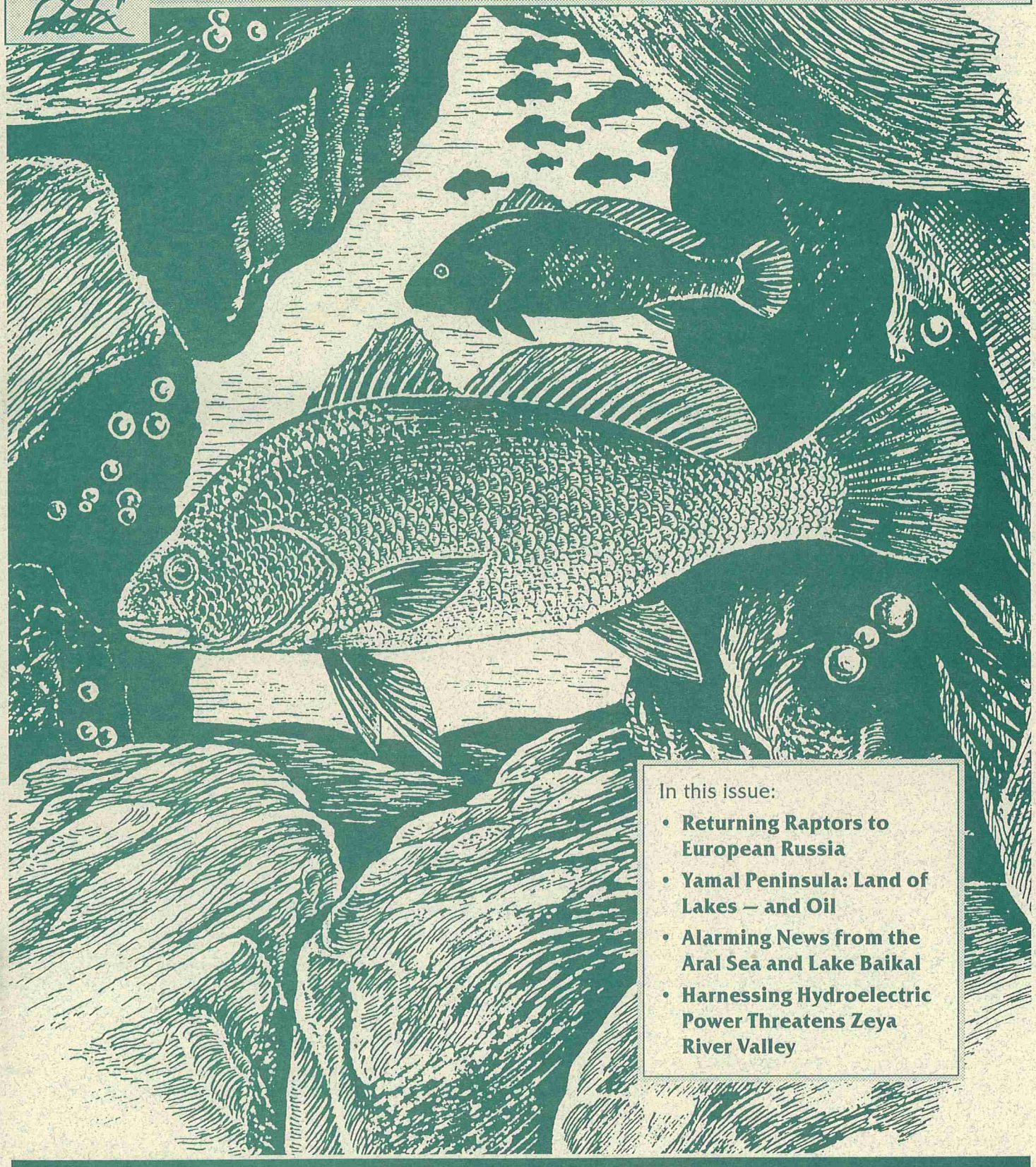
No. 17 Fall 1998

Russian Conservation News



In this issue:

PROMOTING BIODIVERSITY CONSERVATION IN RUSSIA AND THROUGHOUT NORTHERN EURASIA

CONTENTS

CONTENTS

The mission of the ***Pocono Environmental Education Center*** is to advance environmental awareness, knowledge, and skills through education in order that those who inherit the planet may better understand the complexity of natural and human-designed environments.

