CONSERVING RUSSIA'S BIOLOGICAL DIVERSITY

An Analytical Framework and Initial Investment Portfolio

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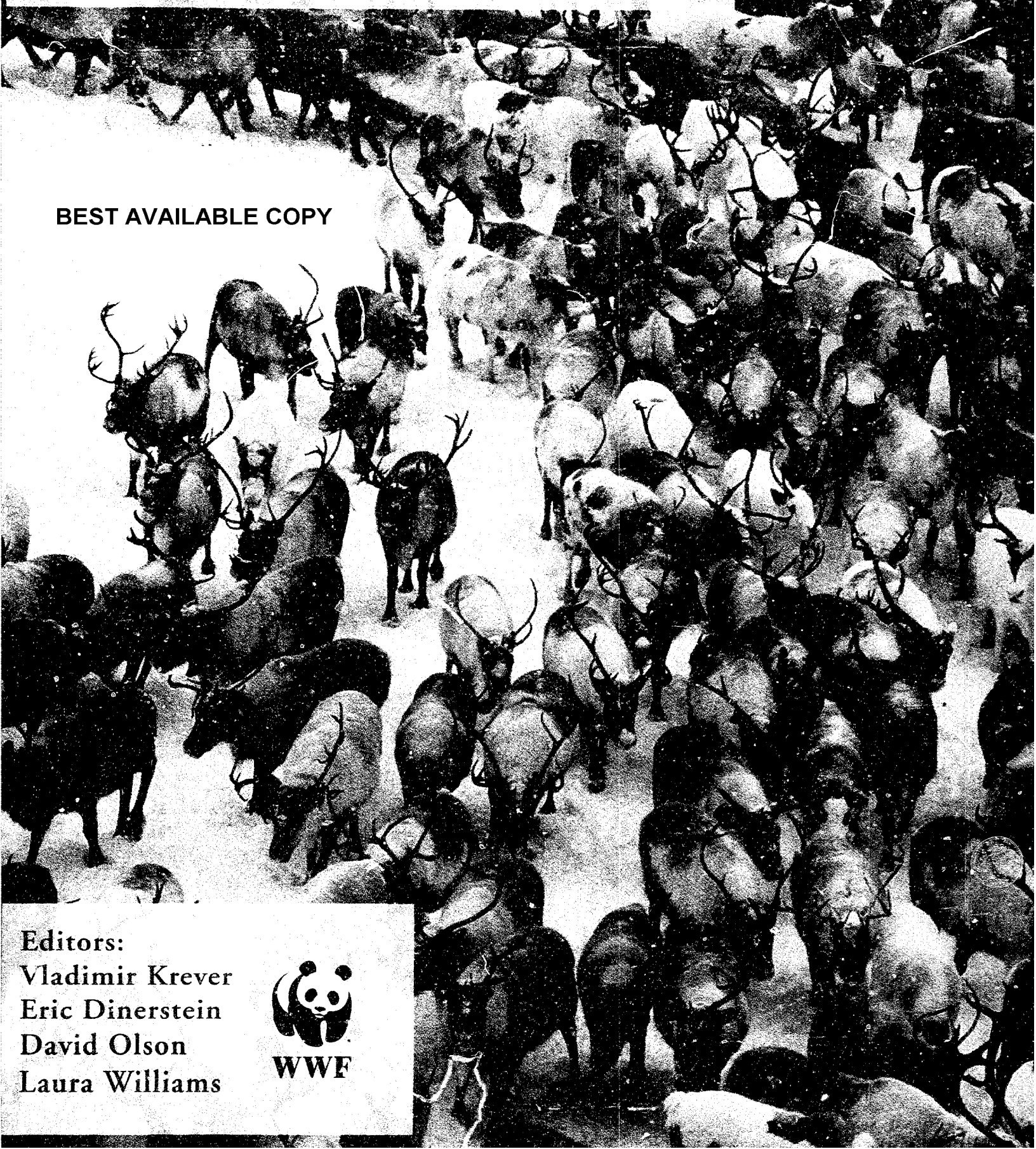

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WWF

ISN 93776

Conserving Russia's Biological Diversity: An Analytical Framework and Initial Investment Portfolio

SPECIAL PUBLICATION

This special publication is the first in WWF's Conservation Biology Series. The purpose of this new Series is to strengthen the link between the principles of conservation biology and their application to real problems, particularly those that are most urgent. The intended audience includes the donor community, government agencies, academics, field biologists, the media, and conservation organizations.

A framework to conserve Russia's rich biological diversity is an appropriate first subject for this series, in light of the dire threats posed by Russia's current political and economic turmoil. While addressing urgent needs, the analytical framework and investment portfolio adhere closely to the fundamental principles of conservation biology. We hope that this document focuses international attention on the emergency needs of the Russian Federation and advances the cause of global biodiversity conservation.

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Conserving Russia's Biological Diversity: An Analytical Framework and Initial Investment Portfolio

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January 1994

Supported by The John D. and Catherine T. MacArthur Foundation

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editors: Krever, V., Dinerstein, E., Olson, D., & Williams, L.

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Printed by Corporate Press, Landover, Maryland, U.S.A.

Cover design by Mimi Hutchins.
Cover photo by Natalie Fobes, reindeer (*Rangifer tarandus*), near Getlyanina River, Chukchi Peninsula, Siberia, Federation of Russia.
Maps by Dr. Igor Lyssenko, Russia Biodiversity Project.
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ACKNOWLEDGMENTS

WWF would like to thank the following individuals and organizations for their support and cooperation during the development of this document:

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Andrew Bond & Justin Mundy, The World Bank

Paul Grigoriew & Nikita Lopoukhine, Environment Canada, Parks Service

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EXECUTIVE SUMMARY

The conservation of Russia's biological diversity has global significance. The vast landscapes of the Russian Federation represent one of the last opportunities on Earth to conserve relatively intact ecosystems large enough to allow ecological processes and wildlife populations to fluctuate naturally. The unique assemblages of species in the Greater Caucasus and the Russian Far East surpass the diversity and level of endemism found among temperate forests anywhere in the world. Furthermore, Russia's expanses of forest, taiga and tundra serve as a major carbon sink which, if properly conserved, would help minimize the release of carbon compounds that contribute to the warming of the Earth's atmosphere.

The substantial foundation for conservation already in place in Russia separates it from other developing countries both in its conservation potential and return on investment. First, Russia's extensive network of protected areas has been in existence for a relatively long period, and in terms of size and geographic representation is virtually unsurpassed. Second, the biological diversity of Russia is better documented than in most developed countries of the West. Third, few countries can match the outstanding body of scientists who have dedicated themselves to studying biodiversity, nor the educational system that produced such professionals. Fourth, Russia has an extremely low rate of population growth, in contrast to the high rates that threaten to undo conservation efforts in most developing nations.

The main similarity between Russia and developing countries is lack of funds for conservation action, a situation exacerbated by the current economic crisis. Without emergency funding from donor nations, biodiversity conservation efforts in Russia will deteriorate rapidly in many areas. The purpose of this document is to: 1) devise an analytical framework that promotes biodiversity conservation by federal and regional agencies, and that addresses emergency situations at the bioregional level; 2) ensure that the framework fits into a long-term strategy to conserve Russia's biodiversity; 3) enlist Russian government agencies, the scientific community, and NGOs in developing a portfolio of investment proposals; 4) identify the highest priority initiatives among the ecosystem and species conservation proposals, and the sustainable use, ecotourism development, and training initiatives included in this document; and 5) identify priority activities that for various reasons could not be included in this document but should be considered in second phase investments.

Federal level proposals selected for inclusion in this portfolio, if funded, will significantly strengthen the capacity of the Ministry of Environmental Protection and Natural Resources (Ministry of Environment) to promote new approaches to biodiversity conservation. Offering up-to-date strategies to newly autonomous regions is particularly urgent, but those strategies must address emergency needs *and* fit within a long-term strategy to conserve biological diversity. In addition, this strategy must not sacrifice Russia's commitment to strong protection of endangered ecosystems, habitats, and wildlife populations within the federal

system. The suite of priority federal level proposals presented in this document are designed to: 1) promote greater awareness among all Russians of the biological and economic value of nature conservation; 2) increase the potential for self-supporting nature reserves through ecotourism; 3) provide relevant training opportunities to improve protection programs and to sensitize existing protected areas staff to new approaches in conservation management; 4) improve conservation planning, gap analysis, and monitoring of biological diversity; 5) encourage greater participation of local people in the management of protected areas, with emphasis on traditional resource use within buffer zones; 6) halt the illegal trade in wildlife species; and 7) develop and seek financing for a conservation trust fund in order to meet recurrent costs of key components of the biodiversity conservation program, until these costs can be assumed by a resurgent Russian economy.

Total cost of all proposed projects in the federal portfolio is $4,374,680 over the periods indicated.

In post-Soviet Russia, regional governments assert increasing control over the management of natural resources within their jurisdictions. Non-government organizations, active at the regional and grass-roots levels, serve as important vehicles for mobilizing conservation efforts in a cost-effective manner. This section identifies investment proposals that directly acknowledge this changed political landscape in Russia today. This new regional authority has a range of consequences, from the power to create new zapovedniks (Russian, for strict nature reserves) to exploiting resources and degrading the biological value of existing reserves. Federal agencies must emphasize the gains possible through conservation in order to positively influence regional administrations. Thus, it is essential that regional agencies be provided with the best information and expertise possible to choose wisely from the range of development and conservation initiatives. The selected investment projects in this portfolio all promote training initiatives at the regional level. Training programs will also increase the capacity of Russian NGOs to become more financially stable and effective in every aspect of conservation, from drafting funding proposals, to implementing field projects, to influencing natural resource policy. Four initiatives stand out as vital for funding at the regional level: 1) workshops to address regional conservation planning; 2) a program to increase manpower and strengthen regional conservation agencies; 3) a plan to finance the development of two regional biodiversity strategies as demonstration projects; and 4) a program to increase the capacity of Russian NGOs.

The total cost of the regional program is $1,090,000 over the periods indicated.

A bioregional analysis assessing conservation potential, threats, and the biological value of different habitats and ecosystems provides an important foundation for developing a national strategy to conserve biodiversity. A second step is to determine the extent to which biodiversity conservation is maintained in critical areas of the existing network of protected parks, indigenous reserves, and multiple-use areas. The investment proposals selected for this portfolio address the most urgent threats to biodiversity, but also reflect the chief concerns of modern conservation biology: the maintenance of representative ecosystems,

viable populations, and ecological processes. The priority investments identified in the bioregional section are based on the conviction that the federal system of zapovedniks must receive emergency assistance first, because they contribute most to the long-term conservation of biodiversity in Russia.

The analytical framework proposed here divides Russia into 14 distinct bioregions. Investment proposals are arranged by bioregion chapters to promote greater representation of projects. Each chapter provides an overview of the outstanding biological features, short and long-term threats to biodiversity in the region, and conservation potential. Capsule summaries of investment proposals within each bioregion are subdivided into one of several categories: a) existing zapovedniks in urgent need of assistance; b) investment proposals designed to create new reserves that close gaps in the existing system; c) sustainable use and ecotourism development projects within or adjacent to zapovedniks; and d) proposals that address recovery of species of special concern where populations are in demographic jeopardy. Each capsule summary identifies biodiversity values of the area under consideration, specific threats, objectives, expected results, major budget categories, timetable, and project executants. Finally, we identify 26 highest priority and 16 high priority proposals out of the 52 key initiatives presented.

Total cost of the bioregional investment proposals is $12,056,055 over the periods indicated.

Total cost of the entire investment portfolio is $17,520,735.

The investment portfolio outlined in this document addresses the most urgent needs for conservation. However, a truly comprehensive approach to biodiversity conservation requires strategies that maintain biodiversity protection in other sectors, particularly forestry. Also, several high-priority initiatives in various zapovedniks were left out of this first phase because the submitted proposals were incomplete. Section V outlines a series of such priority investment proposals that might, in a second phase, close the final gaps and complete the strategy to conserve Russia's rich biological diversity.

Conserving Russia's Biological Diversity: An Analytical Framework and Initial Investment Portfolio

INTRODUCTION

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This analytical framework and investment portfolio addresses the key question: why should donor nations help finance biodiversity conservation in economically depressed Russia? What biological features make Russia so unique and globally significant as to divert conservation organizations' fixed attention from the species-rich tropics? What specific threats constrain Russia's efforts to conserve biodiversity? How can scarce conservation funds be channeled into cost-effective investments that meet emergency needs and yet are consistent with the development of a long-term biodiversity conservation strategy?

This document explains why conservation of biodiversity in Russia should be a high priority for major lending institutions and NGOs over the next few years. It highlights urgent threats to biological diversity in Russia at the federal, regional, and local levels. Russia's biological features, threats, and its hard economic realities shape this document, and help clarify its most pressing conservation issues.

Biological Considerations

Promoters of Russia's biological wealth typically highlight its superlatives: the presence of one-fifth of all the world's forests; Lake Baikal, the world's deepest lake; the world's longest coastline; and a host of rare, endemic, and highly charismatic species, such as Amur tigers and leopards, Siberian cranes, desman, and saiga antelope. These advertisements, however, neglect the most important feature:

The vast, relatively intact ecosystems of Russia offer one of the last opportunities to conserve landscapes large enough to allow ecological processes and wildlife populations to fluctuate naturally.

In most countries, conservation of ecosystems and the processes and species they contain is no longer possible without intensive management. Natural ecosystems are now too fragmented or altered by human activities to persist without human intervention, and even the best science at our disposal may only slow the eventual demise of many habitats and species assemblages. Russia, in contrast, remains one of the last places left on Earth to conserve true wilderness. This unmatched potential to maintain ecosystems and viable populations of rare, threatened, and sensitive species places Russia at the forefront of global conservation plans.

The unique assemblages of species in the Greater Caucasus and the Russian Far East surpass the diversity and level of endemism found among temperate forests anywhere in the world. Furthermore, if properly conserved, Russia's expanses of forest, taiga, and tundra would

continue to serve as a major carbon sink. By minimizing the release of the carbon compounds that contribute to the warming of the Earth's atmosphere, this conservation effort benefits the entire planet.

Socio-Political Considerations

In the last three years, political and economic changes have swept across Russia and the former Soviet Union like a tidal wave, and have enormously impacted biodiversity conservation. With the demise of communism, newly autonomous and semi-autonomous regions regained political power and now exhibit a dramatic desire to maintain control of their lands, including their natural resources. Simultaneously, a new entrepreneurial class has emerged, eager to rapidly exploit newly available natural resources, with little regard for the environmental impacts of unplanned development. In an era of economic reform, Russia's conservation agenda has been all but abandoned. This lack of concern for conservation has been well-documented, ranging from uncontrolled logging in the far eastern region; unchecked pollution of air, land, and water in formerly pristine habitats; widespread poaching; and even attempts to abolish at least six protected areas scattered across Russia.

Part of the short-term solution to conserving biological diversity in Russia will be to arrange the outside financial assistance essential to maintaining and expanding an impressive network of world-class protected areas (see below). Other critical elements of this emergency plan include increasing the perceived value of biodiversity and protected areas, outlining the steps required to ensure sustainable use of resources, and restoring wildlife protection efforts.

At all levels--federal, regional, and local--foreign assistance must be directed at improving the climate for biodiversity conservation through an intensive program of conservation education. The project addresses this multi-faceted effort. A second set of proposals in this portfolio considers promotion of sustainable use of resources through traditional means by native people in buffer areas surrounding strictly protected zones, and the development of ecotourism demonstration projects. Approaches to sustainable use, however, will have limited impact in areas where protection efforts have collapsed completely, resources are being heavily exploited, or where wildlife poaching is rampant. These latter areas require enforced protection to preserve vital habitats and wildlife populations. Proposals that outline plans to strengthen the protection of nature reserves and other centers of biodiversity also figure prominently in this investment portfolio.

Sustainability of Conservation Efforts

The established network of zapovedniks (see Attachment A for information on different protected areas) separates Russia from other countries facing similar struggles in conserving biological diversity while promoting rapid economic development. First, Russia's extensive network of protected areas has been in existence for a relatively long period, and in terms of size and geographic representation is virtually unsurpassed. Second, the biological diversity of Russia is better documented than in most developed countries of the West. Third, few

countries can match the outstanding body of scientists who have dedicated themselves to studying biodiversity, nor the educational system that produced such professionals. Fourth, Russia has an extremely low rate of population growth, in contrast to the high rates that threaten to undo conservation efforts in most developing nations.

The main similarity between Russia and developing countries is its inability to win support or sufficient funding from the government to maintain a conservation program. The recurrent costs of supporting a vast network of protected areas dwarfs the annual budgets available. Currently, the government cannot cover more than 30% of the budgetary requirements of protected areas. One part of the solution to this problem is to demonstrate that conservation can pay for itself through ecotourism in protected areas, recycling of park revenues for local development, and by linking conservation efforts with sustainable use of local resources. For landscapes too fragile to support intensive use or too remote to support an ecotourism industry, covering recurrent costs of biodiversity conservation will be a formidable task. Therefore, this document proposes the development of a conservation trust fund to address long-term financial needs, and to ensure the success of a comprehensive conservation program. Ultimately, profits from extraction of Russia's vast natural resources and its overall economic development will reduce the amount of foreign investments required to maintain conservation efforts.

OBJECTIVES

This project has five main objectives:

1. to devise a framework for addressing emergency measures which promote biodiversity conservation at the federal, regional, and bioregional levels;

2. to ensure that the framework can be integrated within a long-term strategy to conserve Russia's biodiversity;

3. to enlist Russian government agencies, the scientific community, and NGOs in developing conservation proposals;

4. to seek funding for the proposals included in this document that promote biodiversity conservation, sustainable use, ecotourism and training; and

5. to identify the priority activities not included in this document, but that should be considered in a second phase of investments.

ORGANIZATION OF THE DOCUMENT

The document breaks down into five sections. Section I outlines the project approach and provides a brief history of its development. Section II covers biodiversity concerns best addressed at the federal level because they impact nature protection across Russia. It also provides an overview of threats and emergency measures, and identifies proposals that figure prominently in a long-term biodiversity strategy. Section III identifies priority activities to be financed at the regional level. This section is critical because it describes the changed political landscape in Russia today, and how regional governments now make decisions that impact biodiversity in each region. Section IV assesses conservation priorities at the bioregional level by identifying threats, conservation potential, and specific activities among the 14 bioregions. Section V outlines additional priorities that must be considered to develop a comprehensive biodiversity strategy, but for a variety of reasons, could not be included in this initial portfolio. Attachments provide more details on the protected areas system in Russia, additional information on some projects, and itemized proposal budgets.

SECTION I. APPROACH

The analytical framework presented in this document begins with a brief discussion of the biological principles fundamental to the conservation of biological diversity anywhere in the world. Those principles are followed by discussion of specific activities that must be implemented at the federal and regional levels in Russia. This segment also considers the central role that the federal system of zapovedniks will play in conserving biological resources in perpetuity, as well as the increasing impact of regional governments on the creation of new reserves and the management of existing zapovedniks. The third component of the approach presents the methodology for a bioregional analysis that includes conservation potential, threats, gaps in conservation efforts, and responses to urgent needs. The last segment describes the development of the project, criteria by which proposals were selected for the portfolio, and collaborating agencies.

FUNDAMENTAL OBJECTIVES OF BIODIVERSITY CONSERVATION

Conservation strategies must include three fundamental objectives in order to effectively maintain biodiversity: to ensure representation, to conserve viable populations, and to sustain ecological processes. All conservation planning at the federal and regional levels will be guided by these broad principles, briefly reviewed in Box 1.

Box 1. OBJECTIVES OF A BIODIVERSITY CONSERVATION STRATEGY

REPRESENTATION	An essential element of biodiversity conservation is to ensure that all native ecosystem types and the full range of their variation are represented within a system of protected areas. Without such representation, no conservation strategy can be deemed entirely successful, because ecosystems and the species they sustain are the currency of biodiversity. Designating large protected areas best conserves habitat diversity and complex environmental gradients. Large reserves also maintain natural disturbance regimes and ecological processes that sustain patterns of biodiversity. However, representation does not always require large land area, especially for populations of some plants and invertebrates. Furthermore, some small, unique ecosystems exist that take priority over larger, more typical areas. Redundancy or multiple reserves of a given ecosystem type greatly enhances the probability of its long-term persistence, making it an important conservation objective. To ensure representation, we adopt a bioregional approach to assessing conservation potential across Russia (see Section III).

MAINTAINING VIABLE POPULATIONS	Representation contributes to species persistence, but not without an explicit strategy to maintain viable populations. Populations periodically drop to low levels as resources, physical factors, and population dynamics vary over time. The presence of large populations can help buffer species from extirpation or extinction during periods of stress, high predation, or intense poaching. Viable populations are best conserved in larger blocks of habitat with abundant space and resources. Measures that create, or enhance linkages, i.e., connectivity, between populations promote viable populations. For example, connectivity of habitats is crucial for species that range over Russia's large areas, like Amur tigers and wild reindeer.
SUSTAINING ECOLOGICAL PROCESSES	Critical ecological processes such as disturbance regimes, predation, pollination, decomposition, and nutrient cycling must continue to function within conservation areas in order to maintain viable populations, representative communities, and ecosystems. Ecological processes are best maintained within large, relatively undisturbed reserves. Large blocks of wilderness adjacent to reserves, a notable feature of many zapovedniks in Russia, help maintain ecological functions as well as viable populations of species. At a minimum, conservation areas must be at least 50 to 100 times larger than the average disturbance patch in order to maintain the range of community types and the natural disturbance regime. The frequency of large fires and movements of animals over great distances in Russian arctic, boreal, and steppe ecosystems makes large protected areas a necessity for most of its bioregions. In addition, the ability of ecosystems to effectively respond to long-term environmental change, such as global warming, depends largely upon the viability of ecosystems over extensive landscapes.

FEDERAL LEVEL ACTIVITIES

The rapid shift towards greater autonomy of regional governments has limited the jurisdiction of the Central Ministry in charge of conserving national parks and protected areas in Russia. While decentralization has been positive in many ways, the experience so far has been mostly negative for conservation. Some regional approaches to resource management have resulted in officially sanctioned overexploitation, while other regional governments have attempted to abolish federal reserves altogether. In this climate, the development of a coherent, national

biodiversity strategy will be impossible without a central role for federal agencies in its design, coordination, and implementation. This process will be in cooperation with regional authorities. Furthermore, certain investments will be more cost-effective under federal rather than local control, and will avoid duplication of efforts. Federal level proposals were developed by experts in the Ministry of Environmental Protection and Natural Resources of the Russian Federation (hereafter, Ministry of Environment) and leading scientific research institutions in collaboration with the Russia-WWF team. The proposals were informed by the detailed analyses of threats, legal issues, and opportunities for conservation at the federal level presented at the project launch workshop (see below).

The federally protected areas of Russia fall under one of four major categories: zapovedniks or strict reserves; national parks; nature refuges (zakazniks); and monuments of national significance. The large size, representativeness, and strict protection of the zapovedniks give them top priority within this analytical framework. The conservation value of the zapovednik system in Russia is summarized in Box 2.

Box 2. CONSERVATION VALUE OF THE RUSSIAN ZAPOVEDNIKS

The long tradition of conservation in Russia has produced a protected area system that, for the following reasons, is unique in the world:

- The zapovednik system is 75 years old, making it one of the oldest and most effective protected area systems ever established.
- The number of zapovedniks (76 in Russia), and their large size reflect a deep understanding of and commitment to conservation that has rarely been achieved elsewhere.
- Many designated reserves are adjacent to, or surrounded by, extensive areas of wilderness, greatly increasing the effective size of the conservation area and the potential to conserve intact ecosystems.
- Extant zapovedniks conserve populations of more than two-thirds of the rare and endangered species listed in the Russian Red Data Book.
- The comprehensive representation of regional ecosystems in protected areas far surpasses efforts elsewhere.

For these reasons, no other country has such great potential to achieve the objectives of an optimal conservation strategy.

Figure 1 and Table 1 show the Russian network of zapovedniks and national parks. The accompanying table gives the number, name, status, area, year of creation, and bioregion number, for each of these protected area categories. Figure 2a shows the size of zapovedniks within each bioregion. Figure 2b shows the percent of total area under protection distributed by size category. See Attachment A for more information on all protected areas.

We contend that the existing zapovednik system, with appropriate additions, provides the cornerstone for maintaining Russia's biodiversity over the long-term. Thus, the core of this investment portfolio is the rescue and strengthening of zapovedniks. The proposals we selected synthesize several factors, including the biological value and uniqueness of the reserve, degree of urgency, and the cost-effectiveness of immediate investments.

REGIONAL APPROACH

Regional proposals complement efforts at the federal and local levels. As regional governments take a greater role in conservation decision-making, their agencies must be provided with the best information and expertise possible to choose wisely from a range of development and conservation initiatives. The selected investment projects emphasize training initiatives to enhance efforts at the regional level.

BIOREGIONAL APPROACH

We assess urgent measures for biodiversity conservation in Russia both at the federal and regional levels, and within the context of 14 distinct bioregions. The bioregions are distinguished by the geographic distribution of species assemblages, climate, and certain physical features. Their boundaries reflect decades of research by Russian scientists and natural historians.

The bioregional approach permits assessment of the adequacy and effectiveness of the protected area system in light of each bioregion's unique set of landscape features, ecological dynamics, threats, and patterns of biodiversity. Moreover, the biogeographical approach enables tailoring of conservation strategies to the particular needs of each ecosystem.

PROJECT BACKGROUND, COLLABORATORS, AND CRITERIA FOR PROPOSAL SELECTION

This project was financed by a grant from the John D. and Catherine T. MacArthur Foundation to help catalyze donor interest in conserving Russia's biodiversity and to develop an analytical framework and investment portfolio to guide donor interest. The document was developed by initial agreement between World Wildlife Fund-United States and the Socio-

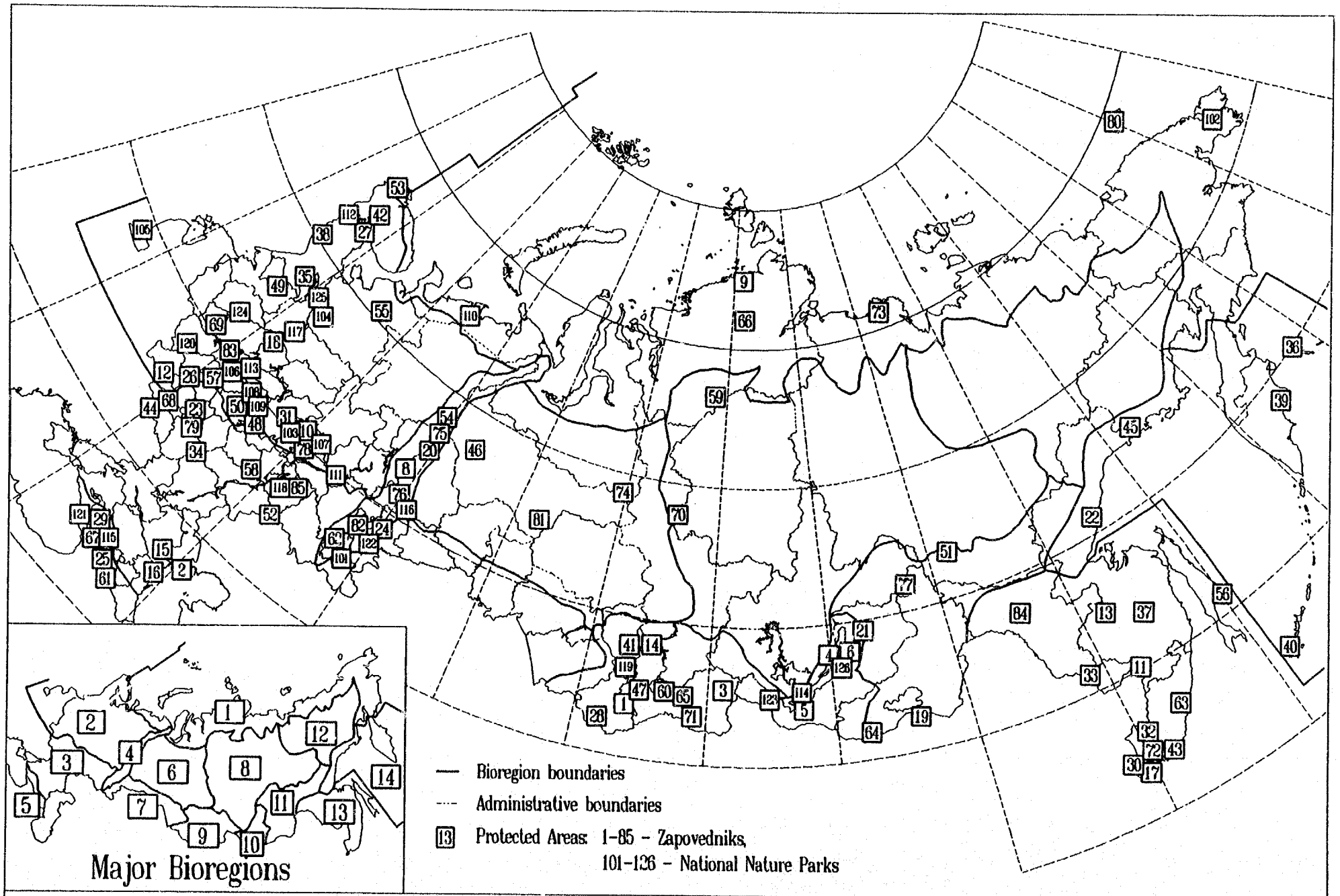

Figure 1. PROTECTED AREAS NETWORK OF RUSSIA

Table 1. Protected Areas of Russia.

Number (Fig.1)	Protected Area Name	Status	Area (sq.km)	Year Estbl.	Bio regi
1	Altaisky	Zapovednik	8695.00	1932	9
2	Astrakhansky	Biosphere Reserve	668.16	1919	3
3	Azas	Zapovednik	3372.90	1985	9
4	Baikalo-Lensky	Zapovednik	6599.19	1986	10
5	Baikalsky	Biosphere Reserve	1657.24	1969	10
6	Barguzinsky	Biosphere Reserve	3744.23	1916	10
7	Bashkirsky	Zapovednik	496.09	1930	4
8	Bassegi	Zapovednik	564.40	1982	4
9	Big Arctic	Zapovednik	41692.22	1993	1
10	Bolshaya Kokshaga	Zapovednik	214.00	1993	2
11	Bolshekhekhtsirsky	Zapovednik	451.23	1963	13
12	Bryansky Les	Zapovednik	117.78	1987	2
13	Bureinsky	Zapovednik	3584.44	1987	13
14	Chazy	Zapovednik	241.41	1991	9
15	Chernye Zemly	Zapovednik	1250.00	1990	3
16	Dagestansky	Zapovednik	190.61	1987	3
17	Dalnevostochny	Zapovednik	643.16	1978	13
18	Darvinsky	Zapovednik	1126.73	1945	2
19	Daursky	Zapovednik	447.52	1987	11
20	Denezhkin Kamen	Zapovednik	781.92	1991	4
21	Dzerginsky	Zapovednik	2378.06	1992	10
22	Dzhugdzhursky	Zapovednik	8062.56	1990	14
23	Galichia Gora	Zapovednik	2.31	1925	3
24	Ilmensky	Zapovednik	303.80	1920	4
25	Kabardino-Balkarsky	Zapovednik	740.99	1976	5
26	Kaluzhskie Zaseki	Zapovednik	185.33	1992	2
27	Kandalakshsky	Zapovednik	705.27	1932	2,1
28	Katunsky	Zapovednik	1500.79	1991	9
29	Kavkazsky	Biosphere Reserve	2632.77	1924	5
30	Kedrovaya Pad	Zapovednik	178.97	1925	13
31	Kerzhensky	Zapovednik	469.40	1993	2
32	Khankaisky	Zapovednik	379.00	1990	13
33	Khingansky	Zapovednik	978.36	1963	13
34	Khopersky	Zapovednik	161.78	1935	3
35	Kivach	Zapovednik	108.80	1931	2
36	Komandorsky	Zapovednik	36486.79	1993	14
37	Komsomolsky	Zapovednik	638.66	1963	13
38	Kostomukshsky	Zapovednik	474.57	1983	2
39	Kronotsky	Biosphere Reserve	10990.00	1934	14
40	Kurilsky	Zapovednik	653.65	1984	14
41	Kuznetzky Alatau	Zapovednik	4555.00	1989	9
42	Laplandsky	Biosphere Reserve	2684.36	1930	2
43	Lazovsky	Zapovednik	1200.24	1957	13
44	Les na Vorskle	Zapovednik	10.38	1979	3
45	Magadansky	Zapovednik	8838.05	1982	14,
46	Malaya Sozva	Zapovednik	2225.60	1976	6
47	Maly Abakan	Zapovednik	978.29	1993	9
48	Mordovsky	Zapovednik	321.48	1936	2
49	Nyzhnesvirsky	Zapovednik	414.00	1980	2
50	Oksky	Biosphere Reserve	557.31	1935	2
51	Olekminsky	Zapovednik	8471.08	1984	8,1
52	Orenburgsky	Zapovednik	216.00	1989	3,7
53	Pasvik	Zapovednik	145.86	1992	2
54	Pechoro-Ilytchsky	Biosphere Reserve	7213.22	1930	4
55	Pinezhsky	Zapovednik	412.44	1974	2
56	Poronaisky	Zapovednik	566.94	1988	13

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Table 1 (cont.). Protected Areas of Russia.

Number (Fig.1)	Protected Area Name	Status	Area (sq.km)	Year Estbl.	Bio-region
57	Prioksko-Terrasny	Biosphere Reserve	49.45	1935	2
58	Pryvolzhskaya Lesostep	Zapovednik	81.80	1989	3
59	Putoransky	Zapovednik	18873.00	1988	8
60	Sayano-Shushensky	Biosphere Reserve	3903.68	1976	9
61	Severo-Osetinsky	Zapovednik	289.99	1967	5
62	Shulgan Tash	Zapovednik	225.00	1986	4
63	Sikhote-Alinsky	Biosphere Reserve	3470.52	1935	13
64	Sokhondinsky	Biosphere Reserve	2110.07	1973	11
65	Stolby	Zapovednik	471.54	1925	9
66	Taimyrsky	Zapovednik	13487.08	1979	1
67	Teberdinsky	Zapovednik	849.96	1936	5
68	Tsentralno-Chernozemny	Biosphere Reserve	48.74	1935	3
69	Tsentralno-Lesnoy	Biosphere Reserve	213.80	1931	2
70	Tsentralno-Sibirsky	Biosphere Reserve	9720.17	1985	8,6
71	Ubsunurskaya Kotlovina	Zapovednik	396.00	1993	9
72	Ussuriysky	Zapovednik	404.32	1932	13
73	Ust'Lensky	Zapovednik	14330.00	1985	1
74	Verkhne-Tazovsky	Zapovednik	6313.00	1986	6
75	Vishersky	Zapovednik	2412.00	1990	4
76	Visimsky	Zapovednik	135.06	1971	4
77	Vitimsky	Zapovednik	5850.21	1982	11
78	Volzhsko-Kamsky	Zapovednik	80.34	1960	2
79	Voronezhsky	Biosphere Reserve	310.53	1927	3
80	Wrangel Island	Zapovednik	7956.50	1976	1
81	Yugansky	Zapovednik	6228.86	1982	6
82	Yuzhno-Uralsky	Zapovednik	2549.14	1978	4
83	Zavidovsky	Zapovednik	1254.00	1929	2
84	Zeysky	Zapovednik	993.90	1963	13
85	Zhygulevsky	Zapovednik	231.40	1927	3
101	Bashkiriya	National Park	823.00	1986	4
102	Berengiya	National Park	30533.00	1993	1
103	Chavash Varmane	National Park	252.00	1993	2
104	Kenozerskiy	National Park	1392.00	1991	2
105	Kurshkaya Kosa	National Park	66.21	1987	2
106	Losiny Ostrov	National Park	111.44	1983	2
107	Mariya Chodra	National Park	366.00	1985	2
108	Meschora	National Park	1187.58	1992	2
109	Meschorsky	National Park	1030.00	1992	2
110	Nenetcky	National Park	60000.00	1992	1
111	Nizhnyaya Kama	National Park	261.00	1991	2
112	Paanayarva	National Park	1033.00	1992	2
113	Pereyaslavsky	National Park	217.00	1988	2
114	Pribaikalsky	National Park	4127.42	1986	10
115	Prielbrussky	National Park	1004.00	1986	5
116	Pripushmenskie Bory	National Park	490.00	1993	4
117	Russkiy Sever	National Park	1664.00	1992	2
118	Samarskaya Luka	National Park	1280.00	1984	3
119	Shorsky	National Park	4180.00	1989	9
120	Smolenskoye Poozer'e	National Park	1462.00	1992	2
121	Sochinsky	National Park	1900.00	1983	5
122	Taganai	National Park	564.00	1991	4
123	Tunkinsky	National Park	11836.00	1991	9,10
124	Valdaisky	National Park	1585.00	1990	2
125	Vodlozersky	National Park	4047.00	1991	2
126	Zabaikalsky	National Park	2693.00	1986	10

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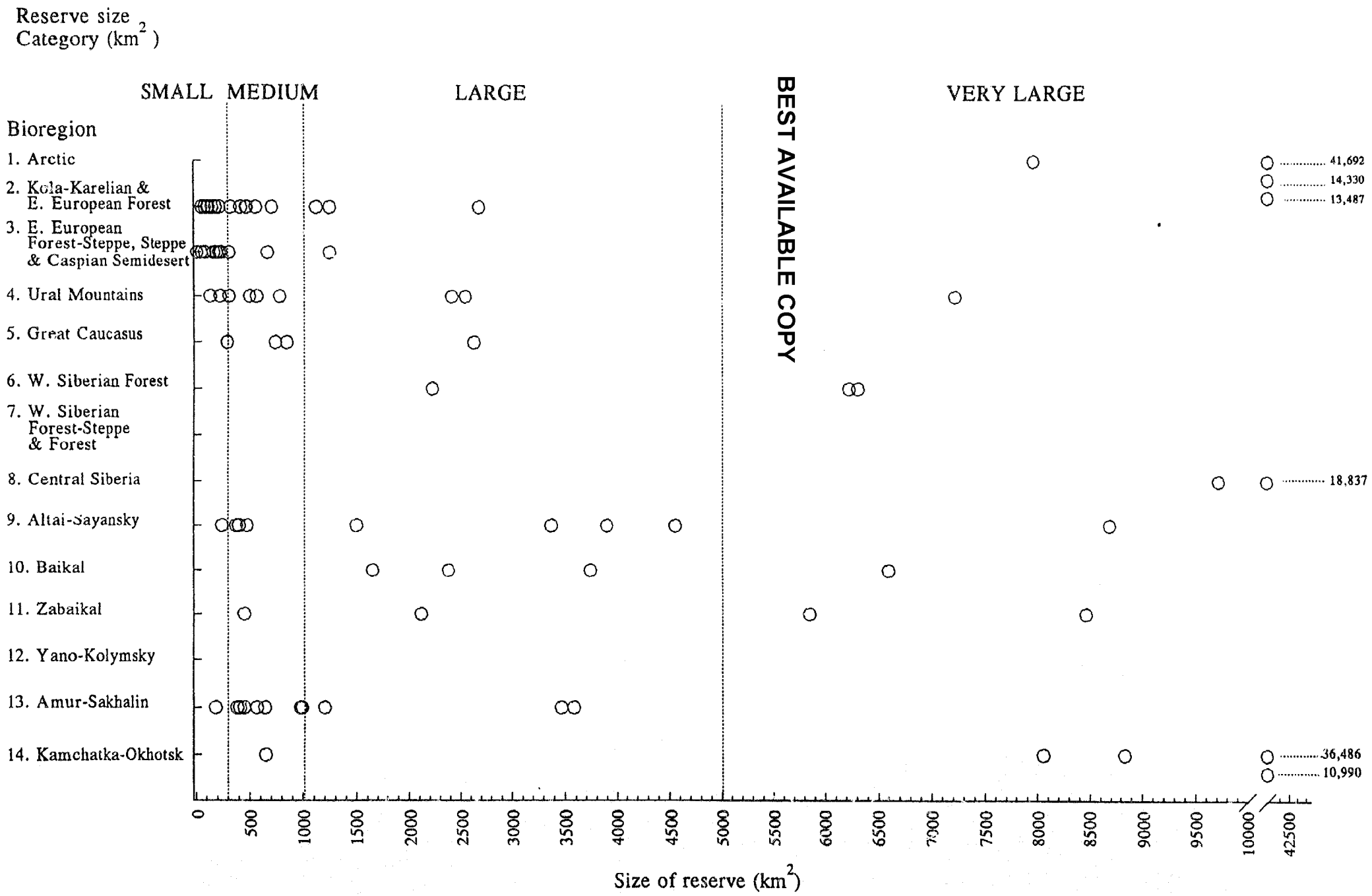

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Figure 2a. Size of zapovedniks within each bioregion. Reserves with areas that exceed the scale are denoted along the right margin with their respective size.

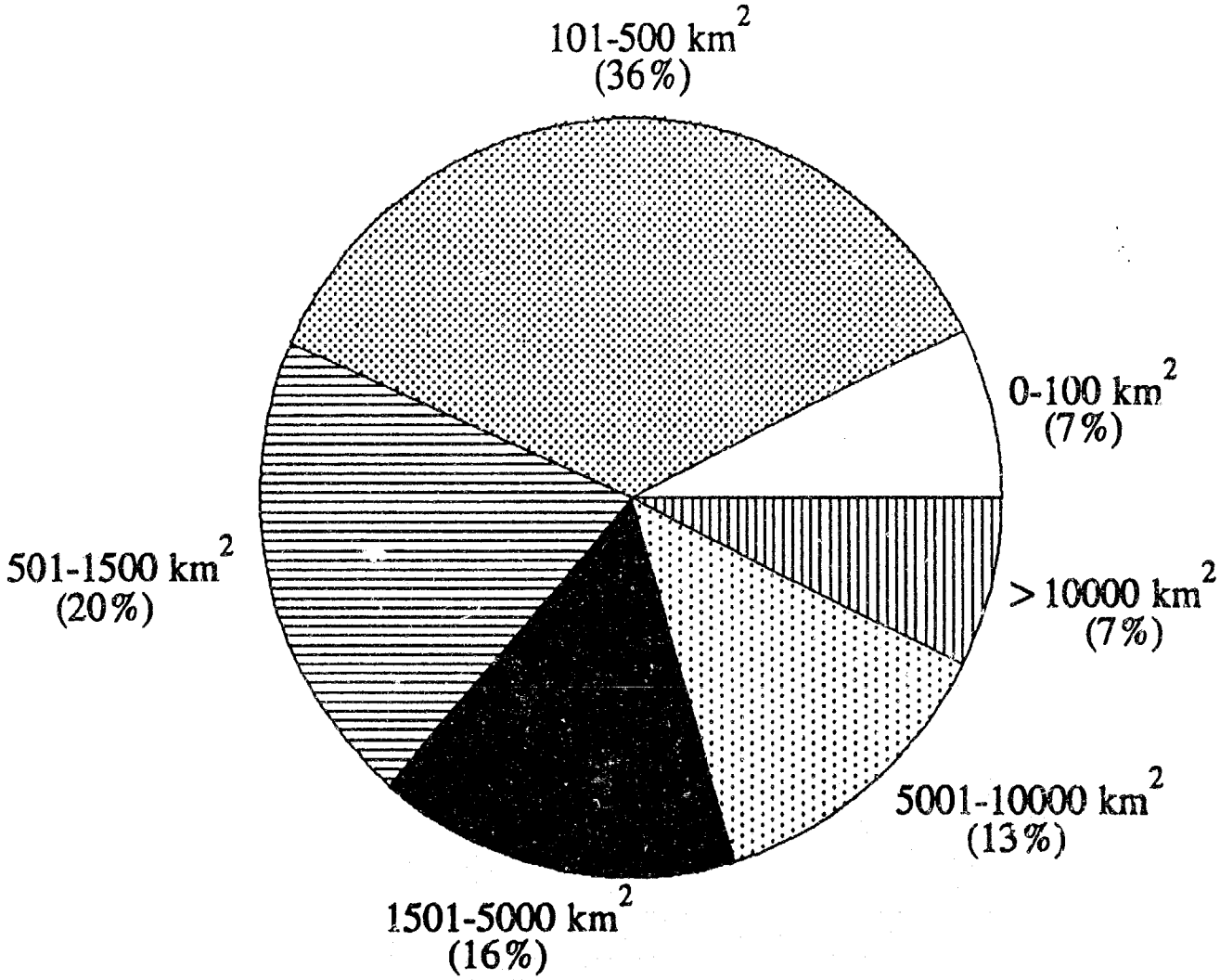

Figure 2b. Percent of total area of zapovednik system distributed among size categories.

Ecological Union, in collaboration with the Ministry of Environment in Russia. A host of Russian experts affiliated with universities, research institutions, protected areas, and NGOs contributed to the work. Preparation of the final document was carried out in cooperation with World Wildlife Fund's Conservation Science Program.

The project was launched at a workshop on the status of biodiversity conservation in Russia held in Moscow from May 24-26, 1993 and was attended by over 35 national experts in this field. A joint Russia-WWF committee developed proposal guidelines to be followed by all interested parties. The workshop organizers then announced a call for proposals from all groups involved in biodiversity conservation. This request for proposals was disseminated across Russia by telephone, electronic mail, regular mail, informal communication, and by telegram to many remote zapovedniks and institutions. The request generated a massive rapid response of over 200 proposals. Even two months after the submission deadline, proposals were still arriving, and so the deadline was extended to September 15, 1993. Federal level proposals were drafted by Ministry personnel and specialists of leading scientific-research institutions, and zapovednik proposals were drafted by local staff and Russian specialists appointed to assist in proposal preparation by the Ministry of Environment.

Federal level proposals were selected for this portfolio when the proposed activities would significantly strengthen the effectiveness of the Ministry of Environment and promote new approaches to biodiversity conservation. Bioregional proposals were chosen to be included in the portfolio if they contributed in a major way to meeting the three biological objectives stated in the first part of this section. From this list, bioregional proposals were scrutinized for cost-effectiveness by comparing objectives with budget requests, timetables, risks, expected results, and the capabilities of project executants. The entire document was thoroughly reviewed prior to publication by the Ministry of Environment, the Socio-Ecological Union, and Dr. Aleksei Yablokov, Ecological Advisor to the President.

SECTION II. PROMOTING NEW APPROACHES TO BIODIVERSITY CONSERVATION AT THE FEDERAL LEVEL

Introduction and Statement of Problem

Until recently, biodiversity conservation strategies in the Russian Federation relied almost exclusively on the strict preservationist approach. Its world-renowned network of zapovedniks, off-limits to the general public, effectively restricted human activities and development projects considered deleterious to conservation. In retrospect, this method proved remarkably successful. Furthermore, the large size of many zapovedniks and their broad geographic coverage led many conservationists to assume that Russia would be one of the few countries to conserve relatively large intact ecosystems and critical ecological processes in a representative national network of protected areas.

Sweeping political change and severe economic hardship during the last two years now challenge this assumption. Increased autonomy in many regions of the Russian Federation has weakened enforcement of protection programs; condoned widespread overgrazing, poaching, and illegal harvest of timber; and, in a number of cases, threatened to abolish sanctuaries. Virtually all zapovedniks, even those that have emerged unscathed from political upheaval, currently lack operating budgets, and their professional staffs are abandoning their posts to seek employment in menial jobs that offer substantially higher salaries. In short, without emergency financial assistance from Western donors, the entire system of protected areas is likely to disintegrate in the near future.

A recent review of protected areas, commissioned at the request of the Ministry of Environment, attempted to estimate the cost of meeting emergency needs for basic infrastructure, communications, and staffing in some priority reserves. This review is timely, but serves only as a stop-gap measure. The new political and economic realities of Russian society force its Federal authorities to look beyond emergency needs and devise new approaches to conserving biological diversity. These new approaches must accommodate regional autonomy without sacrificing strong protection of endangered ecosystems, habitats, and populations.

The suite of proposals presented in this section, if funded, will accelerate implementation of new approaches. The elements contained within the federal proposals also reinforce the biodiversity conservation initiatives proposed at the regional and bioregional level (Sections III and IV of this document, respectively). This overlap of conservation planning will lay the groundwork for a detailed biodiversity conservation strategy appropriate for the Russian Federation and consistent with the principles of conservation biology.

Objectives of the Federal Program

Specific objectives of the proposals contained within this section are:

1) to promote greater awareness among all Russians of the biological and economic value of nature conservation;

2) to increase the potential for self-supporting nature reserves through ecotourism;

3) to provide relevant training opportunities to improve protection programs and to sensitize existing protected areas staff to new approaches in conservation management;

4) to improve conservation planning, gap analysis, and monitoring of biological diversity;

5) to encourage greater participation of local people in the management of protected areas, with emphasis on traditional resource use within buffer zones;

6) to halt the illegal trade in wildlife species; and

7) to develop and seek financing for a conservation trust fund that will meet the recurrent costs of the biodiversity conservation program until these costs can be assumed by a resurgent Russian economy.

Core Federal Level Proposals

Synopses of core proposals are presented below. More detailed documentation of each proposal and estimated budgets follow in the attachment to this section.

A. Development of Conservation Education Programs that Promote the Biological and Economic Values of Russia's Natural Heritage

Until recently, a system of strict protection was considered the most effective means to conserve biodiversity in Russia, especially in the area of zapovednik management. Undoubtedly, this approach has been effective in preserving zapovedniks. At the same time, this strict doctrine evoked hostility among local populations who were previously powerless to effect changes in management policies. Decentralization and democratization of Russian society and recent economic hardship have forced abandonment of an effective but autocratic approach to resource management, and placed greater authority in the hands of regional and local governments (Section III).

The zapovednik system must remain the foundation of Russia's strategy for conserving biodiversity (Section I, *Approach*). However, unless the Russian government, regional governments, and the Russian public understand that the zapovednik system is a national asset and of global significance, no amount of foreign assistance will sustain this program. Federal officials are developing an effective conservation education program that will sensitize regional agencies and the public to the biological and economic value of conserving Russia's biodiversity and, in particular, the significance of zapovedniks. Conservation education is also an essential prerequisite to reduce poaching, over-exploitation of resources, and to harmonize traditional and non-traditional resource use with maintenance of biodiversity. Zapovedniks are logical foci for the conservation program because their staffs are well-trained professionals who already have some experience in conducting conservation education programs.

This proposal seeks funding to set up an international center for environmental education to train zapovednik staff and increase their capacity as environmental educators. The center would conduct training programs for representatives of each zapovednik, organize seminars with international participants, and publish up-to-date bulletins and textbooks to be used by local educators. To ensure cost-savings, the training program would be conducted at the same federal training center planned for other training initiatives in this portfolio. The center would oversee the establishment of mini-centers for conservation education in nine zapovedniks to serve as pilot projects for launching a broader campaign. The objectives of the mini-centers would be to invite groups for lectures and visits to nature museums and zapovedniks, to distribute educational materials, and to work with local residents and tourists to promote conservation education. The expected result is that this program will foster a strong conservation ethic in post-Soviet Russia that will globally benefit biodiversity conservation.

Total cost of creating the international center for ecological education and training is $462,890 over three years. See Attachment C, budget A.1.

The nine mini-center proposals considered in this phase are located under the corresponding bioregional chapters of Section III. Three other proposals could not be adequately prepared in time and will be considered in a later phase. See Attachment B.1. for a complete list of zapovedniks proposed for the mini-center pilot project and their corresponding bioregions.

The project will be carried out by the Main Zapovednik Department of the Ministry of Environment in cooperation with participating zapovedniks.

B. Increasing the Potential for Self-Supporting Nature Reserves through Ecotourism

Current economic hardships force federal officials to consider a range of options to finance the continued work of zapovedniks. One of the options most compatible with biodiversity conservation is ecotourism. Ecological and scientific tourism complies with existing

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legislation and can be highly profitable, if managed carefully. Several zapovedniks have already begun an embryonic ecotourism industry that caters to foreign tourists. About 25 percent of zapovedniks offer the combined attractions of exotic wildlife, magnificent scenery, and *reasonable access* which warrant investments in carefully managed ecotourism. In addition, scientific tourism, through Earthwatch and similar organizations; or international university programs may not view unreasonable access as an insurmountable problem, giving the slightly more remote, but biologically rich zapovedniks significant means of earning hard currency.

A proposal developed in cooperation with the Ministry of Environment seeks funding to increase the potential for ecotourism in areas previously off-limits to visitors. A national bureau for ecotourism coordination and promotion will be established on behalf of the nature reserve system. The agency will be responsible for coordinating ecotourism activities, conducting staff training programs, creating infrastructure for visitors, and publicizing ecotourism opportunities in Russia and abroad. Selected specialists from zapovedniks will attend international training sessions in conservation planning and ecotourism. The ecotourism bureau will help attract investments to protected areas through rational development of ecotourism in order to offer zapovedniks financing alternatives over the long-term. To ensure effective management of tourism on the regional level, the Ministry has identified seven zapovedniks scattered among seven bioregions to serve as demonstration projects for ecotourism development. The zapovedniks and their respective bioregions are:

- Astrakhansky (European Forest Steppe, Steppe, Caspian Semidesert Bioregion, 3);
- Teberdinsky (Caucasus Bioregion, 5);
- Daursky (Zabaikal Bioregion, 6);
- Kronotsky (Kamchatka-Okhotsk Sea Bioregion, 14);
- Sayano-Shushensky (Altai-Sayansky Bioregion, 9);
- Sikhote-Alinsky (Amur-Sakhalin Bioregion, 13); and
- Kurilsky (Kamchatka-Okhotsk Sea Bioregion, 14)

The overall objectives of these projects are to improve conservation management and to create the necessary infrastructure for conducting ecotourism in the zapovedniks, including renovating dilapidated nature museums and printing information booklets about the zapovednik. The expected results of this project are: 1) to establish successful ecotourism programs that will help finance biodiversity conservation in the respective zapovedniks, 2) to demonstrate to the Russian government, oblasts and republics that conservation can pay for itself in certain circumstances, and 3) to train Russian professional staff in the latest approaches to design and management of ecologically sound tourism.

Total cost of establishing an effective central bureau for coordinating ecotourism activities and training of specialists is $161,500 over three years. See Attachment C, budget A.2.

Implementation costs for the seven ecotourism demonstration projects are listed under the respective bioregions in Section III.

The Main Zapovednik Department of the Ministry of Environment will oversee the project and select a three to five member staff to implement the program.

C. Improvement of Biodiversity Protection in Zapovedniks

The breakdown of protection services in a number of zapovedniks seriously threatens the integrity of wildlife habitats and populations within these units. Privatization efforts and increased autonomy by local governments has weakened the authority of reserve staff appointed by the government of Soviet Russia. Moreover, poachers cashing in on the booming illegal trade of wildlife parts pose major enforcement problems for the financially beleaguered zapovednik staff. Certain species, such as Amur (Siberian) tigers, Amur leopard, saiga antelope and others may disappear over the next few years as a result of ineffective protection against poachers. Populations of other large mammal species will also be greatly reduced or extirpated. These factors all jeopardize the long-term viability of protected areas and the opportunities for sustainable use of resources in areas adjacent to zapovedniks. Clearly, without strong international support in this time of crisis, protection in zapovedniks will cease to be effective.

