulgaria). Other conservation activities, such as measures to reverse eutrophication of water bodies and to reforest deforested lands, also entail restoration. These projects, however, have not had as their overriding goal the restoration of biological diversity and ecosystem processes, nor have they been undertaken in a coordinated fashion with coherent and consistent goals, or with objectives and methods tailored to local circumstances. There is, for example, no national plan for protecting and restoring the remnants of the Danube floodplain forests, native steppes, or other especially rare plant communities in agricultural zones. There are signs, however, of growing interest in restoration. For example, the MOE, with the assistance of the French government and the RAMSAR Convention Bureau, has recently developed a national wetlands restoration plan, *Plan National D'actions Prioritaires de Conservation des Zones Humides les Plus Importantes de Bulgarie.*

As restoration becomes a more important component of conservation in Bulgaria, scientists, agency officials, and resource managers can benefit from the recent surge of interest and research in restoration ecology in other countries. At the same time, restoration in Bulgaria will need to reflect the country's inherent possibilities and limitations. Human settlement has altered the landscape of Bulgaria over the course of several millennia; hence, restoration will have different aims than in other, more recently developed nations. It may not be possible, for example, to restore certain elements of the native biota, or to recreate whole natural communities. Nonetheless, restoration can ameliorate past environmental abuses, improve the condition of common as well as critical habitats, open new avenues of research, provide important educational opportunities, and stimulate individual and community involvement in conservation.

The following recommendations are intended to provide the basis for more active restoration work in the future.

Recommendations

- Conduct a national-level workshop to explore current concepts in restoration ecology and to clarify their application in the Bulgarian context.

- Provide support and encouragement for nongovernmental organizations that assume a greater role in developing and implementing restoration projects at the community or municipal level.

- Establish economic incentives to provide local benefits for restoration projects.

- Promote scientific research on restoration methods appropriate to different types of degraded lands and aquatic systems.

- Develop new and existing seed banks, nurseries, and other genetic sources (both *in situ* and *ex situ*) to ensure that necessary amounts of seeds and seedling materials are available for restoration.

- Work with neighboring countries to restore ecological processes within trans-boundary habitats and ecosystems, including the Danube River and the Black Sea.

- Develop partnerships with restoration ecologists in other nations outside the region to take advantage of existing information and knowledge on restoration concepts, methods, and goals. Opportunities for exposure to and dissemination of research results, management techniques, and concepts of restoration from other ecological settings should be sought.

Ex Situ Conservation

This strategy focuses primarily on *in situ* conservation measures -- that is, the protection, restoration, and management of biological diversity within natural habitats and communities. However, measures should also be taken to create, expand, and strengthen *ex situ* conservation activities in Bulgaria. *Ex situ* facilities, such as seed banks, experimental farms, aquacultural structures, captive propagation centers, and other types of breeding, research, and educational facilities (including herbaria, arboreta, aquaria, botanical gardens, zoos, and museums), are needed to bolster and complement *in situ* conservation programs. Attention should focus initially on the need to protect threatened taxa unique to Bulgaria or potentially important as germplasm sources. These latter resources include fruit trees, forest trees, medicinal plants, edible fungi, grape varieties, pasture grasses and legumes, cereal crops, and rare livestock breeds. At the same time, the facilities for basic research -- especially herbaria, museums, and the national seed bank at the National Institute for Plant Genetic Resources at Sodovo -- need to be assessed and their long-term needs defined.

Activities undertaken through *ex situ* programs should not be limited to protection, storage, and propagation. They should be integrated into the broader conservation strategy and support appropriate commercial development (of, for example, medicinal plants), sustainable agriculture and fisheries management, public education, and reintroduction and ecological restoration projects. This may entail redefining the goals of existing *ex situ* institutions and programs, such as those administered by the National Institute for Plant Genetic Resources and the Committee of Forests. While a fuller examination and assessment of *ex situ* conservation needs is required, the following recommendations can be made based on information provided at the NBDCS workshop.

Recommendations

- Develop *ex situ* programs and facilities for the propagation of medicinal plants and other wild plants and animals that are currently threatened or overexploited in their natural habitats. The initial step in this process should be an assessment of the priorities for *ex situ* management and of the potential for reintroduction and reestablishment of wild populations.

- Strengthen the national program for conservation of local plant varieties (including their wild progenitors), and for the protection of plant materials, building on the existing repository at the National Institute for Plant Genetic Resources.

- Develop a program to encourage farmers, gardeners, and conservationists to protect and to cultivate in *ex situ* settings typical local plant varieties. This should include, if necessary, economic incentives, including subsidies or tax exemptions, for farmers who wish to grow local crop varieties.

- Expand opportunities for Bulgarian biologists to participate in existing international, regional, and bilateral *ex situ* conservation programs (including, for example, those of the International Agricultural Research Centers, the European Cooperative Program for Plant Genetic Resources, and the United Nations Food and Agriculture Organization's [FAO] Committee for Plant Genetic Resources).

Box 11. International Treaties and Agreements

Bulgaria is, or is likely to become, a signatory to many international treaties and agreements that affect biodiversity conservation within the country. The special significance of international agreements in Bulgaria derives from Article 5(4) of the 1991 constitution, which states that "[a]ny international instruments which have been ratified by the constitutionally established procedure, promulgated and come into force with respect to the country of Bulgaria, shall be considered part of the domestic legislation of the country. They shall supersede any domestic legislation stipulating otherwise." Recent court rulings in Bulgaria have held that this provision applies only to treaties ratified after the 1991 constitution, and have stipulated that treaties must be ratified *and* published in the *State Gazette* before they acquire the status of domestic law. Nonbinding agreements, in contrast to binding treaties, do not fall under this provision, although they can have, and in practice have had, considerable influence on domestic legislation. Among the most significant agreements, including their current status in Bulgaria, are

- The Convention on Biological Diversity: signed but not yet ratified or published.
- The Framework Convention on Climate Change: signed, ratification pending.
- The Nonlegally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation, and Sustainable Development of All Types of Forests (Rio Forest Principles): signed, nonbinding agreement.
- The Convention on Wetlands of International Importance (RAMSAR), Especially Waterfowl Habitat: signed, ratified, and published.
- The Convention on International Trade in Endangered Species (CITES): signed, ratified, and published.
- The Convention for the Protection of the World Cultural and Natural Heritage (World Heritage Convention): signed and ratified, with one reservation, not yet published.

(CONTINUED ON PAGE 49)

Legislative Initiatives and International Agreements

Law is an essential tool for ensuring that public policy and governmental actions accurately and consistently reflect scientific information, public opinion, and social values. New laws, revisions to existing laws, and the ratification and implementation of international agreements will be needed to attain the goals of the NBDCS.

International agreements provide important and useful tools for protecting biological resources and diversity within Bulgaria. Although they often lack firm enforcement provisions, these agreements define and advance international standards, encourage the exchange of information, and offer opportunities for international collaboration and financial assistance. Under the Bulgarian Constitution of 1991, international treaty obligations become domestic law upon ratification and publication in the *State Gazette*. Moreover, international treaties supersede existing domestic legislation when they conflict (see Box 11). International agreements thus provide important support and direction for the national strategy. However, because most international environmental agreements are writ-