The mission of the ***Center for Russian Nature Conservation (CRNC)*** is to promote the conservation of nature in Russia and throughout the former Soviet Union, and to assist conservation groups in that region through information exchange, coordination of professional and educational exchanges, and provision of technical assistance to protected areas. CRNC is a project of the Tides Center.

Center for Russian Nature Conservation

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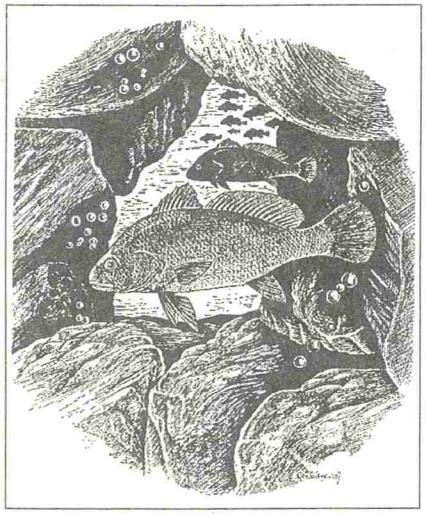
ON THE COVER



Springer fish (Mugil cephalus)
Cover Drawing by D.N. Fedorovski

Voice from the Wild (Letter from the Editors)

In compiling each issue of *Russian Conservation News*, we try to bring our readers a balanced and diverse picture of conservation activities in northern Eurasia, sharing the success stories as well as the challenges facing our colleagues in the region. Usually we use the "Voice from the Wild" to highlight certain articles in the journal, but this time, it seems appropriate to call your attention to the many changes occurring in the society from which our articles originate.

Part of the pleasure in publishing *Russian Conservation News* is the opportunity to shatter the many stereotypes of the environmental movement in the former Soviet Union. Through *Russian Conservation News*, we have surprised the international conservation community with the reports on continuing expansion of protected areas systems in Ukraine, Russia, and Central Asia; we have inspired readers with stories of grassroots efforts to combat poaching of endangered flora and fauna in Georgia, Moldova, and other countries; we have brought alive the names and faces of conservation leaders through their first-hand stories, photos and illustrations.

These accounts from the field give us much more than facts and figures about biology, ecology, or species. They give us insight into the spirit of the environmental community, and help us to understand what a critical role environmental groups play in forcing positive change in society. Many of their actions, whether they be the publication of a bold report on nuclear waste disposal, or the initiation of a children's education program, exemplify exciting moments in the development of a young democracy. The environmentalists' impassioned energy and staunch devotion to nature protection, public health, legal reform, and the defense of basic rights such as the freedoms of speech and press, have been a model for us all.

The seemingly endless optimism and persistence of the environmental community may be deeply rooted, but they are not secure. Since the recent downturn in August of an already declining economy in Russia, a general pall seems to hang like a storm cloud in the air. Throughout the fall season we have been receiving reports from around Russia of the hardships caused by the country's financial state. Budget cuts for Zapovedniks signify much more than limited conservation activities. These problems are sparking increasing tensions inside and around the protected areas as people search for relief from the pressures forced upon them by a new "survival mode." In Sayano-Shushenksi Zapovednik, a ranger has been killed. In Kavkazski Zapovednik, an education specialist laments that his hard work is no longer appreciated or needed. Managers write of their struggle to keep offices and housing heated. Many are dreading a tough winter ahead.

The coming months will, indeed, be difficult for conservationists, protected areas managers, scientists, and many others in the environmental field. Together with our colleagues in the region, we must work hard to preserve the many achievements that have been made in the past decades. We must continue to bolster the Zapovedniks, National Parks, and NGOs in the region and we must find innovative ways of getting funds directly to the region.

As this issue of *Russian Conservation News* was going to press, the shocking murder of Galina Starovoitova (a member of the Russian Duma who fought anti-Semitism and organized crime and defended the development of democracy in Russia) serves as a flashing alarm that Russia has a long way to go before the social and economic situation is stabilized. The international conservation community can help by supporting on-the-ground environmental and conservation projects; educating donor agencies about the need to support environmental initiatives in northern Eurasia as a way of safeguarding democratic reforms; and developing a longer-term strategy to leverage funding from Russian and other domestic agencies. Additionally, *Russian Conservation News* readers can help by maintaining connections and communication with our partners overseas to offer, at the very least, moral support and appreciation for the work of the region's conservationists.