Specific reasons for the declining effectiveness of protection in zapovedniks are:

1) lack of financial and material incentives to attract qualified staff;
2) lack of adequate training of staff in new approaches to conservation management; and
3) the archaic organizational system of protection in the majority of zapovedniks.

This two-part project proposal will improve the protection system through: 1) the design and delivery of relevant training courses; and 2) strengthening the protection system in 20 model zapovedniks. The first component strives to increase the qualifications of zapovednik leaders by organizing annual training programs. Mandatory courses will be held every year for experts from each zapovednik, covering issues such as management of protected areas, the protected areas system in Russia and abroad, handling violations in zapovedniks, and defense training. The government training program will also hold sessions to address specific issues such as anti-poaching mechanisms, and cooperation with traditional user groups. The expected result is an effective training program that will improve zapovednik management in all regions of Russia.

The second part of the proposal aims to technically improve protection mechanisms in those zapovedniks hardest hit by poaching and other violations by creating special operative groups. The poacher-ridden Amur-Sakhalin region and heavily populated regions of European Russia are targeted for pilot projects. Twenty special operative groups, each composed of four people, will be set up in 20 key zapovedniks to patrol and monitor the

protected areas more effectively. The practice of setting up these operative groups has already proven effective in a number of nature protection agencies and zapovedniks. This initiative will outfit the 20 groups in ways that increase their ability to patrol protected areas efficiently. Expected results include strengthening of the infrastructure of the zapovedniks by integrating groups into existing staffs, improved habitat protection, and the reduction of poaching and other violations. If successful, this initiative will lead to the addition of special operative groups to other zapovedniks. Attachment B.2. provides a list of the 20 zapovedniks selected for the first round of establishing special operative groups.

Total cost of the training program to improve protection practices for federal and regional officials is $35,040 over three years. See Attachment C, budget A.3.1.

Total cost of the program to develop operative groups and improve protection capabilities in 20 key zapovedniks is $2,481,050 over three years. See Attachment C, budget A.3.2.

Both projects will be coordinated by the Main Zapovednik Department of the Ministry of Environment.

D. Improving Conservation Planning and Monitoring of Biological Diversity

A remarkable component of the zapovednik system has been the systematic collection of long-term biological and environmental data in reserves which, in many cases, span over 50 years. Such long-term and comprehensive data sets are virtually unique in the world and represent an immensely valuable tool for conservation planning and scientific research. The range of information available from zapovednik archives is overwhelming. It includes detailed and updated inventories of fauna and flora; information on fluctuation of plant communities, productivity of populations of common and rare species of plants animals; and effects of human activities on ecosystem processes. Unfortunately, much of this information is relatively inaccessible as it is hand-recorded into annual volumes and stored at the reserves. Access to and analysis of this data would be greatly facilitated if the information were stored in relational and spatial databases, and if analytical software, such as Geographic Information System (GIS) and statistical packages, were available. Taking the opportunity to manipulate Russia's voluminous data using modern computer software, and then devising appropriate conservation measures and national strategies from it, would create a basic model useful for conservation initatives around the world.

This project seeks funding to create a biomonitoring system (BIOTA) that will coordinate regional information databases. Access to this comprehensive data will be essential to the development of national conservation objectives and protected area planning. BIOTA would be organized on a regional level, in 20 pilot projects, and work would be coordinated by a national BIOTA center. The main objectives of the national BIOTA center would be to:

- Gather and input data collected from all the reserves, other appropriate literature, and map information into a relational and spatial database that permits all potential users (e.g., Federal agencies, reserve managers, researchers, NGOs) to access, synthesize, and analyze it for a variety of purposes;

- Prepare digital maps of important coverages such as vegetation, land use, species population data, reserve infrastructure, and satellite-based landscape imagery;

- Train reserve managers and researchers to use databases and GIS analyses for planning and decision-making, accessing information from other reserves, promoting environmental education and advocacy, and improving communications capability;

- Establish and coordinate regional GIS centers to fill in information gaps and create strategies for improving monitoring in existing protected areas and for setting up new protected areas; and

- Develop GIS and biomonitoring capabilities within Federal agencies and at the majority of zapovedniks by providing technical equipment, training, and broad organizational structures.

The 20 pilot projects will create desperately needed technological infrastructure to support regional data analysis and compilation of databases using existing materials from zapovedniks and other sources. The regional information centers would be equipped with basic computers and software programs in order to process data and develop new analytical tools specific to the region. Information collected at the regional level would be transmitted to the national center to be integrated into national databases. Better communication between regional and federal departments and improvement of conservation planning at all levels are the expected results. Attachment B.3. has more details on the specific tasks of this project.

The GIS center would also be used to conduct a national-level, protected area gap analysis. The Gap Analysis Project will identify natural areas, ecosystems, critical habitats, and populations of species not covered by the protected area network, but which are important to include because of their contribution to representation, maintaining viable populations, or sustaining ecological functions. High resolution maps of vegetation, geomorphology, wildlife-habitat associations, and landscape features are already available for use in this analysis. Given the trend toward increased resource exploitation and privatization of land in Russia, it is essential that biologically based gap analyses be initiated immediately and concurrence on new protected areas be sought among federal, regional, and local authorities.

The total cost for this three year project is $532,000, including $206,000 for creating a national center, and $326,000 for administrative support and coordination with 20 regional centers. See Attachment C, budgets A.4.1 and A.4.2.

The BIOTA project would be coordinated by Igor Lysenko, a specialist on environmental information databases in the All-Russian Scientific Institute of Nature Preservation and Protected Areas of the Ministry of Environment.

E. Ex-situ Conservation of Rare and Threatened Plant Species

In addition to zapovedniks, Russian botanical gardens play a major role in protecting rare and disappearing species of plants. The lack of coordination between the managements of these agencies, however, reduces their effectiveness. A national strategy would help Russia's 60 botanical gardens develop a comprehensive plan for ex-situ plant conservation and advance in-situ conservation methods. This proposal seeks funding to create a national center for the protection of plants that would coordinate the activities of both the botanical garden and zapovednik networks on a regional basis. The center would first organize an international workshop on plant conservation in botanical gardens in order to develop a management plan to address ex-situ conservation of rare plants. The national center would then work closely with the ten largest botanical gardens in Russia, in various regions, to form a unified information network. Other tasks of the national center for plant conservation would be to form a national collection of rare and disappearing plants, to create a database on ex-situ plant conservation, to house a seed bank of rare plants, and to organize expeditions to study wild plant populations and collect seeds. Measures for in-situ cultivation of rare plants and their conservation in the wild would be developed together with regional experts. The expected results of this project are improvement of the conservation potential of rare plant populations by developing a nationally coordinated strategy, the long-term insurance of plant preservation through creation of a seed bank, organized research and monitoring of in-situ conservation efforts, and the delivery of vital support to the 10 largest botanical garden collections in Russia.

This project will be examined for funding requirements in Phase II.

F. A Comprehensive Strategy for Halting the Illegal Trade in Wildlife Species

The recent opening of Russian borders and the institutional breakdown in protection of wildlife has resulted in the decimation of some of Russia's rarest species. Amur tigers are near extinction, and bears and some other wild felids are now seriously threatened. Saiga antelope are being heavily exploited by poachers and falcons are being smuggled out. Amphibians and reptiles, which transport easily, are smuggled in large numbers. Until recently, Russia had only one international airport and a few checkpoints, so the export of animals was kept under relatively tight control. This situation has changed entirely, and current customs staff, equipment, and regulations are inadequate to control the export of animals. The lack of information on the volume of illegal wildlife trade hinders finding effective action to stop it. Dealing with the illegal trade requires a comprehensive strategy. This umbrella proposal seeks funding for three key components of the strategy:

1) Creation of a TRAFFIC-RUSSIA Organization would be the first step in building awareness of the problem. Regional and international level TRAFFIC organizations around the world have proved strongly effective in bringing the issue of illegal wildlife trade to the attention of governments, public interest groups, and international organizations. The TRAFFIC-RUSSIA program would have the following objectives: to publicize the plight of endangered species; to combat the illegal trade of these species by pressuring countries importing, or using animal parts or live animals smuggled from Russia; and to create a database for monitoring trade of endangered species to be coordinated with other TRAFFIC databases around the world. Specific tasks of this proposal are to create a highly professional agency which would monitor and predict trade activities, hold workshops, publish TRAFFIC information bulletins, and organize an information network to encourage the public to identify poachers and illegal trade participants. Expected results are better regulation of the wildlife trade, and reduced threats to wild populations.

Total cost of this component of the proposed project is $56,000 over three years. See Attachment C, budget A.5.1.

The project will be implemented by Igor Chestin, a Moscow University expert on sustainable use of large predatory animals, in cooperation with scientists from the Social-Ecological Union, and regional institutions.

2) Establishing an effective system of monitoring the export of rare species of plants and animals would also help curb illegal trade of wildlife to and from Russia. The proposed project would improve the operation of customs organizations on the borders of the Soviet Union by providing training of personnel, developing identification mechanisms, and creating special holding points for confiscated animals and plants. The specific measures of the project are to publish guides and develop a training program for Russian customs and veterinary services on regulations for transporting animals and plants, to develop a marking mechanism for identification of illegal wildlife parts, and to build holding facilities at eight customs points for live animals and confiscated goods. The expected results of the project are mitigation of illegal trade at border points, and reduction of threats to endangered species in Russia.

Total cost of this component of the project is $192,000 for two years, including training programs, and building holding points. See Attachment C, budget A.5.2.

The project will be coordinated by A. Vinokurov of the Main Management of Biological Resources of the Ministry of Environment. Executants include experts from the Ministry of Environment, the State Customs Committee, the Ministry of Agriculture, the Institute of Nature Conservation, and Moscow State University.

3) Creation of specialized brigades for protection of endangered and disappearing species is the third critical component of the comprehensive strategy. This demonstration project seeks funding for three projects to halt poaching of particularly rare and threatened species: Amur

tiger in the Far East, saiga antelope in the Caspian region, and wild reindeer in the Taimyrsky region. Populations of all three of these species are highly threatened by rampant poaching. A single Amur tiger, used in the Orient for medicinal purposes, can fetch ten to thirty thousand dollars. About 30% of the tiger population in the Amur-Far East region has been eliminated over the past two years by poachers who cooperate with organized crime. Similarly, saiga antelope populations in the Northern Caucasus, which numbered over one million not long ago, have been reduced to just over 120,000 animals due to the demand for their horns ($10 to $15 a pair on the world market). The demand has also caused an imbalanced sex ratio of about ten females to one male in most populations. Finally, urgent attention is necessary to reduce hunting of wild reindeer on the central arctic peninsula where the largest population in Russia exists. Hunting threatens the population's existence, as well as the existence of the local minority groups that depend on wild reindeer for food and other purposes.

This proposal seeks funding to re-create independent brigades and give them new functions and status to effectively combat poaching. The special units could be rapidly deployed to remote areas in order to combat poaching by well-armed, organized groups. The proposal includes measures to create and outfit the three special brigades, to develop relations with interest groups in the regions, and to collect and publish information on poaching and anti-poaching efforts that will promote awareness and collective action. The expected results are to significantly reduce poaching of endangered and economically valuable species.

Total cost of the three components of the proposal is $354,200 over two years, consisting of $103,600 for the tiger brigade, $115,000 for the saiga antelope brigade, and $135,600 for the wild reindeer brigade. See Attachment C, budget A.5.3.

The three executants of this project are: the District Committee on Ecology and Natural Resources, Vladivostok; the Ministry of Environmental Protection and Natural Resources of the Kalmykia Republic, Halm-Tangch; and the Taimyr District Committee on Ecology and Natural Resources.

G. Harmonizing Biodiversity Conservation with Traditional Resource Use

The natural resources within and around many designated protected areas have been used by indigenous peoples for millennia. Activities such as hunting; fishing for salmon; gathering wild plants, nuts, fungi, and berries; and herding reindeer sustain native peoples. Historically, traditional activities have posed little threat to biodiversity because of sustainable harvesting schedules and the low population densities of indigenous peoples. However, many indigenous groups in Russia are themselves threatened for a variety of reasons including exclusion from traditional hunting, gathering, or pasture (reindeer) lands; overexploitation of natural resources by non-indigenous groups or industries; degradation of native ecosystems from industrial development or logging; and the loss of cultural identity through assimilation into the broader Russian society.

This proposal seeks to assist indigenous peoples throughout Russia in maintaining traditional activities of natural resource use in their native homelands, and ensuring that these activities continue to be compatible with biodiversity conservation as economic, social, and political forces evolve. A support program for indigenous peoples consisting of representatives from the indigenous sector, federal and regional agencies, and academic institutions will be created. Primary objectives of this program will be to (1) assess the resource needs and legal rights of each group, (2) facilitate cooperative resource planning between indigenous groups, local conservation managers, and regional and federal authorities, (3) train indigenous groups to be effective advocates for their resource rights and other interests, (4) educate all parties on the value of biodiversity conservation and the mechanisms needed to achieve it in Russia today, and (5) provide indigenous groups with information and other forms of technical assistance that will strengthen their position as stewards of Russian biodiversity.

The total cost of this two year project is $50,000. An itemized budget is available upon request. Executants of the project will be selected by a Russia-WWF team.

H. Development of a Conservation Trust Fund

At present, the federal budget for supporting the zapovednik system covers no more than 30% of annual operating costs. Funds for national parks and other priority areas are also meager. This funding scenario is unlikely to change in the near future, as other pressing economic needs limit the funds available for conservation activities. The recurrent maintenance costs for zapovedniks alone is so great that, no matter how successful ecotourism efforts are, they will have little impact on financing the entire system.

These economic preconditions suggest the need for a long-term financial solution. We propose to establish a conservation trust fund that would allow Central Ministries to plan strategically over longer periods because budgets obtained from the interest on the principal of an endowment are predictable. Other benefits of trust fund would be: increased prominence of conservation agencies and programs within Russia; greater confidence of federal and regional employees in opportunities for long-term employment, thus attracting better candidates to those staffs; and greater flexibility in determining annual budgets.

This proposed project seeks support for a team of Russian and expatriate experts to draft appropriate legislation and an organizational plan for a Russian conservation trust fund. Expatriate experts would bring extensive experience in designing trust funds for other countries.

Total cost of this proposed project is $50,000 over two years. An itemized budget is available upon request. The Ministry of Environment and WWF will oversee implementation of the project and select appropriate specialists.

Total cost of all proposed projects in the federal portfolio is $4,374,680 over the periods indicated.

SECTION III. REGIONAL CONSERVATION PROPOSALS

Introduction and Statement of Problem

In post-Soviet Russia, regional governments have increasing control over the management of natural resources within their jurisdictions. This section identifies priority investment proposals that directly respond to the changed political landscape. This new regional authority has far-ranging consequences for biodiversity, from the power to create new zapovedniks at one extreme to the exploitation of resources and degradation of existing reserves at the other. In order to positively influence the regional administrations, federal agencies must emphasize the gains possible through conservation initiatives. Furthermore, regional agencies must be provided with the best information and expertise possible, so that they choose wisely from the range of development and conservation proposals. The selected investment projects promote training initiatives at the regional level. Regional proposals are designed to complement efforts at the federal and local levels.

Core Regional Level Proposals

Four initiatives stand out as priorities for funding at the regional level: 1) workshops to address regional conservation planning; 2) increased manpower for regional conservation agencies; 3) a program to finance compilation of two regional biodiversity strategies as demonstration projects; and 4) to strengthen the role of regional and national NGOs as advocates for biodiversity conservation.

A. Regional Conservation Planning Workshops

In November of 1993, the Ministry of Environment and Natural Resources held a pilot workshop in Nizhny Novgorod (formerly Gorky). The purpose of this workshop was to:

- Assess the needs of regional agencies in conservation planning.
- Communicate the urgency of greater protection in areas of high biodiversity value to the appropriate regional governments.
- Identify ways to promote greater involvement by local and regional governments in regional and federal conservation programs.
- Explore new incentives to promote conservation while determining how best to combat disincentives for conservation.

This proposal seeks funding to cultivate conservation initiatives in the newly autonomous regions through the staging of workshops and follow-up conferences, such as the pilot project

described above. This initiative is of highest priority because it fosters formal interaction between federal conservation officials and their regional counterparts. In the absence of such coordination workshops, regional conservation efforts might focus narrowly without attention to broader biodiversity issues. To produce a better dialogue between federal and regional planners, and improve the potential for developing regional conservation strategies, up to ten regional workshops and four follow-up conferences will be supported by this proposed project.

Total cost of this proposed project is $20,000 for ten workshops and $20,000 for four follow-up conferences held in various regions of Russia.

The project executant will be the Director of the Ministry of Environment with liaison officials in all of the regional environmental agencies.

B. Strengthening of Regional Conservation Agencies

The long-term viability of biodiversity conservation efforts in post-Soviet Russia may well be determined by the effectiveness and commitment of regional agencies. Political changes in Russia after the recent parliamentary revolt mean that new elections for regional and city councils will take place, along with changes in the way regional and central agencies interact. These local governmental bodies will begin to have more decision-making power to effect their own regional environmental policies. However, due to the economic depression in Russia, these transforming agencies lack the proper financing to operate effectively. This investment proposal seeks funding to equip and train six key regional agencies with the trained staff and materials needed to improve conservation planning and management. A working group will choose the six regional agencies and hold initial coordination meetings. Representatives of those regional agencies will receive training on issues of conservation planning, sustainable development, and public relations in the environmental milieu. Selection of regional agencies will be made after the first round of workshops described above. Improved capacity for conservation management in the regions is the expected result of this project. Regions not covered in this initial proposal can be included in Phase II.

The total cost of this project is $600,000 over two years.

The project executants are to be determined after the first few planning workshops described in Section A.

C. Financing of Regional Biodiversity Conservation Strategies

The increased autonomy of regional governments suggests that each region will ultimately need its own regional biodiversity strategy. This proposed project seeks funding to finance the compilation of two such regional strategies as a demonstration project. If successful, this

initiative could be expanded in Phase II of this assistance program (Section V). Selection of the two regions will be made by the Ministry of Environment after completion of several regional conservation planning workshops detailed in Section A above. The objectives of this project are to give incentive for regional governments to develop long-term plans to conserve the biodiversity of their regions, and to select two outstanding regional initiatives that will serve as a model for other regions of Russia.

The total cost of this project is $200,000 over 1.5 years.

The project executants are to be determined after the first two planning workshops as described in Section A.

D. Strengthening and Supporting NGOs

The fourth initiative will strengthen the role of NGOs working on down from the federal to the grass-roots level. Phase I includes several investment proposals initiated by Russian NGOs, but greater participation of NGOs in future projects will only be possible if their capacity to develop projects, draft proposals, and implement them is greatly improved. The rapid growth and expanded capabilities of NGOs is vital to the long-term conservation of biodiversity in Russia. Three primary activities to be financed under this umbrella proposal will be to provide Russian NGOs with basic equipment for communications and office space, to design and deliver training workshops, and to create an endowment fund accessible to NGOs for promotion of conservation action at the grass-roots level.

The total cost of this project will be $250,000, with $50,000 being used to support ten training workshops and the remainder for technical assistance and the NGO endowment fund. The project will be carried out in cooperation with regional and national non-governmental environmental organizations.

The total cost of the regional program is $1,090,000.

SECTION IV. BIOREGIONAL CONSERVATION PROPOSALS

Introduction

Bioregional assessments of conservation potential, threats, and biological value are crucial to the development of a national biodiversity conservation strategy. A second step is to determine the extent to which critical areas for biodiversity conservation are maintained in an existing network of protected parks, indigenous reserves, or multiple-use areas (Section II). The bioregional investment proposals selected for this portfolio address urgent threats to biodiversity in key areas, but also reflect the chief concerns of maintaining representation, viable populations, and ecological processes. These investment proposals also affirm that the federal system of zapovedniks must receive emergency assistance because they contribute most to the long-term conservation of biodiversity in Russia.

This section takes a long-term view of biodiversity conservation in Russia, but also highlights the immediate crises. Financial collapse in Russia has aggravated an already decrepit infrastructure within a number of zapovedniks. Basic needs, such as a reliable telephone, are a luxury. In emergency situations, some zapovednik directors must travel 20 km or more just to place a telephone call. Most rangers live on or near the plot of land they are responsible for protecting, and during winter months are virtually cut off from outside communication or assistance. Rampant inflation has greatly reduced the value of staff salaries, in the irregular event when they are actually paid. Data collected over years of monitoring and research are often compiled into hand-written journals, making analysis and review of information a formidable and painstaking task. Despite these physical and economic hardships, the majority of the zapovednik staff have remained dedicated to their work.

This investment portfolio is designed so that, with small influxes of financial assistance, certain aspects of this critical situation would be quickly remedied. An electronic mail system has been set up in many parts of Russia, and with a modem and modern communications, remote zapovedniks could interact with institutions all over the country and the world. Even small investments in computers and transportation would enormously improve monitoring and protection of habitats from internal and external threats. Securing adequate salaries for zapovednik staff is critical, but cannot be fully addressed in this investment portfolio.

The analytical framework proposed here divides Russia into 14 distinct bioregions (Fig. 3). Investment proposals are arranged by bioregion chapters to promote greater biological representation of projects. In cases where a protected area overlaps bioregion boundaries, or has subsites in other bioregions, it has been relegated to the bioregion in which the majority of the area lies.

Each bioregion chapter begins with a description of the geographic location and range of the bioregion (accompanied by a map). The descriptions include outstanding biological features,

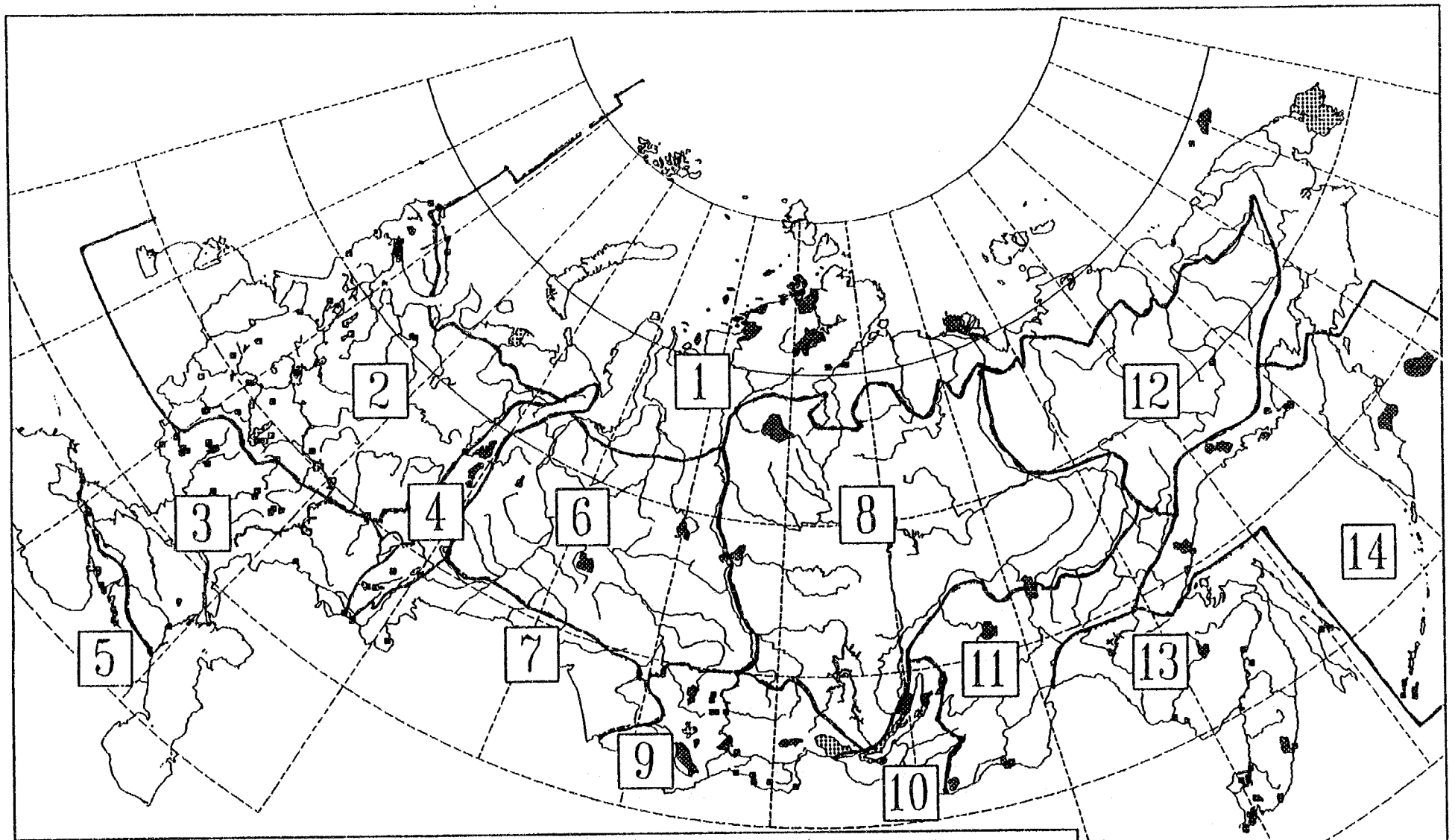

Figure 3. Major Bioregions of Russia

1. Arctic
2. Kola-Karelian & Eastern European Forest
3. Eastern European Forest-Steppe, Steppe & Caspian Semidesert
4. Ural Mountains
5. Great Caucasus
6. Western Siberian Forest
7. Western Siberian Forest-Steppe & Steppe
8. Central Siberia
9. Altai-Sayansky
10. Baikal
11. Zabaikal
12. Yano-Kolymsky
13. Amur-Sakhalin
14. Kamchatka-Okhotsk Sea

Zapovednik — National Nature Park — Bioregion boundaries

unique landscapes, associations among important ecosystems, and species of interest or special concern. An overview of the major short- and long-term threats to biodiversity follow this description. Each bioregional chapter also considers sustainable use, ecotourism, and new approaches to conserving biodiversity.

We provide capsule summaries of investment proposals and present them in two categories: a) existing zapovedniks in urgent need of assistance, and b) new reserves to be created that will close gaps in the existing system. Each capsule summary identifies biodiversity values of the area under consideration, specific threats, objectives, expected results, major budget expenses, timetable, and project executants. Capsule summaries were used to curb the length of the entire document; however, full-length proposals are available from the editors. Itemized budgets of most projects are located in Attachment C.

Four aspects of the bioregional proposals require some elaboration. First, most of the zapovednik budgets presented in the proposals span a three-year period. This interval is considered the minimum funding period necessary to cover the existing financial crisis. At the end of three years, it is expected that the Federal government will have the financial resources to assume greater responsibility in meeting project costs. The proposed conservation trust fund, if funded, would also continue financing the projects identified in this section and in Phase II (Section V).

Second, the bioregional proposals highlight the creation of new reserves that directly address gaps in the current protected areas system. Some may argue that in this financial crisis, creation of new zapovedniks is a luxury. In fact, the next few years may provide the last genuine opportunity to close gaps in the existing system, or to expand the size of reserves that are currently too small to be effective. Increased privatization is likely to intensify in the coming years, contributing to a political climate that may ignore or thwart efforts to conserve representation of protected areas in some bioregions.

Third, a number of investment proposals are included as demonstration projects to promote traditional use of resources by ethnic minorities. Where new reserves are proposed, zoning of core protected areas and zones for extraction by local people are clearly delineated. A second phase of this program (Section V) will recommend more extensive replication of these demonstration projects as experience in developing successful buffer-zone projects grows.

Fourth, the investment proposals favor ecosystem conservation over single-species conservation programs. The rationale behind this approach is that an effective system of reserves that are representative and of sufficient size, number, and shape will conserve viable populations of 95% of all species in a country. However, conservation of some species cannot be addressed at the ecosystem level. These species are typically threatened by poaching, overharvesting, loss of habitat, or are migratory. The existing zapovednik system offers protection to more than two-thirds of all species listed as threatened or endangered in Russia. Many of the proposals, arranged by the bioregion in which the species occurs, consider the long-term survival of these threatened species.

Although all of the bioregional proposals in this analysis qualify as urgent, the Russia-WWF team lists top- and second-level priority projects at the end of each bioregion chapter. This prioritization involved a variety of factors related to national and bioregional goals, such as the contribution of a project to biodiversity conservation, the nature of the threats, and the cost-effectiveness of the proposed initiative.

The bioregional chapters are arranged as follows:

1. Arctic
2. Kola-Karelian and Eastern European Forest
3. European Forest-Steppe, Steppe, and Caspian Semidesert
4. Ural Mountains
5. Greater Caucasus
6. Western Siberian Forest
7. Western Siberian Forest-Steppe and Steppe
8. Central Siberian
9. Altai-Sayansky
10. Baikal
11. Zabaikal
12. Yano-Kolymsky
13. Amur-Sakhalin
14. Kamchatka-Okhotsk Sea

1. THE ARCTIC BIOREGION

I. Geographical Location and Range

The Arctic bioregion extends across the northern boundary of Russia and covers approximately 12% of the country (Figs. 4a and 4b). It includes several large and many smaller islands, such as Novaya Zemlya, Franz Joseph, Novo-Sibirsky, and Wrangel. This bioregion also extends to the surrounding marine systems that occupy parts of the Arctic Ocean, and the Barents, Kara, Laptev, East Siberian, Chukchi, and Bering Seas.

II. Outstanding Biological Features

Landscape Features

The Arctic Bioregion is characterized by vast expanses of polar deserts, various tundra associations, and coastal marine environments. Some of these landscapes, although quite poor in species, contain extremely productive habitats. Another prominent feature is the sparse, widely scattered human habitation; population density in the Arctic is the lowest among all the bioregions. The long, harsh winters, short growing seasons, and the high cost of subsidies to maintain human settlements limits the viability of large-scale developments in this bioregion, with the possible exceptions of intensive extractive industries and reindeer husbandry.

Associations With Other Ecosystems

Conservation of terrestrial and marine ecosystems in the Arctic are closely linked. Many terrestrial species feed in marine coastal habitats and some marine mammals use terrestrial habitats for breeding and hauling out sites. In addition, deltas of several major river systems, including the Lena, Ob, and Yenisey, serve as critical breeding grounds for large populations of migratory waterfowl and shorebirds.

Species of Interest or Concern

The most striking features of the Arctic terrestrial biota are the depauperate nature of most plant and animal groups, the circumpolar distribution of many species, the dependence of many terrestrial species on the marine environments, and animal migrations. At least 69 species of nesting birds have been recorded and eleven species of resident mammals. The marine mammal fauna is more diverse with 14 species of cetaceans and nine species of pinnipeds. The fauna and flora of the shrub tundra zone is more diverse than that of low tundra due to its milder climate and greater habitat diversity. Numerous migratory waterfowl and shorebirds nest in the tundra and broad river deltas including several rare, or endemic species such as the red-breasted goose (*Branta ruficollis*), Siberian crane (*Grus*

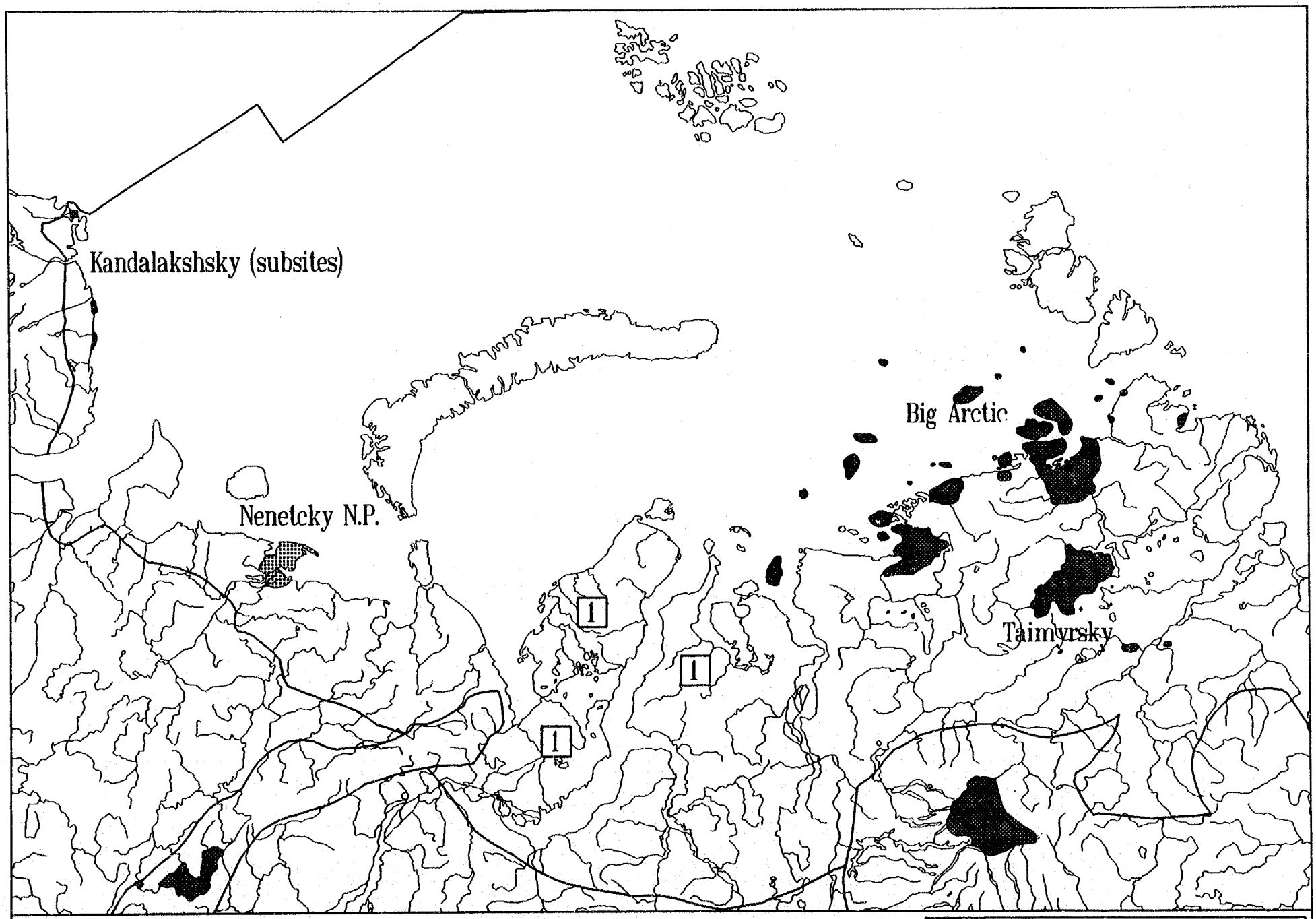

Figure 4a. Bioregion 1: Arctic (western portion)

Zapovednik | National Nature Park | Bioregion boundaries

Planned Zapovednik :

1 - Gydansky

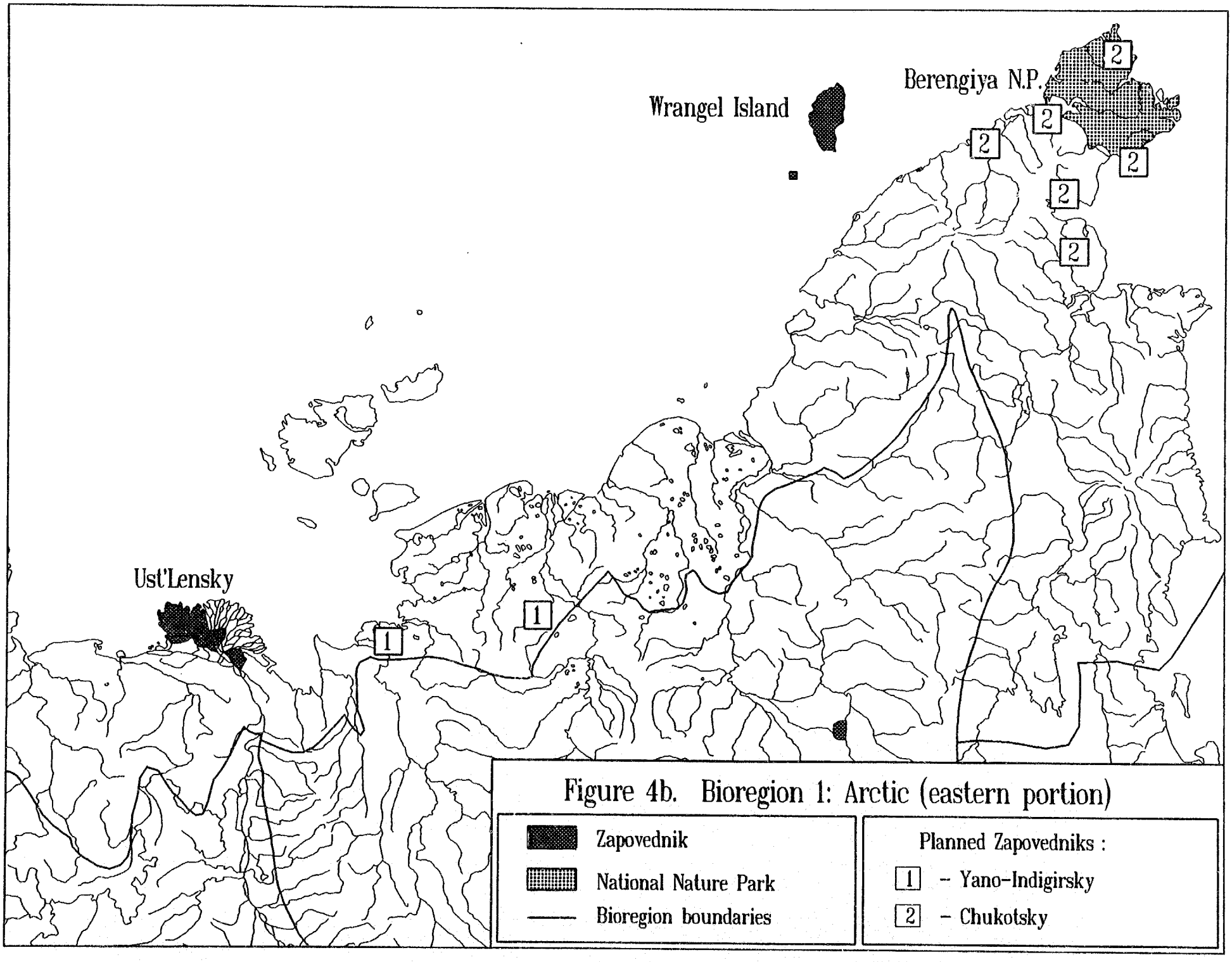

Figure 4b. Bioregion 1: Arctic (eastern portion)

leucogeronus), spoon-billed sandpiper (*Eurynorhynchus pygmaeus*), and buff-breasted sandpiper (*Tryngites subruficollis*). Threatened or endangered species native to the Artic bioregion and listed in the International and Russian Red Data Books of Rare and Disappearing Species include the polar bear (*Ursus maritimus*), walrus (*Odobenus rosmarus*), narwhal (*Monodon monoceros*), wild reindeer (Novaya Zemlya population) (*Rangifer tarandus pearsoni*), red-breasted goose, and others. Other resident vertebrate species include reindeer, polar fox (*Lagopus alopex*), many species of waterfowl, and anadromous fishes such as arctic char.

III. Overview of Short- and Long-Term Threats

Although much of the Arctic remains relatively intact, certain parts of the bioregion are experiencing severe disturbance. Threats to the Arctic region are described below.

- Extensive geological prospecting, test borings, and industrial output of raw materials greatly impact some of the Arctic islands and many regions on the mainland. The extreme fragility of tundra soils and vegetation makes these habitats sensitive to even minor disturbances. Tire tracks made in the thin tundra soils overlying the permafrost take decades, in some cases, even centuries to disappear.

- The largest refineries and iron ore plants in Russia are also located in the Arctic bioregion. The impacts of inefficient refining techniques, transportation, and processing of hydrocarbons have led to major degradation or complete loss of habitats over extensive areas, particularly in the Yamal, Taz, and Kola peninsulas. An estimated 200,000 km^2 of reindeer pasture has been destroyed over the past 20 years from industrial degradation.

- The island of Novaya Zemlya and parts of the Chukotka region are contaminated with radioactive waste, creating grave ecological disturbances and health risks for wildlife and people.

- The decline of traditional reindeer husbandry has resulted from the industrial devastation of summer and winter ranges, migration routes blocked by pipelines, and the shift away from ecologically sound herd management practices.

- The strong annual cycling of populations of arctic lemmings and associated predators, and of the productivity of tundra vegetation, makes arctic ecosystems very susceptible to catastrophic shifts in ecosystem dynamics from even relatively minor disturbances.

- Loss of forest cover from firewood collection and industrial pollution has destroyed fragile forests and degraded tundra landscapes.

- Air pollution has diminished the abundance of some plant species, simplified plant communities, and caused the loss of lichen (reindeer moss, *Cladonia rangiferina*) cover, a primary forage for reindeer.

- The lack of resiliency of Arctic plant communities and soil structure precludes habitat restoration after intensive human activity. Regeneration of the native vegetation may occur on a time scale of centuries rather than decades. Thus, while the Arctic bioregion has experienced a limited amount of development activity to date, the scars from poorly planned projects may require centuries to heal.

- Widespread degradation of natural arctic landscapes through extractive industries, air pollution, or regional climate change can profoundly affect global temperatures. Examples include atmospheric release of carbon compounds (CO_2) from the decomposition of melted tundra soils, and methane from frozen deposits in permafrost and shallow marine sediments.

IV. Conservation Potential

The long-term viability of biological diversity in the Arctic depends to a large extent on the maintenance of five key reserves: Kandalakshsky, Taimyrsky, Big Arctic, Ust-Lensky, and Wrangel Island zapovedniks (Fig. 5). Each zapovednik plays an important role in protecting various environmental features of the region; however, their maintenance alone does not ensure the overall representativeness and redundancy of protected areas in the Artic region.

Existing Zapovedniks Requiring Urgent Assistance

- **Kandalakshsky Zapovednik** (705 km^2), created in 1932, is located on the coast and islands of the Kandalakshsky Gulf and the Barents Sea. Kandalakshsky protects the nesting areas and migration routes of many species of waterfowl and colonial seabirds and is listed under the Ramsar convention. The zapovednik consists of 3 sections of land on the coast of the Kandalakshsky Gulf of the White Sea and two strips on the coast and islands of the Barents Sea. Its littoral and marine component amounts to an additional 530 km^2. Because the region under consideration includes only the two last strips, and its largest part belongs to the taiga zone, this zapovednik and its problems will be described in the corresponding section of the Eastern European forest bioregion.

- **Taimyrsky Zapovednik** (3,483 km^2) occupies the middle part of the Taimyr Peninsula. Taimyrsky is prominent among Arctic zapovedniks because it contains a wide range of tundra habitats and relatively intact communities. Despite its severe climate and short summer, the zapovednik provides habitat for 10 species of mammals, and nesting areas for about 50 species of birds, nine of which are listed in the Russian Red Data Book, including the bean goose (*Anser fabalis*), lesser white-fronted goose (*Anser erythropus*), Bewick's swan (*Cygnus*

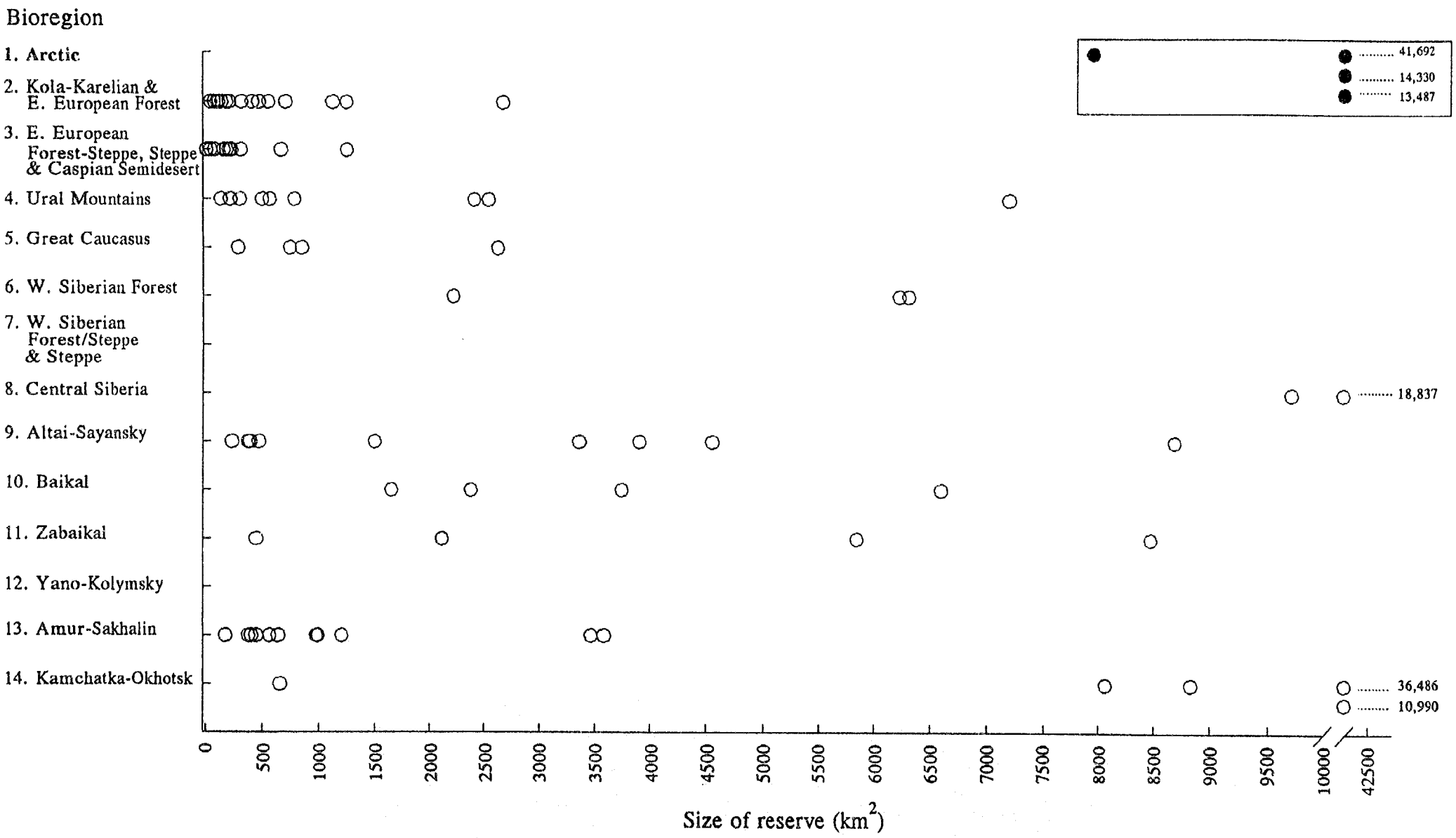

Figure 5. Size of existing zapovedniks in the Arctic bioregion compared to size of zapovedniks in other bioregions.

bewickii), and the red-breasted goose. The freshwater systems of the Taimyrsky Zapovednik support more than 20 fish species and are an important spawning grounds for several anadromous species. The region contains the Ary-Mass forests, Russia's northernmost forested area, and its reindeer pastures are among the most productive in the bioregion.

Human disturbance is generally low, but increased levels of air pollution and radioactivity have been recorded in some areas. The main problem is the poaching of fish, reindeer, and fur-bearing animals. Zapovednik staff participate in different local and international scientific programs in the protection and study of migratory birds. However, the lack of equipment for normal protection of the territory and lack of funds for monitoring populations threaten not only conservation of the wildlife contained within the zapovednik, but the very existence of this highly representative ecosystem of the Siberian Arctic.

The proposed project for Taimyrsky Zapovednik strives to improve infrastructure by procuring the appropriate transportation and communications equipment. Transportation costs for monitoring are relatively expensive due to the remoteness of the area and necessity of air travel to avoid vehicle damage to sensitive tundra habitats. The project will also further efforts to improve ecological awareness in the community and promote public support of the zapovednik by publishing information booklets and short films. The expected results are to improve the effectiveness of biodiversity protection and to encourage public compliance of conservation regulations within the zapovednik.

The total cost of the project is $326,925 over three years, divided between equipment costs and educational activities. See Attachment C, budget 1.1.

The project will be executed by the staff of the Taimyrsky Zapovednik.

- **Big Arctic Zapovednik**, created in 1993, is situated on the northern coastal section of the Taimyr Peninsula and islands of the Kara Sea. At 41,690 km^2 in size, the Big Arctic Zapovednik is not only Russia's largest reserve, but one of the world's largest protected areas. As a result of its size and location, the zapovednik represents the majority of the landscape and biological diversity of the Siberian Arctic. It includes lowlands, deltas, and estuaries of the Yenisey, Pyasina, and Taimyra Rivers. The only continental Arctic deserts in the world are located on the Cheluskyn Peninsula. Over 240 species of vascular plants have been recorded, and many of its animal species are listed in the International and Russian Red Data Books, including the polar bear, walrus, narwhal, wild reindeer, red-breasted goose, and others. Big Arctic's biological value is also heightened by its location as the primary destination of the eastern Atlantic bird migration route.

Being practically unexposed to development, Big Arctic is one of the most pristine natural areas in the world. However, development of recently discovered large mineral reserves and further geological exploration will lead to serious destruction of natural habitats and

degradation of the landscape. The nearby Noril Mountain mine has already caused severely negative impacts on the environment over an extensive area.

The tasks of this project are to assist the zapovednik with start-up and operating costs for the initial three years; to provide for protection activities, transportation, communications equipment, and construction of facilities; and to train zapovednik staff at special centers. Transportation costs are high due to the reserve's remoteness, lack of roads, and extremely large area. Future costs can be covered by the development of limited ecotourism and scientific research activities. Expected results of the project are installation of infrastructure and sufficient protection from external threats for the newly created Big Arctic Zapovednik.

The total cost of the project is $464,820 over three years, consisting of expenses for equipment and ecological training. See Attachment C, budget 1.2.

The project will be carried out by the staff of the Big Arctic Zapovednik.

- **Wrangel Island Zapovednik** (7,957 km^2), located in the extreme northeast of Russia, is the only protected island ecosystem in the Arctic region. It is located on Wrangel and Geraldt islands which are covered in high arctic tundra and situated on the boundary between the Eastern Siberia and Chukotka Seas. The only remaining snow goose (*Anser caerulescens*) population of Russia is located in this zapovednik. The island also hosts an introduced population of musk ox (*Ovibos moschatus*), one of the largest walrus hauling out sites in the world, numerous bird rookeries supporting over half a million birds, and several unique plant communities. The polar bear, buff-breasted sandpiper, and spoon-billed sandpiper, all rare species listed in the Red Data Book, are also located on these islands.

Threats to the natural communities of the zapovednik include uncontrolled poaching of wildlife, environmental pollution from military bases, and overflights of walrus hauling out sites that have led to hundreds of walruses being killed during stampedes. The poor condition of the logistical base of the zapovednik also hinders effective protection efforts, as does the lack of communications, electricity, and funds.

The proposed project addresses difficult management issues and seeks financial assistance to support the existence of the Wrangel Island Zapovednik through this time of crisis. The project focuses on basic needs such as communications and transportation, reconstruction of facilities, and monitoring of the zapovednik by air, the only tenable option in this remote area. A small part of the funding will be allocated to publishing information booklets about the zapovednik. The project expects to result in improved monitoring and protection of the Wrangel and Gerald island ecosystems, and strengthened zapovednik infrastructure.

Total cost of the project is $268,075 over three years, divided between technical costs and ecological education activities. See Attachment C, budget 1.3. The project will be executed by the staff of the Wrangel Island Zapovednik.

Gaps in Bioregional Conservation

The distribution map of the Arctic Bioregion's zapovedniks shows that, at present, only the Siberian Arctic is adequately covered by reserves. There are currently no zapovedniks between the relatively small Kandalakshsky Reserve, located near the Barents Sea, and the Taimyrsky Reserve in Central Siberia. Similarly, the vast expanse between the Taimyrsky Zapovednik and Wrangel Island Zapovednik contains only one zapovednik, Ust-Lensky. Ust-Lensky Zapovednik incorporates portions of the largest river delta in Siberia, the Lena Delta. The marshes and tundra of this delta represent globally important nesting habitat for numerous species of waterfowl, shorebirds, and songbirds. The creation, expansion, and strengthening of protected areas in the Lena Delta is being addressed through a number of initiatives developed by the Russian Ministry and cooperative efforts with WWF and bilateral organizations. Conservation action in the Lena Delta will be more fully detailed in Phase II, as details of the initiatives solidify. To achieve better representation in the Arctic bioregion, the Bolshezemelsky, Jamalo-Gydansky, Chukotsky, and Novozemelsky zapovedniks need to be created. With them, satisfactory redundancy of threatened habitats and wildlife populations within formally protected areas (see Section 1 for information on redundancy of protected areas) will also be achieved. The large-scale migrations and wanderings of waterfowl, shorebirds, reindeer, lemmings (small rodents that are important prey), and predators in Arctic ecosystems require very large protected areas in order to maintain viable populations and ecosystem dynamics.

Creation of New Protected Areas

- Creation of the **Bolshezemelsky Zapovednik** is critical because intensive oil and gas exploration, and oil field development will lead to irreversible changes in the last pristine tundra habitat of the European North. Financial assistance and reserve planning must be investigated during Phase II of this project.

- Creation of the **Jamalo-Gydansky Zapovednik** has been in the planning stage since 1979. Its rich, arctic communities and abundant populations of species listed in the Red Data Book help justify its creation, as does the increasing threat of natural gas and crude oil extraction in the vicinity. Oil and gas exploration has threatened not only the biodiversity of the area, but also the traditional lifestyles of indigenous peoples such as the Hanty, Nentsy, and Mansy. Creation of a zapovednik with buffer zones allotted to indigenous people for traditional use of natural resources can be compatible with biodiversity conservation. These measures would help mitigate the disturbance of oil and gas extraction in fragile landscapes, and foster instead of destroy the traditional economies of indigenous minorities.

Phase 1 of this project would identify initial borders and zoning for the new protected area, based on surveys conducted by scientific specialists and, with the approval of the Ministry of Environment, legal organization of the zapovednik and all administrative procedures would follow. In Phase 2, creation of infrastructure, purchase of operations equipment, and measures for protection would be undertaken. By creating a specially protected core area and a management regime for nature use, the project will protect a unique ecosystem from encroaching oil and gas exploration, as well as other threats.

The total cost of the project is $312,500 over four years, including $12,500 for Phase 1 and $300,000 for Phase 2. See Attachment C, budget 1.4.

Phase 1 will be executed by the survey team of Priroda Rossia. Phase 2 will be carried out by the staff of the new zapovednik.