FROM OUR READERS

October 13, 1998

Dear Editor,

We are writing to you to relate a story that is rooted in *Russian Conservation News.*

An article on bearded vultures in *Russian Conservation News* (Gavashelishvili, RCN#13, Fall 1997, "Tracking the Bearded Vulture") initiated e-mail correspondence between us. Soon, focusing on our shared interest in this species, its conservation status throughout its range, its unique ecology, and its status in Georgia, we developed a proposal to study this vulture in Georgia. We submitted our initial proposal to the National Research Council (US), Office for Central Europe and Eurasia, and received a grant for a planning effort.

This grant allowed us to meet in Georgia, to visit areas used by the vultures, and to solidify our plans. From this meeting we are developing a more comprehensive proposal for long-term research based on survey, monitoring, and satellite radio-tracking of the bearded vulture. Beyond funding the meeting, receipt of this grant indicates that we are functionally 'short-listed' for further funding by National Science Foundation (US). Seemingly, this 'seed' has also spurred interest elsewhere, and we are now hoping to cooperate with researchers in Spain, the United Kingdom, and Austria who are offering in-kind and financial support.

Because of the difficult financial situation in Georgia at the moment, NGOs, universities, and government agencies have little opportunity to undertake conservation work without outside help. With the help of *Russian Conservation News* we have been able to initiate an effort that will be long-term, will help Georgians conserve species within their national boundaries, and contribute to the conservation of bearded vultures elsewhere within their range.

We hope that the partnership we are forging will endure, will be a good example of international cooperation, and will promote conservation in Georgia. Although these hopes have not been fully realized yet, we encourage other researchers and conservationists to use *Russian Conservation News* as a resource and as a point of contact for cooperative work.

Yours sincerely,

Michael McGrady, Ph.D
Earthspan, Boise State University, and University of Maryland, Baltimore County

Alexander Gavashelishvili
Georgian Center for Conservation of Wildlife

PROTECTED AREAS

Zapovednik Directors Meet to Discuss the Future of Russia's Natural Treasures

by ***Nikolai Maleshin***

From the Commander Islands in the Russian Far East to Kandalaksha in the northwest, 82 directors from Russian Zapovedniks—a record attendance—gathered in Abakan (Khakasia Republic) from September 13-19, 1998 to discuss current issues facing Russia's system of strict nature reserves. In addition to the directors, 20 representatives from NGOs and local, regional, and federal agencies attended. In the wake of a grim financial situation, there were many topics and problems to discuss at this year's conference, which was entitled "Preserving Zapovedniks in Russia's Current Socio-Economic Situation." These issues included:

- Exchange of expertise among rangers in different Zapovedniks;
- Monitoring of environmental legislation, interaction with the federal and local prosecutor's office; supreme and regional courts, the Fish and Hunting Inspection Committee; and the federal and regional Committee on Environmental Protection;
- Environmental management and public awareness;
- New methods of management in both newly established and long-standing Zapovedniks;
- Russian Biosphere Reserves and implementation of the Seville Strategy—success stories and cases of failure in the designation of Russian Zapovedniks as Biosphere Reserves.

One of the main outcomes of the meeting was the creation of a new association to address current problems

New Protected Area Appears in Ukraine

A National Nature Park, Yavorovski, was recently created on an area of 7, 078.6 ha in western Ukraine (Yavorovski District, Lvov Oblast). This park protects many Eurasian tree and shrub species and more than 1340 species of vascular plants, 27 of which are listed in the Ukrainian Red Data Book. The park also boasts a high concentration of fauna: more than 250 birds, 58 mammals, 16 fish, 12 amphibians, and 8 reptile species have been identified here. A unique feature of Yavorovski National Park is its mosaic of soil types that gives rise to a high diversity of forest covers. Altogether, twenty types of forest can be found within the park's territory. The sources of many rivers are also located here. Equally important to its biological value is the park's aesthetically pleasing landscape

Information provided by ***Oleg Listopad*** *of the Kiev Ecological-Cultural Center.*

in Russia's nature reserves. The new organization entitled "The Russian Zapovednik Directors' Association," will provide a venue for upholding the professional interests of Zapovednik managers in political, social, and economic spheres. Its mission will be to give directors greater leverage to take a stand against the deterioration of the Zapovedniks in Russia. This association, is composed of sixteen regional representatives. Nikolai Maleshin was nominated as the Association's first Chairman. While the association has yet to be formalized, if financial support is found, it will be established in Moscow as a permanent body. If funding is not secured, work will be done on a volunteer basis.