- Creation of the **Chukotka Zapovednik**, on the Chukotka Peninsula, would protect the habitat of many rare and endemic species listed in the International and Russian Red Data Books, such as the polar bear, gyrfalcon (*Falco rusticolus*), spoon-billed sandpiper, and buff-breasted sandpiper. Many of these species will be protected in accordance with the Russian-American Convention on Migratory Birds and may be incorporated into part of the future Beringia International Reserve. The coastal zone, tundra, and shrub tundra of Chukotka suffer from increasing overexploitation of wildlife and industrial development. Changes in the lifestyle of indigenous peoples has also led to the erosion of traditional hunting and reindeer breeding practices. The growing demand for eggs of rare birds by "collectors" now threatens several endangered species due to the lack of adequate funds for effective monitoring and protection of breeding grounds.

The project will establish the legal basis for the creation, and identification of borders and zones, for a zapovednik of 6,000 to 8,000 km^2 in Phase 1. The proposal includes plans to inventory rare flora and fauna in the region and develop measures for their protection. Phase 2 will create the necessary infrastructure for operation of the zapovednik. The result of the project will be a needed inventory of, and active protection for, rare species and important Arctic habitats. The result of the project will be the creation of a new protected area essential to a comprehensive biodiversity conservation strategy for Russia.

The total cost of Phase 1 of the project is $14,000 in one year. The cost of Phase 2, a three year project, is approximately $300,000 and will be clarified in Phase 1. See Attachment C, budget 1.5.

Phase 1 will be carried out by the survey team of Priroda Rossia.
Subsequent phases will be implemented by the staff of the new zapovednik.

V. Sustainable Use of Resources

Several proposals for zapovedniks in this bioregion address sustainable use in respect to native minorities. The Big Arctic Zapovednik considers the role of ecotourism in sustaining conservation efforts. The project on monitoring and preserving baleen whales looks at using traditional forms of hunting to control exploitation of the species.

VI. Species of Special Concern

One proposal addresses species of special concern that are not effectively protected in terrestrial reserves:

- The baleen whale project will monitor and develop conservation strategies for **several species of endangered whales** in the Bering Strait region. The project will collect basic data on distribution, movements, and population structure in order to conserve whale populations from their exploitation by native hunters. Baleen whales are particularly vulnerable to extinction through hunting, because of their low reproductive rates. The Bering Strait region is an important migration corridor and critical feeding area for a number of rare baleen whale species such as the gray whale (*Eschrichtius gibbosus*), bowhead whale (*Balaena mysticetus*), finback whale (*Balaenoptera physalus*), humpback whale (*Megaptera novaeangliae*), and Minke whale (*Balaenoptera acutirostrata*). The marine ecosystems of this region are also increasingly threatened by oil pollution from shelf exploration.

The objectives of the project are to establish a monitoring system for baleen whales and other marine mammals, determine the population structure and dynamics of the Chukotka-Bering Sea bowhead whale and methods for its conservation, and apply traditional skills of the Eskimos and Chukchi to the study and the conservation of baleen whales. The resulting database on whale population dynamics and resource use patterns will facilitate developing effective conservation measures for the species, including guidelines for limited use by indigenous peoples.

This project will be further considered for funding in Phase II.

VII. Total cost of proposals designed for the Arctic Bioregion is $1,686,320 for the periods indicated.

PRIORITIES: The Big Arctic, Wrangel Island, Jamalo-Gydansky, and Chukotka projects are rated as highest priority. The Taimyrsky Project is given the next level of priority.

2. THE KOLA-KARELIAN AND EASTERN EUROPEAN FOREST BIOREGION

I. Geographical Location and Range

The Eastern European forest bioregion occupies the northern part of the Eastern European Russian Plain, covering approximately half of European Russia and 15% of the total country area (Fig. 6). The large Kola Peninsula to the northwest and several small islands in the White Sea are included within this region.

II. Outstanding Biological Features

Landscape Features

Northern habitats of the Kola-Karelian and Eastern European forest bioregion consist of large expanses of original taiga spruce forests. The central and southern parts of the region were formerly covered by mixed broadleaf-conifer and broadleaf forests, but have been greatly altered by logging and agricultural development. Marshes are abundant across the region, particularly in the northern section where past glaciation has left a myriad of lakes. The entire bioregion is characterized by low-lying terrain.

This bioregion has the highest population density and contains the two largest cities in Russia, Moscow (ca. 9 million) and St. Petersburg (ca. 4 million). This is also the most industrially developed of all the Russian bioregions, with a profusion of industrial, agricultural, and forestry enterprises. Hydroelectric development has been intense, especially along the Volga, where eight major dams have been built.

Associations with Other Ecosystems

Conservation of biodiversity in this region must encompass the relationship of terrestrial ecosystems with those of the extensive river system, as well as small areas of Arctic tundra and marine ecosystems in the northern part of the region. The largest river in Europe, the Volga, spans the entire region, flowing south, with the smaller Pechora and Northern Dvina rivers flowing north. There are numerous large lakes and artificial reservoirs throughout the region, including more than 30,000 lakes on the Karelia Isthmus alone. The northern edge of the region is bordered by the White Sea and part of the Barents Sea, and represents typical coastal tundra habitat. The largest waterfowl migration route in Europe generally follows the Volga River.

Species of Interest or Concern

Eleven mammals and 15 bird species in the region are listed in the Russian Red Data Book of rare and endangered species. The region has many large vertebrate species, such as the

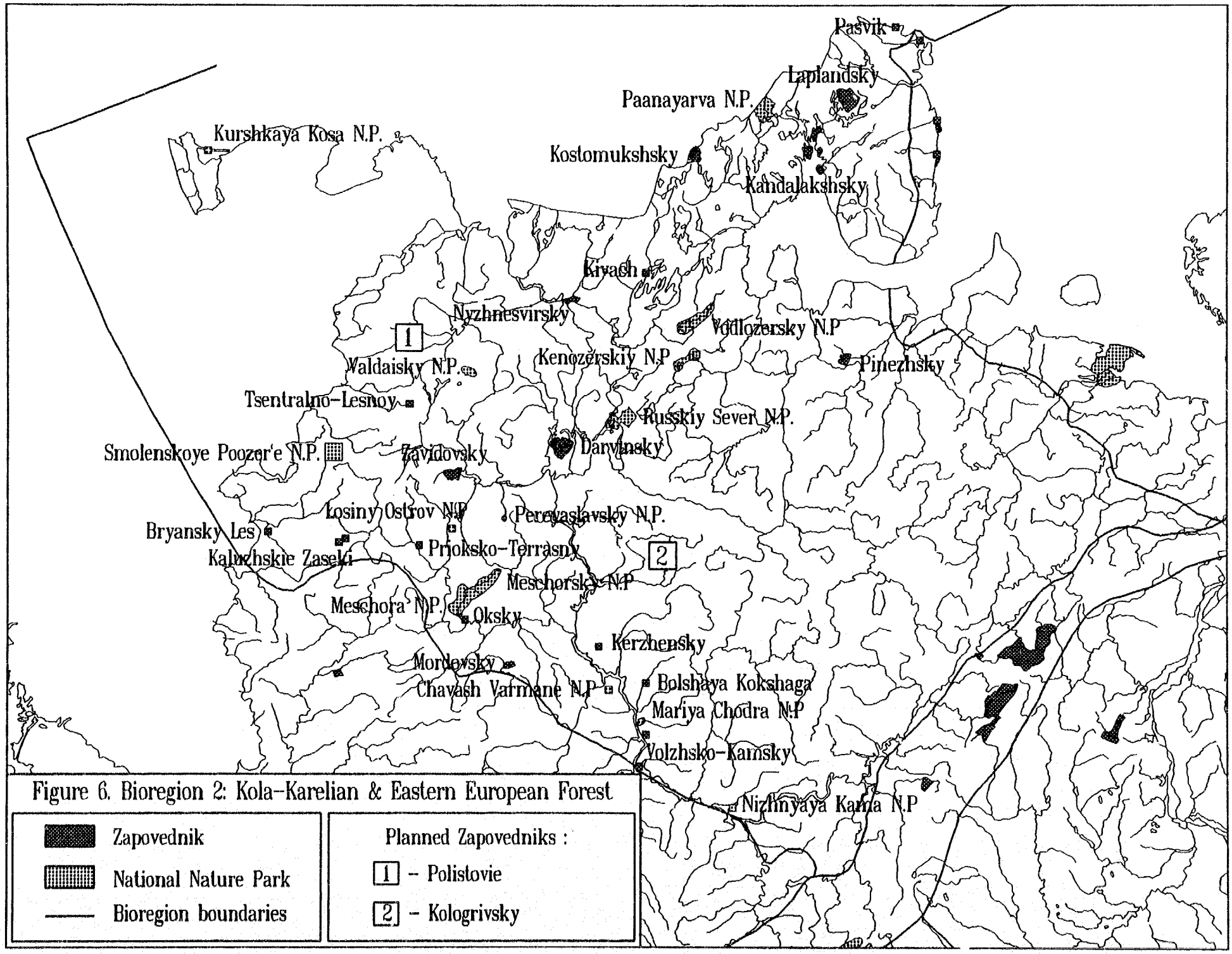

Figure 6. Bioregion 2: Kola-Karelian & Eastern European Forest

brown bear (*Ursus arctos*), lynx (*Lynx lynx*), moose (*Alces alces*), mink (*Mustela lutreola*), marten (*Martes martes*), and wild boar (*Sus scrofa*), but in recent years, increased poaching has significantly reduced the populations of these species. During seasonal migrations, wild and semi-wild reindeer (*Rangifer tarandus*) populations enter into the taiga region from tundra habitats. Migratory birds in the region include the greater white-fronted goose (*Anser albifrons*), common crane (*Grus grus*), and numerous shorebirds and songbirds. A number of wetland plants and species associated with old growth broadleaf-conifer forests are currently threatened or endangered due to habitat loss.

III. Overview of Short- and Long-term Threats

Threats to biodiversity are substantial and diverse in this bioregion. Unsustainable forestry practices and uncontrolled burning continue to reduce forest cover and alter species compositions throughout the region. Aquatic habitats have been damaged by hydroelectric dams, reservoir construction, industrial wastes, pesticides, sedimentation, and physical damage from the transport of timber in northern areas. Habitat destruction and overfishing have resulted in drastic declines in fish species such as sturgeon (*Acipenser* spp.), and salmon (*Onchorhyncus* spp.). Large-scale drainage of wetlands has reduced the amount and quality of habitat available for amphibians, birds, and a unique aquatic insectivore, the desman (*Desmana moshata*). Most of the remaining blocks of original forest are quite small, highly fragmented, and isolated from one another. Only through intensive management of existing reserves can biodiversity be maintained in the region because of the relict nature of the remaining natural habitat, the loss of large-scale ecosystem dynamics, and continuing pressure from human activities.

Atmospheric deposition of sulfur compounds, nitrates, and heavy metals from industrial complexes continuously degrade the northwest taiga forest. For example, large areas of forest on the Kola Peninsula have been destroyed or damaged by airborne industrial pollutants from the Monchegozsky industrial complex. Lichen forage for migrating reindeer has been greatly reduced and studies indicate that the original lichen-forest communities have been permanently altered.

Protection of natural resources in the region is hindered by the country's economic hardship and the lack of financial resources allocated for conservation. The situation is aggravated by the absence of sustainable development programs, which leaves the area vulnerable to competing hunters, foresters, and agricultural and industrial enterprises.

IV. Conservation Potential

The Eastern European Forest bioregion contains the highest number of protected areas of all the bioregions in Russia, with 15 zapovedniks and 12 national parks. The size of zapovedniks ranges from 490 km^2 to 2,780 km^2 (Fig. 7), many of which represent pine forest

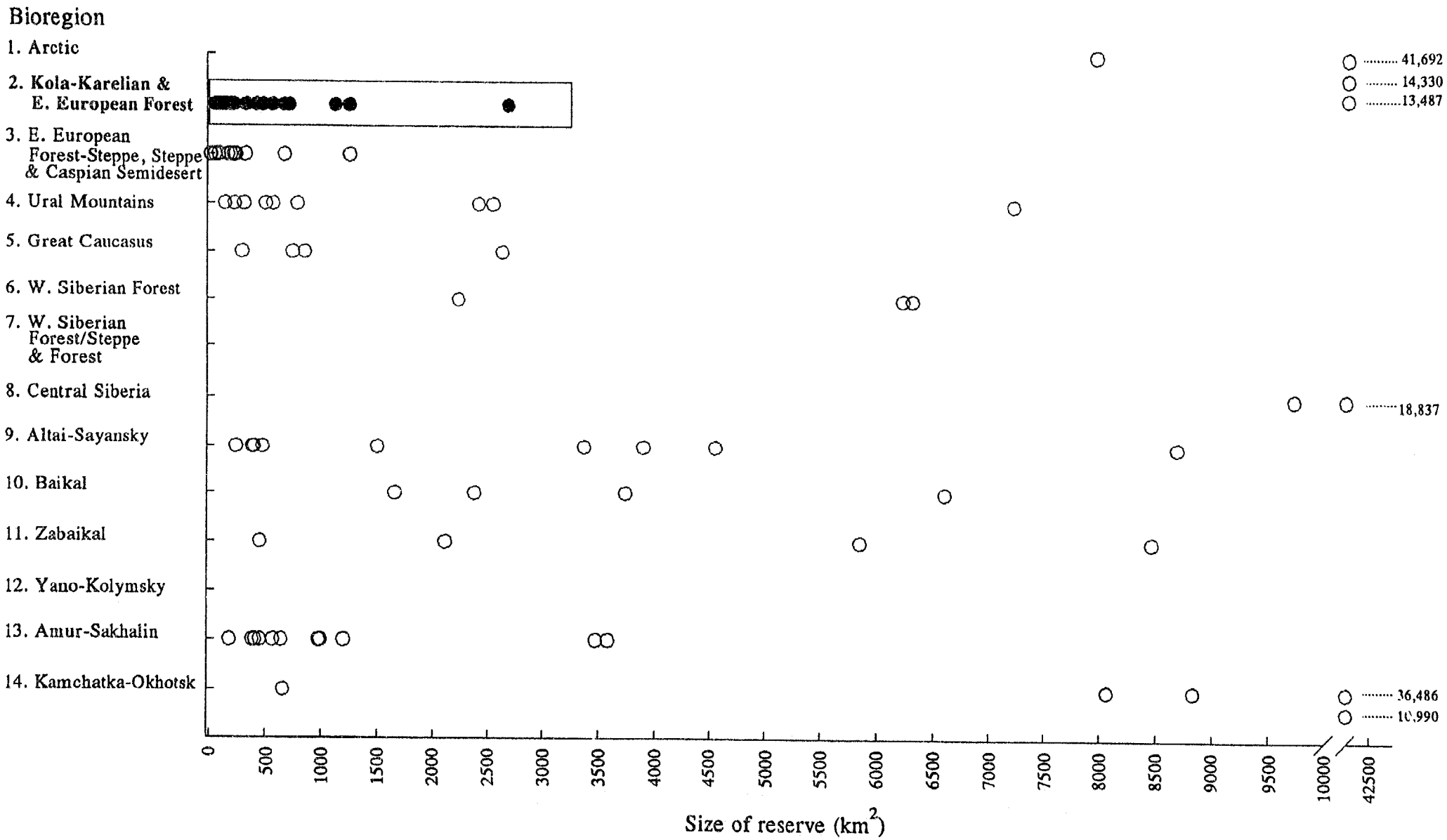

Figure 7. Size of existing zapovedniks in the Kola-Karelian and East European Forest bioregion compared to size of zapovedniks in other bioregions.

and wetlands. Key zapovedniks require immediate support in order to encourage and sustain conservation in a time of economic hardship and increased pressures for resource exploitation. Several existing zapovedniks are targeted for urgent assistance in protection, education, training, and monitoring activities.

Existing Zapovedniks Requiring Immediate Assistance

- **Kandalakshsky Zapovednik** is made up of three parts located on the Kandalaksha Bay in the White Sea and on islands of the Barents Sea. It covers 580 km^2, 400 km^2 of which are marine and island habitats. The zapovednik contains 550 species of higher plants, 23 species of land mammals, 10 species of marine mammals, 210 species of birds, as well as important bird rookeries. It was created to preserve and study taiga, tundra, coastal, and aquatic ecosystems, and to monitor waterfowl. Air and water pollution from industrial activities in the Kola Peninsula are an increasing problem. Recreational pressures are also significant, and the zapovednik is unequipped to effectively protect these areas from degradation. Among the zapovednik staff are experienced educators who annually host groups of biology students from all over the country, but specialized training and educational materials are necessary for a comprehensive conservation education program.

In order to improve conservation efforts in this zapovednik, the proposed project seeks funding to meet the following objectives: 1) to increase environmental education in the region by creating an environmental education mini-center (Section II); 2) to strengthen the infrastructure of the zapovednik by providing basic protection, communication and transportation; 3) to rebuild key zapovednik facilities that are in poor condition; and 4 to improve the training of protection specialists and ecologists. Adequate funding will allow effective monitoring of zapovednik resources by air. Implementation of this project will result in increased ecological awareness using the mini-center model, and improved protection capabilities.

The total cost of the project is $173,590 over three years, including educational, training and equipment costs. See Attachment C, budget 2.1.

The project will be executed by the staff of the Kandalakshsky Zapovednik.

- **Bryansky Les Zapovednik** is located in the Bryansk Oblast in the center of European Russia and covers 122 km^2. The zapovednik represents typical, mixed broadleaf-conifer and deciduous forest ecosystems of the region. This is the only location south of Moscow where large predators such as bear and lynx are still found. Dozens of plant and animal species listed in the Russian Red Data Book are also found here. Threats include deforestation, drainage of lands, poaching, and illegal hunting and fishing by local residents. The high population density of the surrounding area also causes significant pressures on protected

resources. Poor facilities and a lack of educational materials and programs for visitors hinders protection activities.

The project proposes to build an educational center to increase local ecological awareness and gain support in prevention of illegal activities. The zapovednik will prepare educational exhibits, films, and programs, as well as establish interpretive trails and a nature center and museum. The center will also conduct public opinion surveys, and work to establish a relationship between the local populace and the zapovednik. The project will result in improved management of tourism, increased environmental awareness, and better understanding of the role and benefits of conservation.

The total cost of the project is $128,950 over three years, including salaries for center staff, publication of educational materials, and equipment and transport costs. See Attachment C, budget 2.2.

The project will be carried out by the staff of the Bryansky Les Zapovednik.

- **Nizhnesvirsky Zapovednik** is located on the southeastern coast of Lake Ladoga in the Leningrad Oblast and covers an area of 414 km^2. It is an important stopover habitat for migratory birds, and the Lake Ladoga harbor seal (*Phoca hispida ladogensis*), a freshwater subspecies, finds important refuge here from fishing nets and disturbance at other hauling out sites. The zapovednik also covers the coastal zone and mouth of the Svir River where salmon and trout spawn. Intensive economic activity in surrounding areas is causing eutrophication of lake basins and transformation of natural landscapes. Illegal fishing and other violations disturb bird and animal habitats and threaten to reduce viable fish populations. The lack of monitoring equipment and poor facilities hinder protection activities by zapovednik staff.

The project proposes to remedy these problems by creating an integrated ornithological monitoring station to study resident and migratory bird populations and develop methods for their preservation. In addition, the center would undertake ecological education activities to increase awareness and compliance with the zapovednik regime. Funds would equip the zapovednik staff and build special trails and other limited facilities for tourists, resulting in improved infrastructure, transportation, communications, and an increased awareness of conservation in the surrounding area.

The total cost of the project is $176,270 over three years, including technical and education program costs. See Attachment C, budget 2.3.

The project will be executed by the staff of the Nizhnesvirsky Zapovednik.

• **Laplandsky Zapovednik** is located on the western part of the Kola Peninsula in the Murmansk Oblast and occupies an area of 2,684 km^2. The zapovednik represents taiga ecosystems, mountain tundra, and glacial pothole lakes. Numerous swamps, bogs, and marshes also occur here. The wild reindeer population, for which the zapovednik was established, is one of the largest remaining in Europe. In addition to the over 220 species of vertebrates and 180 birds species, there are over 800 species of higher plants, moss, and lichens.

Sulfur deposition from the neighboring nickel factory kills coniferous trees and reduces production of lichen-forest pastures, and displaces reindeer herds in the eastern section. Forest fire protection is very difficult due to the lack of technical equipment and proper means for monitoring and, finally, the zapovednik staff lack appropriate equipment and training to adequately protect the area.

The proposal seeks funding to improve monitoring of industrial pollution and its impact on the biota of the zapovednik by creating a pollution monitoring station and observation program. Reliable information about the environmental condition of ecosystems will be collected and analyzed to determine measures for their preservation. The project will provide training for two representatives of the zapovednik in specialized foreign centers, cultivating cooperation with foreign scientists for ecosystem monitoring. Funds will be used to purchase basic equipment for effective protection measures and to rent air transport for proper patrol and monitoring of the territory.

The total cost of the project is $241,080 over three years, including equipment for monitoring, protection, and training costs. See Attachment C, budget 2.4.

The project will be executed by the staff of the Laplandsky Zapovednik.

• **Pinezhsky Zapovednik** is located in the northwest sector of the bioregion in the Arkhangelsky region and occupies 412 k^2. The territory of the zapovednik includes 83 lakes, the Sotka river, and a network of underground caves. The flora of Pinezhsky includes 480 species of higher plants, including four endemic species of the northwest Russian plain, and three locally rare species of flowering plants. One-fourth of the territory is covered by native pine and fir forests. The zapovednik is relatively unspoiled and situated far from industrial centers; however, poaching, illegal fishing, and logging have increased in recent years. Protection and monitoring activities are inadequate due to insufficient training and equipment of the inspection service, and lack of infrastructure.

The proposed project seeks funding to improve the infrastructure by providing necessary technical equipment and facilities; to increase the effectiveness of the inspection service by sending staff to special training courses; and to expand ecological education and participation of local people in conservation activities. In addition, funds will go to building a crucial access road, and purchasing transportation and field equipment. Expected results include

improved monitoring of the zapovednik territory and an increased level of ecological awareness in the community.

The total cost of the project is $259,410 over three years, including training and equipment expenses. See Attachment C, budget 2.5.

The project will be carried out by the staff of the Pinezhsky Zapovednik.

Three additional projects would be appropriate for further strengthening of the protected area system in this bioregion. They are presented here, but are not of highest priority and can be further assessed in Phase II, or other future conservation efforts.

- **Darvinsky Zapovednik**, located along the shoreline of the Darvinsky water reservoir in the Vologda and Yaroslavl Oblasts, covers an area of 1,112 km^2, including 455 km^2 of aquatic habitat. The ecosystem represents typical fauna and flora of the southern taiga. A huge reservoir produces frequent, temporary flooding of shoreline habitats. There are 37 mammal species including moose, wild boar, brown bear, lynx, and a large population of wolves (*Canis lupus*). The area also provides habitats for 230 bird species, of which two, the golden eagle (*Aquila chrysaetos*), and White-tailed sea eagle (*Haliaeetus albicilla*), are in the Russian Red Data Book. Main threats are the fluctuations of the water level that destroy coastal areas; atmospheric pollution from neighboring industry; and illegal poaching, fishing, and logging. The lack of sufficient equipment and finances reduces the effectiveness of the zapovednik staff to guard against violations.

This proposed project seeks funding to improve monitoring of natural ecosystems and level of pollution; to strengthen the infrastructure of the zapovednik, including reinforcement of shorelines to protect the territory from the fluctuating reservoir; construction of ecological trails and an access road; and procurement of basic equipment. The project will also attempt to reduce violations through community education and action. The expected result of the project will be more effective protection efforts.

The total cost of the project is $201,490 over three years, divided into equipment costs and educational activities. See Attachment C, budget 2.6.

The project will be carried out by the staff of the Darvinsky Zapovednik.

- **Mordovsky Zapovednik** is located in the forest-steppe zone of the eastern part of the Oksko-Klyazma lowlands and covers an area of 322 km^2. It represents some of the last remaining pine and pine-broadleaf forests in the region, as well as unique meadow floodplain communities. There are many rare species, such as the desman (*Desmana moschata*), black stork (*Ciconia nigra*), whooper swan (*Cygnus cygnus*), and peregrine falcon (*Falco peregrinus*). Increasing anthropogenic pressures from poaching, illegal logging, and

industrial pollution threaten the zapovednik, especially as it suffers from inadequate protection equipment and infrastructure.

This project will assist conservation efforts in the zapovednik by equipping the staff with adequate communications, transportation, fire-fighting and protection equipment; conducting ecological education activities and trail-building; and supporting a research program to monitor pollution. With sufficient funding, construction of administrative and laboratory facilities will be completed and the nature museum will be renovated. The project will also develop more comprehensive strategies for protecting the zapovednik and surrounding areas.

The total cost of the project is $112,540 over three years, including equipment, construction and educational costs. See Attachment C, budget 2.7.

The project will be executed by the staff of the Mordovsky Zapovednik.

- **Kivach Zapovednik** is located just northwest of Onega Lake on the Karelian Peninsula and occupies an area of 109 km^2. The zapovednik is one of the oldest and most beautiful in Russia, with waterfalls, lakes, and forests of the Karelian taiga. The fauna of the zapovednik includes typical species such as brown bear, moose, hazel grouse (*Tetrastes bonasia*), lemming (*Lemmus* spp.), and wolverine (*Gulo gulo*). Increased poaching, illegal logging, and other violations need to be addressed through strengthening protection services and local environmental education. The zapovednik also needs basic infrastructure, such as electricity and transportation, to function properly.

This proposal seeks funding to create an ecological education mini-center in the zapovednik to improve ecological education programs. This zapovednik is one of those selected by the Ministry of Environment for promoting conservation education by creating nature exhibits in a museum, producing educational films and materials, and training. Two specialists will attend conservation education training programs in foreign centers. Funds will also provide basic communications and equipment needs, as well a crucial power line to the main zapovednik facilities. The project will improve protection of the zapovednik and increase ecological awareness in the surrounding community. The creation of the mini-center for environmental education will serve as a model for other zapovedniks.

The total cost of the project is $168,210 over three years, including equipment and construction costs, and education and training programs. See Attachment C, 2.8.

The project will be implemented by the staff of the Kivàch Zapovednik.

Gaps in Bioregional Conservation

Although there are a relatively large number of protected areas and zapovedniks in the bioregion, they do not fully represent ecosystem diversity. For example, few protected areas exist in the Fenno-Scandian taiga of the northeast. To address this gap, new protected areas are needed.

- Creation of the **Kologrivsky Les Zapovednik** will protect the last remaining block of southern taiga pine forest between the Unza and Viga rivers. Several rare species of European and Siberian fauna and flora occur in the region and the protected area would help reduce the impact of expanding agricultural and industrial development in the region. Its creation would also help fill an important gap in the national conservation strategy.

In Phase 1, this project will conduct a survey of the area under consideration to determine borders and zones of the zapovednik and prepare the necessary documents for approval by the Russian government. In Phase 2, main facilities for the zapovednik will be constructed and basic equipment will be procured. Successful implementation of the project ensures that a missing representative area will be included into the network of protected areas, and the region will be safe from encroaching economic activities.

The total cost of the project is $226,900 over three years, including $6,900 for Phase 1 planning (one year), and $220,000 for creation of the zapovednik in Phase 2 (two years). See Attachment C, budget 2.9. Exact expenses for Phase 2 will be determined in Phase 1.

Planning will be conducted by the Kostromskoye Regional Committee in cooperation with the Ministry of Environment. Phase 2 will be implemented by the staff of the new zapovednik.

- The proposed **Polistovye Zapovednik** will encompass over 1,000 km^2 of peatlands that contain many rare plants and animals, and represent important breeding habitat for the Eurasian curlew (*Numenius arquata*) and endangered corn crake (*Crex crex*). Peat extraction currently threatens the habitat. Poaching is a problem for some species and violators often use cross-country vehicles which damage the soil surface and cause erosion. This territory is included in the government-planned network of protected areas, but insufficient funding prevents proceeding with land surveys and creation of the zapovednik.

The project will provide initial funds for planning the zapovednik, after which support mechanisms will need to be addressed for the creation and maintenance of the zapovednik. The area will be surveyed, flora and fauna inventoried, and documents will be developed for establishment of a new reserve. Planning phase expenses include salaries for the scientific survey team, travel and equipment costs. Successful implementation of the project will result in protection of one of Europe's best preserved peat bogs.

The total cost of the planning phase of the project is $12,200 over 18 months. This includes salaries, travel expenses, and supplies. See Attachment C, budget 2.10.

The Socio-Ecological Union will oversee initial implementation of the project.

- The **Lipetsk Protected Areas** project aims to develop a methodology for assessing the biological value, conservation potential, and threats to habitats within the Lipetsk region; these assessments are fundamental to biodiversity conservation strategies. This local initiative will serve as an important model for NGO and community conservation programs at the local and regional level. This project will be developed in detail in Phase II.

V. Sustainable Use of Resources and Ecotourism

Several projects in this bioregion lay the groundwork for ecological tourism by developing education programs to increase environmental awareness. In many cases, these activities also include establishing a network of trails and the infrastructure necessary to accommodate tourism in the protected areas.

- A project addressing ecotourism in **Oksky Zapovednik** is identified as a priority because it has a competent and responsible administrative system, advanced ecological education programs, an infrastructure base to receive tourists, and is near Moscow. The zapovednik is located in the Meschera lowland on the Pra River, a tributary of the Oka River. There are over 800 plant species in the protected area, about 75 of which are rare or endangered. Rare animal species include the desman, black stork, and several species of bumblebees. The zapovednik currently conducts ecological tours, lectures, and hosts scientists from other countries to work on joint research projects. Other popular activities include birdwatching and visits to the European bison and crane breeding centers. Tourist and ecological education activities in Oksky are limited, however, due to financial constraints and a lack of facilities. This project will provide infrastructure to support controlled tourism at Oksky, while strengthening existing conservation efforts.

Funding is sought to improve tourist facilities and develop an ecological education program. Specifically, needed facilities include a guest center, nature museum, shelters, telephone line, and nature trails. In addition, improved basic communications and transportation means are necessary for increased protection of the zapovednik under tourism conditions. The project will result in increased capability of Oksky Zapovednik to handle tourist pressures, increased environmental awareness, and improved protection of the zapovednik. The proposal below addresses support of the activities of the European bison and crane breeding centers.

The total cost of the project over three years is $281,560, including costs for building tourist facilities and implementing an educational program. See Attachment C, budget 2.11. The project will be implemented by the staff of Oksky Zapovednik.

VI. Species of Special Concern

Several proposals for the protection of individual species emerge from this bioregion.

- The **Oksky Zapovednik** has been successfully breeding and releasing rare **Siberian cranes** (*Grus leucogeranus*) into Siberia for over three years. There is also a twenty year old breeding center for **European bison** (*Bos bonasus*) that has released about 200 individuals into the Caucasus, the Carpathians, and Moscow regions. The difficult financial situation, however, has led to problems of maintaining these animals in captivity, and limits the program's ability to effectively release individuals into the wild. Financial assistance would help the breeding center continue its successful programs and conduct more reintroduction activities.

The project proposes to renovate and sustain the two breeding centers, and purchase transportation and communications equipment to support functioning of the centers. Funds will also go towards food, veterinary supplies, and planning of reintroduction programs. Protection equipment and transport will help ongoing protection efforts in the zapovednik, freeing up other funds for breeding center activities. The project will ensure that the successful activities of the two Oksky breeding centers can continue to save dwindling crane populations, and re-establish European bison populations in times of decreasing financial support from the state budget.

The total cost of the project over three years is $146,470, including equipment and construction costs. See Attachment C, budget 2.12.

The project will be implemented by breeding center specialists of Oksky Zapovednik.

- **Desman** (*Desmana moshata*) are unique, large, aquatic insectivores that are only found in wetlands and oxbow lakes in the Volga River basin. Only one other smaller species of desman exists in the Pyrenees Mountains of Spain. Desman are endangered due to decades of hunting for the fur trade, and loss and fragmentation of their wetland habitats. The expertise of scientists who have been studying desman populations in Oksky and Khopersky Zapovedniks offers the opportunity to identify, and place under preservation, critical habitats for this endangered species.

A comprehensive program for conserving and restoring the desman throughout its range has been proposed. The project will:

i) create additional areas of protected habitat for desman at several localities along the Volga and its tributaries, including Oksky and Khopersky Zapovednik (Bioregion 3);

ii) develop a breeding program to boost desman populations in the wild; and

iii) monitor and study desman populations to develop long-term preservation measures.

This project will be conducted in two different zapovedniks, requiring $40,110 per zapovednik over three years. Thus, the total budget for this three-year project is $80,220. See Attachment C, budget 2.13.

The executants of this program will be A.S. Onuphrenya (Oksky Zapovednik), and N.A. Karpova (Khopersky Zapovednik), two leading experts on desman.

- **Pearl Mussel** (*Margaritifera margaritifera*) and **Atlantic Salmon** (*Salmo char*) communities have been extirpated from most of Europe. The Pearl Mussel provides some of the highest quality freshwater pearls, but has been eliminated from much of its range due to overharvesting, polluted water, sedimentation, and the declining numbers of Atlantic Salmon on which they depend for successful growth of their larval stages. The Varzuga River on the Kola Peninsula contains the largest population of pearl mussels in the world and the largest population of Atlantic Salmon in Russia. Illegal and excessive harvesting of salmon and mussels threatens this unique aquatic ecosystem, while the industrial activities planned for the region present an even greater threat of general environmental degradation.

The Varzuga River proposal aims to establish a protected area for the Varzuga watershed and adjacent marine habitats. The plan has been approved by local officials, but lacks adequate funding to proceed. The project will also establish an anti-poaching unit, assess the potential for ecological tourism, and explore the possibility of a mussel production center (i.e., freshwater pearls) as a source of long-term funding. Specific tasks include planning and creation of the protected territory, and development of visitor facilities. The project will result in effective preservation Pearl Mussel and Atlantic Salmon habitats by establishing a protected area, and promoting ecological awareness.

This project will be further considered in Phase II.

VII. Total cost of proposals designed for the Eastern Europe forest bioregion is $2,208,890 for the periods indicated.

PRIORITIES: The Kandalakshsky, Bryansky Les, Laplandsky, Oksky Breeding Center, and Desman projects are rated as highest priority.

3. EASTERN EUROPEAN FOREST-STEPPE, STEPPE, AND CASPIAN SEMIDESERT BIOREGION

I. Geographical Location and Range

South of the taiga and broadleaf forest lies a wide band of forest-steppe, steppe, and semidesert. This bioregion covers approximately 9% of the country (Fig. 8). Forest-steppes represent one of the 14 bioregions most heavily altered by human activities; in areas formerly covered by a mix of oak forests and meadows, between 60 to 80% has been converted to agriculture. The role of zapovedniks in this bioregion is critical to the maintenance of biological diversity because they contain the only landscape units able to conserve the natural vegetation of forest-steppe and steppe zones.

II. Outstanding Biological Features

Landscape Features

Landscapes have been so heavily altered in the three zones of this bioregion that existing natural landscapes are relatively small and under great threat. Farming dominates land use in the forest-steppe and steppe zones, while grazing lands and pastures predominate in the semidesert zones. The semidesert zone is characterized by vegetated sand hills and bare sand dunes. The Volga River Delta is an important feature of this bioregion, as are other aquatic associations with the Black and Caspian Seas.

Species of Interest or Concern

Many of the region's larger vertebrates are now extirpated or rare due to the loss of natural habitats and hunting. Two characteristic, but threatened, species are the Great bustard (*Otis tarda*) and the saiga antelope (*Saiga tatarica*), both of which are the subjects of conservation efforts and funding proposals identified by this portfolio (see below).

Despite extensive alteration of water flow and contamination, the Volga River Delta still supports large numbers of migratory waterfowl and wading birds, as well as several endangered birds, including two species of pelican (*Pelecanus crispus* and *P. onocrotalus*), the steppe eagle (*Aquila rapax*), and the golden eagle (*Aquila chrysaetos*). The delta also represents critical feeding areas, spawning grounds, and migration corridors for numerous fishes such as carp, bream, and the beluga sturgeon (*Huso huso*).

III. Overview of Short- and Long-Term Threats

From a conservation perspective, the primary long-term threats to biodiversity conservation are the small size and relative isolation of existing zapovedniks. For these reasons, intensive

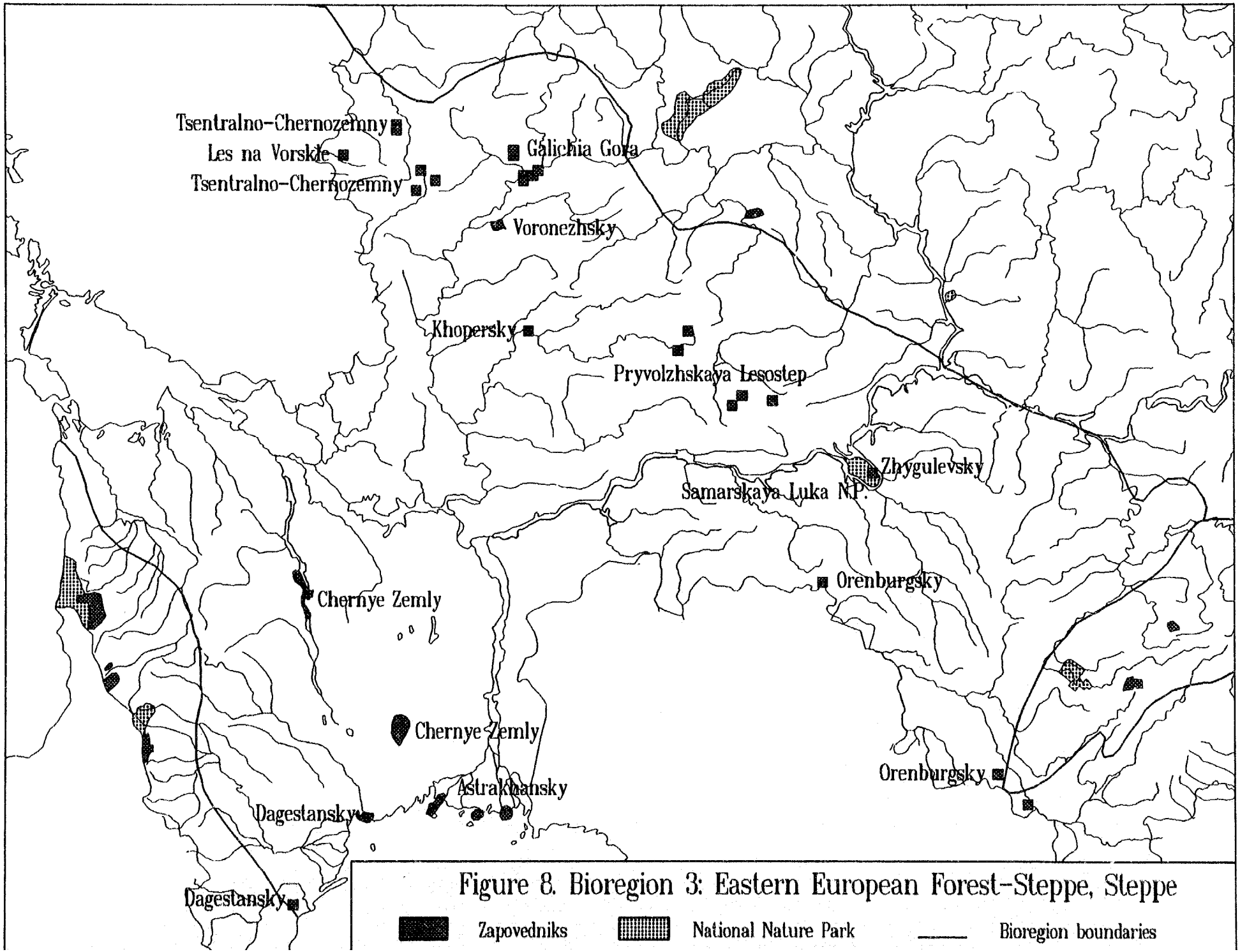

Figure 8. Bioregion 3: Eastern European Forest-Steppe, Steppe

management and vigilance is required in the remaining natural habitats to enable species to persist. Many native plants in the forest-steppe and steppe reserves are now listed as endangered species due to the extensive development of agriculture in the surrounding landscape.

From an environmental perspective, soil erosion and water pollution from ecologically unsound farming practices threaten reserves externally. In addition, ground water levels have been lowered in some areas as a result of mining activities. Pollution and eutrophication of Kakhovsky, Tsimlyansky, and other major reservoirs, and estuary degradation in the Russian Black and Azov Sea coasts affect humans and wildlife conservation alike. Poaching of wildlife has reduced populations of several species, most notably saiga antelope. River deltas, wetlands, and steppe zones are generally more resilient to human disturbance than habitats of colder bioregions; however, this feature is now of little conservation value. Large-scale conversion of natural habitats to agriculture has eliminated source populations of native species for recolonization, has permitted non-native species to dominate, and is likely permanent in most areas.

IV. Conservation Potential

Most of the natural communities of this bioregion are restricted to zapovedniks or smaller protected areas (zakazniks). However, because these reserves are small in size, few in number, and rather isolated from each other, they will require intensive management in order to maintain a substantial fraction of their original biodiversity. Seven zapovedniks are centered in the forest-steppe and steppe zones, and one in the semidesert zone. In addition, Astrakhansky Zapovednik conserves several important sections of the Volga River Delta. The average size of these zapovedniks is smaller than that of zapovedniks found in the Northern European part of Russia (Fig. 9).

Existing reserves do not adequately represent the range of original communities, and the lack of redundancy of critical habitats and species assemblages presents a problem for conservation planning. The following description of existing zapovedniks reads more like a patchwork design of reserves rather than a representative network of protected areas. For example, the total steppe habitat of the Galichya Gora Zapovednik is a mere 0.6 km^2; Tsentralno-Chernozemny Zapovednik does not encompass any of the remaining upland oak forests and flood plain habitats in the region; and Astrakhansky Zapovednik lacks adequate semidesert sites, conserving primarily the Volga Delta complex. Voronezhsky Zapovednik represents a forest valley complex with a rare combination of northern and southern floral elements, but is mostly famous for its beaver (*Castor fiber*) populations. Khopersky

Zapovednik, located on a narrow 5-km long strip along the Khoper River, conserves some of the last intact forest-steppe riparian forests. Zhigulevsky Zapovednik, located on Zhiguli limestone mountains in the Volga area, has 90% of its 230 km^2 covered by stands of original pine and oak forest that have mostly been eliminated elsewhere. The Zavolzhye region lacks any reserves. Finally, the Volga River Delta and the Astrakhansky Biosphere Zapovednik are included in the list of wetland areas of international significance.

Existing Reserves Requiring Urgent Assistance

A regional biodiversity strategy for the forest-steppe, steppe, and Caspian semidesert zones must give priority to maintaining the existing system of reserves and to expand the system where opportunities still exist. However, political problems, such as in the autonomous region of Kalmykia , limit the effectiveness of conservation efforts in some zapovedniks. Some of these political and land use issues, however, should be reconciled within the coming year. At that time, some of the priorities identified below should be revisited and appropriate actions taken to strengthen the protected area network in this highly threatened bioregion.

- **Astrakhansky Zapovednik**, located in the lower region of the Volga Delta in the Astrakhan Oblast, occupies an area of 668 km^2. It represents unique delta ecosystems, the coast of the Caspian Sea, as well as smaller lakes and some desert habitats. Numerous birds nest, feed, and rest in the delta. Fish such as carp, bream, and beluga sturgeon depend on the delta for spawning. The delta is under a range of threats including disruption of natural water flow regimes from irrigation and upstream dams, salinization, pesticide and fertilizer contamination, pollution from heavy metals from upstream industry, poaching, and over-harvesting of fish and waterfowl.

The proposed project aims to improve the situation by promoting ecological awareness in the region and starting a low-scale ecotourism program. Specific needs include renovation of the nature museum, construction of a small guest house and trails, publishing of education materials, and procurement of basic communications, transportation, and safety equipment. The results of the project will be improved management and protection of the zapovednik, and increased compliance to protection measures by local residents and visitors. The program will be combined with the ongoing Integrated Conservation Program for the Lower Volga and Delta that is being developed as a cooperative effort through Federal ministries, the Astrakhan Regional Committee for Nature Conservation, and WWF.

The total cost of the program is $213,490 over three years, including equipment costs and development of ecological tourism programs. See Attachment C, budget 3.1.

The project will be implemented by the staff of the Astrakhansky Zapovednik.

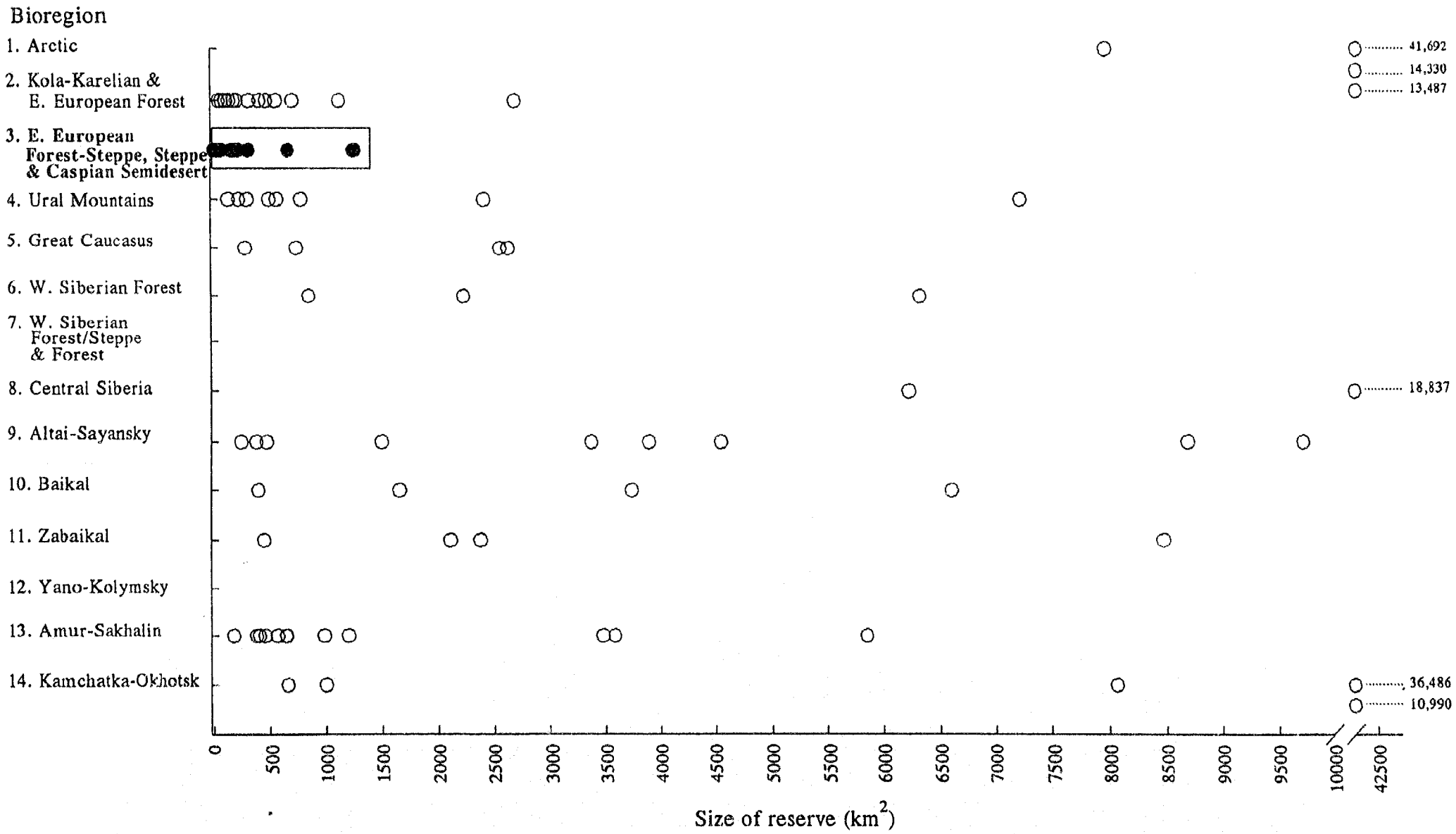

Figure 9. Size of existing zapovedniks in the European Forest-Steppe, Steppe, & Caspian Semidesert bioregion compared to size of zapovedniks in other bioregions.

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The total cost of the program is $213,490 over three years, including equipment costs and development of ecological tourism programs. See Attachment C, budget 3.1.

The project will be implemented by the staff of the Astrakhansky Zapovednik.

Gaps in Bioregional Conservation

The current government plan to create new protected areas would establish the following reserves: North Astrakhan (920 km^2), Bogdino-Baskunchaksky (500 km^2), and Zavolzhsky Steppe (60 km^2). These reserves would represent typical and unique steppe ecosystems and provide redundancy of preserved ecosystems to ensure long-term viability of conservation efforts. Financing of these reserves should be examined more closely and considered for proposals in Phase II, when the advantages and problems of their establishment can be clarified. Two other new reserve projects deserve special mention:

- Creation of the **Utrish protected area** fills the gap in mediterranean Russia, where no nature reservé of sufficient size exists to conserve the unique biodiversity of the coastal dry-subtropical region adjoining the Black Sea. Existing national parks are too small and undermanaged to conserve the endangered fauna and flora. The region harbors several hundred species of plants and animals listed in the Red Data Books of Russia and countries of the former Soviet Union. Morever, many of the listed plants and invertebrates are endemic to the bioregion. The creation of a new zapovednik in the region has been approved by the Ministry of Environment and IUCN, and initial steps towards its establishment have been taken.

This proposal seeks funding for a two phase project which will first establish a 1,830 km^2 zapovednik and then create an expanded protected territory with a total area of 2,000 km^2. The reserve will combine nature conservation with sustainable tourism. Specific tasks for Phase 1 include planning and organizing the zapovednik, establishing an office in the region, and procuring equipment. Phase 2 will organize facilities for the entire reserve and evaluate Phase 1. The result will be creation of a new large reserve area and the capability of creating long-term revenues through limited tourism activities.

The total budget for the project is $267,000 over five years; Phase 1 costs $72,000 and Phase 2 costs $195,000. Expenses include travel, equipment, and salaries for protected area staff. See Attachment C, budget 3.2.

The project executants will be specialists from the All-Russian Scientific Research Institute, the Russian International Institute of Tourism, and others.

- The **Volga Delta** region is an important biological complex of semidesert, flood plain, and delta ecosystems with unique flora and fauna composition. The region requires urgent protection measures due to the small size of existing protected areas in the delta. At present, total protected areas comprise only 1.3% of the Astrakhan region. The project would effectively double the size of the area under formal protection. Project executants will conduct a comprehensive inventory of the important biological features of the region in order

to develop a program for setting up a system of protected areas in the region, as well as to monitor critical habitats. This proposal will be elaborated in Phase II.

- **Preservation and Restoration of the Abatis Line, or "Green Wall":** Since the early 9th Century, large swathes of broadleaf forests in the southern Russian plains were preserved as defensive lines (the Abatis Line or "Green Wall") against invaders from the east. Much of this forest barrier has been eliminated over the centuries due to agriculture and deforestation, but sizable pockets of unplowed, pristine woodlands still remain scattered over the landscape. These forest patches represent some of the last remaining habitat for many species of plants and invertebrates that specialize on old growth forests of the region.

The "Green Wall" project intends to 1) identify the original boundaries of the Abatis Line and remaining patches of undisturbed forest, 2) advocate the designation of significant old-growth forest patches as protected areas, 3) develop a plan to restore portions of the "Green Wall" to forest and to expand the forest corridor network throughout the region, and 4) work with local communities and regional authorities to establish environmentally sound land use practices.

The total cost of the "Green Wall" is $70,650 for Phase 1, to initiate the activities described above. See Attachment C, budget 3.3. The Laboratory for Ecological Designs of the Socio-Ecological Union, a major environmental NGO in Russia, will carry out the "Green Wall" program.

V. Sustainable Use of Resources and Ecotourism

The Astrakhansky Zapovednik assistance proposal includes development of ecotourism in the region, accompanied by practical measures in conservation planning. The Utrish protected area proposal also includes aspects of sustainable resource use and ecotourism.

The saiga antelope conservation proposal described below has the potential to provide the basis for sustainable use of saiga, once pressures on free-ranging populations are eliminated.

VI. Species of Special Concern

- The **saiga antelope** is the keystone species of Russia's dry steppes and semideserts. Millions of saiga antelope once migrated vast distances across the steppes of this bioregion and those further east, in Central Asia. Hunting eliminated much of the original herds, and most of the remaining wild saiga populations are rapidly declining because of continued poaching, intensive agricultural development, and pasture conversion. The original habitat has been reduced by over 75%, and traditional migration routes are now blocked or greatly restricted. Although saiga antelope are fully protected by law, poaching has increased rapidly in the last three years.

The saiga conservation proposal presented in this portfolio addresses threats to wild populations by improving range management of sheep and wild ungulate populations, conserving critical saiga habitats in protected areas, and preserving migration corridors by establishing a new network of protected areas. The project will also help improve law enforcement to curtail poaching. Successful implementation of the project will restore saiga populations in their natural range, minimize damage to remaining saiga habitat, and explore the potential for expanding existing saiga husbandry programs to help lessen the pressure on wild populations.

The total cost of the project is $260,000 over three years. See Attachment C, budget 3.4. The project will be implemented by the Central Scientific Research Laboratory of Game Management of the Russian Federation.

- Loss of habitat in this bioregion has had a major impact on the status of **Great Bustard** populations. In countries of the former Soviet Union, populations of the European subspecies have been reduced by more than 60% during the last few years due to habitat loss and hunting both in Russia and on the bird's wintering grounds in southern Asia. The bustard's proclivity for open steppe habitats puts this species in direct conflict with current land use in much of the region. The following actions will form the basis for a bustard conservation plan: 1) habitat protection measures and collection and incubation of eggs that would otherwise be destroyed during agricultural practices; 2) a reintroduction program for young birds; and 3) efforts to reduce mortality of adult birds. A breeding center was created in Saratov Oblast for incubation of bustard eggs and rearing of young birds for reintroduction into free-ranging groups. The proposed project would seek financial assistance to allow the breeding center to continue its successful propagation work for conservation of the Saratov-Volgograd bustard population through the release of captive-born birds. The ultimate goal is to increase wild numbers of European Great Bustard populations as quickly as possible and to increase public awareness of bustard conservation.

The cost of the proposed project is $91,400 over approximately six years, as male bustards reach sexual maturity at 6 years of age. See Attachment C, budget 3.5. The project will be implemented by the Department of Game of the Saratov Oblast, with scientific consulting from the Central Laboratory of Game Management and Nature Reserves.

- A project to restore the population of the rare aquatic insectivore, the desman (*Desmana moshata*), is considered in Bioregion 2. The project will be carried in Oksky Zapovednik (Bioregion 2) and Khopersky Zapovednik (Bioregion 3).

VII. Total cost of proposals designed for this bioregion is $902,540 for the periods indicated.

PRIORITIES: The Astrakhansky and Saiga Antelope Projects are rated as highest priority.