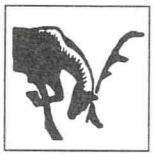
Other activities at the meeting included a conflict resolution seminar led by Alexander Karpenko from St. Petersburg and a visit to the Maly Abakan and Chazy Zapovedniks at the end of the meeting.

This meeting was organized with financial support from the Global Environmental Facility (GEF); the World Wide Fund for Nature (WWF); the administrations of the Khakasia Republic and Shirinski District; the regional Committee on Environmental Protection in the Khakasia Republic, and the ecological foundation "Chazy."

Nikolai Maleshin *is the Director of Tsentral'no Chernozemny Zapovednik.*

Protected areas mentioned in this issue of RCN

1. Kandalakshski Zapovednik
2. Kaluzhskie Zaseki Zapovednik
3. Divnogore Museum-Zapovednik
4. Maly Abakan Zapovednik
5. Chazy Zapovednik
6. Zeyski Zapovednki
7. Wrangel Island Zapovednik
8. Komandorski Zapovednik
9. Magadanski Zapovednik
10. Yavorovski National Nature Park
11. Bolshaya Kokshaga Zapovednik
12. Galichya Gora Zapovednik
13. Dalnevostochni Morskoi Zapovednik
14. Lazovski Zapovednik
15. Ussuriski Zapovednik
16. Khankaiski Zapovednik
17. Bolshekhekhtsirski Zapovednik
18. Khinganski Zapovednik
19. Bureinski Zapovednik
20. Denezhkin Kamen Zapovednik
21. Kronotski Zapovednik



Khakasia: Siberian Stonehenge, Avian Haven

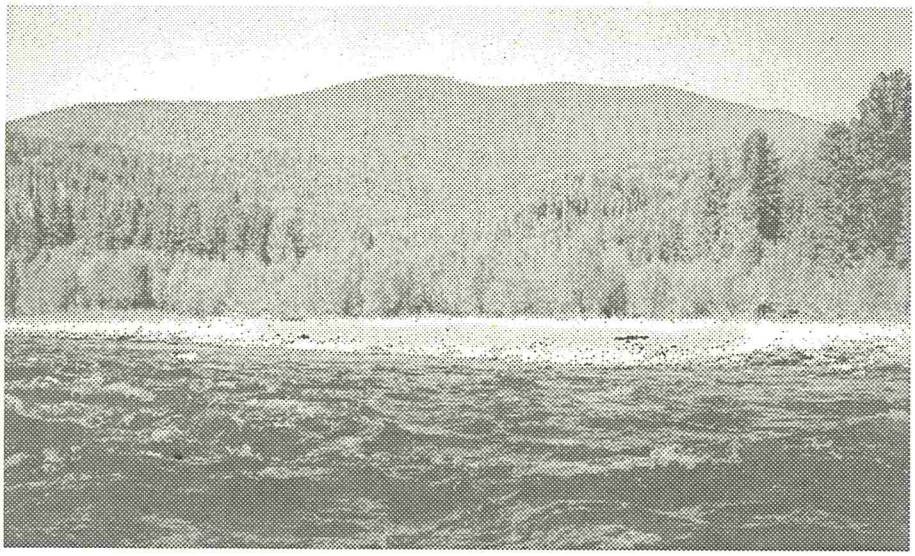
Translated and adapted from an article compiled by the editors of "Zapovednye Ostrova" (No. 5, 4/98), a publication of the Environmental Education Center "Zapovedniki."

Background and Culture

Khakasia, a spectacular country of lakes, mountains, forests and steppe, is a well-kept secret. Located virtually at the center of the Asian continent (just north of Russia's Altai region, which borders Kazakstan, Mongolia, and China) Khakasia region is part of the Altai-Sayan Mountain zone. Here in Khakasia the Western Sayan and Kuznets Alatai Mountain massifs harmonize with intermountain hollows, bringing an extraordinary mosaic pattern to this natural complex. In an area of only 61,900 square km, the varied landscape includes arid and forest steppe, sub-taiga, mountain taiga, and alpine areas, including tundra. Khakasia is also rich in caves, of which there are about 160, including the longest cave in Russia, "Pandora's Box," which is close to 13 km long. In addition, the region is plentiful with sources of mineral water and fresh and salt water lakes. The salinity of some lakes is higher than that of seawater, and they possess the medicinal properties of the Dead Sea. Brass, marble, uranium, precious gems, and various minerals (coal, iron, gold, copper) can also be found in Khakasia, along with mountain ranges varying in height from 1,800 to 3,491 m above sea level. Khakasia's climate is distinctly continental, with a cold winter and a hot summer.

Khakasia is the land of the Khakas people, an ancient Turkic people who retain their distinctive culture, including their oral and written languages. It is the archaeological Mecca of Siberia and an ancient center of civilization noted for its extraordinarily large number of ancient stone monuments.

In this region a series of man-made sculptures has defined the inimitable face of Khakasia's Khakas-Minusin valley for a thousand years. The stones are held sacred by the Khakas people, who bring them



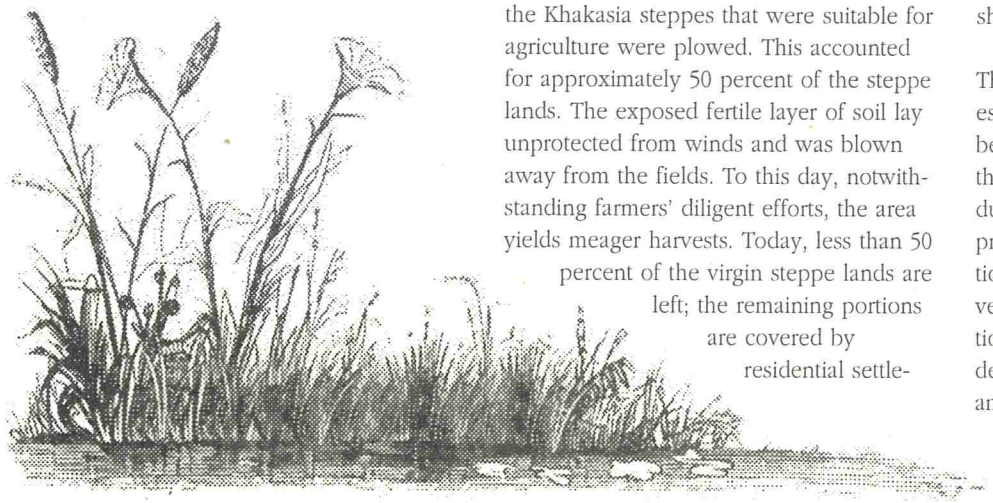
Maly Abakan Zapovednik.
Photo by A. Kolbasov

gifts and appeal to them for assistance. They are an important element of the Khakas' worldview, the basis for many legends, myths, and traditions.

Surprisingly, few people beyond the borders of the region are aware of these wonders. Decades of isolation from the world community deprived both Russians and foreigners of information about this ancient original seat of civilization—a brilliant jewel in the mosaic of world cultural history. With the creation of the stone sculptures, the Khakas-Minusin hollow gradually became the greatest artisan, trade, political, and cultural center of ancient Northern and Central Asia. On the ancient sculptures of the Yenisei River, which forms the northeastern border of Khakasia region, complex, fantastical sketches are found, the origins of which to this day provoke controversy among scientists. Although impressive, even the famous stone structures of the British henges (the most famous of which is Stonehenge), pale in comparison to these structures. Contemporaries of Khakasia's monuments, the British henges are far fewer in number and have not revealed any writing on the stone. In comparison, Easter Island's stone statues are younger and simpler in construction than Khakasia's.

State of Nature

In spite of Russia's long-standing history of nature protection (*please refer to the box "On Penalty of Death: A Glance at Russia's Nature Protection Lineage"*), the scientifically unfounded use of natural resources, including wildlife resources, during the Soviet period led to the significant disturbance of natural processes throughout Russia. Huge areas of forest were cut down, particularly the more valuable species of trees, and the open exploitation of underground mineral resources turned millions of flowering and fragrant plants into a lunar landscape.



The economic practices of the past decades have caused damage to many of Russia's natural areas, and Khakasia was no exception. In almost all accessible areas (Shirinski, Ordzhonikidzevski, Beiski, Askizski, and Ust-Abakanski Regions), cedar forests were reduced to a minimum.