4. URAL MOUNTAINS BIOREGION

I. Geographic Location and Range

The Ural Mountains are oriented north-south and extend for over 2,000 km, forming a montane boundary between the low-lying European and Siberian regions of Russia (Fig. 10). The Urals span several major biogeographical zones in their broad latitudinal range, including: arctic tundra (northern portion), western Siberian Taiga (e. central slope), European mixed broadleaf-coniferous forest (w. central slope), European forest-steppe (w. southern slope), and West Siberian forest steppe and steppe (e. southern slope).

II. Outstanding Biological Features

Within the Urals proper, montane desert, tundra, and taiga are found in the northern Urals, while dense stands of mixed broadleaf-coniferous forests and forested steppes predominate in the central and southern portions of the range. The Urals contain extensive montane habitats that sustain large populations of trees such as Siberian spruce, Daurian larch, and fir; vertebrates such as brown bear (*Ursus arctos*), sable (*Martes zibellina*), and reindeer (*Rangifer tarandus*); and numerous bird species. They are most distinctive biologically however, in terms of the number of rare and endemic plant species and their unique mixture of European and Asian animal species.

III. Overview of Short and Long-Term Threats

Only the polar region of the Urals has escaped extensive habitat loss and degradation from centuries of resource exploitation and heavy industry. Northern taiga habitats have been extensively altered through logging, mining, and industrial processing of metals and chemicals. Similar factors have degraded natural communities in the central Urals, with forest and aquatic habitats damaged by atmospheric pollutants, industrial wastes, and unsustainable forestry practices. In addition to mining and heavy industry, conversion to agricultural land is a major threat to steppe habitats of the southern Urals. Forest cover has been reduced in this portion of the range by 75% and overgrazing is widespread, resulting in high rates of soil erosion and damaged aquatic habitats. Radioactive contamination is also suspected in some localities.

The Urals are an area of great economic importance to local and national economies. Thus, sound environmental management of the Ural ecosystem is a critical issue for both economic development and biodiversity conservation in Russia. Unlike more homogeneous bioregions, the variety of ecological systems in the Urals requires diverse strategies for conservation and restoration of habitats.

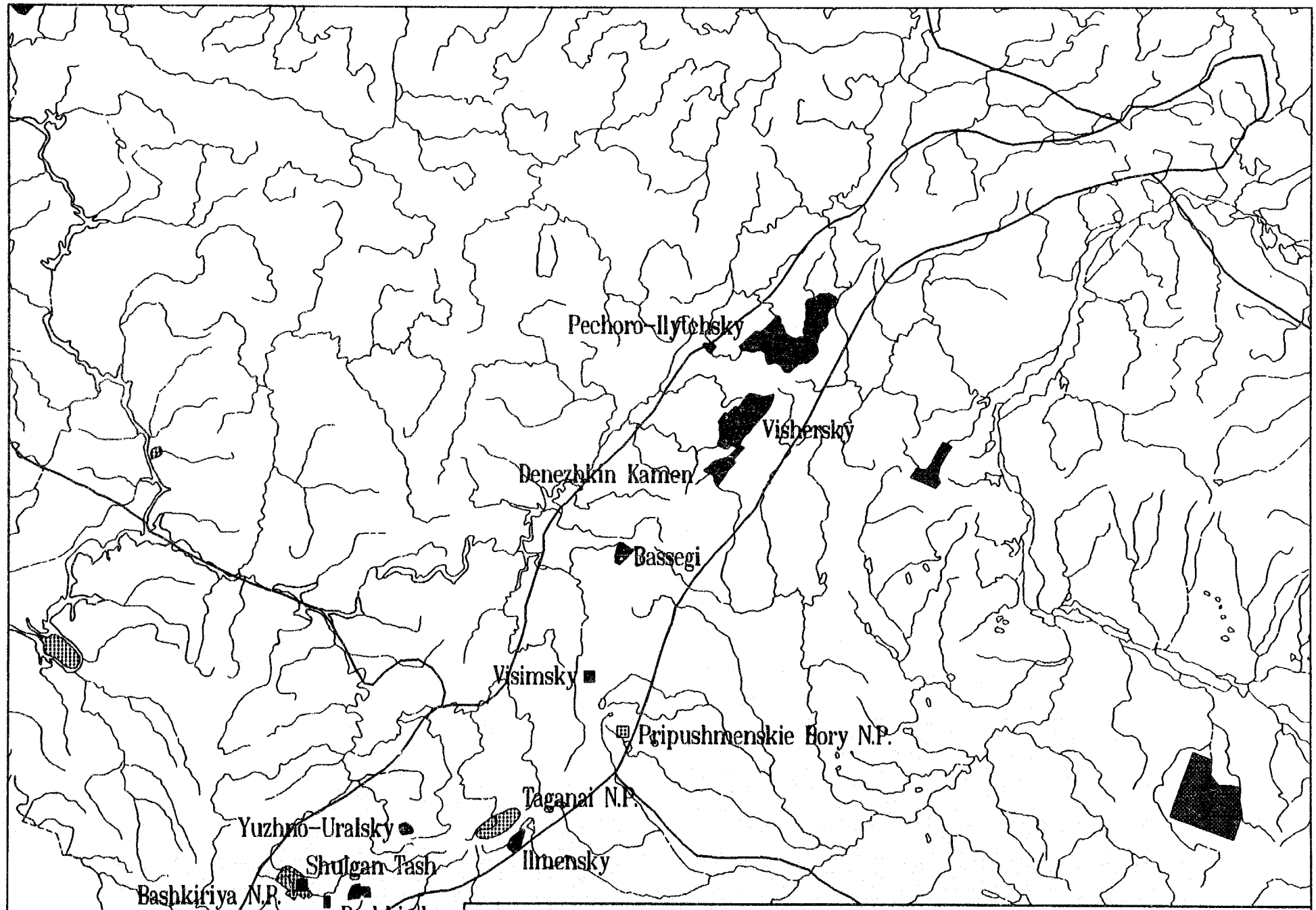

Figure 10. Bioregion 4: Ural Mountains

Zapovednik
National Nature Park
Bioregion boundaries

IV. Conservation Potential

The existing system of eight reserves (Fig. 11) represents all the major ecosystems of the Urals. In light of the dramatic alteration of natural habitats in the Urals, this degree of representation demonstrates how crucial these reserves are for biodiversity conservation. Pechoro-Ilychsky and Vishersky zapovedniks are two relatively large reserves in the northern Ural taiga zone. Denezhkin Kamen, Basegy, Visimsky and Ilmensky zapovedniks are located in the central Ural taiga zone. Bashkirsky Zapovednik preserves steppe habitats in the southern Urals, while Shulgan-Tash Zapovednik represents the eastern border of the European broadleaf forests.

Existing Zapovedniks Requiring Urgent Assistance

All of these reserves are seriously under-financed and beset with a dramatic increase in reserve violations, such as timber and wildlife poaching, unauthorized grazing, and illegal fishing. Fire protection is ineffectual due to the shortage of required equipment, communications, transportation, and funded personnel. Mitigation of external air and water pollution at point sources is difficult because budget constraints limit the response capabilities of reserve managers. This proposal addresses the immediate needs of these reserves to maintain their effectiveness as conservation areas.

The proposals for the Ural bioregion highlight the following zapovedniks:

- **Vishersky Zapovednik** (2,412 km^2), located in the Perm Oblast in the northern Urals, was established to conserve unique botanical communities and many rare bird and animal species such as the peregrine falcon (*Falco peregrinus*), White-tailed sea eagle (*Haliaeetus albicilla*), and wild reindeer (*Rangifer tarandus*). The zapovednik was created in 1991, but poor economic conditions have prevented efforts to develop an effective management structure. The reserve needs immediate technical support and equipment to monitor and protect the area. It lacks a telephone--the closest one is in a distant town--and cross-country vehicles to patrol the reserve.

The project will provide urgent assistance to develop a technical base for systematic protection of the zapovednik. Specific measures include constructing an administrative-laboratory building, training protection staff, procuring equipment and transportation to monitor and patrol the area, and building an information center and trails. Air transport is also needed to effectively monitor the area. The project will result in full realization of an adequate protection program for the Vishersky Zapovednik.

The cost of this assistance proposal is $196,000 over three years, including equipment and ecological education costs. See Attachment C, budget 4.1. The project will be implemented by the administration of the Vishersky Zapovednik.

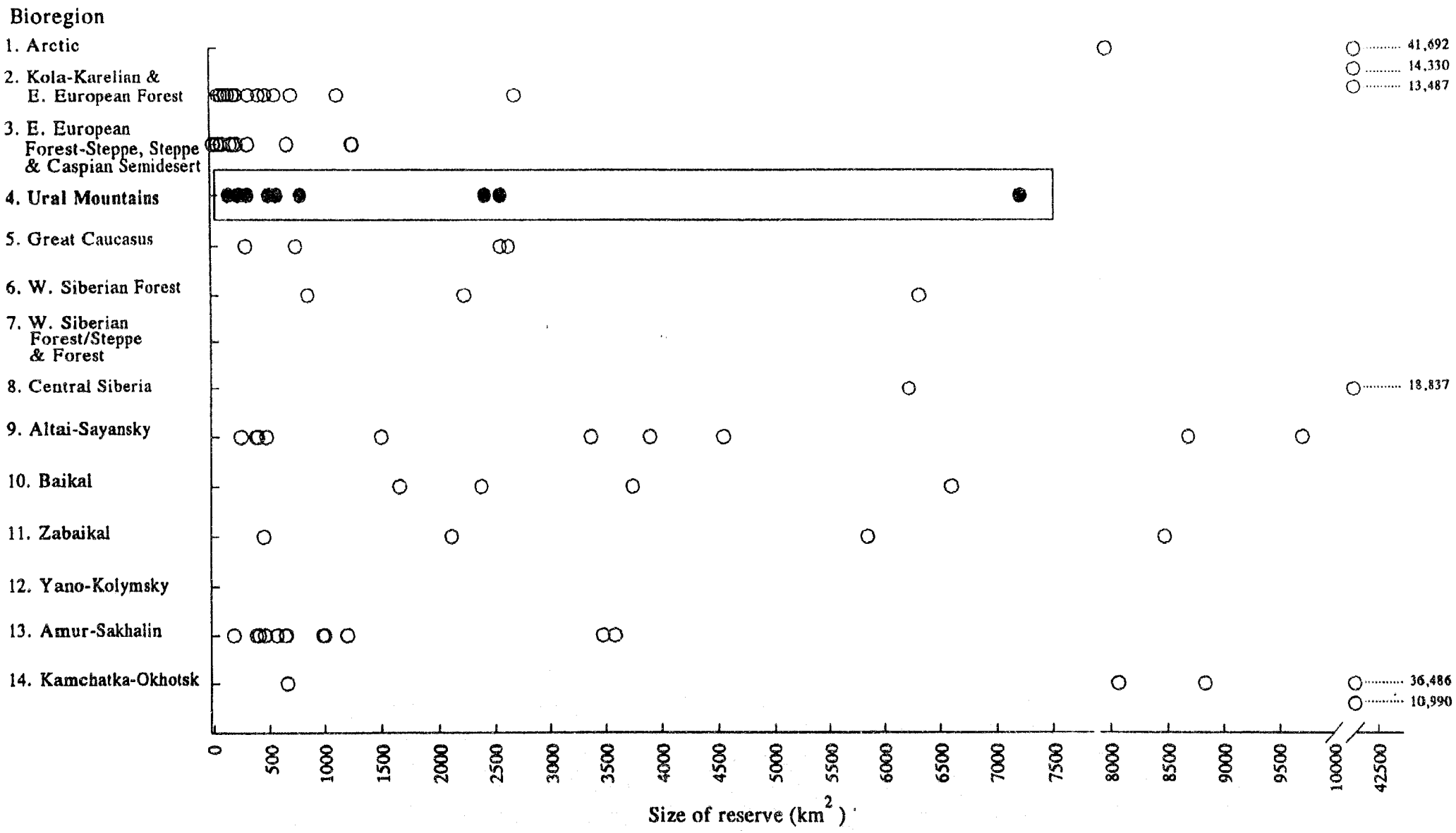

Figure 11. Size of existing zapovedniks in the Urals bioregion compared to size of zapovedniks in other bioregions.

- **Pechoro-Ilychsky Zapovednik** (7,213 km^2), in the Komi Republic, was created to preserve native forest ecosystems of the northern Ural region. The zapovednik is located on the upper reaches of the Pechora River, in a pristine area remote from industrial centers. Important animal migration routes cross the zapovednik's territory. The landscape of the zapovednik consists of lowlands, mountains, and subterranean caves. But the existence of the zapovednik is in danger. Local authorities continuously threaten to close the zapovednik, and residents violate its regime due to the lack of adequate protection mechanisms and little ecological awareness in the community. Assistance is urgently needed to provide the necessary equipment and training for conservation measures.

This project will provide the zapovednik with the necessary equipment, administrative base, and training to maintain effective management and protection. Two representatives of the zapovednik will attend a training program in special foreign centers. The project will increase support for the zapovednik in the region by developing ecological education programs, building trails, and publishing information booklets. Some funds will go to provide vital air transportation for monitoring the protected territory. The result of this project will be increased effectiveness of conservation efforts and improved local support for the zapovednik.

The cost of this assistance project is $223,475 over a three year period, including equipment, construction, training and educational costs. See Attachment C, budget 4.2.

The project will be implemented by the staff of the Pechoro-Ilychsky Zapovednik.

- **Shulgan-Tash Zapovednik** (225 km^2), located in Bashkiria Republic, was created to conserve and study the only remaining population of the wild Bashkirian bee. In addition to the wild bee, the zapovednik has a host of relict and rare species of plants and animals whose habitats require urgent conservation. Rare bird species that nest here include the osprey, golden eagle, and peregrine falcon. Violations to the protected regime, such as cutting timber and gathering honey, disturb animal populations and destroy habitats. Current conservation functions lack the necessary infrastructure and equipment to protect and monitor critical habitats.

This project will provide the necessary equipment, infrastructure, and training to ensure the long-term viability of the zapovednik. Three experts from the zapovednik will attend special conservation training courses. Urgent needs include communications, transportation, and monitoring equipment; administrative facilities; access roads; and power lines. The project will also finance development of ecological education activities and construction of trails, observation sites, and a nature museum. The expected results of the project are improved protection and monitoring capabilities and increased compliance of the local public with conservation regulations.

The cost of the project over three years is $267,250, including equipment, construction, and educational and training costs. See Attachment C, budget 4.3.

The project will be implemented by the administration of the Shulgan-Tash Zapovednik.

- **Bashkirsky Zapovednik** (496 km^2), faces a similarly difficult financial situation and requires urgent assistance to maintain protection of virgin ecosystems on the western slopes of the southern Urals. The protected area contains 24 animal species that are listed in the Red Data Book. The preserved area experiences significant pressures from local agricultural enterprises, grazing, and poaching. Local people, unaware of the importance of the zapovednik, are attempting to abolish it altogether. Effective protection and educational activities must begin immediately to make sure the protected area remains intact.

The proposed project seeks funding for urgent measures to reconstruct the administrative facilities, and provide protection equipment, vehicles, communications equipment, and roads. Because infrastructure is meager in this particular zapovednik, equipment costs comprise the bulk of requested funds. The project will also organize educational activities, construct trails, and publish educational materials on the importance of nature preservation and encourage local participation in conservation programs.

The total cost of this three year project is $316,900, including equipment, transportation, construction, and educational costs. See Attachment C, budget 4.4.

The project will be implemented by the staff of the Bashkirsky Zapovednik.

- **Denezhkin-Kamen Zapovednik** (782 km^2), the largest reserve in the central Urals, contains some of the most pristine forests, and protects the only high montane habitats in the central region. In 1991, this reserve was re-established as a protected area, but funding has been unavailable to develop the necessary management infrastructure, or to hire the personnel necessary for effective conservation. Because uncoordinated tourism contributes to the degradation of the zapovednik territory, local ecological education programs are needed to improve conservation and tourism management.

The proposal included here would rectify this situation by providing the necessary equipment for effective operation of the zapovednik. An administrative-laboratory complex will be constructed for the zapovednik staff, and air transport will be procured for monitoring the protected area. Funding would extend to ecological education programs, building of trails, and publication of information booklets. The successful implementation of this project will improve management and ensure the long-term viability of the protected area by developing organized tourism programs.

The total cost of this three year project is $190,540, including equipment and educational costs. See Attachment C, budget 4.5.

The project will be implemented by the administration of the Denezhkin-Kamen Zapovednik.

Gaps in Bioregional Conservation

The relatively small size of the reserves in the central Urals, and the degradation of surrounding habitat, has prompted discussion of the establishment of habitat corridors between reserves to increase the effective area of conservation and to enhance connectivity. This important project will be addressed in subsequent phases.

V. Sustainable Use of Resources and Ecotourism

Many of the projects to support existing zapovedniks address issues of environmental education and sustainable tourism practices. Sustainable development practices are also mandatory in buffer zones surrounding zapovedniks.

VI. The total budget for the Ural Bioregion conservation proposals presented here is $1,194,165 for the periods indicated.

PRIORITIES: The Pechoro-Ilychsky and Bashkirsky projects are rated as highest priority. The Shulgan-Tash project is rated at the next level of priority.

5. GREAT CAUCASUS BIOREGION

I. Geographic Location and Range

Almost the entire northern slope of the Great Caucasus Mountains extends into Russia between the Caspian and Black Seas (Fig. 12). Although it is the smallest bioregion, constituting only 1% of Russia's total territory, a great diversity of species, many rare and endemic, inhabit the Caucasus. The range seems small when compared to the entire map of Russia; however, the Caucasus is an impressive range with 60 peaks over 13,000 ft (3,960 m), and over 2,000 glaciers.

II. Outstanding Biological Features

Forested steppes cover much of the lower slopes, except in the higher rainfall areas of the west, where open mixed broadleaf and coniferous forests predominate at middle elevations. Subalpine and alpine meadows prevail in the higher reaches. The moderate climate, rugged topography, varied geology, and geographic proximity to Europe and the Near East help account for the uniqueness and complexity of the biota. Among the 14 bioregions of Russia, only the Amur-Sakhalin region and the Caucasus are comparable in terms of their high species richness, large number of endemic plant and invertebrate species, and unique role as the northernmost limit for a number of species within Russia.

III. Short- and Long-Term Threats

Despite the impressive biodiversity of the Great Caucasus, extensive civil unrest constrains investment opportunities in this bioregion at the current time. Upon cessation of hostilities, biodiversity conservation efforts should be given highest priority.

The long history of human activity in the Caucasus has resulted in extensively altered natural habitats, and the threat of local or global extinction to many species. At greatest risk are (i) the many plant and invertebrate species with restricted geographic ranges, an evolutionary consequence of complex terrains, geology, and climates, and (ii) large vertebrates such as the Caucasus brown bear (*Ursus arctos*) and tur (*Capra caucasica*) that are easily depleted through hunting. The Caucasus leopard (*Panthera pardus tulliana*), an endemic subspecies, is believed to have already been extirpated.

The natural steppes of the Caucasian plain have been largely converted to agricultural land. Montane forests are heavily deforested and replaced by cultivated land or persistent secondary vegetation with low resource value. Habitats at all elevations are extensively used for pasture, resulting in vast areas of heavily degraded vegetation. Degradation of alpine

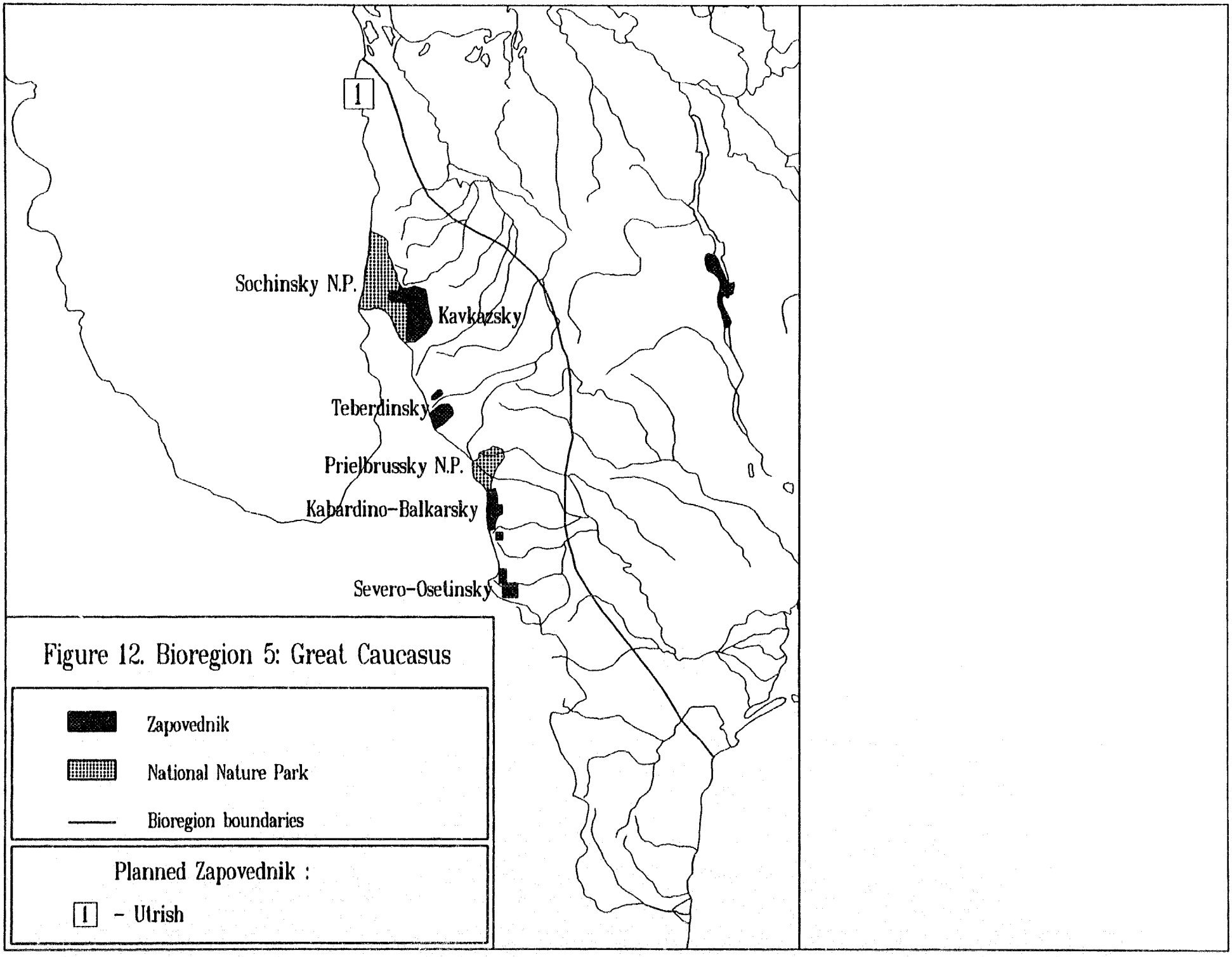

Figure 12. Bioregion 5: Great Caucasus

meadows and fellfields is further exacerbated through intensive recreational activities (e.g., resorts, climbing camps) in many areas. The breakdown of traditional authority during recent civil unrest may be contributing to increased poaching of larger vertebrates. Many ecosystems in the region have the potential to respond favorably to restoration efforts, if human disturbance is controlled and populations of native species have not been too severely depleted.

IV. Conservation Potential

The five existing zapovedniks have a total area that represents less than 2% of the region's territory (Fig. 13). Apart from the severe financial difficulties of all the reserves, serious political strife in the region (including the southern slope of the Caucasus in Georgia) threatens protected areas by undermining the authority of reserve managers; reducing their ability to respond to fires, poaching, and other violations; greatly increasing the frequency and intensity of violations; and eliminating revenues from tourism. Thus, the purpose of the proposals outlined here is to provide emergency support for reserve managers to continue their limited but critical resource management during the duration of the civil unrest, and to ensure that an adequate amount of funding is available for expansion of activities when the political turmoil subsides.

Existing Zapovedniks Requiring Urgent Assistance

The following two zapovedniks have been identified for immediate support measures:

- **Teberdinsky Zapovednik** (850 km^2), although relatively small, has very high biodiversity value, including such species as the Caucasian tur (*Capra caucasica*), European bison (*Bos bonasus*), and many birds. The zapovednik is very popular for tourists due to the beautiful alpine meadows, waterfalls, and mountains. The zapovednik also boasts significant experience in handling tourists, but guest facilities need to be built. This zapovednik was singled out by the Ministry of Environment as a priority for support during this critical period in the Caucasus region in order to ensure that the zapovednik's protected territory will remain intact for future conservation and ecological tourism programs.

This proposal will provide funding to support Teberdinsky Zapovednik during this time of political and economic strife in the Caucasus region. Urgent needs include basic equipment and infrastructure, rental of air transport for patrol and monitoring of the territory, and large quantities of fuel, otherwise unavailable in the region. The project will also allow the zapovednik to strengthen its ecological education program by creating a mini-center in the zapovednik (Section II), vital to the development of future ecotourism. Specific measures to be implemented are construction of a nature museum and tourist facilities, creation of nature trails, and publishing information about the zapovednik. Adequate funding will allow the zapovednik to maintain its protected regime until further assistance can be delivered.

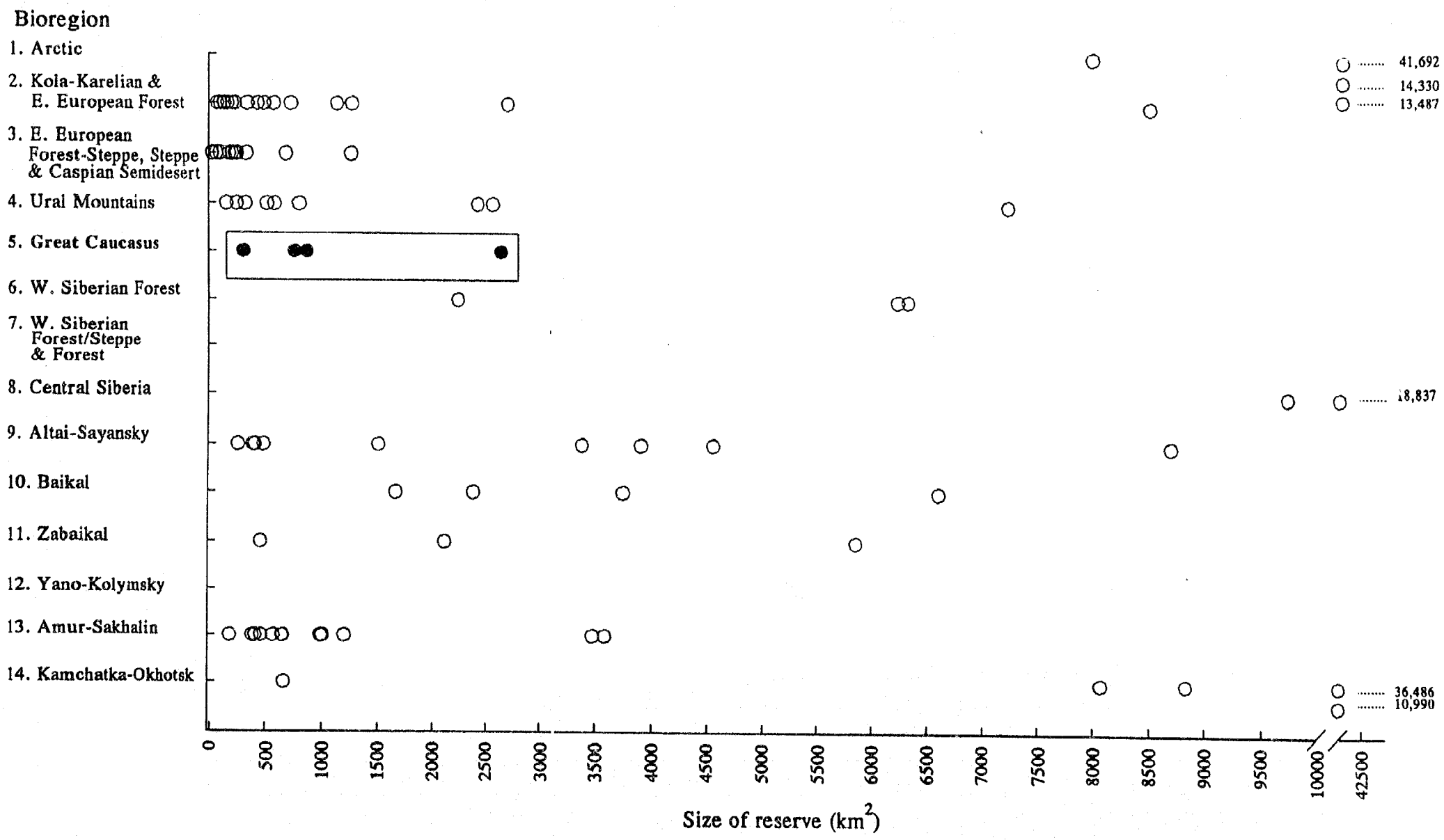

Figure 13. Size of existing zapovedniks in the Greater Caucasus Semidesert bioregion compared to zapovedniks in other bioregions.

Ecological education programs will also help to establish a positive attitude toward the zapovednik locally, to ensure its long-term existence.

The total cost of this assistance effort is $246,900 over three years, including vital technical needs, and initiation of ecological tourism programs. See Attachment C, budget 5.1.

The project will be carried out by the staff of Teberdinsky Zapovednik.

- **Kavkazsky Zapovednik** (2,883 km^2), also known as the Caucasus Biosphere Nature Reserve, represents a particularly critical site for biodiversity conservation because it is the largest protected area in the region and encompasses one of the last remaining stands of Khosta boxwood (*Buxus colchica*) and yew forests. *Ninety-eight* species listed in the Russian Red Data Book of rare and endangered species occur there. The zapovednik requires urgent technical assistance to continue conservation efforts. Infrastructure for ecological education programs should also be created now, so that controlled ecotourism can provide long-term financing of the zapovednik.

This project will eventually develop ecotourism in the region. Urgent measures for maintaining the zapovednik now include procuring equipment, transportation, and fuel. Air transport is necessary to monitor the territory. Tourist facilities should be created now to handle the increasing number of visitors each year. A guest house and trails will be built, and the nature museum and two guard stations will be renovated. Two experts from the zapovednik will also attend a special training program to improve conservation management in the reserve. The project will result in consistent protection of the zapovednik and improved tourism capacity.

The total cost of the project is $285,020 over three years. See Attachment C, budget 5.2.

The project will be implemented by the staff of the Kavkazsky Zapovednik.

Gaps in Bioregional Conservation

All existing reserves need technical and financial assistance in reserve protection and resource management. Some additional conservation activities that would be appropriate for the bioregion in the future, but for which no proposals were currently available, include:

- Expansion of existing reserves to incorporate buffer zones, where grazing, hunting, fires, and other forms of disturbance are strictly regulated.

- Identification and designation of additional reserves to capture remaining pockets of relatively undisturbed original habitat.

- Development and implementation of guidelines for low-impact recreational activities, including ecotourism, within and external to reserves.

- Development and implementation of educational programs for local communities and regional authorities on the role of reserves and the short- and long-term value of biodiversity conservation.

V. Sustainable Use of Resources and Ecotourism

No projects in this bioregion address these issues.

VI. Species of Special Concern

The European bison requires special conservation attention. A proposal on breeding and reintroduction is addressed in the Kola-Karelian and Eastern European Forest bioregion.

VI. The total budget for the Great Caucasus Bioregion conservation proposals presented here is $531,920 for the periods indicated.

PRIORITIES: Both projects in this bioregion are rated as highest priority.

6. WESTERN SIBERIAN FOREST BIOREGION

I. Geographical Location and Range

The Western Siberia Bioregion is bordered on the East by the Ural Mountains and extends across the vast western Siberian plain eastward to the banks of the Yenisey River (Fig. 14). The region encompasses large areas of taiga forests and wetlands, with permafrost underlying much of the landscape.

II. Outstanding Biological Features

Landscape Features

The vast, low plains of Western Siberia still retain enormous natural landscapes. Fifty to 80 percent of the area is covered by marshlands, the largest tracts of this habitat type in all of Russia. Taiga (fir, cedar, Siberian spruce) and subtaiga (birch, aspen) forests predominate towards the south, although the latter habitat type is also present in the northern and central parts along rivers. The largest river in the Western Siberia bioregion, the Ob, bisects the region.

Species of Interest or Concern

The fauna is generally characterized by mixed European and Eastern Siberian species, with a large number of widespread palearctic species. Threatened species in the area include the endangered Siberian crane (*Grus leucogeranus*), of which there are less than 15 individuals left in the western Siberian population; the Western Siberian beaver subspecies (*Castor fiber pohlei*); and the White-tailed sea eagle (*Haliaeetus albicilla*). Larger vertebrates such as moose, bear, wolverine, and sable, also abound here.

III. Overview of Short- and Long-Term Threats

Industrial development, particularly oil and gas extraction, is rapidly increasing in the region, altering once pristine ecosystems. Since 1964, large oil deposits have been exploited, and pipelines, roads, and other industrial development have structurally changed taiga landscapes. Those changes have resulted in fragmentation of habitats, disruption of migration routes, loss of fisheries in damaged streams, degradation of habitat for mammals and birds, loss of lichen forage for reindeer, and permanent flooding of low-lying areas. In the northern reaches of Western Siberia, environmental degradation occurs over a large area due to oil spills, atmospheric deposition of sulfur and toxic metals, peat fires, and the disturbance of fragile tundra and taiga soils due to the movement of trucks and heavy equipment.

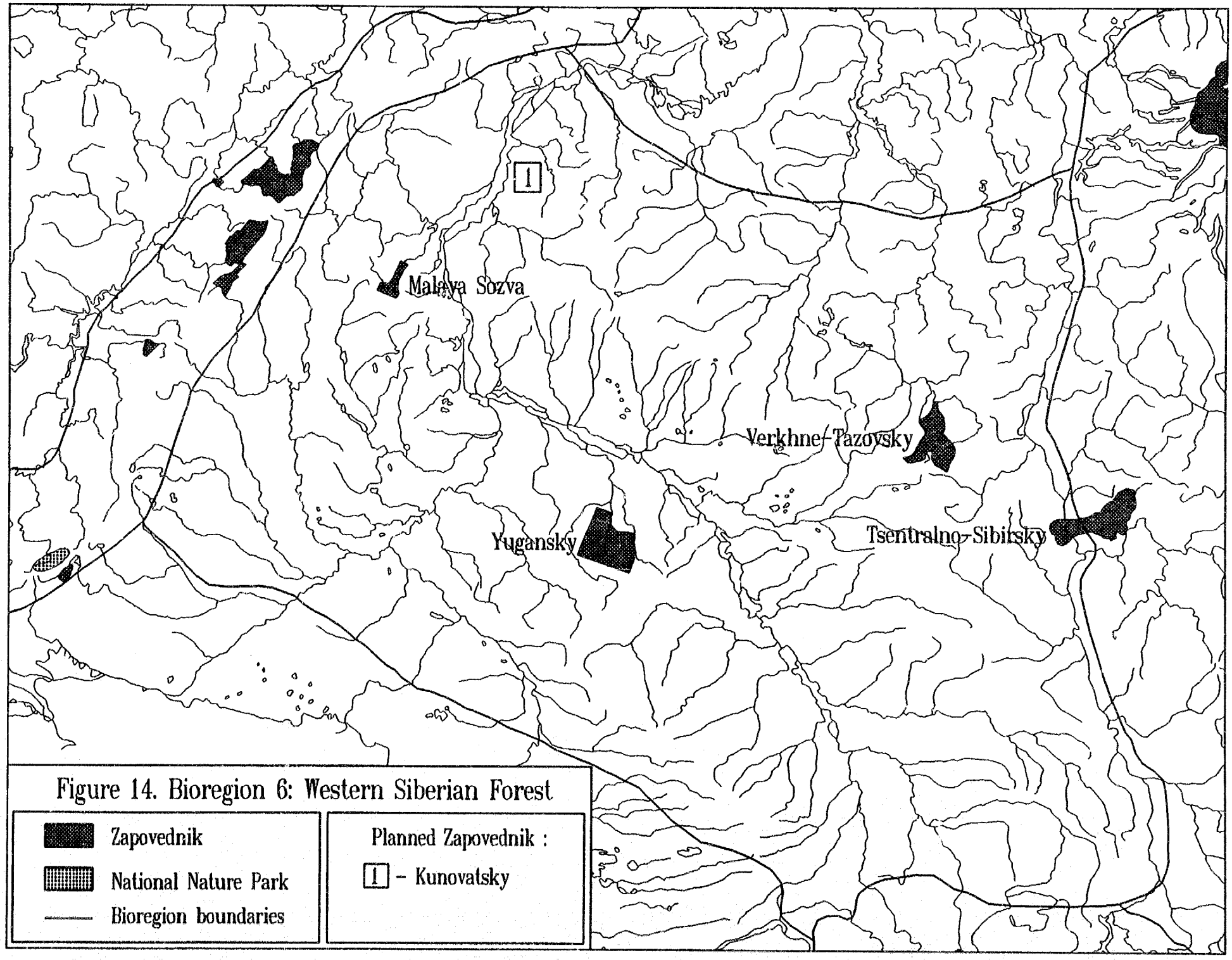

Figure 14. Bioregion 6: Western Siberian Forest

In the Tomsk and Tyumen Oblasts, over 90% of the existing forest reserves are damaged directly or indirectly through industrial activities. Many pollutants degrade slowly in the cold environment and there is growing scientific evidence that damage to permafrost habitats is irreversible and continues to spread beyond the initial disturbance. Hydroelectric construction on the Irtysh River has exacerbated flood conditions, drained important floodplain wetlands, and reduced the biological productivity of local ecosystems. Unregulated timber harvesting is rapidly replacing conifer forests with birch and aspen-birch forests.

IV. Conservation Potential

Existing Reserves

Only three zapovedniks exist in this huge bioregion: Verkhnetazovsky, Malaya Sos'va, and Yugansky. They all require additional evaluation for investment potential in Phase II. Their ecosystems primarily represent the central part of the Western Siberian taiga, and they are of sufficient size to conserve many viable populations of wildlife and most ecological processes (Fig. 15). However, there is no representation of southern taiga ecosystems, subzones of northern taiga, or southern broadleaf forests. Thus, the focus in this bioregion is on creation of new reserves, with particular emphasis on unprotected ecosystems and habitats of rare species.

Creation of New Protected Areas

Creation of zapovedniks in this region, according to the government's plan for expanding the network of protected areas, includes: Kunovatsky Zapovednik in the northern taiga subzone, and Pikhtovye Zapovednik in the southern taiga subzone. These zapovedniks are being considered for financing out of the state budget and are therefore not considered here, but their importance to the network will undoubtedly make them a priority for outside assistance in the future.

- Creation of a zapovednik in the **Kunovat River basin** and a system of protected areas emerges primarily from the urgent need to protect breeding habitat of the endangered **Siberian crane** (*Grus leucogeranus*). Less than 15 individuals still exist in this region and, unfortunately, nesting habitats of the western population are located in the largest oil and gas region. During migrations, the species is traditionally hunted in Afghanistan and Pakistan and so saving this species from *rapid* extinction requires urgent measures in all of its breeding, wintering, and migratory habitats.

The project proposes to preserve the breeding habitat of the Siberian crane and create seasonal sanctuary areas along migration routes. The project also addresses captive breeding and reintroduction of cranes into nature, a system of fines and penalties for violations, and

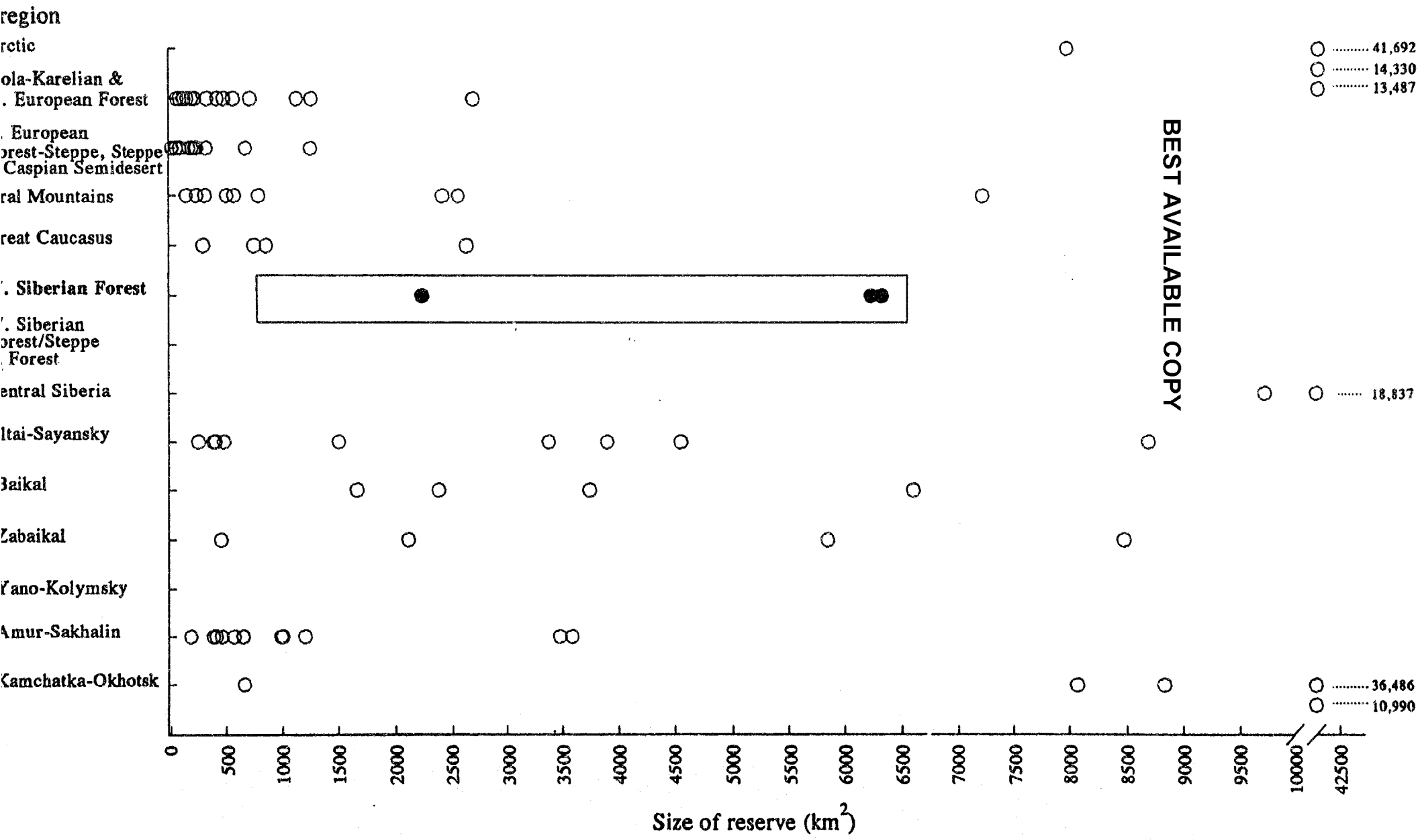

Figure 15. Size of existing zapovedniks in the Western Siberian Forest bioregion compared to size of zapovedniks in other bioregions.

coordination of international conservation efforts. The project intends to increase the population of the Siberian crane and reduce threats to its prosperity.

The total cost of the Siberian crane restoration program is $73,200 over three years, consisting of expedition costs, salaries for project executants, and rental of a helicopter and satellite telemetry equipment. See Attachment C, budget 6.1.

The project will be implemented by specialists from All-Russian Scientific Research Institute of Environmental Protection and Zapovednik Activities of the Ministry of Environment, from the Oksky Zapovednik crane breeding center, and others.

V. Sustainable Use of Resources and Ecotourism

No projects in this bioregion address these issues.

VI. Species of Special Concern

The Siberian crane is addressed through creation of a protected area for its habitat and temporary sanctuaries along its migration route (above).

VII. The total cost of the proposals designed for the Western Siberian Bioregion is $73,200 for the periods indicated.

7. WESTERN SIBERIAN FOREST-STEPPE AND STEPPE BIOREGION

I. Geographical Location and Range

The Western Siberian forest-steppe and steppe region extends westward from the Ural mountains to the beginning of the Altai-Sayan mountain massif along the southern edge of Russia. The bioregion represents the northern edge of the central Asian steppe zone found in the territory of Northern Kazakhstan (Fig. 16).

II. Outstanding Biological Features

Landscape Features

This bioregion has low relief and poor drainage, resulting in numerous lakes and marshy areas. A mosaic of pine, birch and aspen forests (ca. 7% of the landscape) is mixed with steppe meadows and typical steppes. The Barabinskaya Steppe contains the largest complex of lake and steppe habitats in Russia.

Species of Interest or Concern

An important migration flyway for Western Siberia and the central Arctic passes through this bioregion. Many bird species depend on the region's wetlands and grasslands for critical feeding, resting, or nesting habitat. Endangered bird species include the great bustard (*Otis tarda*), little Bustard (*Chlamydotis undulata*), Houbara bustard (*Otis tetrax*), stone thick-knee (*Burhinus oedicnemus*), and sociable lapwing (*Chetussia gregaria*). The rare marbled polecat (*Vormela peregusna*) also occurs in the steppes of this region.

III. Overview of Short- and Long-Term Threats

Conversion of steppe habitats to agriculture has reduced the extent of original habitat by 40 to 50%, producing highly fragmented and isolated blocks of habitat. Intensive grazing also degrades steppe formations, increases erosion, alters species compositions, destroys nesting habitat for birds, and permits aggressive alien forage species to dominate. As a result of unregulated harvesting of pine forests on the upper floodplain terraces of rivers, especially along the tributaries of the Ob River, sand dunes have formed indicating extensive habitat degradation.

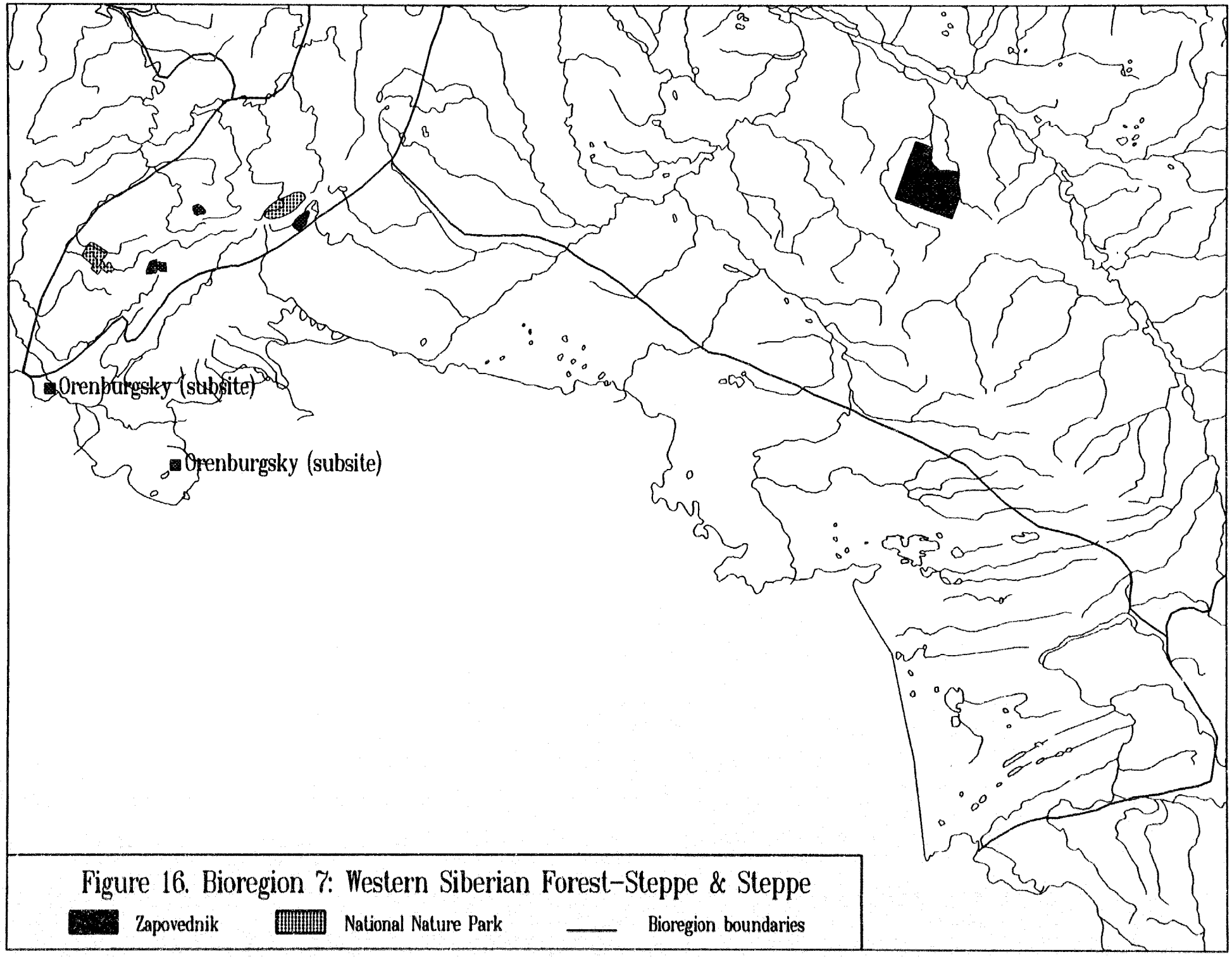

Figure 16. Bioregion 7: Western Siberian Forest-Steppe & Steppe

IV. Conservation Potential

Currently no zapovedniks exist in this bioregion (Fig. 17). However, there are several refuges (zakazniks) of regional and federal significance. Four new zapovedniks are targeted for this bioregion in the government's plan for developing new zapovedniks: Tavolzhansky and Bairovsky zapovedniks will represent forest-steppe zones, and Barabiksky and Kulundinsky zapovedniks will represent lake and steppe ecosystems. With these reserves in place, all major types of natural ecosystems will be protected. They will also create redundancy of protected areas, and conserve critical habitats in the southern part of the migration flyway. However, because agricultural activities are also growing in the region, these projects need to be fully addressed in Phase II of the project, when proper mechanisms for implementation are more readily identifiable.

V. Sustainable Use of Resources and Ecotourism

After the organization of the zapovedniks mentioned above, methods for sustainable use of resources in surrounding areas will be developed to ensure that agriculture and other resource use practices are compatible with biodiversity conservation.

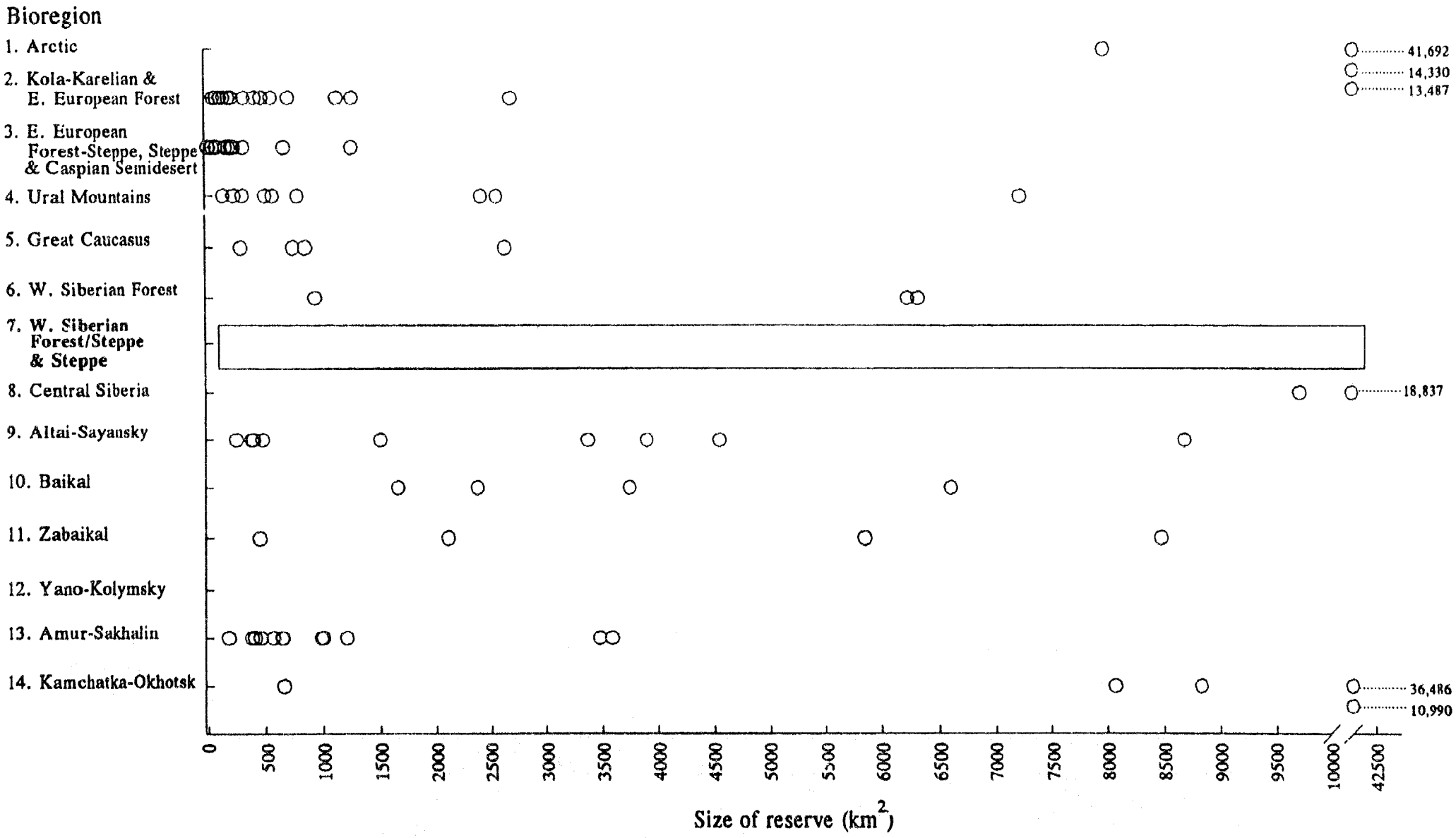

Figure 17. Size of zapovedniks by bioregion. There are currently no existing zapovedniks in the Western Siberian Forest-Steppe & Steppe bioregion.

8. CENTRAL SIBERIAN BIOREGION

I. Geographical Location and Range

The Yenisey and Lena, two large rivers that flow northward through Siberia into the Arctic Ocean, form the major boundaries between the Western, Central, and Eastern Siberia bioregions (Figure 18). The distributional limits of many species of Siberian trees, understory plants, birds, and mammals occur at these rivers. The complexity of the landscapes also increases from west to east with large mountains in Eastern Siberia, low mountains and hills in the Central Siberian plateau, and flat plains and extensive marshy areas in the west. Among the bioregions of Siberia, the central region is the largest.