Loss of Khakasia's Steppe Lands

Of all the ecosystem types in Khakasia, the steppe suffered perhaps the most. In the 1950s, during the Soviet campaigns to assimilate virgin lands, all of the plots on the Khakasia steppes that were suitable for agriculture were plowed. This accounted for approximately 50 percent of the steppe lands. The exposed fertile layer of soil lay unprotected from winds and was blown away from the fields. To this day, notwithstanding farmers' diligent efforts, the area yields meager harvests. Today, less than 50 percent of the virgin steppe lands are left; the remaining portions are covered by residential settlements, roads, construction sites, and landfills.

Steppe lands in Khakasia suffered additional damage with the construction of the Krasnoyarsk dam on the Yenisei River. Millions of hectares of steppe flood lands, the basis of fertile pasture and haymaking lands, were submerged. At the same time, Soviet orders commanded local people to deliver meat, milk, and wool to the government, a directive which necessitated maintaining a flock of 2.5 million sheep and a huge quantity of cattle on the territory of Khakasia. Today the mountain taiga compensates for the absence of flood plain pastures for cattle. This practice, together with forest fires and the felling of trees, is decimating the grassy forest undergrowth. In addition, the cattle trample the springs that feed mountain streams and the main water artery of Khakasia, the Abakan River, which provides 78 percent of the Republic's water. As a result, all of these waterways are becoming more and more shallow.

The over-pasturing of sheep proves especially dangerous for the steppe because these animals trample much more than they eat. Moreover, their urine and dung damage the steppe's vegetation. This practice has resulted in the current condition of Khakasia's steppes. They are on the verge of second- and third-degree degradation, with the third degree being semi-desert. Spring fires also cause a significant amount of damage.

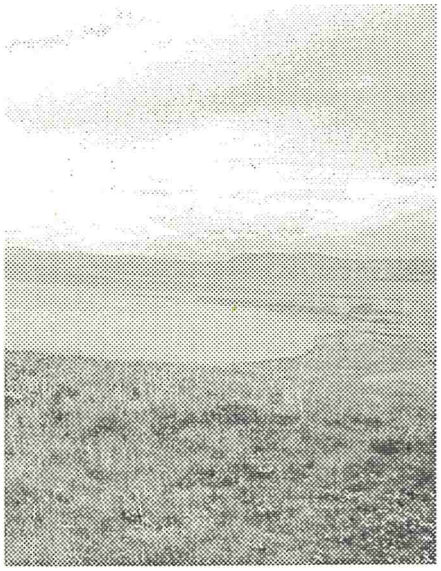
Preservation Efforts

With these current methods of exhaustive land management, soon there will be only one option: to rehabilitate the steppe's vegetation. Yet, no one knows how to do this, since each plant community develops in its own way, established by nature's laws. In order to understand these laws, an extensive system of nature reserves has been created for research and conservation of entire ecosystems. However, experience indicates that, given the extreme vulnerability of steppe and the slow pace of its restoration, preserving even a small area of steppe is a very complex process. Only three of Russia's 99 Zapovedniks are steppe reserves, and they are situated on very scant areas of land.

The Steppe Reserve

The Chazy Zapovednik ("Chazy" means steppe in the Khakas language) is located on seven plots of steppe and forest-steppe zones, with an overall area of 24,700 ha. The steppe here is rich with an abundance of plant systems, ranging from desert and rocky steppe to meadow steppe. It contains waterless valley meadows, salt marshes, swamps, and deciduous birch copses.

The area is famous for its lakes, both lowland and alpine, more than 50 of which contain healing waters and mud. The Zapovednik's Lakes Bele, Shira, Itkul, and Ulukh-Kol cast a soft hue over the landscape. Lake Bele's water is close to the salinity of seawater, which allows for the growth of Siberian and hunchback salmon. The lake's picturesque shores and beaches, as well as the water's healing properties, attract many vacationers. Tourism, however, complicates conservation efforts during the summer season. This particular area is where most of the violations in the Zapovednik regime take place.