II. Outstanding Biological Features of Bioregion

Landscape Features

Superlatives are appropriate for Central Siberia: it contains the world's largest tract of unbroken wilderness and is the largest of the 14 bioregions, covering 23% of Russia's territory. The vast expanses of taiga forest represent some of the largest intact forests (and carbon reserves) on Earth, and the region is contained within the watershed of two enormous river systems. Thus, preservation of the vast natural ecosystems of this region are crucial for biodiversity conservation on national and global scales. The ecological communities consist primarily of montane tundra and larch taiga on permafrost soils in the north, predominantly spruce-fir taiga in the middle of the bioregion, and taiga-steppe mosaics in the far south.

Ethnic Diversity

Eight indigenous cultures inhabit the region: the Evenki, Dolgani, Nentsi, Selkupi, Nganasani, Keti, and Northern Yakuti. Most of these groups still rely on the natural resources of the rivers, tundra, and taiga for their survival.

Species of Interest or Concern

Some of Russia's largest populations of brown bear, moose, wolf, fox, reindeer, wolverine, and sable exist in these forests. The breeding grounds of several rare bird species, such as the golden eagle (*Aquila chrysaetos*) and the little curlew (*Numenius minutus*) live in this bioregion.

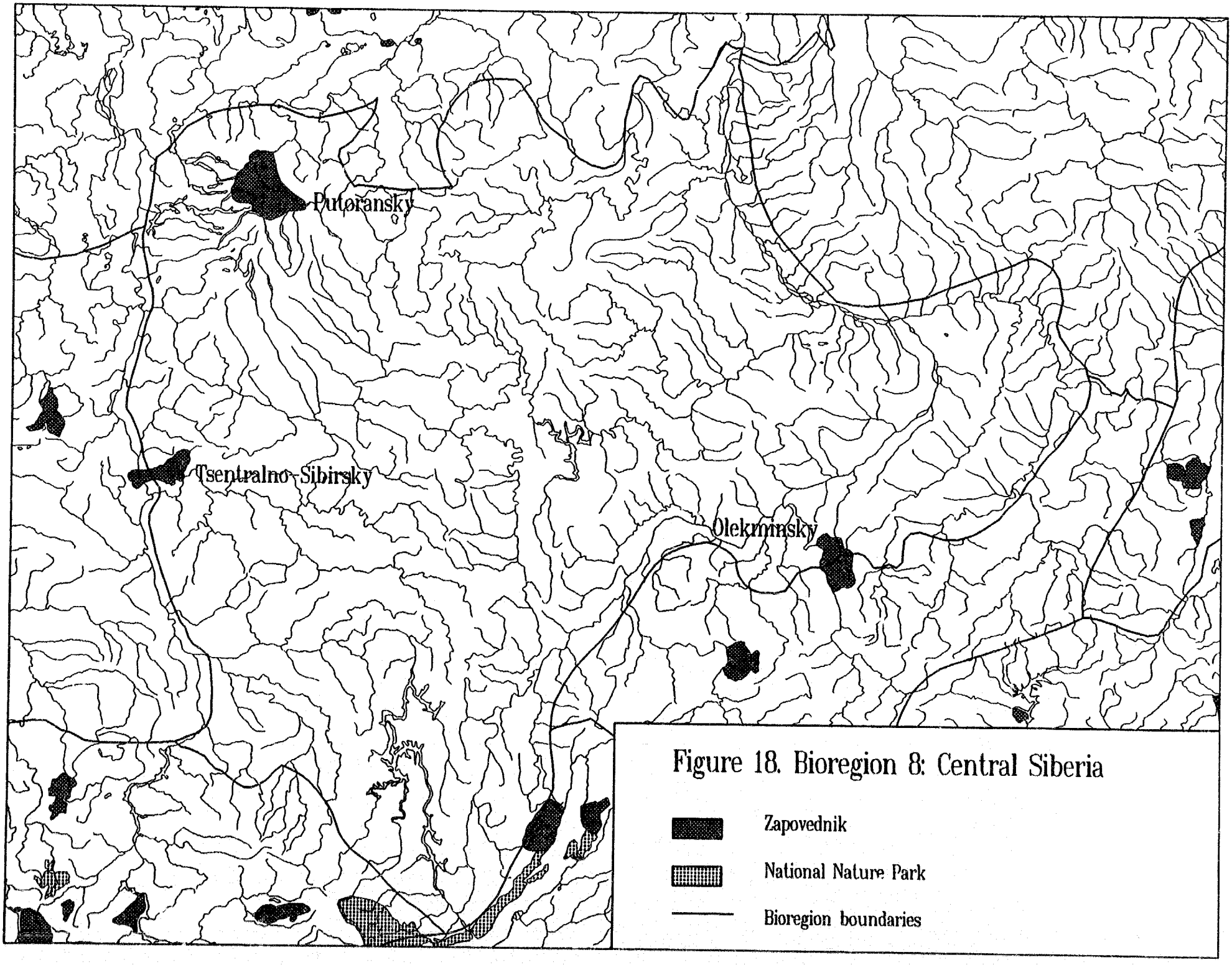

Figure 18. Bioregion 8: Central Siberia

III. Overview of Short- and Long-Term Threats

Although Central Siberia still contains some of the world's largest intact ecosystems, pressure to extract the region's natural resources is tremendous. Extensive coal mining, logging, and oil and gas development is underway in the southern portion of the region (e.g., Kansky and Cheremkhovsky Basins), and large forest areas have been razed for industrial purposes or have been degraded through air pollution and fires. Soil erosion and water pollution present serious problems near industrial centers, such as the Kansko-Achinsky Energy Complex, and other petroleum and mining operations. The toxic materials and debris from mining, logging, and processing operations can damage rivers for hundreds of kilometers downstream. Several major hydropower projects are planned for the Yenisey River such as the Middle Yenisey and Turukhan projects. In addition to the pollution and land disturbance resulting from the construction of these dams, they have the potential to alter movements of migratory fish and mammal populations, and will inundate immense tracts of forest. Thus, it is essential that the conservation strategy for this region strengthens the existing system of large reserves, plans for future conservation areas, and strictly limits development, particularly for the sensitive montane tundra and permafrost taiga regions in the central and northern lands.

IV. Conservation Potential

Two large reserves exist in the taiga zone, Putoransky (18,873 km^2) and Tsentralno-Sibirsky (9,720 km^2) zapovedniks (Fig. 19). These reserves, of course, do not represent all of the biodiversity or ecosystems of the region. However, three new zapovedniks, with an overall area of 20,000 square kilometers, are part of the government's plan for zapovednik network expansion. Because these new reserves will be examined in Phase II of this project, the following reserves are take priority as conservation initiatives.

<u>Existing Reserves Requiring Urgent Assistance</u>

- The **Tsentralno-Sibirsky Zapovednik**, located in the Yenisey River basin, is a central link in the network of northern taiga zapovedniks, stretching from the Urals to the Okhotsk Sea. This very large reserve represents typical natural ecosystems of the middle taiga, and contains diverse fauna and many endemic plants. Technical assistance is needed to maintain its existing management programs, and development and implementation of sustainable use guidelines are crucial in order for the activities of indigenous peoples to remain compatible with biodiversity conservation. General educational programs are also needed to promote the zapovednik.

This project seeks funding to provide equipment, and air and ground transport for effective monitoring and protection of the large reserve. The project will also fund environmental education programs to increase public awareness and compliance with the zapovednik

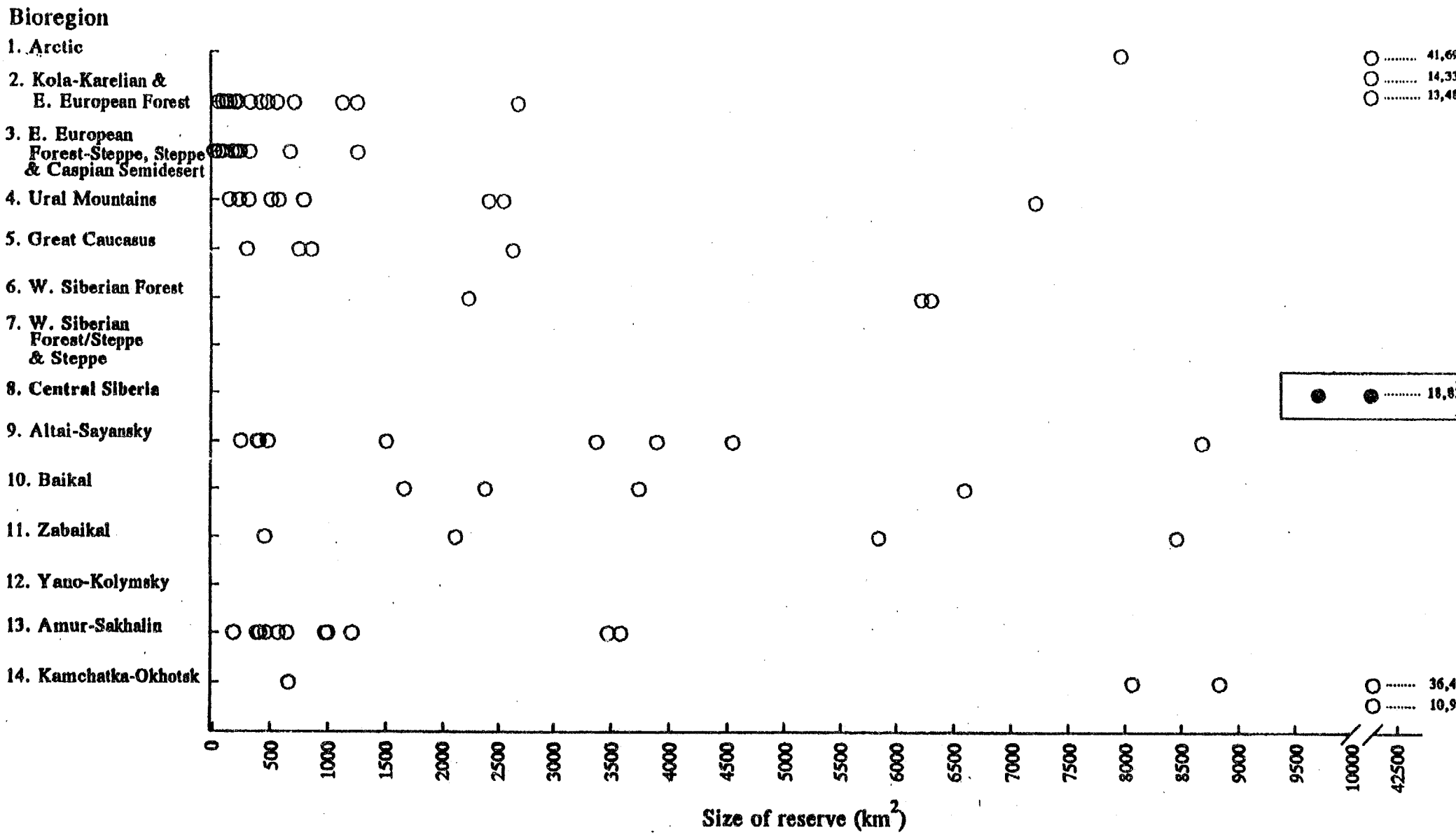

Figure 19. Size of existing zapovedniks in the Central Siberian bioregion compared to size of zapovedniks in other bioregions.

regime. Specific measures for implementing this part of the project include building a guest house for 15 people, building nature trails, creating exhibits in the nature museum, and producing educational booklets and films. The project will result in improved management of tourism and overall protection of resources.

The total cost of the proposed project is $274,400 over 3 years, including technical costs and educational programs. See Attachment C, budget 8.1.

The project will be implemented by the staff of the Tsentralno-Sibirsky Zapovednik.

- The **Putoransky Zapovednik** (18,873 km^2), located in the Krasnoyarsk Krai in the north of the bioregion, contains mountainous relief, deep river valleys, peat tundra on high plateaus, and the large Lake Ayan. The rare Putoran bighorn sheep (*Ovis nivicola borealis*) occurs in this region, in addition to numerous species of birds and mammals. The zapovednik is currently in severe financial crisis and requires urgent assistance in order for reserve managers to adequately protect and monitor the reserve.

This project will finance basic needs in communication and transportation to foster protection efforts. In particular, a landing pad is necessary for air monitoring, as the large territory has few roads. A program for increasing ecological awareness of the local population and tourists is also included to diminish violations occurring in the zapovednik. The program will produce educational materials and films, equip nature trails, and create a small guest house. Successful implementation of the project will improve protection of the territory and education of the public by zapovednik staff.

The total cost of this project is $254,000 over 3 years, including equipment costs and educational programs. See Attachment C, budget 8.2.

The project will be implemented by the staff of the Putoransky Zapovednik.

Gaps in Bioregional Conservation

The natural ecosystems in this bioregion are sizable and intact, warranting an extensive, landscape-scale, gap analysis to identify habitat blocks, watersheds, and habitat corridors for designation as protected areas in the future. Given the scale of periodic disturbance events in the entire Siberian region, such as the catastrophic fires covering over 1 million km^2 that typically occur once or twice a century, and the great distances vertebrate populations migrate, the establishment of a number of very large reserves is likely to be the optimal strategy for this ecosystem type. The two extant reserves are essential components of this strategy; however, several additional reserves are needed to ensure that large-scale ecosystem dynamics persist. Immediate identification and designation of new protected areas will

preclude damage to critical areas by exploitative enterprises. The Gap Analysis Project described in the Federal Proposal section addresses this important issue.

V. Sustainable Use of Resources and Ecotourism

The following project addresses the need to create new areas while considering the needs of local indigenous peoples.

- A proposal from the Yenisey River valley takes the first step towards establishing a protected area system of global significance for biodiversity conservation. The Yenisey riverine and delta wetlands represents one of the largest complexes of bird breeding habitats in the world, and the river itself serves as important spawning beds for arctic char. The project proposes to designate indigenous reserves for the Keti and Entsi people in the Yenisey River valley, where their traditional forms of nature use will be protected. The plan also calls for protection of important wetlands for the numerous species of birds that migrate through or breed here.

The project seeks funding to plan a conservation area where limited traditional resource use by indigenous groups will continue. The project will provide funding to plan and create the area, as well as to develop measures for sustainable development. The result will be recommendations to the protected area system planning committee on developing the protected territory. Necessary measures and funding for later phases of the project will need further assessment.

The cost of the planning phase is $50,000 for travel and salaries of the survey team for one year. An itemized budget is available upon request.

The project will be led by Dr. Syroechkovsky from the All Russian Institute for Ecology and Animal Morphology, and teams from various institutes.

- As mentioned above, a large number of minority populations in this region rely on conservation of natural habitats . A group of authors proposes a project to develop and implement a program of biodiversity conservation, sustainable development, and preservation of minority populations of Siberia. The project addresses the need to plan new protected areas to fill gaps in conservation in the network as a whole. This proposal is very important, but requires additional research and will be examined in Phase II.

VI. Species of Special Concern

No projects in this bioregion address this issue.

VII. The total cost of the project for the Central Siberian bioregion is $578,400 for the periods indicated.

PRIORITIES: The Tsentralno-Sibirsky project is rated at the highest priority. The Putoransky project is rated at the next priority level.

9. ALTAI-SAYANSKY BIOREGION

I. Geographic Location and Range

The Altai-Sayansky bioregion occupies the center of the Asian continent and covers 8% of the country (Fig. 20). It contains part of southern Siberia and encompasses the Tuva Republic, the southern regions of Krasnoyarsk Krai, and the southwestern part of Irkutsk Oblast. The Altai region is one of the most mountainous of the 14 bioregions.

II. Outstanding Biological Features

Landscape Features

Altai-Sayansky's central location in Asia, its high mountains, and strong environmental gradients create much landscape diversity. Montane habitats cover more than half of the bioregion. Drier areas to the west, in the rainshadow of the mountains, are semidesert.

Species of Interest or Concern

The mountain-steppe landscapes support a characteristic Mongolian fauna that includes a number of rare and endangered species such as Altai mountain sheep (*Ovis ammon ammon*) or argali, snow leopard (*Panthera uncia*), manul (*Felis manul*, or Pallas' cat), Altai ular (*Tetraogallus altaicus* or snowcock), cinereous vulture (*Aegypius monachus*), golden eagle (*Aquila chrysaetos*), and lammergeier (*Gypaetus barbatus*).

III. Overview of Short- and Long-Term Threats

In the mountain region, population density is relatively low and economic activities are limited to hunting and reindeer breeding. Because the northern regions are nearly inaccessible, the landscapes are mostly unfragmented and intact. In the southern steppe regions, however, the landscapes are highly disturbed and have been transformed due to intense sheep grazing.

The Altai-Sayansky bioregion faces a wide variety of threats:

- Overgrazing in dry-steppe and semidesert landscapes of mountain valleys and lowlands has resulted in major degradation of pastures and reduced their productivity. Overgrazing of high mountain pastures has displaced populations of endangered Altai mountain goats and contributed to their decline.

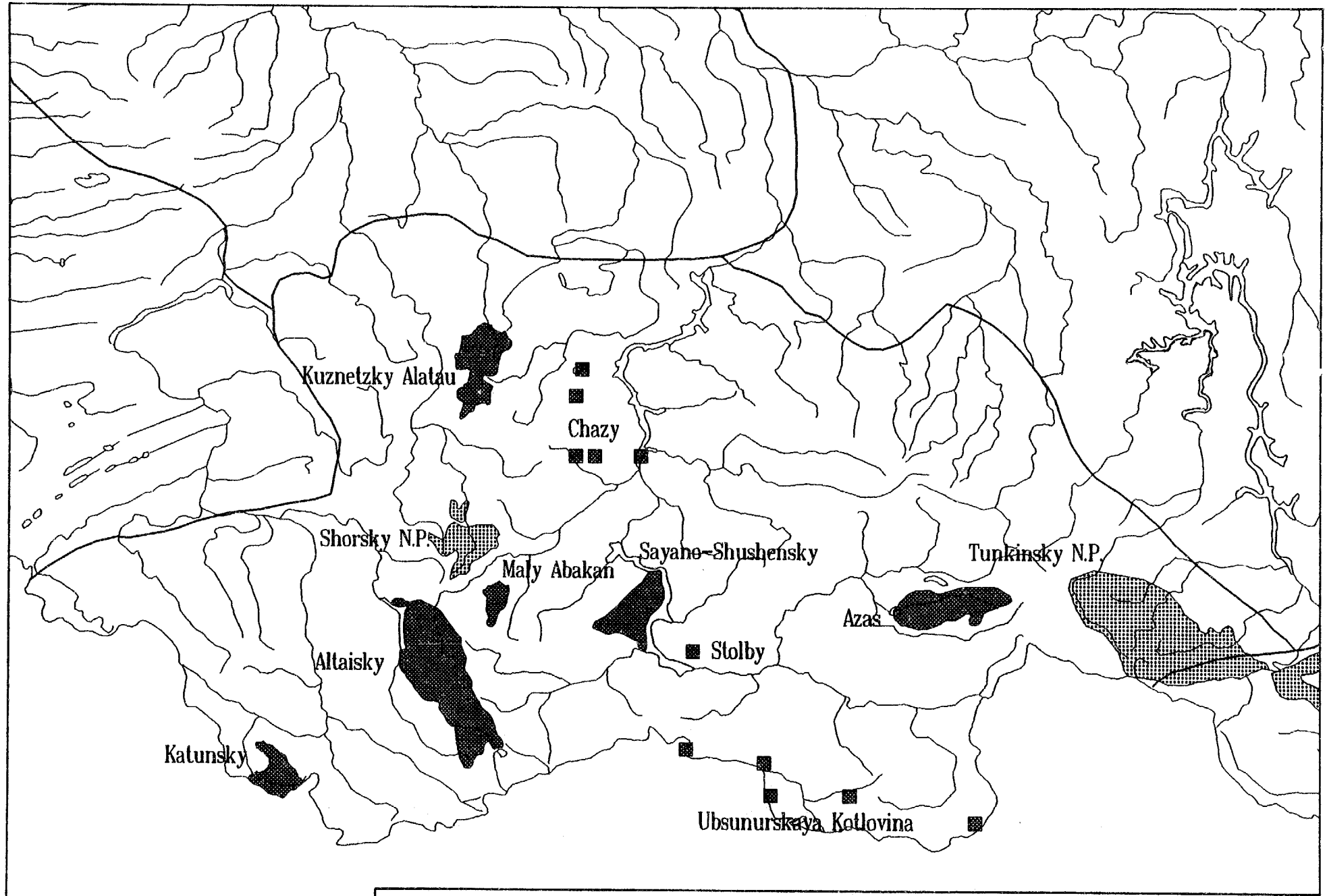

Figure 20. Bioregion 9: Altai-Sayansky

Zapovednik | National Nature Park | Bioregion boundaries

- Logging of steep slopes has exacerbated soil erosion, increased the risk of avalanches, and degraded forested landscapes.

- The bioregion supports highly developed electrical energy installations such as the Sayansky fuel-industrial complex, and a mining industry, all of which impact environmental quality. Several water reservoirs and hydro-power stations have also impacted the biology of aquatic species.

- The Kuzbass region has been disturbed by mining development and major air pollution. Soil productivity has diminished, creating one of the most environmentally threatened areas in the region.

- Competing land-use now threatens the conservation of traditional hunting areas, sites for hazelnut collection, and the cedar forests and watersheds essential to the health and well-being of local communities.

IV. Conservation Potential

The long-term viability of biological diversity in the Altai bioregion depends to a large extent on maintenance of its six zapovedniks and two national parks (Fig. 21). This protected area network represents the biodiversity of the region relatively well, including both native mountain and steppe ecosystems. The only exception is a small, but very biologically important piece of land near Katunsky Zapovednik that is proposed for protection in the near future.

Existing Zapovedniks Requiring Urgent Assistance

- **Altaisky Zapovednik** (8,637 km^2) is one of the largest and oldest Zapovedniks in Russia, first created in 1932. The zapovednik also ranks among the highest in biological value because it conserves a unique combination of alpine, taiga, and steppe landscapes. These landscapes support a fauna of 73 mammals, 310 bird species, and 1,425 plants, including 250 Altai-Sayan endemics. International attention has focused on the Altaisky because it is home to an important population of endangered snow leopards. The reserve lacks basic funds for management, and is now completely cut off because of deterioration of roads, shortages of funds for fuel, and a lack of basic communications equipment. This situation is unfortunate, because the magnificent landscapes of Altaisky and its native wildlife make it a priority site for the development of ecological tourism. In the future, ecotourism should contribute greatly to financing conservation efforts in the reserve; however, without immediate assistance to maintain and upgrade infrastructure and park protection, important biological resources will be lost, along with the opportunity to conserve biodiversity.

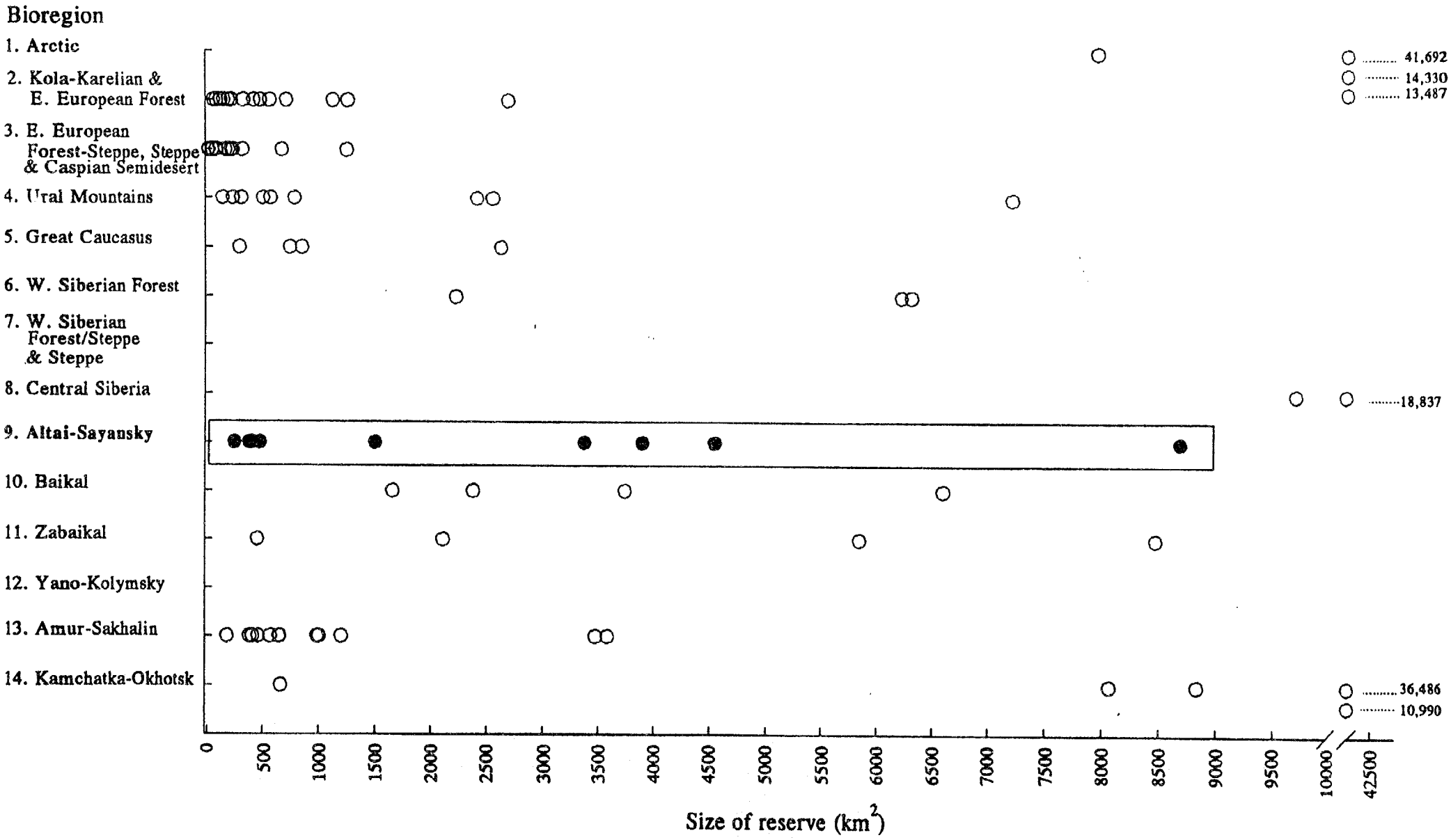

Figure 21. Size of existing zapovedniks in the Altai-Sayansky bioregion compared to size of zapovedniks in other bioregions.

Support measures in this project include purchase of equipment and transport, construction of a central station, and reconstruction of a pier. Funding for creating a conservation education mini-center (Section II) will complete construction of a nature center and tourist accommodations, improve trails, and refurbish a decaying natural history museum. Educational materials and films will be produced for the museum, and two experts of the zapovednik will attend an international training course. Results of the project will be improved conservation management and implementation of ecological education programs.

The total of the project is $369,080 to be allocated to: (1) provision of basic infrastructure, and (2) promoting ecotourism. See Attachment C, budget 9.1.

The two components of the project can be implemented independently by the staff of the Altaisky Zapovednik.

- **Sayano-Shushensky Zapovednik** (3,900 km^2) is another important large reserve of the Altai bioregion that conserves many of the same species and habitats as the Altaisky Zapovednik. The close proximity of these two reserves enhances their conservation potential by providing habitat redundancy for populations of endangered argali sheep and snow leopard. Sayano-Shushensky was created in 1976 and later recognized as a UNESCO Biosphere reserve in 1984. The Sayano-Shushensky reservoir has increased access to formerly remote areas, and affected local climate through increased fog cover and raised temperatures. Like most of the reserves in this bioregion, funds for basic management are no longer available. Ecological education programs need to be developed to maintain public support in the region. The Ministry of Environment recommends creating a mini-center for environmental education in this zapovednik (Section II).

This project seeks funding to sustain reserve management, promote conservation education, and thus improve protection of wildlife populations and habitats. Specific objectives of the project are to provide basic equipment and air transport for monitoring the zapovednik, and to develop an ecological education center. The mini-center would be open to the public, offering nature displays, guided tours, and educational films and materials. Expected results of the project are more effective protection of the zapovednik and improved public support for biodiversity conservation.

Total cost of this proposed project is $209,700 over three years, including equipment costs, and construction of the mini-center. See Attachment C, budget 9.2.

The project will be implemented by the staff of the Sayano-Shushensky Zapovednik.

- **Chazy Zapovednik** consists of seven separate sites totaling about 200 km^2 in area. Chazy contains the only relatively intact habitat of central Siberian steppe vegetation, making

it crucial to the national system. It is one of the most important sites for in-situ plant conservation in the region. The zapovednik is also a popular tourist attraction, with over 7,000 visitors a year who come to view the beautiful landscapes, lakes, and to bathe in mineral waters. However, particularly because the zapovednik was just created in 1991, funds to establish main facilities for the protected area have been unavailable due to recent economic hardship.

This proposal seeks funding to meet the basic requirements for management of this reserve and conservation of its unique steppe communities. If funded, this project will create an administrative complex and laboratory, and two remote stations for monitoring the territory. Basic transportation and communications equipment, air transport, fuel and other supplies would also be purchased. The project will also assist development of ecological education and tourism programs, creating a special exhibit in the nature museum, equipping trails, and publishing educational materials.

Total cost of this project is $190,260 over three years. See Attachment C, budget 9.3.

The project will be implemented by the staff of the Chazy Zapovednik.

- **Stolby Zapovednik** (471 km^2) borders the large Siberian city of Krasnoyarsk. Stolby's famous geological formation (the Pillars), its natural taiga habitats, and easy access make it a popular tourist destination of nearby city residents. The opportunity to make Stolby an important center for conservation education, however, has not been fully realized. Although staff scientists and other personnel are actively engaged in public outreach, the collapse of the funding base for this reserve has all but stopped this program. Stolby is ideal for the creation of a mini-center for conservation education which would then serve as a model for future projects in other zapovedniks (Section II).

The project proposes to establish infrastructure in the zapovednik by providing modern communications, transportation equipment, and a training program for a few specialists. The project will also create a mini-center for education which would include a special exhibition center, a nature museum, and information booklets and educational films. Funds will also build nature trails and remodel remote monitoring stations needed for proper protection under tourism conditions. Effective implementation of the project will result in a sustainable conservation program for the zapovednik.

The total cost of this proposed project is $206,265 over a three year period, including costs for equipment and construction of the mini-center. See Attachment C, budget 9.4.

The project will be implemented by the staff of the Stolby Zapovednik.

Gaps in Bioregional Conservation

The maintenance of existing reserves alone does not ensure the overall representativeness and redundancy of protected areas in the region. For example, during the creation of Katunsky Zapovednik (1,500 km^2), a whole range of key sites were not included; areas omitted represent typical natural ecosystems of the region and especially valuable rare species. Addressing these omissions requires expansion of this reserve to include unique assemblages of the Central-Altai flora and fauna representative of the Altai-Sayan mountains.

- The proposed project would expand the **Katunsky Zapovednik** by about 300 km^2 to include mountain-steppe landscapes that support populations of several rare animal species included in Russia's Red Data Book, e.g., the Altai mountain goat or argali, snow leopard, manul, Altai ular, cinereous vulture, golden eagle, lammergeier, and other species. The extension is particularly important for conservation of argali. During winter, they face severe grazing pressure in winter from domestic stock and are forced to migrate to even higher pastures, where snow cover makes foraging difficult. In addition, increased poaching in wintering areas has led to a sharp decline in argali numbers; they were once widespread in the mountains of southern Siberia, but now remain in only a few places. A small group of 60 to 70 animals inhabits the southern part of Altaisky Zapovednik, where illegal yak grazing is conducted by enterprises of the Tuva Republic. The largest argali population in the Altai region (120 to 130 animals) inhabits the proposed new protected area.

A major objective of this project is to create a core protection zone in the center of the argali concentration by extending the territory of the existing Katunsky Zapovednik to include a land site in the upper reaches of the Chagan-Burgazy River in the Sailugem mountain range. The extension can only be achieved if the Katunsky Zapovednik itself receives adequate funding for operation. The two components of the program are: 1) to provide technical support to the existing zapovednik, including communications and transport, administrative facilities, and rental of air transport for monitoring purposes; and 2) to plan and create an expanded protected area by dispatching a survey team to the site, and following up with a planned infrastructure for the new protected area.

(1) Total cost of the project component to strengthen management of the Katunsky Zapovednik is $155,900 for equipment and technical provisions. See Attachment C, budget 9.5.A.

(2) Total cost of the project component to extend the area of Katunsky Zapovednik is $255,300 over three years, including salaries and expenses for the survey team ($5,300) and creation of infrastructure for the expanded zapovednik ($250,000). See Attachment C, budget 9.5.B.

Both projects will be implemented by specialists of the Katunsky Zapovednik.

V. Sustainable Use of Resources and Ecotourism

The proposals for Altaisky, Sayano-Shushensky, and Stolby zapovedniks consider the role of ecotourism in sustaining conservation efforts.

VI. Species of Special Concern

Several proposals address species of special concern, in particular, the argali as addressed by the extension of Katunsky Zapovednik.

VII. Total cost of proposals designed for the Altai-Sayan Bioregion is $1,386,505 for the periods indicated.

PRIORITIES: The Altaisky and Katunsky are rated as highest priority. The Chazy and Sayano-Shushensky projects are rated at the next priority level.

10. BAIKAL BIOREGION

I. Geographical Location and Range

The Lake Baikal bioregion, covering 4% of the country, has received more international environmental attention than any other in Russia (Fig. 22). Located in southern Siberia, the bioregion includes the entire Baikal watershed and the surrounding high mountain ranges.

II. Outstanding Biological Features

Landscape Features

Lake Baikal is famous for being the deepest (1,741 m) and oldest freshwater lake in the world, as well as a region of outstanding natural beauty. Montane taiga, montane steppes, and larch-conifer forests cover the shorelines and mountains surrounding the lake. The Selenga River and numerous smaller streams drain the 500 km length of the Baikal watershed. In addition, the Baikal Valley is an important biogeographical boundary for numerous plant and animal species of Eastern Siberia.

Species of Interest or Concern

The great age and isolation of Lake Baikal has produced one of the world's richest and most unusual freshwater faunas. Lake Baikal is, in essence, the Galapagos of Russia. Underwater "reefs" of giant sponges, a unique biological phenomenon, harbor a great diversity of endemic fish, crustaceans, and other invertebrates. Several large endemic fish, such as the Baikal omul, inhabit deeper waters. These fish support regional fisheries and are part of the prey base for the endemic Baikal Seal, the only entirely landlocked seal species. Baikal forests support large populations of bear, sable, wolf, birds and other wildlife, while several rare and endangered species of plant, fungi, and lichen occur in the surrounding basin.

III. Overview of Short- and Long-Term Threats

International attention to the region has given rise to several projects aimed at reducing threats. Although industrial development is significant, natural habitats are not as highly fragmented as they are in other bioregions. Major threats to the region stem from pulp, aluminum, and other industrial enterprises that dump pollutants into the lake and its tributaries, and harmful compounds into the atmosphere. Other threats include forest clearance, fires, and agricultural activities which contribute to habitat loss, fragmentation, degradation, and soil erosion. In the Selenga River delta, intense cattle grazing and hay-production encroach and damage nesting grounds of migratory waterfowl.

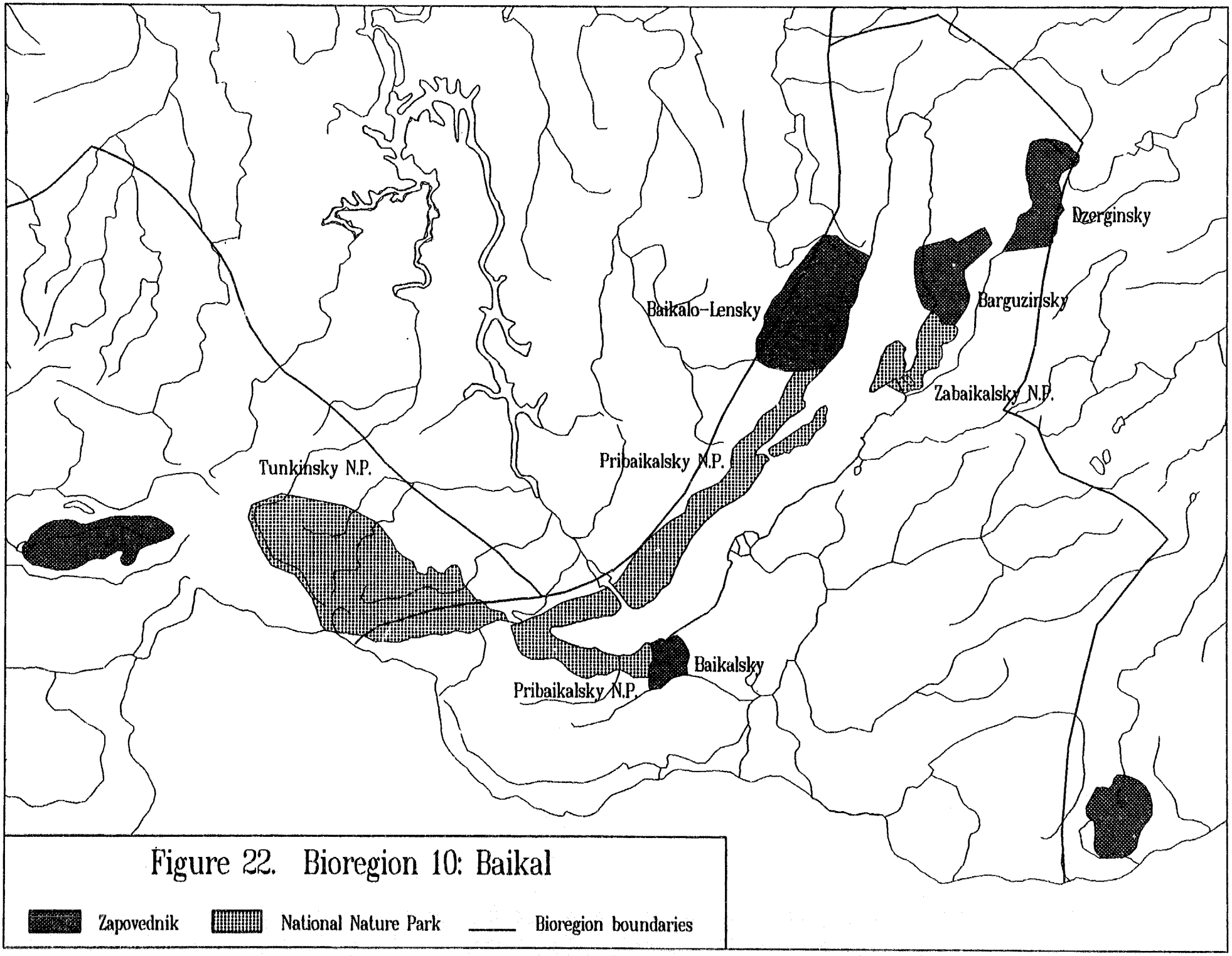

Figure 22. Bioregion 10: Baikal

IV. Conservation Potential

The Baikal bioregion consists of four large zapovedniks (Fig. 23). The contribution of these reserves to the preservation of intact landscapes, and to the overall biodiversity of Russia, is paramount. Three zapovedniks cover various parts of the Baikal watershed: The Baikalo-Lensky Zapovednik (6,599 km^2) protects the northwest shore; Barguzinsky Zapovednik (3,743 km^2) protects the northeast shore, and Baikalsky Zapovednik (1,657 km^2) protects the southeast shore. Dzherginsky Zapovednik (2,378 km^2) is in the northeast of the bioregion. All of the zapovedniks represent typical montane taiga ecosystems. Many national parks and monuments are scattered throughout the bioregion and attract a large number of tourists. Support for existing zapovedniks by enhancing ecological education and controlled tourism is crucial to ensure the long-term sustainability of protected areas. Two projects with these specific objectives are presented below.

Existing Zapovedniks Requiring Urgent Assistance

The zapovednik requiring the most urgent assistance to reestablish protection capacity is the Barguzinsky Zapovednik.

- **Barguzinsky Zapovednik** is a large reserve representing montane taiga and regions on the western slopes of the Baikal watershed. The zapovednik was originally created in 1916 to protect the Barguzin sable and its habitat; in 1986 Barguzin obtained biosphere reserve status. The zapovednik is now in severe financial crisis. The central station was destroyed by fire; the protection service has no equipment; there are no means for transportation and fire-fighting; it lacks incentives to attract qualified personnel; and ecological education programs are far too few for a very popular tourist region.

This project proposes to remedy these problems by strengthening the infrastructure and technical base of the zapovednik, and by developing programs for ecological education and limited ecotourism with a new mini-center. The center will promote the values of biodiversity conservation using educational materials, films, and guided nature tours. Adequate funding will enable the zapovednik to monitor and patrol the large area and increase ecological awareness in the community.

The total cost of this proposal is $271,000 over a three year period, including equipment costs and educational programs. See Attachment C, budget 10.1.

The project will be implemented by the staff of the Barguzinsky Zapovednik.

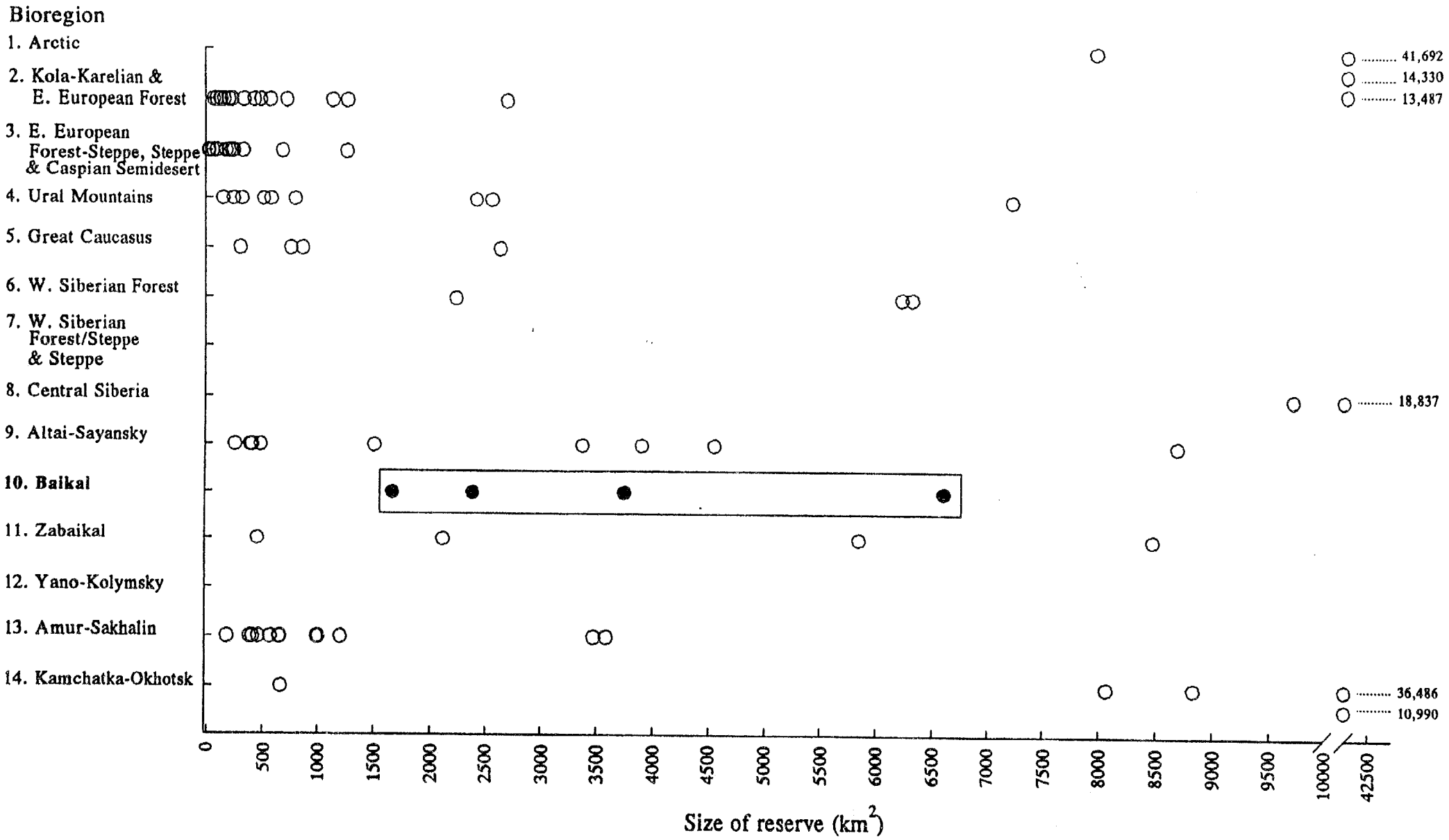

Figure 23. Size of existing zapovedniks in the Baikal bioregion compared to size of zapovedniks in other bioregions.

Gaps in Bioregional Conservation

The Selenga River delta is not represented in the network of protected territories of the bioregion, and attempts to establish a national park in the delta have not been successful to date. However, plans are underway to conserve the entire shoreline of Lake Baikal under the administration of one national park.

V. Sustainable Use of Resources and Ecotourism

The Baikalo-Lensky and Baikalsky Zapovedniks are two very large reserves with significant infrastructure for ecotourism development. The surrounding regions are very popular tourist sites; however, these zapovedniks need to improve their education programs for local communities in order to gain support for zapovednik activities. Lack of public support, particularly with the pressure of economic development, jeopardizes the very existence of the protected areas. In addition, the zapovedniks need to address major infrastructure and equipment needs (transportation, communications, etc.) in order to ensure adequate reserve management in the face of rapidly growing tourism. Two projects highlighted below promote ecological awareness and education, and will improve the ability of the zapovedniks to maintain the biodiversity of this globally important bioregion.

- **Baikalo-Lensky Zapovednik**, one of Russia's very large zapovedniks (i.e., > 5,000 km^2), includes the relatively remote and untouched forest-steppe, montane taiga, and alpine tundra ecosystems of the western and eastern slope of the Baikal range. This zapovednik includes 100 km of shoreline and plays an important role in protecting aquatic ecosystems of global importance. The extremely poor financial state of Baikalo-Lensky aggravates the difficulty of protecting such a large area from poachers and other violators of reserve laws. Effective protection activities within the reserve depend on the availability of equipment, an increased awareness of its ecological importance, and attention to current regulations affecting the area.

The proposed project seeks funding to equip the protection service with modern equipment and expand ecological education activities and tourism through the building of a mini-center (Section II). Funds will also provide the air, water, and land transport vital to the protection of the zapovednik. Main facilities are also needed to provide a base for the zapovednik staff. This project will result in more effective implementation of biodiversity conservation and educational programs.

Total cost of this project is $338,235 over three years, including construction, equipment, and educational program costs. See Attachment C, budget 10.2.

The project will be implemented by the staff of the Baikalo-Lensky Zapovednik.

- **Baikalsky Zapovednik** at the center of the Khamar-Daban mountain range lies amidst a relatively developed zone, separated from the shore of Lake Baikal by railroad tracks and a highway. This zapovednik is located near the town of Tankhoi which is accessible by several modes of transportation. The existence of a natural history museum in Tankhoi also makes it an excellent site for broadening ecological education activities.

This project aims to improve the educational capacity of the zapovednik and its facilities to handle tourists, while equipping the staff to properly manage the zapovednik. The project will send two zapovednik specialists to special international training courses. Additional funds will purchase critical transportation for protecting the territory, and build an educational and scientific center. The result of the project will be enhanced ecological education and tourism, and improved management and preservation of the zapovednik.

Total cost of this project is $207,530 over three years, including education and equipment costs. See Attachment C, budget 10.3.

The project will be implemented by the staff of the Baikalsky Zapovednik.

VI. Species of Special Concern

No projects in this bioregion address this issue.

VII. Total cost of the proposed projects to be financed within this bioregion is $816,765 for the periods indicated.

PRIORITIES: The Barguzinsky and Baikalo-Lensky projects are rated as highest priority.

11. ZABAIKAL BIOREGION

I. Geographical Location and Range

The Zabaikal Bioregion (literally, beyond Baikal) is located on the southeastern inland part of Russia from the Chinese border to eastern central Yakutia (Fig. 24). Mountain ranges, high plateaus, deep river valleys, and the headwaters of several major rivers characterize the region.

II. Outstanding Biological Features

Landscape Features

The deeper valleys of the Zabaikal bioregion have a harsh continental climate. The pronounced cooling effect in these valleys creates communities typical of more northerly latitudes. Larch-dominated taiga forests in the north turn into spruce-fir taiga with a denser understory of plants farther south. Steppe habitats cover much of the southern portion of the bioregion.

Species of Interest or Concern

Several rare and endangered species occur in Zabaikal. One of only two known nesting sites of the relict gull (*Larus relicta*) is located at Lake Barun-Toray, and the endangered hooded crane (*Grus monachus*), white-naped crane (*Grus vipio*), and Demoiselle crane (*Anthropoides virgo*) nest in the region's wetlands. The southern steppes contain populations of Steppe cat (*Felis manul*), Daurian hedgehog (*Hemiechinus dauricus*), and Mongolian marmot (*Marmot sibirica*) which is seriously threatened by intense poaching. Przewalski's horse (*Equus prezwalskii*) formerly inhabited the vast southern steppes of Zabaikal, but was extirpated by hunting and loss of habitat. A successful captive breeding program, however, now reintroduces this species into its historic habitat.

III. Overview of Short- and Long-Term Threats

The most developed area of this region is along the Trans-Siberian railroad. Timber harvesting, fur trading, reindeer breeding, and mining are the primary economic activities in the region. Much steppe wildlife habitat has been destroyed or fragmented by agriculture, particularly by overgrazing and seasonal burning for forage enhancement.

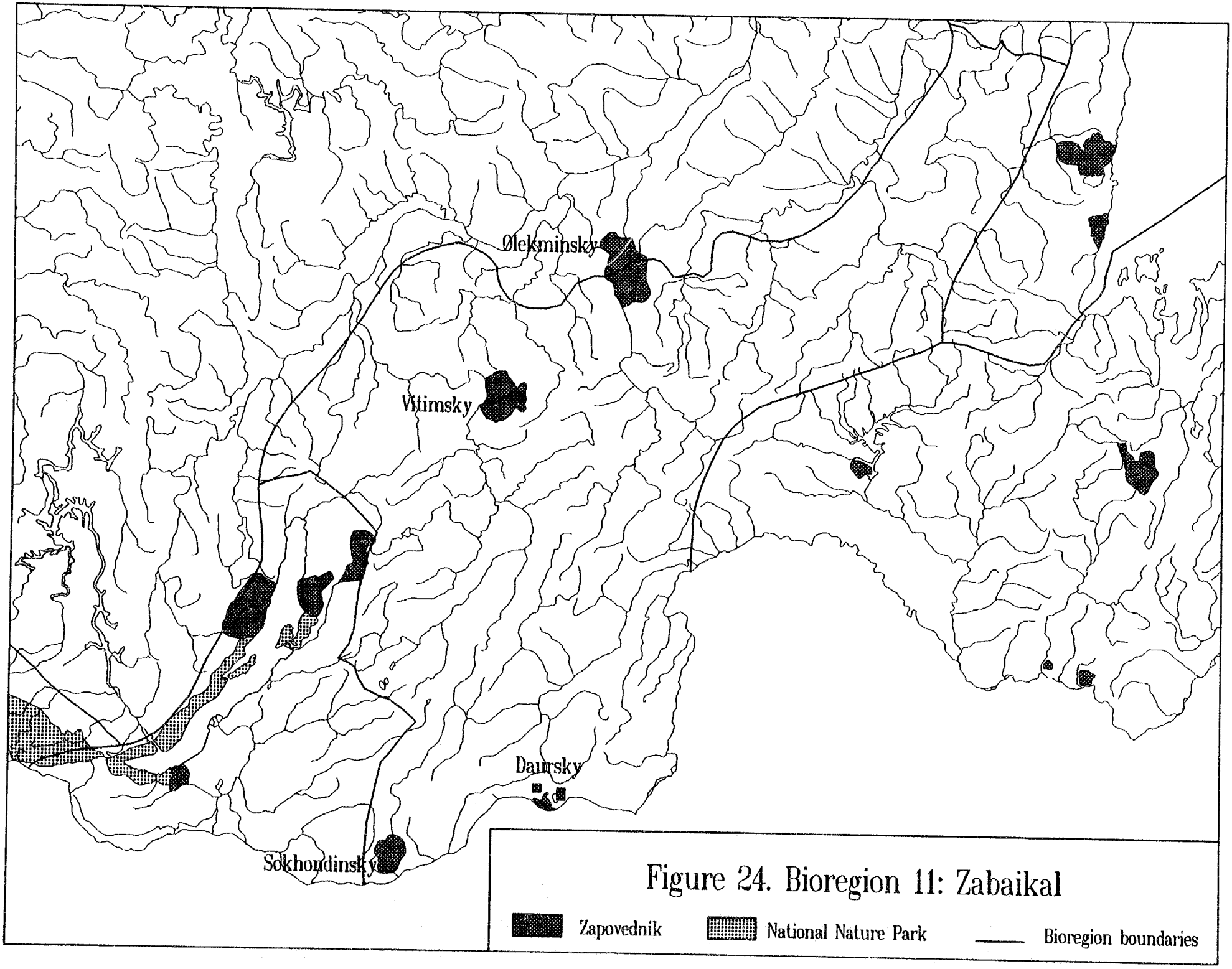

Figure 24. Bioregion 11: Zabaikal

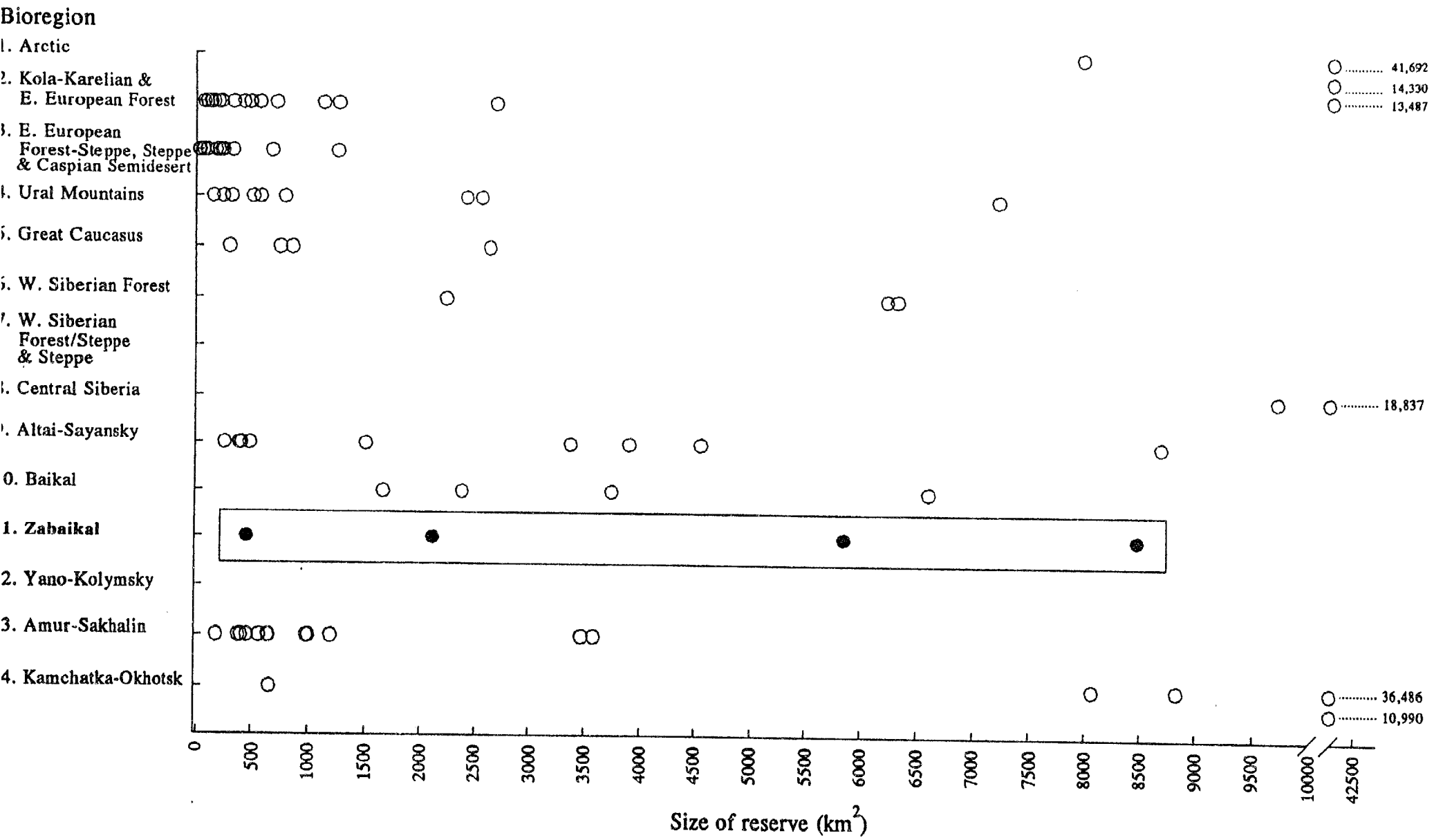

Figure 25. Size of existing zapovedniks in the Zabaikal bioregion compared to size of zapovedniks in other bioregions.

IV. Conservation Potential

There are four zapovedniks in the Zabaikal bioregion: Vitimsky (5,850 km^2) Sokhondinsky Biosphere Reserve (2,110 km^2), Daursky (457 km^2), and Olekminsky (8,471 km^2) (Fig. 25). Together they encompass a wide range of biotic communities, including northern taiga, montane, steppe, forest and lake ecosystems. These zapovedniks are an effective foundation for protecting biodiversity in the region, especially considering the international Mongolian-Russian-Chinese zapovednik currently being developed.

Existing Zapovedniks Requiring Urgent Assistance

- Of the four zapovedniks in this region, **Daursky Zapovednik** (458 km^2), located on the Mongolian border, requires the most immediate international attention. Daursky plays a central role in an important international reintroduction program (Przewalski's horse) and a conservation program for endangered crane populations (the white-naped and Demoiselle cranes). This zapovednik also includes the Torey lakes, an important stopover point along the largest migratory flyway in Central Asia.

The project would provide financial assistance to help the zapovednik out of severe financial crisis. The main components of the project include strengthening zapovednik infrastructure, communications, and transport; and improving its monitoring capabilities. Central facilities, remote monitoring stations, and telephone and power lines are necessary to improve management and maintain contact with other regions. An additional project outlined below explores the potential development of an ecotourism program in Daursky Zapovednik.

Total cost of this project is $188,540 over three years, including construction, equipment, and transportation expenses. See Attachment C, budget 11.1.

The project will be carried out by the staff of Daursky Zapovednik.

V. Sustainable Use of Resources and Ecotourism

- This initiative assesses the potential for ecotourism activities in **Daursky Zapovednik.** This zapovednik is of particular interest to tourists because of its close location to China, Mongolia, and Japan, and its numerous populations of rare and charismatic bird and mammal species. This zapovednik is also an important component of the international Russian-Mongolian-Chinese zapovednik which has enormous potential for attracting tourists. Ecotourism activities will help the zapovednik become financially self-sufficient in the future.

This project will improve zapovednik functions and strengthen its existing infrastructure which supports a large number of tourists. The zapovednik urgently needs to modernize its

equipment, transportation base, and tourist facilities, and to develop educational programs. A guest house, nature museum, and seasonal camps will be created. The number of tourist groups admitted to the zapovednik will be carefully regulated to minimize disturbance of ecosystems. Two members of the zapovednik staff will attend international conservation training courses to help improve management and planning.

The total cost of the Daursky ecotourism project is $218,700 over three years, including construction of facilities, equipment, and training and education programs. See Attachment C, budget 11.2. The success of this program depends on implementation of the previous project to strengthen the existing infrastructure and protection service.

The project will be implemented by the staff of Daursky Zapovednik.

VI. Species of Special Concern

- This proposal considers the potential for reintroducing **Przewalski's horse** (*Equus prezwalskii*), currently extinct in the wild, into its historic range. To date, 900 individuals have been successfully bred and raised in captivity. The Daurian steppe is the only remaining ecosystem in Russia that adequately preserves the species' original habitat. The creation of a trans-border reserve including portions of Russia, Mongolia, and China will extend protection of the species' habitat and maintain the long-term viability of this population. The proposed project will finance completion of a breeding center. Horses that have been raised in zoos and other places in Russia will be brought to the center and used as parent stock for herds to be released. It is expected that the high profile of this species will attract additional funding to a reintroduction program, once initial support is received and the program is underway in the region.

The project would provide funding for the release and continual monitoring of a free-ranging population of Przewalski's horse over the first few years of the project. Specific measures include purchasing and transporting horses from breeding centers, constructing open pens at the release site, and continuous monitoring of the populations. The project will be coordinated with other international efforts in the area, and will help restore the once wild Przewalski's horse.

Total cost of this project is $102,000 over five years, including salaries, transportation, and animal maintenance expenses. See Attachment C, budget 11.3.

The project will be carried out in cooperation with the staff of Daursky Zapovednik.

- The **Mongolian marmot**, a local species on the verge of disappearing from Russia, is being studied to assess the possibility of reintroducing the rodents into the Daursky Zapovednik. A successful reintroduction program depends upon thorough research of the

biology of this species. The Mongolian marmot is under severe threat from poaching and loss of suitable habitat. This problem can be ameliorated by reintroducing the species in southeastern Zabaikal, but specific methods should be defined, as this is the first attempt to reintroduce this species in Russia. This project proposes to support the study of marmot biology, identify areas in **Daursky Zapovednik** suitable for its reintroduction, and, in the first year, release a test population in hopes of beginning a reintroduction program. The project will be assessed in Phase II.

VII. Total cost of the proposals in this bioregion is $509,240 for the periods indicated.

PRIORITIES: All of these projects are rated as highest priority.

12. YANO-KOLYMSKY BIOREGION

I. Geographical Location and Range

The Yano-Kolymsky bioregion is located in northeast Siberia, from the Lena River westward to the Kolymsky mountain range, covering 10% of Russia (Fig. 26). Severe climatic conditions prevail in its northern mountains and valleys where permafrost and glaciers cover much of the terrain. The Oimyakon Valley is the coldest place on Earth outside of Antarctica.

II. Outstanding Biological Features

Landscape Features

This bioregion is one of the most pristine in Russia with large wilderness areas still extant. The southern mountainous relief reaches heights of 2 to 3 kilometers, while plateaus and broad river valleys characterize the northern regions. Sparse larch forests are common in valleys and lower slopes, while tundra and rocky scree cover the upper slopes. Winters in the region are severe with only mild maritime influence from the Okhotsk Sea.

Species of Interest or Concern

More than 300 species of higher plants, lichen, and fungi are found in the mountain regions. The fauna is typical of northern taiga ecosystems, and includes such species as reindeer (*Rangifer tarandus*), sable (*Martes zibellina*), and numerous waterfowl. Rare species and subspecies in the region include Chukotka bighorn sheep (*Ovis nivicola koriakorum*) and White-tailed sea eagles (*Haliaeetus albicilla*).

III. Overview of Short- and Long-Term Threats

Threats in this region are relatively minor due in part to the low population density and minimal level of industrial development. Mining and forestry enterprises do damage forests, tundra, and streams near the few operations that exist. The increasing interest in industrial development in the region, however, combined with the low resiliency of the tundra and permafrost taiga, creates the potential for extensive, permanent alteration of natural communities in the near future.

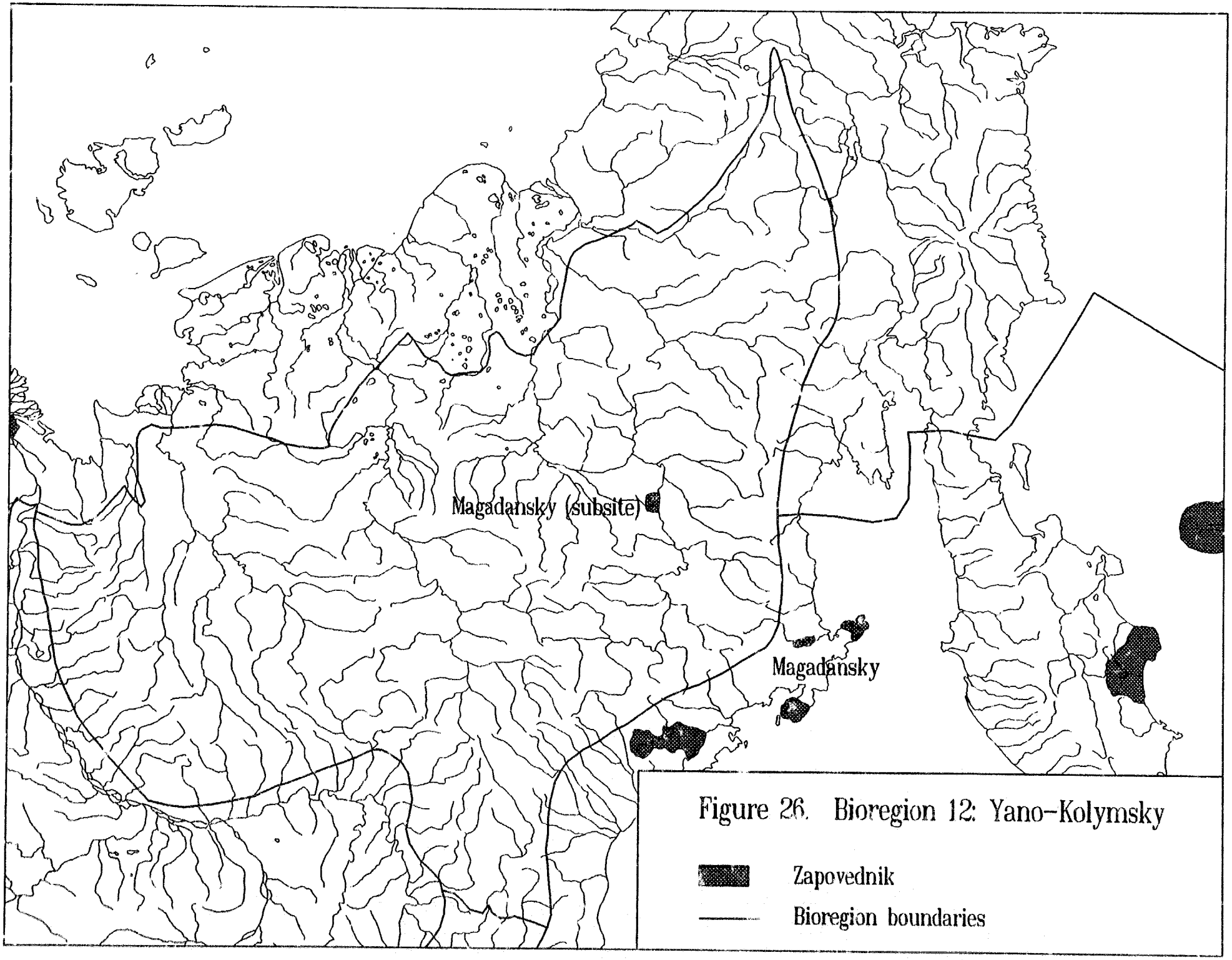

Figure 26. Bioregion 12: Yano-Kolymsky

IV. Conservation Potential

A small subsite of the Magadansky Zapovednik (Bioregion 14) is the only protected area in this bioregion (Fig. 27). A proposal for the support of the entire Magadansky zapovednik will be further considered in Phase 2. As a whole, low population density, the low level of extractive or industrial enterprises, and limited access throughout much of the region maintains its currently low rate of degradation. There are no plans at the present time to create new protected areas according to the government's planned network of protected areas. This omission should be revisited by the Russian Biodiversity Gap Analysis Project outlined in the Federal Proposal section of this document, and the conservation value of the enormous tracts of wilderness found in this bioregion should be more closely assessed.

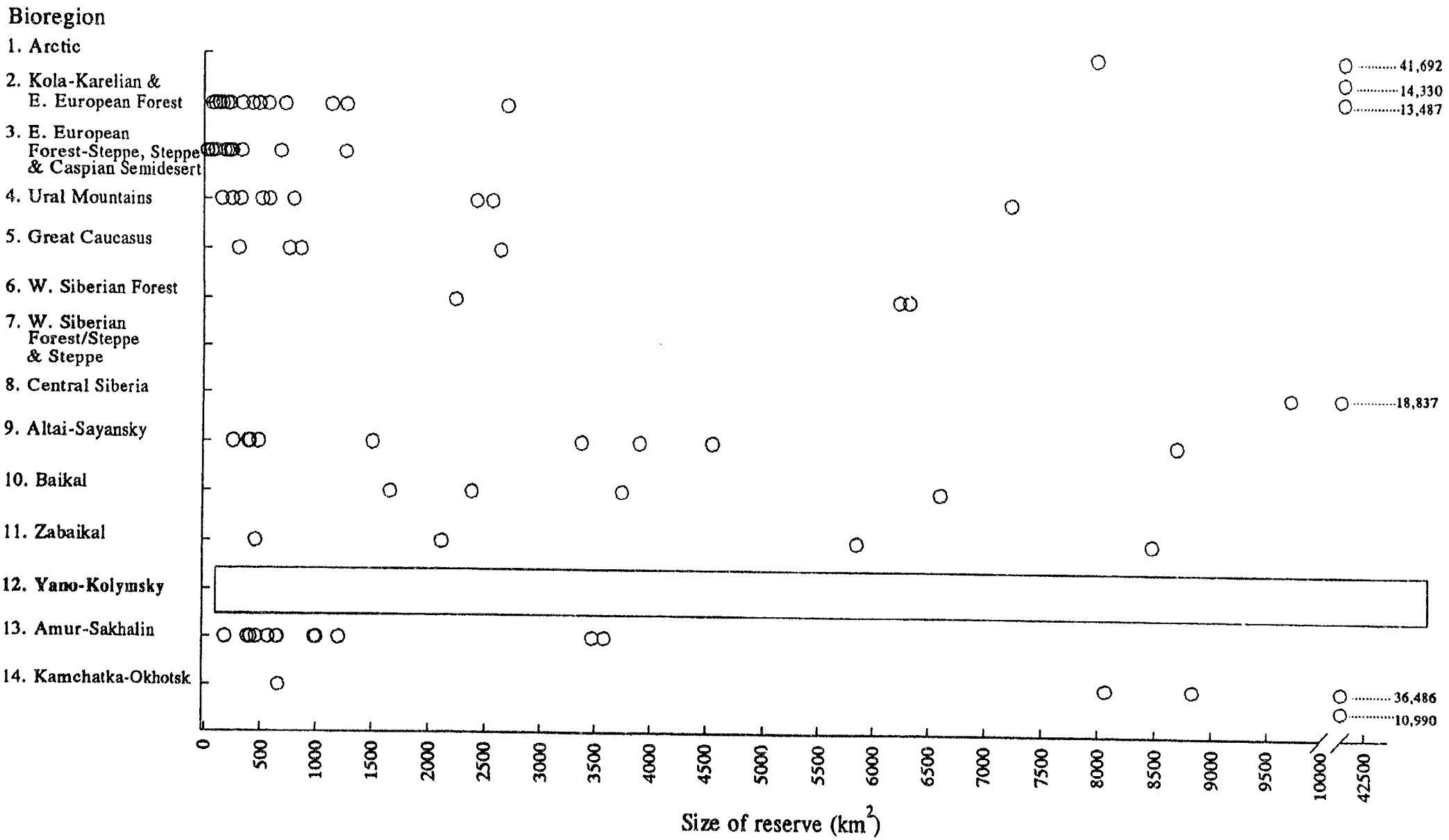

Figure 27. Size of zapovedniks by bioregion. There are currently no existing zapovedniks in the Yano-Kolymsky bioregion

13. AMUR-SAKHALIN BIOREGION

I. Geographical Location and Range

The Amur-Sakhalin bioregion lies in the extreme southeast of the Russian Far East and covers 7% of the country (Fig. 28). This bioregion is bordered by the Sea of Japan to the east, China to the south and west, and the Stanovoy and Dzhugdzhur Mountains to the north. Sakhalin Island, nearly 1,000 km long, parallels the northern coast of the mainland.

II. Outstanding Biological Features

Uniqueness of the Amur-Sakhalin Bioregion

The Amur-Sakhalin bioregion is critical to global biodiversity conservation because it contains some of the richest and most unusual temperate forests anywhere in the world. These forests are now virtually unique to Russia because similar communities have been largely destroyed in China, Japan, and the Korean Peninsula. Much of the Amur-Sakhalin region escaped past periods of glaciation, allowing it to act as a climatic refuge for numerous species and communities now found nowhere else in Russia, or the world. Compared to other temperate ecosystems, the level of endemic plants and invertebrates present in the region is extraordinarily high which, together with the region's unique biogeographic history, has resulted in unusual assemblages of plants and animals. For example, Amur (or Siberian) tigers (*Panthera tigris altaica*), Amur leopards (*Panthera pardus orientalis*), musk deer (*Moschus moschiferus*), and Himalayan bears (*Selenarctos thibetanus*) share the same habitat with brown bears (*Ursus arctos*), reindeer (*Rangifer tarandus*), and salmon (*Oncorhynchus* spp.).

Landscape Features

Parallel to the coast, the Sikhote-Alin Mountains rise to just over 2,000 meters. The Amur River flows northward beyond the mountains through a broad valley filled with productive wetlands. Larch-spruce-fir taiga, tundra, and permafrost occur in the mountainous terrain to the north and west. Mixed broadleaf-conifer forests occur at lower altitudes in the north, but fully cover the mountains and valleys in the south. Korean pine (*Pinus koraiensis*), oaks, beech, fir, and maple are representative trees of these forests. Some forest-steppe habitat occurs in the extreme south. Sakhalin Island habitat ranges from taiga in the north, to mixed broadleaf-conifer forests in the more mountainous central and southern locations.
Productive marine environments support large populations of seabirds, marine mammals, and anadromous fishes.

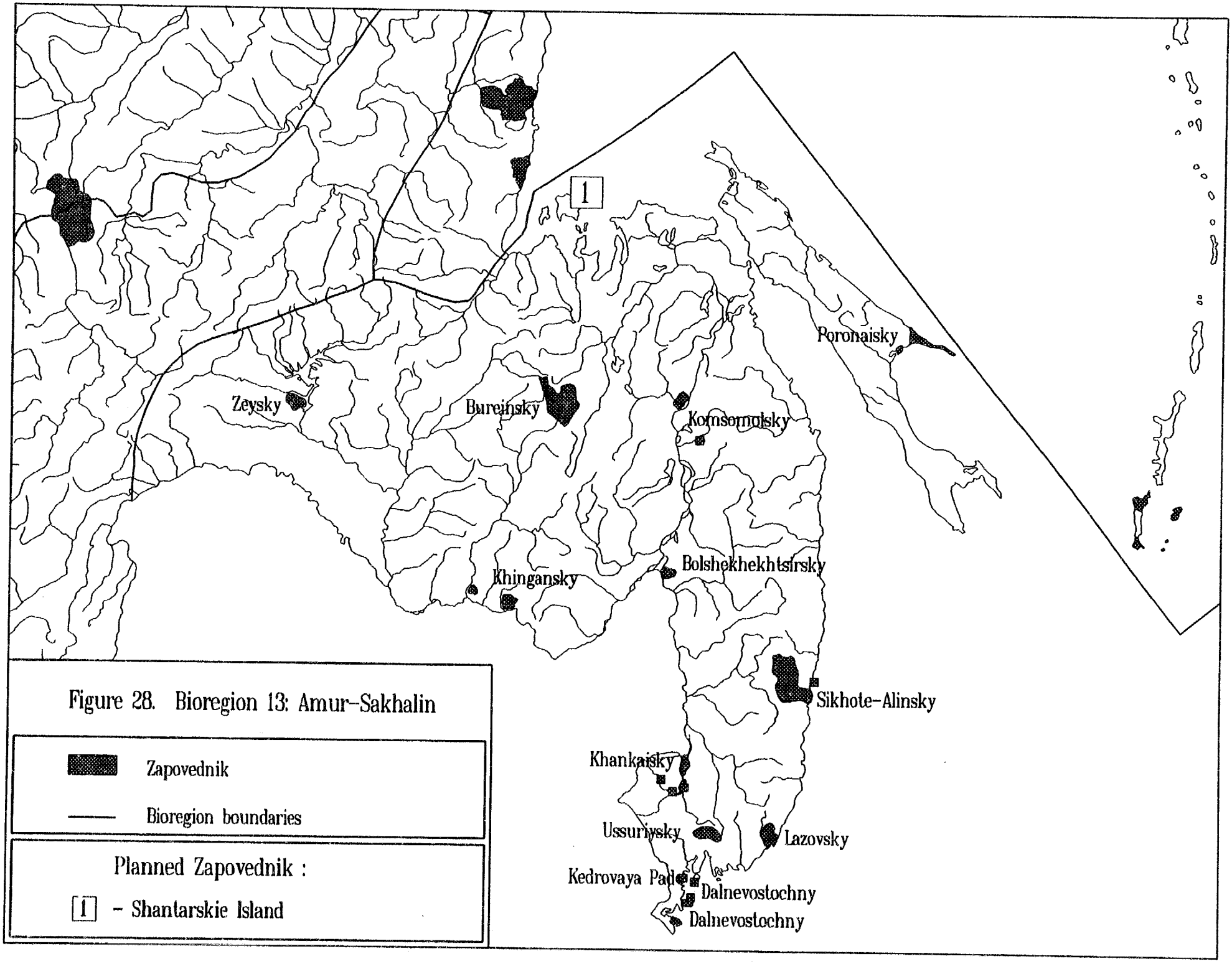

Figure 28. Bioregion 13: Amur-Sakhalin

Species of Interest or Concern

Numerous animals and plants are endemic to this bioregion both within Russia and globally. Of those, many are rare and threatened with extirpation or extinction. Examples include Steller's sea eagle (*Haliaeetus pelagicus*), Siberian spruce grouse (*Falcipennis falcipennis*), Japanese crane (*Grus japonensis*), White-naped crane (*Grus vipio*), Brown hawk owl (*Ninox scutulata*), Blakiston's fish owl (*Ketupa blakistoni*), Reed parrotbill (*Paradoxornis heudei*), Amur sturgeon (*Acipenser medirostris*), thirteen species of Freshwater mussel, two spectacular species of Swallowtail butterflies (*Sericinus montela* and *Atrophaneura alcinous*), Goral (*Nemorhaedus caudatus*), Himalayan bear, Amur forest cat (*Felis euptilura*), Amur leopard, and the Amur (Siberian) tiger. Several hundred species of vascular plants, ferns, lichens, liverworts, mosses, and fungi are considered rare, endemic, and, in many cases, threatened.

Amur tigers and leopards are top predators in Amur ecosystems. Functionally, they serve as keystone species because their disappearance would alter the densities of prey species such as Sika deer (*Cervus nippon*), musk deer, and wild boar. These changes would subsequently affect bear populations and cause herbivore damage to forests. This bioregion is also the last refuge for the Amur tiger, and home to the remaining 30 Amur leopards. The leopard population is primarily restricted to the forests in the vicinity of the Kedrovaya Pad Zapovednik in the south. Current estimates of tiger numbers range from 400 to 600, but an unknown number, estimated between 25 and 100 were poached over the last two years. Specific threats to the tiger and leopard and efforts for their preservation are discussed in detail below.

III. Overview of Short- and Long-Term Threats

Much of the Amur River Valley and other lowland habitats has been converted to rice fields, other agricultural uses, and urban areas. Khanka Lake, a large lake and wetland complex on the Chinese border, shows the effects of pesticide pollution from surrounding rice fields, and both rivers and coastal marine environments are polluted by industrial wastes, sewage, and sedimentation resulting from deforestation. Coastal waters near Vladivostok have been particularly affected. Further degradation results from mining operations which produce sediment and heavy metal pollution throughout the region. Newly discovered oil and gas deposits on Sakhalin Island have prompted the rapid expansion of industrial developments and multinational investments in extractive operations.

The fast pace of economic deregulation and the absence of a long-term management plan threaten the region's biodiversity. In particular, deforestation and poaching of wildlife have increased dramatically in the past two years. Past extractive timber operations have resulted in deforestation of 20% to 50% of the native forests, depending upon the region. Inefficient logging practices and uncontrolled fires have also deforested extensive areas. However, past activities cannot compare with the ecological devastation now being carried out by

multinational timber corporations seeking inexpensive, high quality timber. Hyundai Corporation is currently conducting huge clearcutting operations, destroying extensive tracts of forest and entire watersheds. Two indigenous groups, the Udege and Namai, inhabit the upper Bikin River watershed. They are struggling to maintain traditional resource use in their homelands in the face of intense outside pressure for logging and mining concessions.

No realistic reforestation programs are underway, despite public relations campaigns. Habitat loss from deforestation potentially threatens many species with extinction in this bioregion, because a large number of plant and invertebrate species have highly restricted geographic ranges. And, as indicated above, poaching and loss of habitat have already reduced the Amur tiger and leopard populations drastically. Other poaching activity targets Siberian musk deer for their musk, which is worth as much as $60,000 per kilo; and bears for their gall bladder bile, worth over $5,000 per kilo. Poaching activity has greatly increased due to a rising demand for animal parts for Asian remedies, the growth of organized crime in the region, and the inability of resource managers to effectively protect wildlife given current financial and legal constraints.

IV. Conservation Potential

Although twelve zapovedniks currently exist, the extant system is likely to be inadequate for the long-term conservation of biodiversity in the bioregion (Fig. 29). Most extant reserves are too small and isolated from one another to support viable populations of large vertebrates, especially top predators such as brown bears and tigers, or to adequately conserve all the species with strict geographic ranges. (Small reserves, however, may act as effective sanctuaries for many plants, invertebrates, fungi, and smaller vertebrates, and should not be overlooked in conservation strategies.) Sikhote-Alinsky Zapovednik (347 km^2), located along the central coast of the Sikhote-Alin Range, is the largest reserve. The Amur tigers found there are part of a larger population that inhabits both the reserve and extensive tracts of the surrounding wilderness. The long-term viability of the reserve population is doubtful if current rates of poaching continue, and areas of surrounding intact habitat are lost due to logging and mining. From the landscape ecology perspective, the best approach to conserving the forest ecosystems of the Sikhote-Alin Range is to designate several large areas, preferably intact watersheds, as core reserves all along the range and connect them with broad habitat corridors. Sikhote-Alinsky Zapovednik could serve as a cornerstone for such a regional conservation strategy. Strengthening of existing reserves and developing ecologically sound resource management plans for the region must be initiated now, so that opportunities for conservation are not lost.

In addition to Sikhote-Alinsky Zapovednik, four smaller reserves can conserve the rich forest habitats of the southern Primorsky Krai: Kedrovaya Pad, Ussuriysky, Khankaisky, and Lazovsky. The forested region in and around Kedrovaya Pad Zapovednik sustains the last 30 individuals of the Amur leopard. Lazovsky Zapovednik (120 km^2) contains rare forest

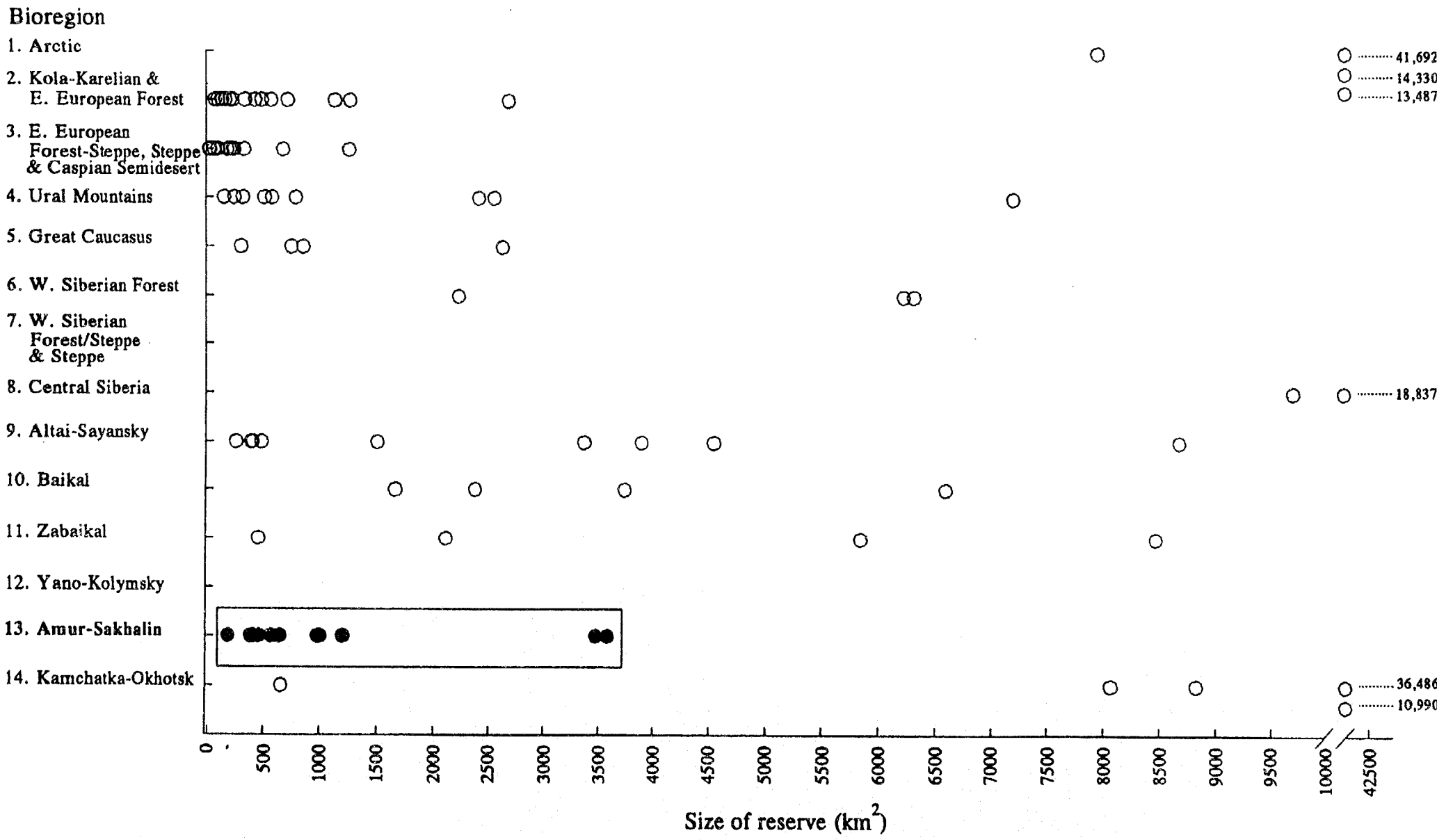

Figure 29. Size of existing zapovedniks in the Amur-Sakhalin bioregion compared to size of zapovedniks in other bioregions.

communities on the mainland and two offshore islands. The Dalnevostochny Marine Reserve protects several offshore islands and the surrounding marine habitats. Poronaysky and Kurilsky reserves conserve Sakhalin Island taiga and Kuril Island habitats, respectively. Khingansky and Zeysky reserves are located in wetland and forested foothill habitats of the northern Amur River Valley. Bolshekhekhtsirsky, Komsomolsky, and Bureinsky reserves encompass a variety of wetland, taiga, and mixed broadleaf-conifer forest habitats in the Khabarovsk Region to the north.

Existing Reserves Requiring Urgent Assistance

- **Sikhote-Alinsky Zapovednik** is the hallmark reserve of the southern Primorsky forest ecosystem, and the prime site for Amur tiger conservation efforts. Strengthening of this reserve, therefore, is one of the highest priorities for conservation efforts in Russia. Currently the zapovednik requires technical assistance and training to maintain effective management and wildlife protection. Its rich and unique ecosystem is home to a critical core population of Amur tiger and other threatened vertebrates living within the reserve. Furthermore, its spectacular wildlife, scenery, and proximity to Japan give the Sikhote-Alinsky Zapovednik high potential for successful ecotourism programs. The development of an educational mini-center (Section II) has been recommended by the Ministry of Environment as a priority for this zapovednik.

This project will provide the zapovednik with urgently needed transportation and communication equipment to effectively protect tigers and other wildlife from poaching. Additional equipment, personnel, training, and administrative resources are needed to strengthen its overall management capability and to enhance educational programs in local communities. A conservation education mini-center will be created to promote awareness and ensure long-term support for the zapovednik. Members of the zapovednik staff will attend a special training course in conservation education. Overall protection efforts should vastly improve with implementation of this project.

The cost of the Sikhote-Alinsky Zapovednik project is $250,800 over a 3 year period, including costs for equipment, construction of educational facilities, and staff training. See Attachment C, budget 13.1.

The project will be implemented by the staff of the Sikhote-Alinsky Zapovednik.

- **Lazovsky Zapovednik** conserves very rich and unusual communities of the southern Primorsky region. The zapovednik territory includes two small pristine islands in the Sea of Japan, with original yew forests in some areas. Forest fires and poaching are two serious threats to the protected area. This reserve is near Sikhote-Alinsky and could easily be incorporated into both a regional conservation network of protected areas, and an ecotourism program that would provide much needed funding and employment.

This project will provide basic transportation and communication equipment, and personnel training to increase protection efforts and fire response capability. Some staff will train in an international center. Funds will also be used to renovate the educational center and scientific laboratory, and to develop local education activities and infrastructure for ecotourism. Overall zapovednik management and generation of park revenue will improve if this project is successfully implemented.

Total cost of these efforts is $157,530 over three years, including equipment costs and educational programs. See Attachment C, budget 13.2.

The project will be implemented by the staff of the Lazovsky Zapovednik.

Gaps in Bioregional Conservation

Additional protected areas are needed in the region to adequately conserve biodiversity. The Federal GIS/Gap Analysis Project can address these issues (see Federal proposals in Section II of this document), and the WWF Amur Tiger Project discussed below can contribute through its conservation strategy workshops and GIS program.

- The **Shantar Islands** are located to the north of the Amur River Delta in the Sea of Okhotsk. They support huge seabird colonies, seal rookeries, and extensive taiga forests with bear, fox, reindeer, and many other species. The nearby mainland is rapidly being developed, creating serious concern that exploitative activities will soon expand to the islands. The area has been targeted for protection, but a lack of sufficient funding delays proceeding with the project.

The Shantar Island Project would support planning of the reserve in Phase 1 by sending a survey team to the site to prepare the appropriate documentation. Phase 2 would consist of construction of protection and management facilities on the islands, provision of transportation and communications equipment, and development of protection measures. The project would result in the creation of a new protected territory vital to a national conservation strategy.

The cost of the project for Phases 1 and 2 is $307,000 over four years, broken down into two phases, planning ($7,000), and creation of the protected area ($300,000). See Attachment C, budget 13.3.

Phase 1 will be implemented by the survey group Priroda Rossia. Phase 2 will be implemented by the staff of the new zapovednik.

V. Sustainable Use of Resources and Ecotourism

- **WWF Bikin Valley/Udege Integrated Conservation and Development Plan** seeks assistance for the Udege people who face intense pressure to sell logging and mining concessions within their homeland. The Udege people of the Bikin River Valley are attempting to protect their native rights and access to natural resources, while using them in an ecologically sound manner. The upper Bikin River Valley represents one of the largest intact blocks of forest in the southern Sikhote-Alin Range, and thus has the potential to be a critical habitat block for conservation of the Amur tiger as well as the entire Sikhote-Alin ecosystem. World Wildlife Fund-US will help devise a model integrated conservation and development project (ICDP) in collaboration with the Udege people to explore how the goals of wildlife habitat conservation and local income generation can be harmonious.

The project will provide information and training to help develop the legal and institutional basis for effective natural resource management, and give advice for developing environmentally sustainable businesses that reinforce conservation efforts. In addition, technical assistance will be provided to enhance anti-poaching activities and environmental education programs.

The total budget for the WWF Bikin Valley/Udege Project is $100,000. The detailed budget is provided upon request to the editors.

The project will be implemented by a team of Russians selected in cooperation with WWF.

- The rich bird fauna and scenic wetlands and forests of **Khingansky Zapovednik** make ecotourism a viable long-term financing option. Of special interest are rare species of crane that are easily seen at a well-established crane breeding/reintroduction program on site. Its relative proximity to the Sikhote-Alin region also provides the option of a combined ecotourism program.

The project would provide financing for the necessary infrastructure to develop tourism, such as construction of a guest house, procurement of communications and transportation equipment, and publishing of educational materials. In addition, procurement of basic needs, such as a telephone line and air and ground transport for monitoring the territory, will greatly improve protection operations.

Total cost of this project is $221,110 over a three year period, including equipment costs and educational programs. See Attachment C, budget 13.4.

The project will be implemented by the staff of the Khingansky Zapovednik.

VI. Species of Special Concern

- The **Red-crowned and White-naped Crane Reintroduction Program** located in the Khingansky Zapovednik is attempting to reestablish viable wild populations of Red-crowned and White-naped Cranes. Loss of habitat and hunting have critically endangered these species, reducing wild populations to low numbers. The crane program plans to strengthen wild crane populations by integrating large numbers of young birds from their breeding programs into wild and semi-wild flocks. This program has received the support of the international crane conservation community.

This project would provide funding to enhance breeding center facilities, to support feeding and veterinary requirements, and to build wetland operation structures for reintroduction activities. Implementation measures would include creating semi-wild pairs, releasing the birds into new habitats, monitoring their activities, and conducting regular breeding and reintroduction activities. The result of the project will be a greater chance of preserving these rare species.

The total cost of the project is $114,200 over two years, including expenses for maintaining birds, paying salaries to implementors, and field expenses. See Attachment C, budget 13.5.

- The WWF **Amur Tiger Conservation Project** is designed to promote tiger conservation by providing immediate funds to finance anti-poaching efforts, educational activities, and habitat conservation initiatives. Anti-poaching programs will also reduce poaching of Amur leopards, musk deer, bears, and other wildlife. Over the long-term, a regional tiger conservation strategy that integrates conservation of critical wildlife habitat with logging activities, and other forms of development is required. World Wildlife Fund-US will help develop such a landscape-level approach in collaboration with all relevant parties in the region. Three primary activities for tiger conservation need immediate support:

- Strengthening of anti-poaching efforts in the Primorsky region through improved protection services in the field and in customs;

- Staging a workshop to bring together all relevant parties to assess regional needs for tiger conservation and to develop a GIS-based regional tiger conservation strategy; and

- Developing environmental education programs within zapovedniks, local communities, and through local media. Tiger conservation will be emphasized initially.

Total cost of the main components of the proposed project is $250,000 over three years. A detailed budget is available upon request to the editors.

The project will be executed by the Primorsky Committee of Nature Conservation.

VII. The total cost of projects for the Amur-Sakhalin bioregion is $1,400,640 for the periods indicated.

PRIORITIES: The Sikhote-Alinsky, Lasovsky, Crane Reintroduction Program, and Amur Tiger Project are rated as highest priority. The Bikin/Udege and Shantar Islands Projects are rated at the next priority level.

14. KAMCHATKA-OKHOTSK SEA BIOREGION

I. Geographical Location and Range

The Kamchatka-Okhotsk Sea bioregion includes the Kamchatka Peninsula, the Okhotsk Sea and its western coast, and the Kuril and Komandorsky Islands. This bioregion covers 12% of Russia and is the center of much geological activity (Fig. 30). This region has one of the highest concentrations of active volcanoes in the world, as well as numerous dormant and extinct cones. This dynamic landscape is frequently changed by volcanic eruptions, earthquakes, and tidal waves.

II. Outstanding Biological Features

Landscape Features

The Kamchatka-Okhotsk Sea bioregion is one of the most spectacular and pristine natural areas in the world. Only in the recent past have pockets of industrial development emerged. Prominent landscape features include high volcanic peaks amidst tall ranges, broad river valleys, and rugged coastlines and islands. Kamchatka is covered by a mosaic of tundra and taiga habitats. The northern Kuril and Komandorsky Islands have dwarf stone birch, alder, and cedar scrub formations, while mixed broadleaf-conifer forests occur in the southern Kuril Islands.

Associations with Other Ecosystems

In many aspects, Kamchatka's marine and terrestrial ecosystems are closely linked. Enormous colonies of seabirds and marine mammal populations thrive on the rich marine resources in the Okhotsk Sea and Pacific Ocean. Sea eagles and brown bears rely on abundant populations of salmon and other anadromous fish.

Species of Interest or Concern

The Kamchatka Peninsula contains 29 species of rare and endemic plants. Large populations of brown bear (*Ursus arctos*) and other animals characteristic of taiga/tundra habitats occur on the peninsula. The only population of sea otters (*Enhydra lutris*) in the eastern Pacific is found off the Pacific Coast side of the Kamchatka Peninsula, and around the Kuril and Komandorsky Islands. Other species of special concern include the Kuril seal (*Phoca vitulina kurilensis*), the Komandor population of Arctic fox (*Alopex lagopus semenoui*), Blackiston's fish owl (*Ketupa blakistoni*), brown hawk-owl (*Ninox scutulata*), and Steller's sea eagle (*Haliaeetus pelagicus*). Sable (*Martes zebillina*) and various salmon species (e.g., *Salmo mykiss, Oncorhynchus* spp.) have been traditionally harvested in the region.

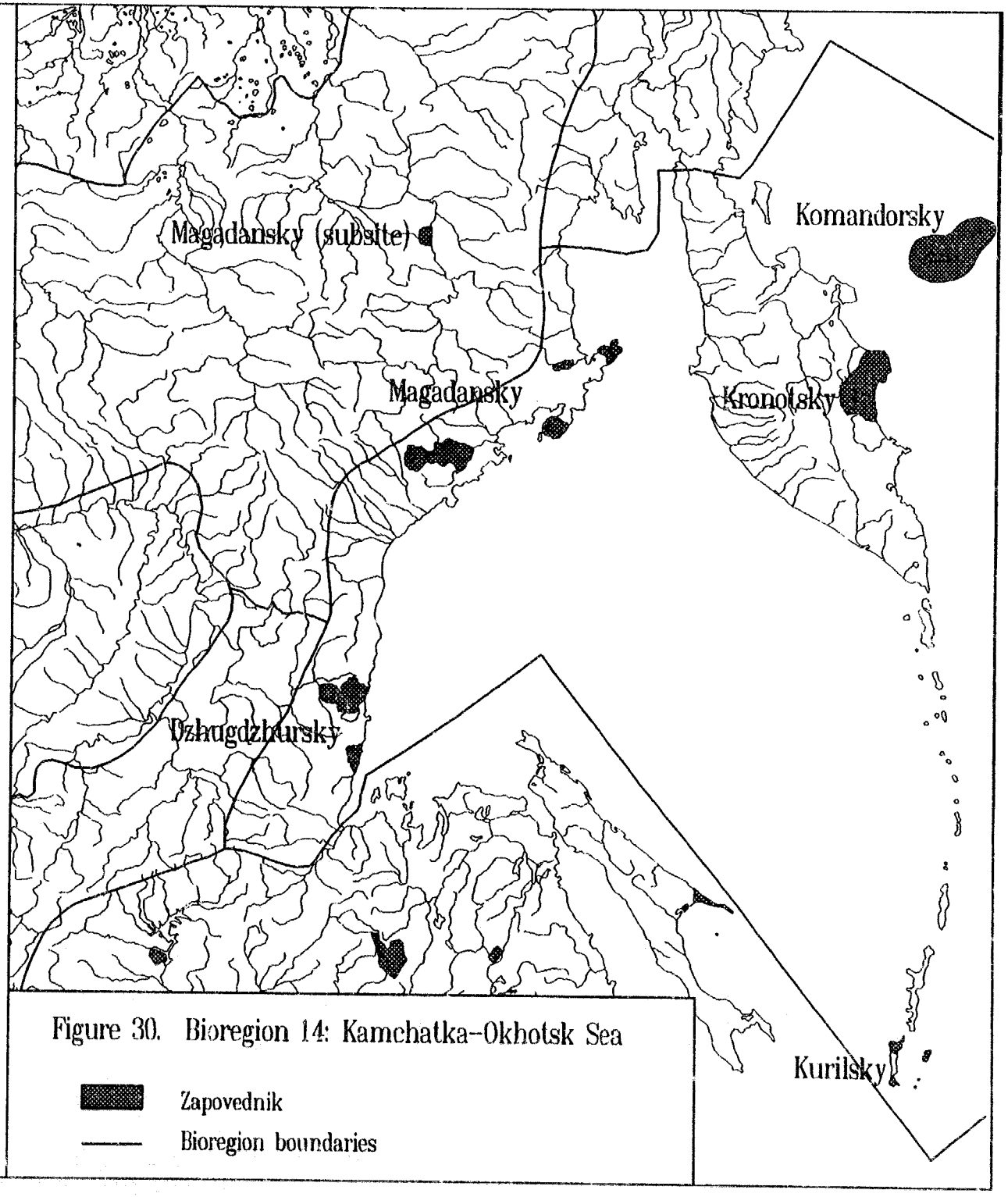

Figure 30. Bioregion 14: Kamchatka–Okhotsk Sea

III. Overview of Short- and Long-Term Threats

Habitats in this bioregion are relatively intact and undeveloped, with low population density in most areas. The major population centers occur around industrial zones, particularly in the Petro-Pavlosk and Magadan regions. Economic activity is underway in scattered areas, mainly fishing, hunting, and mining for gold, coal, and other minerals. Other economic activities include timber harvesting, reindeer breeding, and small agricultural enterprises. Poaching of brown bear, and the attraction of foreign trophy hunters for big game has greatly diminished the bear population.

IV. Conservation Potential

Enormous reserves of terrestrial and marine ecosystems characterize the protection areas in this bioregion, four of which range from 8,600 to 36,000 km^2 including protected marine components (Fig. 31). The five zapovedniks of Kamchatka-Okhotsk represent all of the major ecosystem types in this diverse bioregion. The Kronotsky Zapovednik (11,420 km^2), located on the eastern coast of Kamchatka, is a very popular tourist attraction due to the presence of a large geyser valley. The Kurilsky Zapovednik (653 km^2), located on Kynashira Island, is also a popular tourist destination because of its warm monsoon climate and scenic beauty. Both of these areas require urgent support to exercise their high potential for ecotourism. Synopses of each funding proposal are summarized in the following section on sustainable development and ecotourism.

Existing Zapovedniks Requiring Immediate Assistance

- The **Komandorsky Zapovednik** (36,487 km^2), created in 1993, is a large marine reserve which also protects parts of Bering and Mednye islands in the Bering Sea. Large populations of marine mammals, including several endangered species, live within the reserve. The current financial crisis has delayed the establishment of a reserve management program. Programs also need to be developed for sustainable use of the region's resources, particularly since the only population center, located on Bering Island, has traditionally relied on commercial harvesting of salmon, polar fox, fur seal, and on gathering mushrooms and berries. Thus, the major objective of this project is to activate management activities for this new reserve quickly, and to encourage local people to participate in conservation efforts.

The proposed project seeks funding to meet start-up costs of this new zapovednik, in particular, to construct a reserve headquarters, to procure essential equipment, to train staff, and to promote ecological education. These efforts will require incorporation of measures that maintain traditional natural resource use by the local population. Other activities include a joint scientific project for developing a conservation plan for the new zapovednik. The project will result in the full establishment of the protected area.

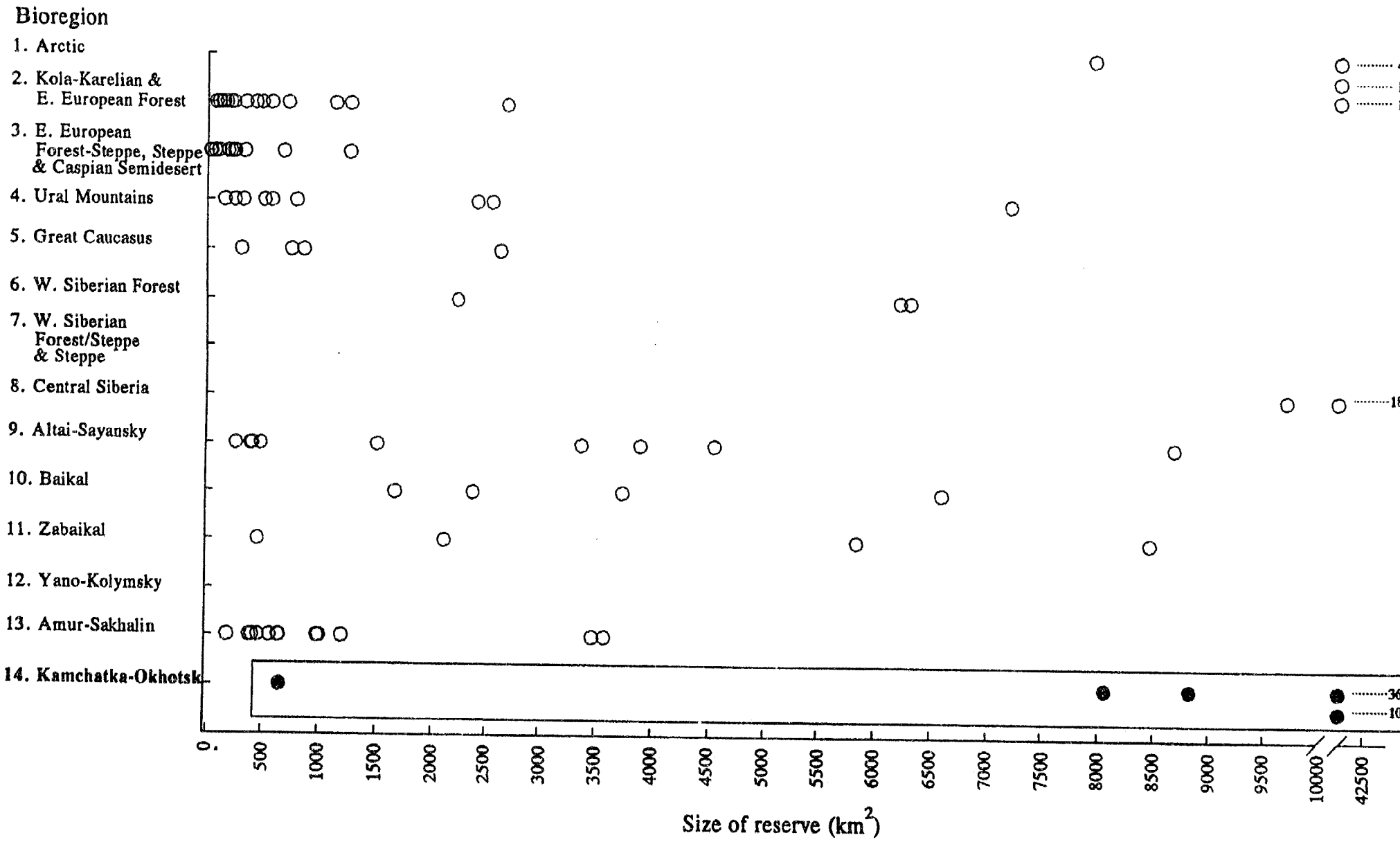

Figure 31. Size of existing zapovedniks in the Kamchatka-Okhotsk Sea bioregion compared to size of zapoved in other bioregions.

Total cost for this proposed project is $205,950 over three years, including training, research, and creation of zapovednik facilities. See Attachment 14.1.

The project will be carried out by the staff of the Komandorsky Zapovednik.

- **Magadansky Zapovednik** (8,838 km^2), located on the northwestern coast of the Okhotsk Sea, is a large reserve that contains coastal taiga, and islands supporting enormous seabird colonies. The **Dzhurdzhursky Zapovednik** (8,600 km^2), another very large reserve, conserves montane taiga and tundra habitats, as it spans the crest of the Dzhurdzhursky Mountains. These important zapovedniks are threatened by encroaching development, however, uncertainties in addressing this problem preclude recommending investments at this stage. Because these difficulties should be resolved within the next year, these reserves are recommended for consideration in Phase II.

V. Sustainable Use of Resources and Ecotourism

The Kurilsky and Kronotsky Zapovedniks have unique and beautiful terrestrial and marine ecosystems which attract people from all over the world. The major objectives of these proposals are to address basic needs to ensure that ecotourism can be managed properly. A secondary objective is to demonstrate to development-oriented regional officials that conservation can pay for itself in this scenic region.

- **Kronotsky Zapovednik** is the only site in Russia with large geysers that enhance its tourism potential. The unique coastal ecosystem offers unparalleled observations of brown bear, bird rookeries, and marine mammals. The zapovednik has significant experience in conducting ecological education activities, but its lack of finances limits these programs.

The proposed project seeks funding to develop ecological education facilities and programs, and to equip the zapovendik staff with the necessary equipment to protect the zapovednik's resources, given the predicted increase in ecotourism. Construction of a small guest house, renovation of the nature museum, and construction of nature trails are among the intended measures. Basic needs such as the air transportation needed for monitoring and communications equipment must also be provided. The expected results are improved reserve management and sustainable ecotourism in the region.

Total cost of the proposed project is $318,350 over three years, including equipment, construction, and educational programs. See Attachment C, budget 14.2.

The project will be executed by the staff of the Kronotsky Zapovednik.

- **Kurilsky Zapovednik**, on the southern island of Kynashira, requires immediate assistance to protect its resources and to cope with a rapidly increasing influx of foreign tourists. The zapovednik primarily protects the breeding grounds of different seal species. The vegetation of the region is luxuriant due to the warm monsoon climate, making the region one of the most biologically productive on Earth. Currently, the zapovednik lacks appropriate facilities to ensure effective protection under conditions of growing tourism.

The proposed project seeks funding to help finance construction of essential tourist facilities, including a small lodge and nature museum; and to equip the zapovednik staff with modern transportation and communication equipment to ensure protection. Funding will help to update the primitive state of the current facilities, as well as provide air transport for monitoring terrain which is difficult to access. The expected results are improvement in the management capacity of the zapovednik and development of an ecologically sound management plan to handle increasing ecotourism.

Total cost of the proposed project is $243,170 over three years, including tourism infrastructure and equipment costs. See Attachment C, budget 14.3.

The project will be implemented by the staff of the Kurilsky Zapovednik.

VI. Species of Special Concern

No projects in this bioregion address this issue.

VII. Total cost of the proposed projects in this bioregion is $767,470 for the periods indicated.

PRIORITIES: The Komandorsky Project is rated as the highest priority.

THE TOTAL COST OF THE ENTIRE BIODIVERSITY CONSERVATION PORTFOLIO FOR RUSSIA IS $17,520,735.

SECTION V. PHASE II INITIATIVES: AN OVERVIEW

The emergency situation in which this initial investment portfolio was assembled precluded providing a complete summary of all high priority proposals worthy of consideration for donor assistance. We propose that these additional and equally worthy initiatives be developed and submitted in a second round of proposals to be considered as soon as possible. Proposals that were left out of this document, along with other major initiatives, will be critical for fleshing out the principle components of a national biodiversity strategy.

The major objective of Phase II will be to assemble a multi-disciplinary team of Russian experts to draft a comprehensive national biodiversity strategy. The biodiversity strategy will provide a blueprint for the long-term conservation of biodiversity at all levels--federal, regional, and local. Another major objective of Phase II will be to develop an Implementation Strategy for proposed initiatives financed from Phase I. It is proposed that a Russia-WWF implementation team will assume a lead role in monitoring and evaluating implementation of key conservation initiatives. A monitoring and implementation program is crucial to the success and cost-effectiveness of projects for many reasons, including the necessity of finding and verifying reliable partners on all levels, response to constant changes in national and regional administrative systems and personnel, the lack of a reliable banking system, and many other factors. We recommend that upon approval for funding, reassessments of project budgets be made due to hyper-inflation. A monitoring and implementation program, overseen by a Russia-WWF team, can help to develop these assessments, working with project leaders to define specific tasks, time tables, and budgets. The Russia-WWF implementation team will ensure that investments are targeted for the most urgent requirements and reach their destinations. A direct-funding mechanism for projects through a WWF-supervised program can help to diversify and decentralize investments and ensure the long-term success of funded projects.

Another important component of Phase II will be a comprehensive analysis of forestry and agriculture issues in the context of their contribution or threat to biodiversity conservation. Because the majority of species populations occur outside of protected areas, the nature of these activities is critical for the long-term conservation of biodiversity in Russia. Initiatives will be developed to assess the impact of current forestry and agricultural practices on biodiversity conservation, and to facilitate the planning and implementation of compatible land use and management regimes. Extensive cooperation among all appropriate authorities and interest groups will be promoted to help ensure the success of this program.

The following projects have been identified in this document, and in general, as important initiatives to be supported in Phase II:

Creation of New Reserves

Lena Delta (Arctic Bioregion)
Bolshezemelsky Zapovednik (Arctic Bioregion)
Amur-Sakhalin Bioregion, in general
Central Siberia Bioregion, in general
Western Siberian Forest-Steppe & Steppe, in general
Yano-Kolymsky Bioregion, in general
Lipetsk Protected Area (Kola-Karelian & Eastern European Forest)

Support of Existing Reserves

Magadansky Zapovednik (Kamchatka-Okhotsk Sea Bioregion)
Dzhugzhursky Zapovednik (Kamchatka-Okhotsk Sea Bioregion)
Darvinsky Zapovednik (Kola-Karelian & Eastern European Forest)
Mordovsky Zapovednik (Kola-Karelian & Eastern European Forest)
Kivach Zapovednik (Kola-Karelian & Eastern European Forest)
Cherno-Zemny Zapovednik (Eastern European Forest-Steppe, Steppe, and Caspian Semidesert)

Additional Initiatives

Pearl Mussel-Atlantic Salmon Ecosystem Conservation Project (Kola-Karelian & Eastern European Forest)
Conservation of Baleen Whales (Arctic)
Mongolian Marmot Reintroduction Program (Altai-Sayansky Bioregion)
Preservation of Ethnic Minorities and Biodiversity in Central Siberia

Phase II should also involve a continuation and expansion of many of the federal and regional level programs initiated in Phase I.

Federal level projects that should be considered in Phase II include:

Center for Health of Wild Animals
Ex-situ Plant Conservation in Botanical Gardens
Center for Breeding and Reintroduction of Rare Animals
Monitoring and Conservation of Large Mammals
Developing a Cryobank
Planning Expansion of the Existing Network of Zapovedniks

ATTACHMENT A: BACKGROUND INFORMATION ON THE PROTECTED AREAS SYSTEM IN RUSSIA

A. Creation and operation of specially protected natural territories

Russia's specially protected natural territories form a unified system whose primary purpose is biodiversity conservation and research of natural processes and phenomena. Protected territories consist of state nature zapovedniks, national natural parks, nature zakazniks (refuges), and natural monuments.

State Nature Zapovedniks

State nature zapovedniks are protected, scientific research institutions that aim to research and conserve the natural course of ecosystem processes, and the gene pool of plants and animals of typical and unique ecosystems.

Zapovedniks are responsible for:

- conservation of biodiversity and maintenance of protected ecosystems in natural conditions;
- ecological monitoring and scientific research;
- ecological education; and
- training scientific personnel and specialists in nature protection.

Land sites, underground resources, and water reservoirs within zapovednik boundaries are withdrawn from economic exploitation and given to zapovedniks for free continuous use, or as property.

As of June 1, 1993, there were 83 zapovedniks in the Russian Federation, with a total area of about 28 million hectares, including 3.5 million hectares of aquatic habitats. The total territory of zapovedniks make up 1.4% of the territory of Russia. About 5,500 specialists work in zapovedniks. Seven zapovedniks belong to the Russian Ministry of Environment, four to the Russian Academy of Science, two to state universities, and one to the system of forestry organizations. Sixteen zapovedniks have the status of biosphere reserve.

It is prohibited to conduct any economic activities in zapovedniks which violate the development of natural processes, threaten the state of natural ecosystems and objects, or which are not related to implementation of the zapovednik's objectives. Protective zones with regulated and controlled economic activities have been created in adjacent lands and water areas in order to protect zapovednik territories from unfavorable anthropogenic influences.

Specific features of creation and operation of zapovedniks are determined individually by the state organ which manages the zapovednik. Protection of state zapovedniks is implemented by a special security inspection service under the umbrella of zapovednik personnel.

National Natural Parks

National natural parks are nature-protection institutions whose territories have special ecological, historical, and aesthetic value, and which are intended for use in environmental, recreational, educational, scientific, and cultural activities.

As of July 1st, 1993, there were 24 national natural parks in the Russian Federation with a total area of 13 million hectares, representing 0.2% of the whole territory of the Russian Federation. Twenty-two national natural parks are managed by the Federal forestry service of Russia.

National natural parks are responsible for:

- conservation of historic and cultural monuments and other objects of cultural heritage;
- creation of conditions for regulated ecological tourism and rest in the natural environment;
- organization of ecological education for local people; and
- development of scientific methods for protecting natural and cultural heritage.

Land sites, their underground resources, aquatic habitats, and all natural, historical and cultural objects within their limits are given to the national park for an unlimited period of use. National park territories are taken into account during development of plans and future social-economical development for territorial complexes, land use, and regional planning. Each national natural park operates on the basis of individual regulation which is approved by the state organ that manages the park.

Various functional zones can be allocated on the territory of national natural parks. They include:

- preserved zones with a regime foreseen for creating zapovedniks;
- zones of special protection, where economic or recreational use of territory is forbidden or strictly limited;
- zones of educational tourism, intended for organization of ecological education and acquaintance with noteworthy sites of the national park;
- zones of recreational use, including areas for sport and hunting and fishing;
- zones of protection for historical-cultural sites, ensuring conditions for conserving complexes and objects of cultural heritage;
- territories of intended for agricultural activities, using ecologically harmless methods;
- visitor service zones, intended for hotels, camps, and other cultural and informational tourist services; and
- zones of economic purpose, where economic activities necessary to ensure the national park's functioning are conducted.

National natural parks that are located in regions inhabited by native populations can contain specially allocated zones for traditional nature use which does not damage the environment and biological resources. It is forbidden to conduct any activities which might threaten the existence of natural and historical-cultural objects on the territory of national natural parks. Specific features, zoning, and regimes for each national natural park is determined by a special individual act for each park.

State Nature Refuges (Zakazniks)

Zakazniks are territories where partial limitations on land use are introduced to preserve natural ecosystems. Zakazniks at the federal level are organized by the Ministry of Environment in coordination with the executive organs of Russian Federation subdivisions (republics, included in Russian Federation, regions, districts, and autonomous units). Zakazniks at the regional level are organized by executive organs of Russian Federation subdivisions in coordination with regional organs of the Ministry of Environment, local committees of people's deputies, and also property owners, land owners, land users and lease holders of the corresponding territories and water reservoirs.

The objectives of zakazniks are preservation of natural ecosystems and individual species; preservation, reproduction and restoration of natural resources; and maintenance of ecological balance. Concrete tasks and attributes of zakazniks are determined by individual regulations, for federal refuges by the Ministry of Environment, and for regional refuges in coordination with local councils and land users. Some of the federal zakazniks are monitored by zapovedniks. Zakazniks support biodiversity conservation because they are numerous, more easily created than zapovedniks and national parks, and have more flexibility for changing the protection regime in each territory.

Natural Monuments

Natural monuments are individual valuable natural objects protected in order to maintain their natural condition. Federal level natural monuments are established by the government of the Russian Federation at the initiative of the Ministry of Environment in coordination with executive organs of subdivisions of the Russian Federation. Natural monuments at the regional level are established by resolution of executive organs of Russian Federation subdivisions after initiation by regional branches of the Ministry of Environment. In all cases, the decision of establishing a natural monument is made in coordination with land users and local organs of power.

Protection of natural monuments is carried out by the land user of the protected area or in coordination with other physical or juridical persons. In the system of specially protected territories, natural monuments play a role in preserving natural objects of interest which are usually of small size.

ATTACHMENT B: ADDITIONAL INFORMATION ON SOME PROPOSALS

B.1. List of zapovedniks proposed for creating conservation education mini-centers

1. Kandalakshsky Zapovednik (Kola-Karelian and Eastern European Forest Bioregion, 2)
2. Kivach Zapovednik (Kola-Karelian and Eastern European Forest Bioregion, 2)
3. Teberdinsky Zapovednik (Great Caucasus Bioregion, 5)
4. Sayan-Shushensky Zapovednik (Altai-Sayan Bioregion, 9)
5. Altaisky Zapovednik (Altai-Sayan Bioregion, 9)
6. Stolby Zapovednik (Altai-Sayan Bioregion, 9)
7. Barguzinsky Zapovednik (Baikal Bioregion, 10)
8. Baikalo-Lensky Zapovednik (Baikal Bioregion, 10)
9. Sikhote-Alinsky (Amur-Sakhalin Bioregion, 13)

The three projects that were not considered for this round of proposals, but which should be addressed at a later time are as follows:

1. Magadansky Zapovednik (Kamchatka-Okhotsk Sea Bioregion, 14)
2. Voronezhsky Zapovednik (Eastern European Forest-Steppe, Steppe, and Caspian Semidesert Bioregion, 3)
3. Kostomukshsky Zapovednik (Kola-Karelian and Eastern European Forest Bioregion, 2)

B.2. List of 20 zapovedniks targeted for establishment of special operative groups against poaching and other violations

1. Altaisky Zapovednik (Altai-Sayan Bioregion, 9)
2. Sikhote-Alinsky Zapovednik (Amur-Sakhalin Bioregion, 13)
3. Lazovsky Zapovednik (Amur-Sakhalin Bioregion, 13)
4. Khankaisky Zapovednik (Amur-Sakhalin Bioregion, 13)
5. Bureinsky Zapovednik (Amur-Sakhalin Bioregion, 13)
6. Magadansky Zapovednik (Kamchatka-Okhotsk Sea Bioregion, 14)
7. Baikalo-Lensky Zapovednik (Baikal Bioregion, 10)
8. Vishersky Zapovednik (Ural Mountains Bioregion, 4)
9. Mordovsky Zapovednik (Kola-Karelian and Eastern European Forest Bioregion, 2)
10. Nizhnesvirsky Zapovednik (Kola-Karelian and Eastern European Forest Bioregion, 2)
11. Kivach Zapovednik (Kola-Karelian and Eastern European Forest Bioregion, 2)
12. Bryansky Les Zapovednik (Kola-Karelian and Eastern European Forest Bioregion, 2)
13. Kerzensky Zapovednik (Kola-Karelian and Eastern European Forest Bioregion, 2)
14. Bolshaya Kokshaga (Kola-Karelian and Eastern European Forest Bioregion, 2)
15. Teberdinsky Zapovednik (Great Caucasus Bioregion, 5)
16. Kavkazsky Zapovednik (Great Caucasus Bioregion, 5)
17. Cherno-Zemni Zapovednik (Eastern European Forest-Steppe, Steppe, and Caspian Semidesert Bioregion, 3)
18. Komsomolsky Zapovednik (Amur-Sakhalin Bioregion, 13)
19. Darvinsky Zapovednik (Kola-Karelian and Eastern European Forest Bioregion, 2)
20. Tsentralno-Chernozemny Zapovednik (Eastern European Forest-Steppe, Steppe, and Caspian Semidesert Bioregion, 3)

Note: Some zapovedniks may have other proposals in this package, however, these projects are considered separately.

B.3. Additional information on the Biomonitoring Information System (BIOTA) to improve conservation planning and monitoring of biodiversity.

Most zapovedniks were established for long-term monitoring of natural ecosystems. Some zapovedniks organized many years ago, such as Barguzinsky, Astrakhansky, Ilymensky, Kavkazsky, Bashkirsky, Voronezhsky, Laplandsky, Pechoro-Ilychsky, Sikhote-Alinsky, Oksky, Prioksko-Terrasny, and others have been collecting data on natural succession processes for more than 50 years. The information is stored in archives, often hand-written "Annuals of Nature," and needs to be collected and synthesized in order to develop integrated conservation strategies. Updating these archives using modern computer software, and using analytical tools to devise appropriate conservation measures is an essential project. The BIOTA biomonitoring system would coordinate and analyze regional information databases and form targeted national conservation objectives, substantially improving protected area planning. BIOTA would be organized on a regional level in 20 pilot projects, with overall coordination by a national BIOTA center.

The range of information available from zapovedniks is overwhelming. Most zapovedniks conduct long-term monitoring in the following categories:

a. detailed and up-dated inventories of fauna and flora;
b. succession and fluctuation of plant communities;
c. productivity of plant communities;
d. dynamics of populations, and sex and age structure of populations of common and rare animal species;
e. phenology;
f. effects of human influence on zapovednik natural ecosystems; and
g. basic meteorological and weather conditions.

The main functions of the BIOTA national information center would be to:

1) cooperate with nature protection services and organizations to obtain valuable information;

2) organize digitization of obtained data and maps, both using existing software and creating new software;

3) verify ecosystem information obtained for accuracy using up-to-date analytical tools;

4) develop methods to make different data sets compatible and to integrate ecological information;

5) analyze data on different levels--from individual protected areas to the whole reserve system;

6) create a databank on zapovedniks and other protected areas to examine such things as landscape and climatic characteristics; ecosystem organization; species, population, ecosystem diversity; population dynamics; productivity; and successional processes;

7) develop special software and computer maps, and input data from state and other sources;

8) train personnel of the local divisions of BIOTA to use up-to-date information technologies;

9) facilitate contacts among specialists, involve them in programs, and store data on management specialists and other experts in different areas of conservation biology;

10) provide information exchange among Russian zapovedniks, protected areas, and information centers abroad;

11) develop sustainable use and biodiversity conservation strategies, in cooperation with government environmental agencies, to improve the protected areas system and nature preservation as a whole;

12) influence management organs by providing information upon which to base policy decisions; and

13) create a favorable public opinion of nature preservation and support for protected areas.

Tasks of the 20 pilot information centers would include:

1) inputting parameters that characterize the condition of ecosystems, dividing them into two categories: a) parameters shared by all zapovedniks according to standard program format and b) indicators characteristic for a particular zapovednik, considering specific traits and scientific methods;

2) identify requirements for specialists who develop software and create an original data bank for the zapovednik;

3) establish contacts with organizations and specialists in the region for gathering data (including nature protection services, game management centers, fish protection organs, scientific and higher education institutions, and non-governmental organizations);

4) collect and input materials from zapovednik archives;

5) process and transmit information to the national BIOTA center, and provide answers to questionnaires and other inquiries;

6) train zapovednik staff on methods of information processing using computers and databases in the zapovednik; and

7) facilitate contacts and provide information to the public.

The BIOTA information system would significantly increase the capability of both national and regional experts to analyze the data needed to develop comprehensive conservation strategies.

ATTACHMENT C: ITEMIZED BUDGET SUMMARIES

NOTE: ALL BUDGETS ARE FOR THREE YEAR PERIODS UNLESS OTHERWISE INDICATED

A. FEDERAL LEVEL INITIATIVES

A.1. ECOLOGICAL EDUCATION TRAINING PROGRAM

PROJECT ACTIVITY	QUANTITY	COST/ITEM	TOTAL COST
SEMINAR:			
- transportation:			
Russians	32 pers.	$300	$9,600
Foreign guests	6 pers.	$3,600	$21,600
- lodging (14 days):			
Russians	32 pers.	$5/day	$2,240
Foreign guests	6 pers.	$20/day	$1,680
- meals (14 days)	38 pers.	$20/day	$5,320
- photocopying materials	--	--	$100
- mailings	--	--	$250
- telephone calls	--	--	$300
- office supplies	--	--	$100
CREATING CENTER:			
- legalizing charter	--	--	$1,000
- renting office space (over 5 yrs.)	200 sq.m.	$30/sq.m.	$30,000
PROCURING EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- VCR, TV, video camera	2 ea.	$2,000	$4,000
- typewriter	1	$400	$400
- copying machine	1	$600	$600
- telephones with answering machines	4	$40	$160
- office furniture	2 sets	$3,000	$6,000
- office supplies	--	--	$800
SALARIES:			
- full-time specialists	4 pers.	$300/mo.	$43,200
- part-time specialists	3 pers.	$200/mo.x24mos.	$14,400
PUBLISHING AND PRODUCTION:			
- popular scientific journals	--	$15,000/yr.	$45,000
- advertising materials, souvenirs, calendars	--	$15,000/yr.	$45,000
- seminar materials and educational textbooks	--	$10,000/yr.	$30,000
- educational films	--	$15,000/yr.	$45,000
- mail expenses	--	$200/yr.	$600
COMPENSATION FOR EDUCATORS:			
- teachers for 88 days, 6 hours/day = 528hrs.	4 pers.	$10/hr.	$21,120
CONDUCTING TRAINING SESSIONS:			
- travel expenses (4 groups of 30 people each)	120 pers.	$300	$36,000
- meals (30 days)	120 pers.	$5/day	$18,000
- excursions	16	$100	$1,600
- local transportation	--	--	$30,080
- business trip expenses	--	--	$9,240
EQUIPPING KEY ZAPOVEDNIKS:			
- telex, fax, modem	10 ea.	$1,700	$17,000
- computers	10	$2,000	$20,000
- personnel training	20 pers.	$40	$800
TOTAL COST OF ECOLOGICAL EDUCATION TRAINING PROGRAM			**$462,890**

A.2. NATIONAL BUREAU FOR ECOTOURISM COORDINATION

PROJECT ACTIVITY	QUANTITY	COST/ITEM	TOTAL COST
CREATION OF CENTER:			
- procuring office equipment (3 computers, 2 printers, copying machine, fax)	--	--	$9,000
- rental of office space	1 yr.	$6,000	$6,000
- travel expenses:			
in Russia	--	--	$4,000
abroad	--	--	$10,000
- salaries (1 year):			
coordinator	1 pers.	$300/mo.	$3,600
staff	5 pers.	$150/mo.	$9,000
- communication expenses	--	--	$1,000
- publishing and mailing advertising materials	--	--	$10,000
- unforseen expenses	--	--	$5,000
SUBTOTAL FOR CREATION OF CENTER (1st YEAR)			**$57,600**

PROJECT ACTIVITY	QUANTITY	COST/ITEM	TOTAL COST
SEMINAR (3 days):			
- rental of conference room	--	$1,000	$1,000
- compensation for translators	3 days	$300	$900
- travel expenses	20 pers.	$300	$6,000
- excursion for foreign participants	1	$2,000	$2,000
TRAINING:			
- visit to national parks abroad for training	12 pers.	$7,000	$84,000
SUBTOTAL OF SEMINAR AND TRAINING COSTS			**$93,900**

PROJECT ACTIVITY	QUANTITY	COST/ITEM	TOTAL COST
PRODUCTION OF INFORMATIONAL MATERIALS			
- preparing films using existing materials	--	--	$3,000
- printing educational materials about zapo-vedniks	20	$200	$4,000
- publishing catalog of ecotours in zapoved-niks of Russia	--	--	$3,000
SUBTOTAL OF PUBLISHING COSTS			**$10,000**

TOTAL COST OF CREATING ECOTOURISM BUREAU	**$161,500**

A.3.1. CONSERVATION TRAINING PROGRAM

PROGRAM COSTS	QUANTITY	COST/ITEM	TOTAL COST
REQUIREMENTS FOR 1 TRAINING COURSE FOR 45 PEOPLE:			
- lodging	15 days	$2/day/pers.	$1,350
- meals	15 days	$2/day/pers.	$1,350
- rental of auditorium	15 days	$500	$500
- payment to educators	84 hrs.	$10/hr.	$840
- copying materials	--	--	$500
- rental of shooting gallery and ammunition	--	--	$600
- film viewing	--	--	$200
- unforseen expenses	--	--	$500
SUBTOTAL FOR 1 TRAINING COURSE			**$5,840**
TOTAL COST OF 2 TRAINING COURSES/YEAR FOR THREE YEARS			**$35,040**

A.3.2. IMPROVING PROTECTION IN 20 KEY ZAPOVEDNIKS BY CREATING 21 OPERATIVE GROUPS AND IMPROVING BASIC INFRASTRUCTURE

CREATING OPERATIVE GROUPS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT COSTS FOR ONE GROUP:			
- tent	1	$150	$150
- sleeping bags	4	$40	$160
- backpacks	4	$250	$1,000
- kerosene stove	1	$10	$10
- SKS carbines	4	$250	$1,000
- pistols	4	$150	$600
- gas revolvers	4	$50	$200
- walkie-talkies	4	$500	$2,000
- binoculars	4	$60	$240
- night vision devices	1	$300	$300
- ammunition	--	--	$600
SUBTOTAL OF EQUIPMENT COSTS FOR 1 GROUP			**$6,260**
TOTAL EQUIPMENT COSTS FOR 21 GROUPS			**$131,460**

PROJECT EXPENSES (CON'T)	QUANTITY	COST/ITEM	TOTAL COST
TRANSPORTATION (ALL GROUPS):			
- UAZ-452 cross-country vehicles	16	$9,000	$144,000
- "Buran" snowmobiles	42	$1,200	$50,400
- "Kazanka 5-M" motor boats	15	$1,000	$15,000
- "Vikhr" boat motors	20	$450	$9,000
FUEL AND SUPPLIES:			
- fuel supplies for 3 years for all groups	--	$50,000/yr.	$150,000
AIR MONITORING:			
- helicopter rental (in 7 zapovedniks)	1 trip/mo.	$2,600x36mos.	$655,200
OTHER EXPENSES:			
- incentive fund for state inspectors	83 pers.	$60mo.x36mos.	$179,280
- special uniforms	83	$70	$5,810
SUBTOTAL OF OTHER EXPENSES			**$1,208,69**

SUBTOTAL OF CREATING 21 OPERATIVE GROUPS **$1,340,15**

INFRASTRUCTURE SUPPORT	QUANTITY	COST/ITEM	TOTAL COST
ADDITIONAL INFRASTRUCTURE NEEDS IN 20 ZAPOVEDNIKS:			
- cross-country vehicles	15	$7,000	$105,000
- jeeps	30	$2,000	$60,000
- "Vikhr-30" motors	50	$450	$22,500
- motor boats	15	$1,000	$15,000
- equipment costs (fire-arms, ammunition, communications)	20 zapovedniks	$11,000	$220,000
- large vessel rental	4 zapovedniks	$52,500	$210,000
- field outfits	20 zapovedniks	$2,920	$58,400
- fuel and supplies	20 zapovedniks	$22,500	$450,000
SUBTOTAL OF INFRASTRUCTURE NEEDS IN 20 ZAPOVEDNIKS			**$1,140,90**

TOTAL COST OF IMPROVING PROTECTION IN 20 ZAPOVEDNIKS **$2,481,05**

CREATING A NATIONAL INFORMATION ANALYSIS CENTER

NATIONAL CENTER COSTS	QUANTITY	COST/ITEM	TOTAL COST
COMPUTER HARDWARE			
- PC AT/486	2	$2,500	$5,000
- LaserJet IIp printer	1	$1,000	$1,000
- memory upgrade 4Mb	1	$200	$200
- HP DeskJet 550C printer	1	$800	$800
- drive for DCW	1	$1,000	$1,000
- Bernoulli boxes	2	$800	$1,600
- digitizing tablet	1	$4,000	$4,000
- cartographic plotter	1	$10,000	$10,000
- modem 2400	1	$500	$500
- ScanJet IIc	1	$1,400	$1,400
- power back ups	2	$750	$1,500
- work station	1	$12,000	$12,000
COMPUTER SOFTWARE:			
- ArchInfo GIS system for PC	1	$6,000	$6,000
- ArchInfo GIS for workstation	1	$24,000	$24,000
- DCW electronic map	1	$200	$200
- IDRISI	1	$100	$100
- DBASE IV	2	$200	$400
- Framework IV	2	$200	$400
- Quatro Pro 4.0	1	$100	$100
- Coreldraw 3.0	1	$200	$200
- Paradox 3.50	1	$200	$200
- additional software	--	$700	$700
SUBTOTAL OF EQUIPMENT COSTS			**$71,300**

CENTER COSTS (CON'T)	QUANTITY	COST/ITEM	TOTAL COST
TRAINING:			
- center personnel training	--		$14,000
PROFESSIONAL SUPPORT:			
- GIS consultants	--	$2,000/yr.	$6,000
- consulting with foreign experts (incl. travel)	2 pers.	$7,500/yr.	$45,000
- consulting with local experts	2 pers.	$100	$200
PROJECT DEVELOPMENT:			
- international conferences for coordination	1/yr.	$5,000/yr.	$15,000
RECURRENT COSTS:			
- salary for project manager	1 pers.	$2,500/yr.	$7,500
- GIS/Ecology coordinator	1 pers.	$2,500/yr,	$7,500
- technical assistants	2 pers.	$1,000/yr.	$6,000
- software design experts	2 pers.	$1,000/yr.	$6,000
- contracts for data processing and analysis	10	$500	$5,000
- purchase of information (maps, databases)	--	--	$14,000
- office supplies	--	$500/yr.	$1,500
- translation of reports and databases	--	--	$7,000
SUBTOTAL OF TRAINING AND RECURRENT COSTS			**$134,700**
TOTAL COST OF CREATING NATIONAL CENTER			**$206,000**

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A.4.2. SUPPORT FOR REGIONAL LEVEL GIS MONITORING

REGIONAL SUPPORT COSTS	QUANTITY	COST/ITEM	TOTAL COST
COMPUTER HARDWARE			
- PC AT/486	20	$2,500	$50,000
- LaserJet IIp printer	20	$1,000	$20,000
- memory upgrade 4Mb	20	$200	$4,000
- HP DeskJet 550C printer	6	$800	$4,800
- Bernoulli boxes	6	$800	$4,800
- digitizing tablet	20	$1,000	$20,000
- cartographic plotter	2	$3,000	$6,000
- modem 2400	20	$500	$10,000
- ScanJet IIc	3	$1,400	$4,200
- power back ups	20	$500	$13,000
COMPUTER SOFTWARE:			
- ArchInfo GIS system for PC	6	$6,000	$36,000
- IDRISI	20	$100	$2,000
- DBASE IV	20	$200	$4,000
- Framework IV	20	$200	$4,000
- Quatro Pro 4.0	6	$100	$600
- Coreldraw 3.0	6	$200	$1,200
- Paradox 3.50	6	$200	$1,200
- additional software	20 sets	$130	$2,600
SUBTOTAL OF EQUIPMENT COSTS			**$188,400**

REGIONAL COSTS (CON'T)	QUANTITY	COST/ITEM	TOTAL COST
TRAINING:			
- center personnel training	--	--	$18,500
PROFESSIONAL SUPPORT:			
- GIS consultants	--	--	$4,000
- consulting with national center experts (incl. travel)	--	--	$3,600
- consulting with local experts	--	--	$6,000
PROJECT DEVELOPMENT:			
- national workshops for GIS coordination	2	$2,750	$5,500
RECURRENT COSTS (TWO YEARS):			
- salary for regional managers	8 pers.	$2,000/yr.	$32,000
- GIS consultants	8 pers.	$2,000/yr,	$32,000
- technical assistants	8 pers.	$1,000/yr.	$16,000
- software design experts	2 pers.	$1,000/yr.	$6,000
- purchase of information (maps, databases)	--	--	$9,000
- office supplies	--	--	$2,000
- translation of reports and databases	--	--	$3,000
SUBTOTAL OF TRAINING AND RECURRENT COSTS			**$137,600**
TOTAL COST OF SUPPORTING REGIONAL CENTERS			**$326,000**

A.5.1 DEVELOPING A "TRAFFIC-RUSSIA" AGENCY TO COMBAT ILLEGAL TRADE OF WILDLIFE

FIRST YEAR EXPENSES	QUANTITY	COST/ITEM	TOTAL COST
CREATION COSTS:			
- seminar of Russian and foreign experts (incl. transport, hotel, etc.)	1	$15,000	$15,000
- developing charter and documentation for agency	--	$1,000	$1,000
- procuring equipment	--	$5,000	$5,000
RECURRENT COSTS:			
- rental of office space	5 yr. lease	$1,200/yr.	$6,000
- salaries for full-time employees (three years)	2	$1,500/yr.	$9,000
- compensation for analysts and consultants	--	$3,000/yr.	$9,000
- business trips	4	$500	$2,000
- mailing expenses for information bulletins	--	$1,000/yr.	$3,000
- preparing and publishing press releases and other materials	--	$1,000/yr.	$3,000
- other expenses	--	$1,000/yr.	$3,000
TOTAL COST OF CREATING TRAFFIC-RUSSIA			**$56,000**

A.5.2. IMPROVEMENT OF CUSTOMS OPERATIONS FOR HALTING ILLEGAL TRADE OF WILDLIFE

TWO YEAR IMPLMENTATION PERIOD

PROJECT COSTS	QUANTITY	COST/ITEM	TOTAL COST
PUBLISHING COSTS:			
- manuscript for guides, booklets, posters	--	--	$2,500
- translation of text into english	--	--	$3,000
- payment for drawings	--	--	$4,000
- printing costs	--	--	$10,000
- mailing costs	--	--	$2,000
TRAINING COSTS:			
- preparing training program and educators	--	--	$1,500
- training session in Moscow for 20 Russians, 3 foreigners, travel	--	--	$20,000
- training sessions in other regions	3	$5,000	$15,000
CREATING HOLDING POINTS:			
- rental of space for 2 years at int'l airport	2 yrs.	$12,500/yr.	$25,000
- equipment (cages, supplies, medicine)	--	--	$15,000
- salaries for staff of holding stations	--	--	$2,000
- holding points in St. Petersburg and Khabarovsk	2	$15,000	$30,000
- holding points at 5 border stations	5	$10,000	$50,000
DEVELOPING MARKING METHODS:			
- developing methods for marking captive animals	--	--	$2,500
- preparing tags for marking and instructions for use	--	--	$8,000
- mailing costs	--	--	$1,500
TOTAL COST OF IMPROVING CUSTOMS SERVICE			**$192,000**

A.5.3. CREATION OF SPECIAL BRIGADES FOR COMBATTING POACHING
TWO YEAR IMPLEMENTATION PERIOD

A. AMUR TIGER BRIGADE	QUANTITY	COST/ITEM	TOTAL COST
COMPENSATION AND TRAINING:			
- salaries for employees	8 pers.	$1,562.50/yr.	$25,000
- training program	1	$2,000	$2,000
- payments for consultants	2 yrs.	$1,000	$2,000
- fund to pay informers	2 yrs.	$2,500	$5,000
EQUIPMENT:			
- cross-country vehicle	2	$8,000	$16,000
- snowmobiles	3	$3,600	$3,600
- gasoline, spare parts	--	--	$4,000
- rental of space and garage	2 yrs.	$6,000	$12,000
- uniforms, arms	8 pers.	$750	$6,000
- radio stations	4	$500	$2,000
- field equipment	8 pers.	$750	$6,000
- fax, computer, copying machine, radio telephone	1 ea.	$5,000	$5,000
TRANSPORT:			
- helicopter rental	25 hrs./yr.	$200/hr.	$10,000
OTHER:			
- unexpected expenses	2 yrs.	$2,500	$5,000
SUBTOTAL OF AMUR TIGER BRIGADE			**$103,600**

B. SAIGA ANTELOPE BRIGADE	QUANTITY	COST/ITEM	TOTAL COST
COMPENSATION AND TRAINING:			
- salaries for employees	8 pers.	$1,562.50/yr.	$25,000
- training program	1	$2,000	$2,000
- payments for consultants	2 yrs.	$1,000	$2,000
- fund to pay informers	2 yrs.	$2,500	$5,000
EQUIPMENT:			
- cross-country vehicle	2	$8,000	$16,000
- gasoline, spare parts	--	--	$9,000
- rental of space and garage	2 yrs.	$6,000	$12,000
- uniforms, arms	8 pers.	$750	$6,000
- radio stations	4	$500	$2,000
- field equipment	8 pers.	$750	$6,000
- fax, computer, copying machine, radio telephone	1 ea.	$5,000	$5,000
TRANSPORT:			
- helicopter rental	50 hrs./yr.	$200/hr.	$20,000
OTHER:			
- unexpected expenses	2 yrs.	$2,500	$5,000
SUBTOTAL OF SAIGA ANTELOPE BRIGADE			**$115,000**

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C. REINDEER BRIGADE	QUANTITY	COST/ITEM	TOTAL COST
COMPENSATION AND TRAINING:			
- salaries for employees	8 pers.	$1,562.50/yr.	$25,000
- training program	1	$2,000	$2,000
- payments for consultants	2 yrs.	$1,000	$2,000
- fund to pay informers	2 yrs.	$2,500	$5,000
EQUIPMENT:			
- motor boats	3	$1,000	$3,000
- cross-country vehicle	2	$8,000	$16,000
- snowmobiles	3	$3,600	$3,600
- gasoline, spare parts	--	--	$4,000
- rental of space and garage	2 yrs.	$6,000	$12,000
- uniforms, arms	8 pers.	$750	$6,000
- radio stations	4	$500	$2,000
- field equipment	8 pers.	$750	$6,000
- fax, computer, copying machine, radio telephone	1 ea.	$5,000	$5,000
TRANSPORT:			
- helicopter rental	75 hrs./yr.	$200/hr.	$30,000
OTHER:			
- unexpected expenses	2 yrs.	$2,500	$10,000
SUBTOTAL OF REINDEER BRIGADE			**$135,600**
TOTAL COST OF ALL THREE ANTI-POACHING BRIGADES			**$354,200**

1. ARCTIC BIOREGION

1.1. TAIMYRSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- special clothes	34 sets	$100	$3,400
- copying machine	1	$600	$600
TRANSPORT:			
- "Buran" snowmobiles	7	$1,200	$8,400
- all-terrain vehicle	1	$10,000	$10,000
- MRB-type boats	2	$8,500	$17,000
FUEL AND SUPPLIES:			
- gasoline	100 tons	$143	$14,300
- motor oil	2.5 tons	$920	$2,300
- diesel fuel	100 tons	$150	$15,000
- diesel oil	3.5 tons	$850	$2,975
- boat motors	6	$700	$4,200
- 5-10 kW diesel generator	2	$3,000	$6,000
- 100 kW diesel generator	1	$11,000	$11,000
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL			
- air transport rental	350hrs/yr	$200/hr	$210,000
SUBTOTAL OF TECHNICAL COSTS			**$303,925**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- publishing information booklets, advertising	3 yrs.	$5,000/yr.	$15,000
- planning and equipping nature trails	--	--	$7,000
- purchasing VCR, TV, for showing educational films	1 ea.	$500	$1,000
SUBTOTAL OF EDUCATIONAL COSTS			**$23,000**

TOTAL COST OF TAIMYRSKY ZAPOVEDNIK PROJECT	**$326,925**

1.2. BIG ARCTIC ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- special clothes	35 sets	$100	$3,500
- boat motors	5	$700	$3,500
- SKS carbines	10	$400	$4,000
TRANSPORT:			
- "Buran" snowmobiles	4	$1,200	$4,800
- all-terrain vehicles	3	$10,000	$30,000
- 100-400 ton ice-breaking ship or pilot boat	1	$25,000	$25,000
- "Kazanka" motor boats	3	$800	$2,400
FUEL AND SUPPLIES:			
- gasoline	70 tons	$143	$10,010
- motor oil	3 tons	$920	$2,760
- diesel fuel	50 tons	$150	$7,500
- diesel oil	4 tons	$850	$3,400
- 5-10 kW diesel generators	2	$3,000	$6,000
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL			
- air transport rental	400hrs/yr	$200/hr	$240,000
CONSTRUCTION:			
- cordon (stations) planning and construction	7	$15,000	$105,000
SUBTOTAL OF TECHNICAL COSTS			**$450,820**

ECOLOGICAL TRAINING	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- training security personnel for 1 mo.	6 pers.	$333.33	$2,000
- training specialists if foreign centers	2 pers.	$6,000	$12,000
SUBTOTAL OF TRAINING COSTS			**$14,000**

TOTAL COST OF BIG ARCTIC ZAPOVEDNIK PROJECT	**$464,820**

1.3. WRANGEL ISLAND ZAPOVEDNIK

TECHNICAL REQUIREMENT	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- Angar radio stations	4	$300	$1,200
- portable radio stations	12	$40	$480
- special clothes	35 sets	$100	$3,500
- night vision devices	10	$400	$4,000
TRANSPORT:			
- "Buran" snowmobiles	4	$1,200	$4,800
- T-25 tractors	2	$2,000	$8,000
- T-130 bulldozer	1	$15,000	$15,000
- GAZ-66 automobile	1	$2,000	$2,000
- snow-swamp vehicles	6	$8,000	$48,000
FUEL AND SUPPLIES:			
- gasoline	150 tons	$143	$21,450
- motor oil	3.5 tons	$920	$3,220
- diesel fuel	150 tons	$150	$22,500
- diesel oil	3.5 tons	$850	$2,975
- 300-500 kW diesel generators	2	$4,000	$8,000
- hydroelectric press	1	$4,000	$4,000
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	140hrs/yr	$200/hr	$84,000
CONSTRUCTION:			
- reconstruction of main office	1	$16,000	$16,000
SUBTOTAL OF TECHNICAL COSTS			**$252,075**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- publishing information booklets and advertising	--	$5,000/yr.	$15,000
- purchasing VCR, TV for showing educational films	1 ea.	$500	$1,000
SUBTOTAL OF EDUCATIONAL COSTS			**$16,000**

TOTAL COST OF WRANGEL ISLAND ZAPOVEDNIK PROJECT	**$268,075**

1.4. JAMALO-GYDANSKY ZAPOVEDNIK

PHASE 1: ONE YEAR; PHASE 2: THREE YEARS

PHASE 1: PLANNING COSTS	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- salaries for survey team	2 pers.	$2000/1 yr.	$4,000
- travel expenses to site and back (2 trips)	2 round trips/pers.	$875/trip	$3,500
- air and ground transport rental and expenses	2 trips	$2,000/trip	$4,000
- publishing results and other expenses	--	--	$1,000
SUBTOTAL OF PHASE 1			**$12,500**

PHASE 2: TECHNICAL COSTS	QUANTITY	COST/ITEM	TOTAL COST
REQUIREMENTS:			
- approximate cost of basic equipment and transport needs		--	$100,000
- approximate cost of office, housing, and stations construction		--	$150,000
- cost of rental of air transport		--	$50,000
SUBTOTAL OF PHASE 2			**$300,000**

TOTAL COST OF JAMALO-GYDANSKY ZAPOVEDNIK PROJECT	**$312,500**

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1.5. CHUKOTKA ZAPOVEDNIK

PHASE 1: ONE YEAR; PHASE 2: THREE YEARS

PHASE 1: PLANNING COSTS	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- salaries for survey team	2 pers.	$2000/1 yr.	$4,000
- consultant fees	1 pers.	$1,000/1 yr.	$1,000
- travel expenses to site and back (2 trips)	2 round trips/pers.	$1,000/trip	$4,000
- air and ground transport rental and expenses	2 trips	$2,000/trip	$4,000
- publishing results and other expenses	--	--	$1,000
SUBTOTAL OF PHASE 1			**$14,000**

PHASE 2: TECHNICAL COSTS	QUANTITY	COST/ITEM	TOTAL COST
REQUIREMENTS:			
- approximate cost of basic equipment and transport needs		--	$100,000
- approximate cost of office, housing, and stations construction		--	$150,000
- cost of rental of air transport		--	$50,000
SUBTOTAL OF PHASE 2			**$300,000**

TOTAL COST OF CHUKOTKA ZAPOVEDNIK PROJECT	**$314,000**

2. EASTERN EUROPEAN FOREST BIOREGION

2.1. KANDALAKSHSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- special clothes	55 sets	$100	$5,500
- boat motors	20	$700	$14,000
TRANSPORT:			
- UAZ-469 jeeps	1	$5,000	$5,000
- VAZ-2121 "Niva"	1	$7,000	$7,000
- UAZ-3303 truck	1	$5,000	$5,000
- MRB-type motor boats	2	$8,500	$17,000
- "Kazanka-5M" motor boats	6	$800	$4,800
- "Buran" snowmobiles	3	$1,200	$3,600
FUEL AND SUPPLIES:			
- gasoline	44 tons	$110	$4,840
- motor oil	2 tons	$450	$900
- diesel fuel	20 tons	$120	$2,400
- diesel oil	2 tons	$250	$500
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	60hrs/yr	$120/hr	$21,600
CONSTRUCTION:			
- reconstruction of sea berth	--	--	$25,500
SUBTOTAL OF TECHNICAL COSTS			**$120,590**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- publishing information booklets, advertising	--	$5,000/yr.	$15,000
- planning and equipping nature trails	--	--	$10,000
- training specialists in foreign centers	3 pers.	$6,000	$18,000
- renovating nature museum exhibition	--	--	$10,000
SUBTOTAL OF EDUCATIONAL COSTS			**$53,000**

TOTAL OF KANDALAKSHSKY ZAPOVEDNIK PROJECT	**$173,590**

2.2. BRYANSKY LES ZAPOVEDNIK

EDUCATIONAL COSTS	QUANTITY	COST/ITEM	TOTAL COST
SALARIES:			
- full-time educators	2	$1,000/yr.	$6,000
- part-time personnel	4	$500/yr.	$6,000
TRANSPORT:			
- travel and transport	--	--	$5,000
- minibus	1	$10,000	$10,000
EQUIPMENT AND SUPPLIES:			
- TV and VCR	1 ea.	$500	$1,000
- video cameras	2	$2,000	$4,000
- photo cameras	5	$400	$2,000
- projectors	2	$3,000	$6,000
- viewing screen	2	$1,000	$2,000
- computer	1	$1,250	$1,250
- telex, fax, modem	1 ea.	--	$1,700
- exhibition materials	--	--	$5,000
- supplies and overhead	--	--	$5,000
PUBLISHING EXPENSES:			
- writing and preparing educational materials	--	--	$15,000
- publishing and copying	--	--	$15,000
CONSTRUCTION:			
- educational center and museum	--	--	$25,000
- creation of museum exhibitions	--	--	$8,000
- planning and equipping nature trails	--	--	$10,000
TOTAL COST OF BRYANSKY LES ZAPOVEDNIK PROJECT			**$128,950**

2.3. NIZHNESVIRSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- special clothes	27 sets	$100	$2,700
- night vision devices	6	$400	$2,400
- binoculars	5	$400	$2,000
- cameras	4	$400	$1,600
- SKS carbines	8	$400	$2,400
- pistols	3	$170	$510
- copying machine	1	$600	$600
- BMI-3 microscopes	2	$600	$1,200
- boat motors	6	$700	$4,200
- PMP-1L motor pumps	2	$70	$140
- motor saws	2	$100	$200
TRANSPORT:			
- UAZ-469 jeep	1	$5,000	$5,000
- VAZ-2121 "Niva"	1	$7,000	$7,000
- GAZ-66	1	$3,000	$3,000
- air-pillow boat	1	$13,000	$13,000
- "Kazanka" boats	5	$800	$4,000
- "Buran" snowmobile	4	$1,200	$4,800
- "Ural" motorcycles	3	$1,000	$3,000
FUEL AND SUPPLIES:			
- gasoline	47 tons	$110	$5,170
- motor oil	2 tons	$450	$900
- diesel fuel	50 tons	$150	$7,500
- diesel oil	2 tons	$250	$500
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	120hrs/yr	$80/hr	$28,800
CONSTRUCTION:			
- construction of main road	--	--	$30,000
SUBTOTAL OF TECHNICAL COSTS			**$133,570**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- creating an ecological education center and ornithological monitoring station	--	--	$15,700
- publishing information booklets, advertising	--	--	$25,000
- procuring VCR, TV, video camera	1 ea.	--	$2,000
SUBTOTAL OF EDUCATIONAL ACTIVITIES			**$42,700**

TOTAL COST OF NIZHNESVIRSKY ZAPOVEDNIK PROJECT	**$176,270**

2.4. LAPLANDSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- special clothes	67 sets	$100	$6,700
- night vision devices	5	$400	$2,000
- copying machine	1	$600	$600
- boat motors	10	$700	$7,000
LABORATORY EQUIPMENT:			
- atomic-absorption analyzer	1	$60,000	$60,000
- sulphur analyzer	1	$30,000	$30,000
- ionometers	5	$400	$2,000
- chemical laboratory	1	$50,000	$50,000
TRANSPORT:			
- UAZ-469 jeeps	2	$5,000	$10,000
- VAZ-2121 "Niva"	1	$7,000	$7,000
- "Kazanka" boats	5	$800	$4,000
- "Buran" snowmobiles	5	$1,200	$6,000
FUEL AND SUPPLIES:			
- gasoline	43 tons	$143	$6,150
- motor oil	1.5 tons	$920	$1,380
- diesel fuel	40 tons	$150	$6,000
- diesel oil	2 tons	$250	$500
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	55hrs/yr	$120/hr	$19,800
SUBTOTAL OF TECHNICAL COSTS			**$222,080**

ECOLOGICAL TRAINING	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- training specialists in foreign centers	2	$6,000	$12,000
- observation/monitoring program (4 specialists)	--	--	$5,000
- purchasing TV, VCR, video camera	1 ea.	--	$2,000
SUBTOTAL OF TRAINING AND EDUCATIONAL ACTIVITIES			**$19,000**

TOTAL COST OF LAPLANDSKY ZAPOVEDNIK PROJECT	**$241,080**

2.5. PINEZHSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- stationary radio stations	1	$400	$400
- portable radio stations	10	$40	$400
- special clothes	37 sets	$100	$3,700
- cameras	5	$400	$2,000
- binoculars	10	$400	$4,000
- "Vikhr" boat engines	5	$450	$2,250
TRANSPORT:			
- UAZ-469 jeeps	2	$5,000	$10,000
- VAZ-2121 "Niva"	1	$7,000	$7,000
- ZIL-130 truck	1	$4,000	$4,000
- "Kazanka" motor boats	2	$800	$1,600
- "Buran" snowmobiles	3	$1,200	$3,600
FUEL AND SUPPLIES:			
- gasoline	50 tons	$110	$5,550
- motor oil	2 tons	$450	$900
- diesel fuel	50 tons	$150	$7,500
- diesel oil	2 tons	$250	$500
- DG-7 diesel generator	1	$1,000	$1,000
- motor pumps MP-1600	2	$250	$500
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	40hrs/yr	$200/hr	$24,000
CONSTRUCTION:			
- construction of road	22 km.	--	$150,000
SUBTOTAL OF TECHNICAL COSTS			**$230,410**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- training specialists in foreign centers	2	$6,000	$12,000
- publishing information booklets, advertising	--	$5,000/yr.	$15,000
- VCR, TV, video camera	1 ea.	--	$2,000
SUBTOTAL OF TRAINING AND EDUCATIONAL COSTS			**$29,000**

TOTAL COST OF PINEZHSKY ZAPOVEDNIK PROJECT	**$259,410**

2.6. DARVINSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- stationary radio stations	2	$200	$400
- portable radio stations	10	$40	$400
- 60 km range radio tel.	1	$2,000	$2,000
- special clothes	65 sets	$100	$6,500
- night vision devices	10	$400	$4,000
- binoculars	10	$400	$4,000
- cameras	2	$400	$800
- copying machine	1	$600	$600
- laboratory analysis equipment	1	$4,000	$4,000
- "Vikhr" boat motors	4	$450	$1,800
TRANSPORT:			
- "Buran" snowmobiles	10	$1,200	$12,000
- mini tractors with hanging device	2	$3,750	$7,500
FUEL AND SUPPLIES:			
- gasoline	40 tons	$110	$4,400
- motor oil	2 tons	$450	$900
- diesel fuel	30 tons	$150	$4,500
- diesel oil	2 tons	$250	$500
- 100 kW diesel generator	1	$3,500	$3,500
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	60hrs/yr	$118/hr	$21,240
CONSTRUCTION:			
- complete construction of bridge over Losha River	--	--	$17,500
- construction of road to main village of zapovednik	--	--	$25,300
- reconstruction of 2 docks and shoreline reinforcement	--	--	$51,700
SUBTOTAL OF TECHNICAL COSTS			**$176,490**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- planning and equipping nature trails	--	--	$8,000
- publishing information booklets, advertising	--	$5,000/yr.	$15,000
- videocamera, VCR, TV for educational films	1 ea.	--	$2,000
SUBTOTAL OF EDUCATIONAL COSTS			**$25,000**

TOTAL COST OF DARVINSKY ZAPOVEDNIK PROJECT	**$201,490**

2.7. MORDOVSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- portable radio stations	10	$40	$400
- special clothes	47 sets	$100	$4,700
- binoculars	5	$400	$2,000
- pistols	5	$50	$250
- MBS-9 microscopes	5	$110	$650
- SKS carbines	18	$400	$7,200
- "Vikhr" boat motors	5	$450	$2,250
- motor saws "Druzhba"	2	$100	$200
- motor saws "Ural"	2	$130	$260
TRANSPORT:			
- "Buran" snowmobiles	7	$1,200	$8,400
- "Kazanka" motor boats	3	$800	$2,400
- UAZ-469 jeep	1	$5,000	$5,000
- UAZ-3303 trucks	2	$4,500	$9,000
- fire-fighting machine on a GAZ-66	1	$5,000	$5,000
- "Ural" motorcycles	5	$1,000	$5,000
FUEL AND SUPPLIES:			
- gasoline	35 tons	$110	$3,850
- motor oil	2 tons	$450	$900
- diesel fuel	20 tons	$150	$3,000
- diesel oil	2 tons	$250	$500
CONSTRUCTION:			
- construction of administrative office and lab.	--	--	$32,500
- fire-monitoring tower	1	$1,200	$1,200
SUBTOTAL OF TECHNICAL COSTS			**$ 93,380**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- renovating exposition in nature museum	--	--	$3,160
- planning and equipping nature trails	--	--	$5,000
- publishing information booklets, advertising	--	--	$11,000
SUBTOTAL OF EDUCATIONAL COSTS			**$19,160**

TOTAL COST OF MORDOVSKY ZAPOVEDNIK PROJECT	**$112,540**

2.8. KIVACH ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- portable radio stations	7	$40	$280
- special clothes	35 sets	$100	$3,500
- night vision devices	3	$400	$1,200
- cameras	2	$400	$800
- SKS carbines	10	$400	$4,000
- pistols	3	$170	$510
- spectroscan	1	$2,500	$2,500
- microscopes MBS-9	2	$110	$220
- "Vikhr" motor boats	10	$450	$4,500
- gasoline saws	3	$100	$300
TRANSPORT:			
- "Buran" snowmobiles	6	$1,200	$7,200
- "Ural" motorcycles	3	$1,000	$3,000
- VAZ-2121 "Niva"	1	$7,000	$7,000
- UAZ-31621 automobiles	2	$8,000	$16,000
- MTZ-82 tractor	1	$5,000	$5,000
FUEL AND SUPPLIES:			
- gasoline	35 tons	$110	$3,850
- motor oil	2 tons	$450	$900
- diesel fuel	20 tons	$150	$3,000
- diesel oil	2 tons	$250	$500
CONSTRUCTION:			
- construction of reserve energy supply line and transformer station	10 km.	--	$43,000
SUBTOTAL OF TECHNICAL COSTS			**$122,210**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- planning ecological education center	--	--	$3,000
- planning and equipping nature trails	--	--	$7,000
- publishing information booklets, advertising	--	$5,000/yr.	$15,000
- renovating nature museum exhibition	--	--	$7,000
- training specialists in foreign centers	2 pers.	$6,000	$12,000
- purchasing videocamera, VCR TV for educational films	1 ea.	--	$2,000
SUBTOTAL OF EDUCATIONAL AND TRAINING COSTS			**$46,000**

TOTAL COST OF KIVACH ZAPOVEDNIK PROJECT	**$168,210**

2.9. KOLOGRIVSKY LES ZAPOVEDNIK
PHASE 1: ONE YEAR; PHASE 2: TWO YEARS

PHASE 1: PLANNING COSTS	QUANTITY	COST/ITEM	TOTAL COST
PLANNING REQUIREMENTS:			
- salaries for survey team	3 pers.	$1,000	$3,000
- payment for consultants	2 pers.	$300	$600
- air travel-6 round trips to survey site	6 trips	$300	$1,800
- rental of transport	--	--	$1,000
- publishing and other expenses	--	--	$500
SUBTOTAL OF PHASE 1			**$6,900**

PHASE 2: CREATION COSTS	QUANTITY	COST/ITEM	TOTAL COST
REQUIREMENTS:			
- approximate cost of basic equipment and transport needs		--	$100,000
- approximate cost of office, housing, and stations construction		--	$100,000
- cost of rental of air transport		--	$20,000
SUBTOTAL OF PHASE 2			**$220,000**

TOTAL COST OF KOLOGRIVSKY LES ZAPOVEDNIK PROJECT	**$226,900**

2.10. POLISTOVYE ZAPOVEDNIK
18 MONTH IMPLEMENTATION PERIOD

PLANNING COSTS	QUANTITY	COST/ITEM	TOTAL COST
SALARIES:			
- project coordinator	1 pers.	$150/mo.	$2,700
- zoologists and botanists	2 pers.	$100 x 9 mos.	$1,800
part-time	2 pers.	$100 x 6 mos.	$1,200
TRAVEL EXPENSES:			
- train travel	5 pers	$10	$50
- local bus travel	5 pers.	$8	$40
- daily travel (90 days)	5 pers.	$2/day	$900
- Jeep rental (30 days)	1	$20/day	$600
- cross-country vehicle rental (20 days)	1	$5/day	$100
EQUIPMENT:			
- notebook computer and printer	1 ea.	--	$2,200
- "Nikon" camera	1	$500	$500
- expedition equipment	5 sets	$40	$200
OTHER EXPENSES:			
- preparation of slide film and booklet	--	--	$100
- office supplies	--	--	$100
- film	--	--	$80
- computer diskettes	--	--	$50
- overhead (13% of total)	--	--	$1,580
TOTAL COST OF POLISTOVYE ZAPOVEDNIK PROJECT			**$12,200**

2.11. ECOTOURISM IN OKSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- special clothes	30 sets	$100	$3,000
TRANSPORT:			
- UAZ-469 jeeps	2	$5,000	$10,000
- "Buran" snowmobiles	2	$1,200	$2,400
- VAZ-2121 "Niva"	1	$7,000	$7,000
- UAZ-459 minibus	1	$7,500	$7,500
FUEL AND SUPPLIES:			
- gasoline	105 tons	$110	$11,550
- motor oil	3 tons	$320	$960
- diesel fuel	30 tons	$130	$3,900
- diesel oil	2 tons	$250	$500
CONSTRUCTION:			
- telephone communication line (58 km.)	--	--	$83,400
- renovation of nature museum	--	--	$47,400
- renovation of guest houses at cordons	4	$6,250	$25,000
SUBTOTAL OF TECHNICAL COSTS			**$205,560**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- constructing facilities for visitors (center)	--	--	$30,000
- planning and equipping nature trails	--	--	$27,000
- publishing information booklets, advertising	--	$5,000/yr.	$15,000
- purchasing videocamera, VCR TV for educational films	1 ea.	--	$2,000
- purchasing horses for guests	4	$500	$2,000
SUBTOTAL OF EDUCATIONAL AND TRAINING COSTS			**$76,000**

TOTAL COST OF OKSKY ZAPOVEDNIK ECOTOURISM PROJECT	**$281,560**

2.12. BREEDING CENTERS AT OKSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- special clothes	66 sets	$100	$6,600
- SKS carbines	15	$400	$6,000
- MBS-9 microscope	2	$110	$220
- "Vikhr" boat motors	5	$450	$2,250
- "Neptune" boat motors	5	$500	$2,500
TRANSPORT:			
- "Buran" snowmobiles	3	$1,200	$3,600
- VAZ-2121 "Niva"	1	$7,000	$7,000
- UAZ-469 jeeps	2	$5,000	$10,000
- T-130 bulldozer	1	$15,000	$15,000
- minitractor with hanging equipment	1	$3,750	$3,750
FUEL AND SUPPLIES:			
- gasoline	105 tons	$110	$11,550
- motor oil	3 tons	$450	$1,350
- diesel fuel	30 tons	$150	$4,500
- diesel oil	2 tons	$250	$500
- forage for animals in breeding centers	475 tons/yr.	$12	$17,100
- veterinary supplies	--	$2,000/yr	$6,000
CONSTRUCTION:			
- major reconstruction of breeding center facilities	--	--	$10,000
- construction of road	15 km	--	$35,600
TOTAL COST OF OKSKY ZAPOVEDNIK BREEDING CENTER PROJECT			**$146,470**

2.13. DESMAN RESTORATION PROJECT

A. OKSKY ZAPOVEDNIK	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- radio stations	4	$400	$1,600
- rental of equipment for making ponds	--	--	$20,000
TRANSPORT:			
- UAZ 452B	1	$5,400	$5,400
- "Krym" boat	1	$680	$880
- boat motor	1	$450	$450
- rubber boat	1	$80	$80
FUEL AND SUPPLIES:			
- gasoline	3 tons/yr.	$100	$900
SALARIES:			
- project leader	1 pers.	$200/mo.x36mos.	$7,200
- project assistant	1 pers.	$100/mo.x36mos.	$3,600
SUBTOTAL OF OKSKY DESMAN RESTORATION PROJECT			**$40,110**

B. KHOPERSKY ZAPOVEDNIK	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- radio stations	4	$400	$1,600
- rental of equipment for making ponds	--	--	$20,000
TRANSPORT:			
- UAZ 452B	1	$5,400	$5,400
- "Krym" boat	1	$680	$880
- boat motor	1	$450	$450
- rubber boat	1	$80	$80
FUEL AND SUPPLIES:			
- gasoline	3 tons/yr.	$100	$900
SALARIES:			
- project leader	1 pers.	$200/mo.x36mos.	$7,200
- project assistant	1 pers.	$100/mo.x36mos.	$3,600
SUBTOTAL OF KHOPERSKY DESMAN RESTORATION PROJECT			**$40,110**

TOTAL OF DESMAN RESTORATION PROJECT IN 2 ZAPOVEDNIKS	**$80,220**

3. EASTERN EUROPEAN FOREST-STEPPE, STEPPE, AND CASPIAN SEMIDESERT BIOREGION

3.1. ASTRAKHANSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- special clothes	98 sets	$100	$9,800
- cameras	5	$400	$2,000
- copying machine	1	$600	$600
- tents	15	$100	$1,500
- sleeping bags	30	$40	$1,200
- "Vikr" boat motors	6	$450	$2,700
- SKS-2 mower	3	$4100	$12,300
TRANSPORT:			
- UAZ-469 jeeps	2	$5,000	$10,000
- VAZ-2121 "Niva"	1	$7,000	$7,000
- patrol boat KC-100D	1	$15,000	$15,000
- "Kazanka" motor boat	8	$800	$6,400
FUEL AND SUPPLIES:			
- gasoline	92 tons	$110	$10,120
- motor oil	2.5 tons	$450	$1,125
- diesel fuel	65 tons	$150	$9,750
- diesel oil	2.5 tons	$250	$625
CONSTRUCTION:			
- electricity line	25 km.	--	$35,700
SUBTOTAL OF TECHNICAL COSTS			**$128,770**

ECOLOGICAL TOURISM	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- reconstructing and equipping nature museum	--	--	$9,000
- creating and equipping nature trails	--	--	$12,000
- constructing guest house for 15 people	--	--	$23,000
- repairing tourist facilities and other measures	--	--	$30,000
- procuring video camera, VCR, TV for films	1 ea.	--	$2,000
- procuring slide projector	1	$500	$500
SUBTOTAL OF ECOTOURISM PROJECT COSTS			**$76,500**

TOTAL COST OF ASTRAKHANSKY ZAPOVEDNIK PROJECT **$205,270**

3.2. UTRISH ZAPOVEDNIK AND PROTECTED AREA

PHASE 1: TWO YEARS; PHASE 2: THREE YEARS

PHASE 1: REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
SALARIES:			
- project executants	3 pers.	$1,000/yr.	$6,000
- project consultants	2 pers.	$1,000/yr.	$4,000
TRAVEL EXPENSES:			
- air travel to site	8 trips	$250/trip	$2,000
- purchase of transport means and services	--	--	$30,000
EQUIPMENT AND CONSTRUCTION:			
- purchase of office equipment	--	--	$10,000
- construction of zapovednik office and facilities	--	--	$20,000
SUBTOTAL OF PHASE 1			**$72,000**

PHASE 2: REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
SALARIES:			
- full- and part-time staff in protected area	--	--	$30,000
EQUIPMENT AND CONSTRUCTION:			
- creation of office and facilities for reserve	--	--	$50,000
- equipment and transport means	--	--	$100,000
- publishing and education activities	--	--	$15,000
SUBTOTAL OF PHASE 2			**$195,000**
TOTAL COST OF UTRISH RESERVE PROJECT			**$267,000**

3.3. PRESERVATION AND RESTORATION OF THE GREEN WALL OF RUSSIA

PHASE 1: ONE YEAR IMPLEMENTATION PERIOD

PHASE 1: REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
OFFICE AND EQUIPMENT COSTS:			
- rental of office space	1 yr.	$4,000	$4,000
- procurement of equipment for information processing	--	--	$7,000
- other equipment, supplies	--	--	$2,000
- procurement of satellite and other pictures	--	--	$1,500
- procurement of maps	--	--	$450
- procurement of information from archives of various institutions	--	--	$2,000
- photoprocessing and equipment	--	--	$350
- office furniture	1 set	$150	$150
SALARIES:			
- project leader	1 pers.	$750/mo.	$9,000
- assistant coordinator	1 pers.	$400/mo.	$4,800
- researchers	4 pers.	$250/mo. ea.	$12,000
- computer programers	2 pers.	$225/mo. ea.	$5,400
- consultants	6 pers.	$2,000 ea.	$12,000
OTHER:			
- mail and telephone costs	--	--	$1,000
- travel costs	--	--	$4,000
- unforseen expenses	--	--	$5,000
TOTAL COST OF GREEN WALL PROJECT			**$70,650**

3.4. SAIGA ANTELOPE CONSERVATION PROJECT

PROJECT REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- organizing and carrying out expeditions	5	$20,000	$100,000
- organizing and equipping saiga protection team	--	--	$90,000
- procuring equipment and supplies	--	--	$60,000
- publishing information and creating films	--	--	$10,000
TOTAL COST OF SAIGA ANTELOPE CONSERVATION PROJECT			**$260,000**

3.5. GREAT BUSTARD CONSERVATION PROJECT

PROJECT REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EXPENSES:			
- equipment and supplies for expeditions	10 trips	$1,000	$10,000
- salaries for expedition groups	40 days/yr.	$1,000/yr.	$3,000
- compensation for technical assistants	40 days/yr.	$1,000/yr.	$3,000
- preparation for work (training, etc.)	1 time/yr.	$100/yr.	$300
- breeding center maintenance	--	$500/yr.	$1,500
- food supplies and medicine for animals	--	$1,000/yr.	$3,000
- inventory costs	--	$200/yr.	$600
- salaries for breeding center personnel	10 pers.	$2,000/pers/yr.	$60,000
- overhead costs	--	--	$10,000
TOTAL COST OF GREAT BUSTARD CONSERVATION PROJECT			**$91,400**

4. URAL MOUNTAINS BIOREGION

4.1. VISHERSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- stationary radio stations	2	$300	$600
- portable radio stations	10	$40	$400
- special clothes	45 sets	$100	$4,500
- night vision devices	5	$400	$2,000
- binoculars	7	$400	$2,800
- cameras	3	$400	$1,200
- boat motors	10	$450	$4,500
TRANSPORT:			
- "Buran" snowmobiles	7	$1,200	$8,400
- T-130 bulldozer	1	$15,000	$15,000
- "Kazanka" motor boats	5	$800	$4,000
- UAZ-469 jeeps	2	$5,000	$10,000
- UAZ-3303 trucks	2	$4,500	$9,000
- MTZ-82 tractor	1	$5,000	$5,000
FUEL AND SUPPLIES:			
- gasoline	30 tons	$120	$3,600
- motor oil	2 tons	$450	$900
- diesel fuel	25 tons	$150	$3,750
- diesel oil	2 tons	$250	$500
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	40hrs/yr	$220/hr	$26,400
CONSTRUCTION:			
- administrative-laboratory building with nature museum	--	--	$41,500
SUBTOTAL OF TECHNICAL COSTS			**$147,000**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- creating and equipping nature trails	--	--	$17,000
- creating exhibits at nature museum	--	--	$12,000
- publishing information booklets, advertising	--	--	$20,000
SUBTOTAL OF EDUCATIONAL COSTS			**$49,000**

TOTAL COST OF VISHERSKY ZAPOVEDNIK PROJECT	**$196,000**

4.2. PECHORO-ILYCHSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- special clothes	56 sets	$100	$5,600
- night vision devices	4	$400	$1,600
- cameras	6	$400	$2,400
- copying machine	1	$600	$600
- "Vikhr" boat motors	4	$450	$1,800
- table saw	1	$4,000	$4,000
TRANSPORT:			
- "Buran" snowmobiles	4	$1,200	$4,800
- T-130 bulldozer	1	$15,000	$15,000
- "Amur" patrol boat	1	$15,000	$15,000
- VAZ-2121 "Niva"	1	$7,000	$7,000
- UAZ-469 jeep	1	$5,000	$5,000
- UAZ-452	1	$4,500	$4,500
FUEL AND SUPPLIES:			
- gasoline	40 tons	$110	$4,400
- motor oil	2 tons	$450	$900
- diesel fuel	70 tons	$150	$10,500
- diesel oil	2.5 tons	$250	$625
- 100 kW diesel generator	1	$2,500	$2,500
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	40hrs/yr	$220/hr	$19,800
CONSTRUCTION:			
- administrative-laboratory complex	--	--	$45,300
- river crossing	--	--	$31,200
SUBTOTAL OF TECHNICAL COSTS			**$185,475**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- creating and equipping nature trails	--	--	$12,000
- publishing information booklets, advertising	--	--	$14,000
- training specialists in foreign centers	2 pers.	$5,000	$10,000
- purchasing VCR, TV, and videocamera for educational films	1 ea.	--	$2,000
SUBTOTAL EDUCATIONAL AND TRAINING COSTS			**$38,000**

TOTAL COST OF PECHORO-ILYCHSKY ZAPOVEDNIK PROJECT	**$223,475**

4.3. SHULGAN-TASH ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- "Lyon" radio stations	5	$200	$1,000
- special clothes	39 sets	$100	$3,900
- night vision devices	2	$400	$800
- binoculars	5	$400	$2,000
- cameras	2	$400	$800
- SKS carbines	15	$400	$6,000
- "Vikr" boat motors	5	$450	$2,250
- device for monitoring conditions of bees	1	$15,000	$15,000
TRANSPORT:			
- "Buran" snowmobile	4	$1,200	$4,800
- UAZ-469 jeeps	2	$5,000	$10,000
- "Kazanka" motor boats	2	$800	$1,600
- GAZ-53 truck	1	$4,000	$4,000
- MTZ-82 tractors	2	$5,000	$10,000
- "Ural" motorcycles	6	$1,000	$6,000
FUEL AND SUPPLIES:			
- gasoline	50 tons	$110	$5,500
- motor oil	1 ton	$450	$450
- diesel fuel	40 tons	$150	$6,000
- diesel oil	2 tons	$250	$500
- 100-150 kW diesel generator	1	$2,500	$2,500
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	14hrs/yr	$100/hr	$4,200
CONSTRUCTION:			
- administrative-laboratory building and nature museum	--	--	$80,000
- key roads and power lines	--	--	$50,000
SUBTOTAL OF TECHNICAL COSTS			**$220,250**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- creating and equipping nature trails	--	--	$17,000
- training specialists in foreign centers	3 pers.	$5,000	$15,000
- publishing information booklets, advertising	--	$5,000/yr.	$15,000
SUBTOTAL OF EDUCATIONAL AND TRAINING COSTS			**$47,000**

TOTAL COST OF SHULGAN-TASH ZAPOVEDNIK PROJECT	**$267,250**

4.4. BASHKIRSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- radio stations	6	$200	$1,200
- special clothes	42 sets	$100	$4,200
- night vision devices	10	$400	$4,000
- SKS carbines	15	$400	$6,000
- cameras	5	$400	$2,000
- "Ural" gas saw	16	$100	$1,600
TRANSPORT:			
- "Buran" snowmobile	4	$1,200	$4,800
- UAZ-469 jeeps	2	$5,000	$10,000
- VAZ-2121 "Niva"	1	$7,000	$7,000
- tank car	1	$3,000	$3,000
- GAZ-66	1	$2,500	$2,500
- bus	1	$14,000	$14,000
- ZIL 157 truck	1	$4,500	$4,500
- "Ural" motorcycles	4	$1,000	$4,000
- "Izh" motorcycles	6	$700	$4,200
- bulldozer	1	$15,000	$15,000
- tractor DT-75	1	$8,000	$8,000
- tractor MTZ-82	1	$5,000	$5,000
- tractor T-25	1	$3,000	$3,000
FUEL AND SUPPLIES:			
- gasoline	30 tons	$120	$3,600
- motor oil	1 ton	$450	$450
- diesel fuel	30 tons	$150	$4,500
- diesel oil	1 ton	$250	$250
- motor pump DT-75	3	$250	$750
- 100 kW diesel generator	1	$1,500	$1,500
- 5-10 kW diesel generators	3	$300	$900
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	20hrs/yr	$200/hr	$12,000
CONSTRUCTION:			
- administrative-laboratory complex	--	--	$51,000
- construction of gravel roads	25 km.	--	$100,000
SUBTOTAL OF TECHNICAL COSTS			**$281,900**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- creating and equipping nature trails	--	--	$25,000
- publishing information booklets, advertising	--	$5,000/yr.	$15,000
SUBTOTAL OF EDUCATIONAL COSTS			**$35,000**

TOTAL COST OF BASHKIRSKY ZAPOVEDNIK PROJECT	**$316,900**

4.5. DENEZHKIN KAMEN ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- Angar radio stations	4	$300	$1,200
- portable radio stations	5	$40	$200
- special clothes	16 sets	$100	$1,600
- cameras	2	$400	$800
- binoculars	5	$400	$2,000
- SKS carbines	10	$400	$4,000
- tents	10	$100	$1,000
- gas saws	4	$100	$400
TRANSPORT:			
- "Buran" snowmobile	5	$1,200	$6,000
- VAZ-2121 "Niva"	1	$7,000	$7,000
- UAZ-469 jeep	1	$5,000	$5,000
- "Ural" truck	1	$5,000	$5,000
- "Ural" motorcycles	5	$1,000	$5,000
FUEL AND SUPPLIES:			
- gasoline	30 tons	$120	$3,600
- motor oil	1 ton	$450	$450
- diesel fuel	30 tons	$150	$4,500
- diesel oil	1 ton	$250	$250
- motor pumps PMP-L1	5	$70	$350
- 4-8 kW diesel generator	4	$1,560	$6,240
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	50hrs/yr	$200/hr	$30,000
CONSTRUCTION:			
- administrative-laboratory complex and garage	--	--	$68,000
SUBTOTAL OF TECHNICAL COSTS			**$155,540**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- creating and equipping nature trails	--	--	$25,000
- publishing information booklets, advertising	--	$5,000/yr.	$15,000
SUBTOTAL OF EDUCATIONAL COSTS			**$35,000**

TOTAL COST OF DENEZHKIN KAMEN ZAPOVEDNIK PROJECT **$190,540**

5. GREAT CAUCASUS BIOREGION

5.1. TEBERDINSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- special clothes	69 sets	$100	$6,900
- night vision devices	5	$400	$2,000
- copying machine	1	$600	$600
- gas saws	2	$100	$200
TRANSPORT:			
- VAZ-2121 "Niva"	1	$7,000	$7,000
- UAZ-469 jeep	1	$5,000	$5,000
- UAZ-3303 truck	1	$4,500	$4,500
- "Ural" motorcycles	5	$1,000	$5,000
- minitractor with hanging equipment	1	$3,750	$3,750
FUEL AND SUPPLIES:			
- gasoline	100 tons	$135	$13,500
- motor oil	2.5 tons	$350	$875
- diesel fuel	100 tons	$130	$13,000
- diesel oil	3.5 tons	$270	$945
- coal	1.5 tons	$200	$300
- 50 kW diesel generator	1	$2,500	$2,500
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	10hrs/yr	$296/hr	$8,880
SUBTOTAL OF TECHNICAL COSTS			**$77,900**

ECOLOGICAL TOURISM	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- creating and equipping nature trails	--	--	$15,000
- publishing information booklets, advertising	--	$4,000/yr.	$12,000
- constructing nature museum and exhibitions	--	--	$105,000
- creating tourist facilities	--	--	$35,000
- purchasing VCR, TV, and camera for films	1 ea.	--	$2,000
SUBTOTAL OF ECOTOURISM COSTS			**$169,000**

TOTAL COST OF TEBERDINSKY ZAPOVEDNIK PROJECT	**$246,900**

5.2. KAVKAZSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- special clothes	114 sets	$100	$11,400
- night vision devices	20	$400	$8,000
TRANSPORT:			
- UAZ-469 jeeps	3	$5,000	$15,000
- "Ural" motorcycles	7	$1,000	$7,000
- T-130 bulldozers	2	$15,000	$30,000
- delta planes	2	$3,500	$7,000
FUEL AND SUPPLIES:			
- gasoline	70 tons	$135	$9,450
- motor oil	2 tons	$350	$700
- diesel fuel	45 tons	$130	$5,850
- diesel oil	1 ton	$270	$270
- 10-30 kW diesel generators	5	$1,000	$5,000
- feed for 87 horses	100 tons	$60	$6,000
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	50hrs/yr	$296/hr	$44,400
CONSTRUCTION:			
- restoration of stations	2	$20,000	$40,000
SUBTOTAL OF TECHNICAL COSTS			**$193,020**

ECOLOGICAL TOURISM	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- creating and equipping nature trails	--	--	$22,000
- publishing information booklets, advertising	--	$5,000/yr.	$15,000
- reconstructing nature museum and exhibitions	--	--	$26,000
- creating tourist facilities	--	--	$15,000
- purchasing VCR, TV, and camera for films	1 ea.	--	$2,000
- training specialists in foreign centers	2 pers.	$6,000	$12,000
SUBTOTAL OF ECOTOURISM AND TRAINING COSTS			**$92,000**

TOTAL COST OF KAVKAZSKY ZAPOVEDNIK PROJECT	**$285,020**

6. WESTERN SIBERIAN FOREST BIOREGION

6.1. SIBERIAN CRANE ECOSYSTEM CONSERVATION

PROJECT REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
CREATION OF ZAPOVEDNIK:			
- salaries for survey team	2 pers.	$100/mo.	$2,400
- travel to site and back for 2 people	4 trips	$100	$400
EXPERIMENTAL RELEASE OF CRANES:			
- salaries for scientists	5 pers.	$100/mo.x4mos.	$2,000
- travel to site and back	5 pers.	$200	$1,000
- transportation of cranes and equipment	--	--	$700
- helicopter rental	20 hrs.	$350/hr.	$7,000
- food, fuel, wood, cages, special clothes, tents	--	--	$2,000
RESEARCH OF CRANE MIGRATION:			
- purchase and service charge for satellite radio sensors	2	$3,000	$6,000
OTHER EXPENSES:			
- preparation of video films	--	--	$200
- supplies	--	--	$400
- organization of international coordination	--	--	$300
- unforseen expenses	--	--	$2,000
SUBTOTAL FOR ONE YEAR OF WORK			**$24,400 X 3 YRS.**
TOTAL COST OF SIBERIAN CRANE CONSERVATION PROJECT			**$73,200**

8. CENTRAL SIBERIAN BIOREGION

8.1. TSENTRALNO-SIBIRSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- stationary radio stations	5	$300	$1,500
- portable radio stations	15	$40	$600
- special clothes	41 sets	$100	$4,100
- night vision devices	5	$400	$2,000
- SKS carbines	10	$400	$4,000
- tents	4	$100	$400
- sleeping bags	5	$100	$500
- rubber boats	4	$65	$260
- boat engines	6	$450	$2,700
TRANSPORT:			
- "Buran" snowmobile	6	$1,200	$7,200
- patrol boat KC 100D	1	$15,000	$15,000
- PAZ/KAVZ bus	1	$9,000	$9,000
- Gepard patrol boat	1	$6,600	$6,600
- "Ural" motorcycles	5	$1,000	$5,000
- motor boats	3	$800	$2,400
- T-130 bulldozer	1	$15,000	$15,000
- MTZ-82 tractor	1	$5,000	$5,000
FUEL AND SUPPLIES:			
- gasoline	53 tons	$130	$6,890
- motor oil	2 tons	$450	$900
- diesel fuel	100 tons	$150	$15,000
- diesel oil	2 tons	$250	$500
- diesel generators	5	$1,560	$7,800
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	100hrs/yr	$250/hr	$75,000
SUBTOTAL OF TECHNICAL COSTS			**$190,300**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- creating and equipping nature trails	--	--	$18,000
- designing nature museum exhibition	--	--	$9,100
- publishing information booklets, advertising	--	$5,000/yr.	$15,000
- purchasing VCR, TV, and videocamera for films	1 ea.	--	$2,000
- building guest house for 15 people	--	--	$40,000
SUBTOTAL OF EDUCATIONAL COSTS			**$84,100**

TOTAL COST OF TSENTRALNO-SIBIRSKY ZAPOVEDNIK PROJECT **$274,400**

8.2. PUTORANSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- typewriters	2	$200	$400
- copying machine	1	$600	$600
- special clothes	19 sets	$100	$1,900
- SKS carbines	5	$400	$2,000
TRANSPORT:			
- "Buran" snowmobiles	4	$1,200	$4,800
- UAZ-3303 truck	1	$4,500	$4,500
- VAZ-2121 "Niva"	1	$7,000	$7,000
- motor boats	10	$800	$8,000
- patrol boats	2	$12,000	$24,000
FUEL AND SUPPLIES:			
- gasoline	30 tons	$130	$3,900
- motor oil	1 ton	$450	$450
- diesel fuel	20 tons	$150	$3,000
- diesel oil	1 ton	$250	$250
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	75hrs/yr	$250/hr	$56,250
CONSTRUCTION:			
- landing pad and strip	--	--	$50,000
SUBTOTAL OF TECHNICAL COSTS			**$170,000**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- creating and equipping nature trails	--	--	$27,000
- publishing information booklets, advertising	--	$5,000/yr.	$15,000
- purchasing VCR, TV, and videocamera for films	1 ea.	--	$2,000
- building guest house for 10 people	--	--	$40,000
SUBTOTAL OF EDUCATIONAL COSTS			**$84,000**

TOTAL COST OF PUTORANSKY ZAPOVEDNIK PROJECT	**$254,000**

9. ALTAI-SAYANSKY BIOREGION

9.1. ALTAISKY ZAPOVEDNIK

BEST AVAILABLE COPY

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- Angar radio stations	5	$300	$1,500
- portable radio stations	7	$40	$280
- radio telephone	1	$1,000	$1,000
- copying machine	1	$600	$600
- special clothes	70 sets	$100	$7,000
- SKS carbines	20	$400	$8,000
- tents (2 person)	10	$200	$2,000
- "Vikhr" boat motors	20	$450	$9,000
- night vision devices	4	$400	$1,600
TRANSPORT:			
- UAZ-469 jeeps	2	$5,000	$10,000
- "Ural" all-terrain vehicle	1	$4,000	$4,000
- GAZ-66	1	$5,000	$5,000
- UAZ-3303 truck	1	$4,500	$4,500
- 15 t barge	1	$18,500	$18,500
- "Kazanka" motor boats	5	$5,000	$5,000
- DT-75 tractor	1	$4,500	$4,500
- T-130 bulldozer	1	$15,000	$15,000
- MTZ-82 tractor & trailer	1	$5,000	$5,000
FUEL AND SUPPLIES:			
- gasoline	65 tons	$120	$7,800
- motor oil	2 tons	$450	$900
- diesel fuel	30 tons	$150	$4,500
- diesel oil	2 tons	$250	$500
- 100-150 kW diesel generator	1	$3,500	$3,500
- 15-20 kW generator	1	$850	$850
- 5-10 kW generators	5	$500	$2,500
RENTAL OF AIRCRAFT:			
- air transport rental	50hrs/yr	$250/hr	$37,500
CONSTRUCTION:			
- reconstruction of pier	--	--	$31,600
- administrative-laboratory complex	--	--	$120,000
SUBTOTAL OF TECHNICAL COSTS			**$315,080**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- creating and equipping nature trails	--	--	$25,000
- publishing information booklets, advertising	--	$5,000/yr.	$15,000
- training specialists in foreign centers	2 pers.	$6,000	$12,000
- procuring VCR, TV, and video camera for films	1 ea.	--	$2,000
SUBTOTAL OF EDUCATIONAL AND TRAINING COSTS			**$54,000**

TOTAL COST OF ALTAISKY ZAPOVEDNIK PROJECT **$369,080**

9.2. SAYANO-SHUSHENSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- monitoring station	1	$15,000	$15,000
- special clothes	56 sets	$100	$5,600
- night vision devices	6	$400	$2,400
- copying device	1	$600	$600
- cameras	5	$400	$2,000
- "Vikr" boat motors	5	$450	$2,250
- motor saws	6	$100	$600
TRANSPORT:			
- UAZ-469 jeeps	2	$5,000	$10,000
- "Ural" motorcycles	5	$1,000	$5,000
- "Progress" motor boats	10	$1,000	$10,000
- bulldozer	1	$15,000	$15,000
FUEL AND SUPPLIES:			
- gasoline	45 tons	$120	$5,400
- motor oil	2 tons	$450	$900
- diesel fuel	30 tons	$150	$4,500
- diesel oil	1 ton	$250	$250
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	75hrs/yr	$250/hr	$56,250
SUBTOTAL OF TECHNICAL COSTS			**$138,700**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- creating nature trails and mini-center	--	--	$22,000
- publishing information booklets, advertising	--	$5,000/yr.	$15,000
- producing movies and films	--	--	$32,000
- procuring VCR, TV, and video camera for films	1 ea.	--	$2,000
SUBTOTAL OF EDUCATIONAL COSTS			**$71,000**

TOTAL COST OF SAYANO-SHUSHENSKY ZAPOVEDNIK PROJECT **$209,700**

9.3. CHAZY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- stationary radio stations	2	$300	$600
- portable radio stations	4	$40	$160
- special clothes	20 sets	$100	$2,000
- night vision devices	2	$400	$800
- cameras	2	$400	$800
- SKS carbines	5	$400	$2,000
TRANSPORT:			
- UAZ-469 jeeps	2	$5,000	$10,000
- VAZ-2121 "Niva"	1	$7,000	$7,000
- UAZ-3303 truck	1	$4,500	$4,500
- "Ural" diesel truck	1	$4,500	$4,500
- "Ural" motorcycles	3	$1,000	$3,000
- MTZ-82 tractor	1	$5,000	$5,000
- DT-75 tractors	2	$7,000	$14,000
- bulldozer	1	$15,000	$15,000
FUEL AND SUPPLIES:			
- gasoline	30 tons	$130	$3,900
- motor oil	1 ton	$450	$450
- diesel fuel	25 tons	$150	$3,750
- diesel oil	1 ton	$250	$250
- 8 kW diesel generator	2	$1,650	$3,300
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	20hrs/yr	$250/hr	$15,000
CONSTRUCTION:			
- cordons (stations)	2	$6,500	$13,000
- administrative-laboratory building with garage	--	--	$41,300
SUBTOTAL OF TECHNICAL COSTS			**$153,260**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- creating and equipping nature trails	--	--	$12,000
- publishing information booklets, advertising	--	$5,000/yr.	$15,000
- creating exhibit for nature museum	--	--	$10,000
SUBTOTAL OF EDUCATIONAL COSTS			**$37,000**

TOTAL COST OF CHAZY ZAPOVEDNIK PROJECT	**$190,260**

9.4. STOLBY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- portable radio stations	10	$40	$400
- special clothes	34 sets	$100	$3,400
- night vision devices	2	$400	$800
- SKS carbines	5	$400	$2,000
TRANSPORT:			
- "Buran" snowmobile	4	$1,200	$4,800
- "Ural" motorcycles	4	$1,000	$4,000
- UAZ-469 jeeps	2	$5,000	$10,000
- VAZ-2121 "Niva"	1	$7,000	$7,000
FUEL AND SUPPLIES:			
- gasoline	50 tons	$120	$6,000
- motor oil	1.5 tons	$450	$675
- diesel fuel	15 tons	$150	$2,250
- diesel oil	1 ton	$250	$250
- 4-8 kW diesel generators	4	$1,560	$6,240
CONSTRUCTION:			
- cordons (stations)	3	$5,000	$15,000
- reconstruction of "Narym" cordon	1	$10,000	$10,000
- reconstruction of enclosures	--	--	$18,000
SUBTOTAL OF TECHNICAL COSTS			**$93,765**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- creating ecological education mini-center	--	--	$26,000
- creating and equipping nature trails	--	--	$14,000
- creating exhibit for nature museum	--	--	$8,500
- constructing nature museum	--	--	$54,000
- training of specialists in foreign centers	2 pers.	$5,000	$10,000
SUBTOTAL OF EDUCATIONAL COSTS			**$112,500**

TOTAL COST OF STOLBY ZAPOVEDNIK PROJECT	**$206,265**

9.5.A. KATUNSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- "Angar" radio stations	5	$300	$1,500
- radio telephone	1	$1,000	$1,000
- special clothes	36 sets	$100	$3,600
- night vision devices	4	$400	$1,600
- binoculars	5	$200	$1,000
- cameras	4	$400	$1,600
- SKS carbines	10	$400	$4,000
- "Vikhr" boat motors	15	$450	$6,750
- motor saws	6	$100	$600
TRANSPORT:			
- UAZ-469 jeeps	2	$5,000	$10,000
- VAZ-2121 "Niva"	1	$7,000	$7,000
- UAZ-3303 truck	1	$4,500	$4,500
- "Kazanka" motor boats	10	$1,000	$10,000
- rubber boats	10	$200	$2,000
- "Ural" motorcycles	3	$1,000	$3,000
- DT-75 tractors	2	$5,000	$10,000
- bulldozer	1	$15,000	$15,000
FUEL AND SUPPLIES:			
- gasoline	30 tons	$120	$3,600
- motor oil	2 tons	$350	$700
- diesel fuel	15 tons	$150	$2,250
- diesel oil	1 ton	$250	$250
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	22hrs/yr	$300/hr	$19,800
CONSTRUCTION:			
- administrative-laboratory building with garage	--	--	$43,200
TOTAL COST OF KATUNSKY ZAPOVEDNIK PROJECT			**$155,900**

9.5.B. KATUNSKY ZAPOVEDNIK EXPANSION PROJECT

PHASE 1: PLANNING	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- compensation for planning specialists	2 pers.	$750	$1,500
- payment for consultant	1 pers.	$500	$500
- travel expenses	5 trips	$400	$2,000
- transport rental and expenses	2 trips	$500	$1,000
- publishing and other expenses	--	--	$500
SUBTOTAL OF PLANNING COSTS			**$5,300**

PHASE 2: CREATION	QUANTITY	COST/ITEM	TOTAL COST
REQUIREMENTS:			
- construction of office, housing, and cordons	--	--	$150,000
- purchasing transportation and equipment	--	--	$100,000
SUBTOTAL OF CREATION COSTS			**$250,000**

TOTAL COST OF KATUNSKY ZAPOVEDNIK EXPANSION PROJECT	**$255,300**

10. BAIKAL REGION

10.1. BARGUZINSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- stationary radio stations	4	$300	$1,200
- portable radio stations	10	$40	$400
- radio telephone	1	$2,000	$2,000
- special clothes	55 sets	$100	$5,500
- binoculars	5	$400	$2,000
- SKS carbines	15	$400	$6,000
- "Vikr" boat motors	4	$450	$1,800
TRANSPORT:			
- "Buran" snowmobile	4	$1,200	$4,800
- "Progress" motor boats	5	$1,000	$5,000
- "Amur" patrol boat	1	$12,500	$12,500
- deltaplanes	2	$3,500	$7,000
- UAZ-469 jeep	1	$5,000	$5,000
- bulldozer	1	$15,000	$15,000
FUEL AND SUPPLIES:			
- gasoline	65 tons	$130	$8,450
- motor oil	2 tons	$450	$900
- diesel fuel	300 tons	$150	$45,000
- diesel oil	14 tons	$250	$3,500
- 100 kW diesel generators	2	$3,000	$6,000
- 200 kW diesel generators	2	$4,000	$8,000
- ship diesel ZD-6	-	--	$4,000
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	80hrs/yr	$300/hr	$72,000
SUBTOTAL OF TECHNICAL COSTS			**$218,000**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- creating ecoloical education mini-center	--	--	$20,000
- creating and equipping nature trails	--	--	$16,000
- publishing information booklets, advertising	--	$5,000/yr.	$15,000
- purchasing VCR, TV, and videocamera for films	1 ea.	--	$2,000
SUBTOTAL OF EDUCATIONAL COSTS			**$53,000**

TOTAL COST OF BARGUZINSKY ZAPOVEDNIK PROJECT **$271,000**

10.2. BAIKALO-LENSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- stationary radio stations	2	$300	$600
- portable radio stations	10	$40	$400
- special clothes	49 sets	$100	$4,900
- SKS carbines	12	$400	$4,800
- night vision devices	5	$400	$2,000
- binoculars	5	$300	$1,500
- "Vikhr" boat motors	5	$450	$2,250
TRANSPORT:			
- UAZ-469 jeeps	2	$5,000	$10,000
- VAZ-2121 "Niva"	1	$7,000	$7,000
- UAZ-3303 truck	1	$3,000	$3,000
- Yaroslavets patrol boat	1	$40,000	$40,000
- minibus	1	$8,000	$8,000
- "Progress-4M" boats	5	$1,000	$5,000
- "Buran" snowmobiles	4	$1,200	$4,800
FUEL AND SUPPLIES			
- gasoline	47 tons	$139	$6,110
- motor oil	1.5 tons	$450	$675
- diesel fuel	60 tons	$150	$9,000
- diesel oil	3 tons	$250	$750
- diesel generator	1	$2,000	$2,000
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	75hrs/yr	$300	$67,500
CONSTRUCTION:			
- administrative-lab. complex	--	--	$100,000
SUBTOTAL OF TECHNICAL COSTS			**$283,235**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- creating ecological education center	--	--	$28,000
- creating and equipping nature trails	--	--	$12,000
- publishing information booklets, advertising	--	$5,000/yr.	$15,000
SUBTOTAL OF EDUCATIONAL COSTS			**$55,000**

TOTAL COST OF BAIKALO-LENSKY ZAPOVEDNIK PROJECT **$338,235**

10.3. BAIKALSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- stationary radio stations	2	$300	$600
- portable radio stations	10	$40	$400
- radio telephone	1	$2,000	$2,000
- special clothes	60 sets	$100	$6,000
- night vision devices	5	$400	$2,000
- binoculars	4	$250	$1,000
- SKS carbines	20	$400	$8,000
- cameras	3	$400	$1,200
- mobile hydrochemical laboratory	1	$4,700	$4,700
- sawmill	1	$4,000	$4,000
TRANSPORT:			
- "Buran" snowmobiles	2	$1,200	$2,400
- deltaplanes	2	$3,500	$7,000
- UAZ-469 jeeps	2	$5,000	$10,000
- VAZ-2121 "Niva"	1	$7,000	$7,000
- UAZ-3303 truck	1	$4,500	$4,500
- PAZ bus	1	$8,000	$8,000
- motorcycles	3	$1,200	$3,600
- bulldozer	1	$15,000	$15,000
FUEL AND SUPPLIES:			
- gasoline	56 tons	$130	$7,280
- motor oil	2 tons	$450	$900
- diesel fuel	30 tons	$150	$4,500
- diesel oil	2 tons	$250	$500
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	40hrs/yr	$300/hr	$36,000
CONSTRUCTION:			
- creating a scientific center	--	--	$15,000
SUBTOTAL OF TECHNICAL COSTS			**$154,530**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- creating and equipping nature trails	--	--	$12,000
- renovating nature museum and creating mini-shop	--	--	$10,000
- publishing information booklets, advertising	--	$5,000/yr.	$15,000
- training specialists in foreign centers	2 pers.	$5,000	$10,000
SUBTOTAL OF EDUCATIONAL COSTS			**$47,000**

TOTAL COST OF BAIKALSKY ZAPOVEDNIK PROJECT	**$207,530**

11. ZABAIKAL BIOREGION

11.1. DAURSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- stationary radio stations	6	$300	$1,800
- portable radio stations	10	$40	$400
- special clothes	31 sets	$100	$3,100
- night vision devices	4	$400	$1,600
- cameras	3	$400	$1,200
- SKS carbines	15	$400	$6,000
- copying machine	1	$600	$600
- boat motors	3	$300	$900
- lab analysis equip. LAV-3	1	$4,000	$4,000
- gas saws	3	$100	$300
TRANSPORT:			
- UAZ-469 jeeps	2	$5,000	$10,000
- UAZ-3303 truck	1	$4,500	$4,500
- GAZ-66	1	$4,000	$4,000
- "Ural" motorcycles	7	$1,000	$7,000
- fire tank car	1	$3,000	$3,000
- VAZ-2121 "Niva"	1	$7,000	$7,000
- "Buran" snowmobiles	3	$1,200	$3,600
- bus	1	$12,000	$12,000
- minitractor with hanging equipment	1	$3,750	$3,750
- motor deltaplane	1	$12,000	$12,000
FUEL AND SUPPLIES:			
- gasoline	20 tons	$130	$2,600
- motor oil	2 tons	$450	$900
- diesel fuel	20 tons	$150	$3,000
- diesel oil	2 tons	$250	$500
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	15hrs/yr	$250/hr	$11,250
CONSTRUCTION:			
- cordons (stations)	3	$6,530	$19,590
- communications/power lines	--	--	$16,000
- administrative-laboratory complex	--	--	$45,000
TOTAL COST OF DAURSKY ZAPOVEDNIK PROJECT			**$188,540**

11.2. DAURSKY ZAPOVEDNIK ECOTOURISM PROJECT

PROJECT REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- computer with modem	1	$2,000	$2,000
- facsimile	1	$600	$600
- telex	1	$500	$500
- radio station	1	$1,500	$1,500
- VCR, TV, video camera	1 ea.	--	$2,000
TRANSPORT:			
- bus for transporting visitors to airport	1	$17,000	$17,000
- minibuses	2	$7,000	$14,000
- motor boats	2	$1,200	$2,400
- deltaplane	1	$2,100	$2,100
CONSTRUCTION:			
- guest house and facilities	--	--	$75,000
- design of gardens, minizoo, lawns, etc.	--	--	$10,000
- set up and equipment of seasonal camps	2	$15,000	$30,000
- reconstruction of facilities for staff	--	--	$24,000
SUBTOTAL OF TECHNICAL COSTS			**$180,100**

ECOLOGICAL TOURISM	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- creating and equipping nature trails, etc.	--	--	$3,600
- training personnel in foreign centers	2	$5,500	$11,000
- publishing information booklets, advertising	--	$5,000/yr.	$15,000
- salaries for executants of project	3 pers.	$1,000	$9,000
SUBTOTAL OF EDUCATIONAL COSTS			**$38,600**

TOTAL COST OF DAURSKY ZAPOVEDNIK ECOTOURISM PROJECT	**$218,700**

11.3. PRZEWALSKI'S HORSE RESTORATION PROJECT

FIVE YEAR IMPLEMENTATION PERIOD

PROJECT REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- constructing open cages	--	--	$5,000
- animal maintenance (fodder, veterinary supplies, etc.)	--	$500/yr.	$2,500
- purchasing horses from breeding centers and zoos	--	--	$15,000
- transporting horses to Dauria	--	--	$10,000
- constructing large fenced-in pens	--	--	$5,000
- monitoring equipment	--	--	$5,000
- medical supplies for calming horses, veterinary remedies	--	--	$2,000
- expeditions of experts	--	$3000/yr.	$15,000
- international coordination on forming groups	--	--	$5,000
- monitoring groups, air survey of area	--	$2500/yr.x2yrs.	$5,000
- salaries for project executants	3	$1,000/yr.	$15,000
- overhead expenses	--	$1,000/yr.	$5,000
- $5000			
- unexpected expenses	--	$1,500/yr.	$7,500
TOTAL COST OF PRZEWALSKI'S HORSE RESTORATION PROJECT			**$102,000**

13. AMUR-SAKHALIN BIOREGION

13.1. SIKHOTE-ALINSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- Angar radio stations	5	$300	$1,500
- special clothes	62 sets	$100	$6,200
- night vision devices	6	$400	$2,400
- SKS carbines	10	$400	$4,000
- motor saws	5	$100	$500
TRANSPORT:			
- UAZ-469 jeeps	2	$5,000	$10,000
- VAZ-2121 "Niva"	1	$7,000	$7,000
- "Ural" truck	1	$3,000	$3,000
- GAZ-66 truck	1	$2,000	$2,000
- "Ural" motorcycles	5	$1,000	$5,000
- tank truck	1	$3,000	$3,000
- MTZ-82 tractor	1	$5,000	$5,000
- bulldozer	1	$15,000	$15,000
- "Gepard" patrol boat	1	$14,000	$14,000
FUEL AND SUPPLIES:			
- gasoline	135 tons	$130	$17,550
- motor oil	10 tons	$450	$4,500
- diesel fuel	53 tons	$150	$7,950
- diesel oil	5 tons	$250	$1,250
- 5-10 kW diesel generators	3	$2,000	$6,000
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	20hrs/yr	$200/hr	$12,000
CONSTRUCTION:			
- cordons (stations)	5	$10,000	$50,000
SUBTOTAL OF TECHNICAL COSTS			**$180,800**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- creating exhibitions in nature museum	--	--	$12,000
- creating and equipping nature trails	--	--	$9,000
- publishing information booklets, advertising	--	$5,000/yr.	$15,000
- training specialists in foreign centers	2 pers.	$5,000	$10,000
- completing construction of informational and education center	--	--	$24,000
SUBTOTAL OF EDUCATIONAL COSTS			**$70,000**

TOTAL COST OF SIKHOTE-ALINSKY ZAPOVEDNIK PROJECT **$250,800**

13.2. LAZOVSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- special clothes	36 sets	$100	$3,600
- night vision devices	4	$400	$1,600
- motor saws	3	$100	$300
TRANSPORT:			
- UAZ-469 jeeps	2	$5,000	$10,000
- VAZ-2121 "Niva"	1	$7,000	$7,000
- UAZ-3303 truck	1	$4,500	$4,500
- "Buran" snowmobiles	6	$1,200	$7,200
- "Ural" motorcycles	10	$1,000	$10,000
FUEL AND SUPPLIES:			
- gasoline	20 tons	$130	$2,600
- motor oil	1 ton	$450	$450
- diesel fuel	20 tons	$150	$3,000
- diesel oil	1 ton	$250	$250
- 4-8 kW diesel generators	3	$1,560	$4,680
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	15hrs/yr	$200/hr	$9,000
CONSTRUCTION:			
- reconstruction of main laboratory complex	--	--	$26,400
SUBTOTAL OF TECHNICAL COSTS			**$93,530**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- training specialists in foreign centers	5 pers.	$5,000	$25,000
- renovating nature museum and educational center	--	--	$4,000
- creating and equipping nature trails	--	--	$20,000
- publishing information booklets, advertising	--	$5,000/yr.	$15,000
SUBTOTAL OF EDUCATIONAL COSTS			**$64,000**

TOTAL COST OF LAZOVSKY ZAPOVEDNIK PROJECT	**$157,530**

13.3. SHANTAR ISLANDS ZAPOVEDNIK

PHASE 1: ONE YEAR; PHASE 2: THREE YEARS

PHASE 1: PLANNING	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- compensation for planning specialists	2 pers.	$1,000	$2,000
- travel expenses	5 trips	$400	$2,000
- transport rental and expenses	4 trips	$500	$2,000
- publishing and other expenses	--	--	$1,00
SUBTOTAL OF PLANNING COSTS			**$7,000**

PHASE 2: CREATION	QUANTITY	COST/ITEM	TOTAL COST
REQUIREMENTS:			
- construction of office, housing, and cordons	--	--	$150,000
- purchasing transportation and equipment	--	--	$100,000
- rental of air transport	--	--	$50,000
SUBTOTAL OF CREATION COSTS			**$300,000**

TOTAL COST OF SHANTAR ISLANDS ZAPOVEDNIK PROJECT	**$307,000**

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13.4. KHINGANSKY ZAPOVEDNIK ECOTOURISM PROJECT

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- special clothes	46 sets	$100	$4,600
- night vision devices	4	$400	$1,600
- cameras	3	$400	$1,200
- TV, VCR, video camera	1 ea.	--	$2,000
- copying machine	1	$600	$600
- SKS carbines	5	$400	$2,000
- tents	15	$100	$1,500
- sleeping bags	30	$50	$1,500
- inflatable boats	10	$65	$650
- motor saws	3	$100	$300
TRANSPORT:			
- UAZ-469 jeep	1	$5,000	$5,000
- VAZ-2121 "Niva"	1	$7,000	$7,000
- GAZ-66 patrol boat	1	$7,000	$7,000
- "Ural" motorcycles	3	$1,000	$3,000
- "Buran" snowmobiles	5	$1,200	$6,000
- motor boats	5	$1,000	$5,000
- MTZ-82 tractor	1	$5,000	$5,000
- horses	10	$1,000	$10,000
FUEL AND SUPPLIES:			
- gasoline	24 tons	$130	$3,120
- motor oil	1 ton	$450	$450
- diesel fuel	12 tons	$120	$1,440
- diesel oil	1 ton	$250	$250
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	35hrs/yr	$270/hr	$28,350
CONSTRUCTION:			
- telephone line to central complex	--	--	$24,600
- guest house for 20	--	--	$50,000
SUBTOTAL OF TECHNICAL COSTS			**$175,110**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- creating and equipping nature trails	--	--	$17,000
- publishing information booklets, advertising	--	$5,000/yr.	$15,000
- creating tourist facilities	--	--	$14,000
SUBTOTAL OF EDUCATIONAL COSTS			**$46,000**

TOTAL COST OF KHINGANSKY ZAPOVEDNIK PROJECT	**$221,110**

13.5. RED-CROWNED AND WHITE-NAPED CRANE REINTRODUCTION PROJECT
TWO YEAR IMPLEMENTATION PERIOD

PROJECT REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
REQUIREMENT:			
- salary for manager	1 pers.	$200/mo.	$4,800
- acquisition of equipment (incubators, veterinary supplies, office equipment, diesel generators)	--	--	$27,500
- construction of winter facilities for birds, breeding center)	--	--	$29,400
- construction of open cages for summer	--	--	$14,000
- construction of one house for monitoring	--	--	$8,000
- expeditions of experts	--	$4,250/yr.	$8,500
- maintenance and release of birds	--	--	$12,000
- unforseen expenses	--	--	$10,000
TOTAL COST OF CRANES REINTRODUCTION PROJECT			**$114,200**

14. KAMCHATKA-OKHOTSK SEA BIOREGION

14.1. KOMANDORSKY ZAPOVEDNIK

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- binoculars	5	$400	$2,000
- SKS carbines	5	$400	$2,000
- night vision devices	5	$400	$2,000
- VCR, TV, video camera	1 ea.	--	$2,000
RENTAL OF OFFICE SPACE			
- administrative and scientific headquarters	--	--	$20,000
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air and water transport rental	--	--	$118,000
CONSTRUCTION:			
- cordons (stations)	3	$5,000	$15,000
SUBTOTAL OF TECHNICAL COSTS			**$163,950**

ECOLOGICAL TRAINING	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- developing and conducting joint research projects	--	$5,000/yr.	$15,000
- training specialists in foreign centers	2 pers.	$6,000	$12,000
- publishing ecological information, advertising	--	$5,000/yr.	$15,000
SUBTOTAL OF EDUCATIONAL AND TRAINING COSTS			**$46,000**

TOTAL COST OF KOMANDORSKY ZAPOVEDNIK PROJECT	**$205,950**

14.2. KRONOTSKY ZAPOVEDNIK ECOTOURISM PROJECT

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- special clothes	50	$100	$5,000
- night vision devices	20	$400	$8,000
- tents	15	$100	$1,500
- sleeping bags	30	$50	$1,500
- rubber boats	10	$70	$700
- boat motors	10	$450	$4,500
TRANSPORT:			
- "Buran" snowmobiles	20	$750	$15,000
- ITT cross-country vehicle	1	$10,000	$10,000
- "Ural" motorcycles	10	$1,000	$10,000
- GAZ-66	1	$2,000	$2,000
- motor boats	8	$1,000	$8,000
- horses	20	$1,000	$20,000
FUEL AND SUPPLIES:			
- fuel	--	--	$13,200
- 10 kW diesel generator	8	$2,000	$16,000
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	270hrs/yr.	$300/hr.	$81,000
CONSTRUCTION:			
- guest house for 20 persons	--	--	$50,000
SUBTOTAL OF TECHNICAL COSTS			**$249,350**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- creating and equipping nature trails	--	--	$20,000
- publishing ecological information, advertising	--	$5,000/yr.	$15,000
- constructing shelters and tourist facilities	--	--	$16,000
- renovating nature museum	--	--	$18,000
SUBTOTAL OF EDUCATIONAL COSTS			**$69,000**

TOTAL COST OF KRONOTSKY ZAPOVEDNIK PROJECT	**$318,350**

14.3. KURILSKY ZAPOVEDNIK ECOTOURISM PROJECT

TECHNICAL REQUIREMENTS	QUANTITY	COST/ITEM	TOTAL COST
EQUIPMENT:			
- telex, fax, modem	1 ea.	--	$1,700
- computer	1	$1,250	$1,250
- portable radio stations	5	$50	$250
- special clothes	29 sets	$100	$2,900
- binoculars	4	$400	$1,600
- SKS carbines	12	$400	$4,800
- night vision devices	5	$400	$2,000
- tents	15	$100	$1,500
- sleeping bags	30	$50	$1,500
- VCR, TV, video camera	1 ea.	--	$2,000
- boat motors	10	$400	$4,000
TRANSPORT:			
- UAZ-469 jeep	1	$5,000	$5,000
- VAZ-2121 "Niva"	1	$7,000	$7,000
- "Ural" motorcycles	2	$1,000	$2,000
- "Dory" boats	2	$500	$1,000
- MRB-type boat	1	$8,500	$8,500
- motor boats	2	$1,000	$2,000
- "Buran" snowmobiles	5	$1,200	$6,000
- fire-fighting tractor	1	$9,000	$9,000
- mini tractor with hanging equipment	1	$3,750	$3,750
FUEL AND SUPPLIES:			
- gasoline	30 tons	$130	$3,900
- motor oil	1 ton	$360	$360
- diesel fuel	30 tons	$120	$3,600
- diesel oil	2 tons	$280	$560
- 4-6 kW diesel generators	4	$1,200	$4,800
RENTAL OF AIRCRAFT FOR MONITORING AND CONTROL:			
- air transport rental	28hrs/yr.	$300/hr.	$25,200
CONSTRUCTION:			
- cordons (stations)	3	$5,000	$15,000
- guest house for 15	--	--	$45,000
- nature museum	--	--	$48,000
SUBTOTAL OF TECHNICAL COSTS			**$213,170**

ECOLOGICAL EDUCATION	QUANTITY	COST/ITEM	TOTAL COST
ACTIVITY:			
- publishing ecological information, advertising	--	$5,000/yr.	$15,000
- creating and equipping nature trails	--	--	$15,000
SUBTOTAL OF EDUCATIONAL AND TRAINING COSTS			**$30,000**

TOTAL COST OF KURILSKY ZAPOVEDNIK PROJECT	**$243,170**

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