Maly Abakan Zapovednik.
Photo by A. Kolbasov

The purity and transparency of Lake Itkul, a fresh water lake, mirror that of Lake Baikal. In addition to the native fish species found there, peled (*Coregonus peled*) and cisco (*Coregonus sp.*) have also been successfully introduced. The lake's water is of high enough quality to meet drinking water standards, and it is used for this purpose at the Lake Shira resort and the Zhemchug (Pearl) settlement. The Lakes Ulukh-Kol and Shira both have unique healing properties. With a salt content that meets medical standards, it is a ready-made healing bath. This shallow lake warms through easily.

These protected lakes provide important habitat along the migratory routes of numerous species of birds, and they are

On Penalty of Death: A Glance at Russia's Nature Protection Lineage

The roots of Russia's protected areas go back deep into ancient times. Ages ago, Russia's hunting population compiled an unwritten code of laws governing hunting and other behavior in the forests, which can be understood as a form of nature protection. In certain places, protected and sacred areas were created and strictly guarded by the native peoples. Traditional forms of hunting conduct are well-known and are represented in maxims warning against depletion of the forests.

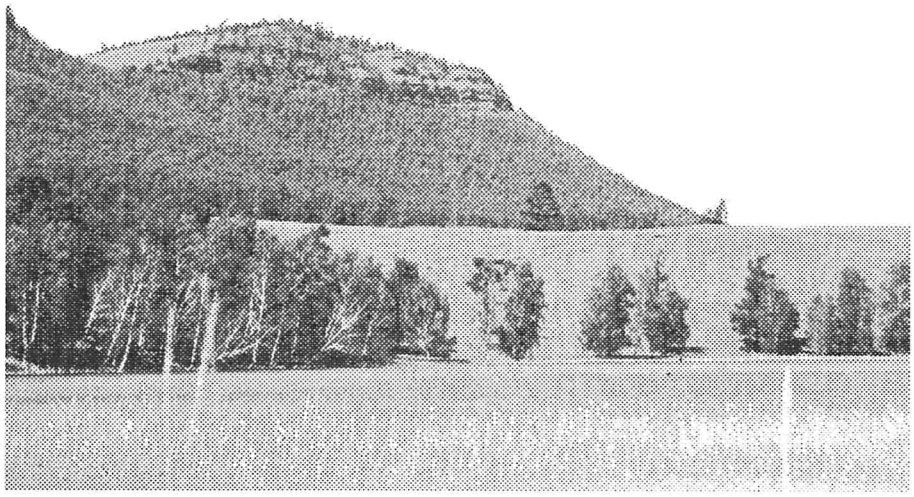
In the eleventh and twelfth centuries, private nature protection efforts were launched as individual landowners declared their most scenic and game-rich lands to be protected areas. Already at that time, governmental nature preservation was conceived. Under Yaroslav the Wise's rule during the eleventh century, a strict penalty was established for cutting preserved forests and for arson. The code of laws also contained points governing the protection of wildlife. In the time of Ivan the Terrible (1530 to 1584), measures were instituted to preserve soil through the establishment of forest reserves along the rivers.

A significant stage in the development of Russia's history of protected areas took place during the reign of Tsar Aleksei Mikhailovich, the father of Peter the Great (1629 to 1679). It was under his direction that the illustrious "Code" was compiled, issuing 67 hunting decrees. Two preserves were established at this time: Kuntsevskii, near Moscow, and "Seven Islands" in northern Russia. In these two places it was forbidden to walk, fish, or hunt for birds.

In Siberia in 1656, protected sable lands were declared along the Rybnoi, Chadobets, Kote, and Kove Rivers. In 1665, a tsarist decree made it illegal to catch sterlet *(Acipenser ruthenus)* less than 8 vershoks (14 inches) long. Peter the Great issued a decree forbidding the cutting or burning of forests in the sable rich lands of Siberia. The penalty for violating this directive was death.

Under Peter the Great, nature preservation acquired a broader governmental meaning: the more valuable forest tracts were declared to be reserves, laying the foundations of forestry. Moreover, great importance was attached to the role of forests in the protection of watersheds. After the death of Peter the Great, the reigning members of the Romanov dynasty continued the nature preservation activities he began.

The foundation for the scientific approach to nature preservation was laid as early as the sixteenth century, making a great contribution to the broad public conservation movement. Nature protection work and, in particular, the development of protected areas, continued into the Soviet period.



Chazy Zapovednik. *Photo by O. Tropin*

sites of mass nesting for waterfowl and other wading birds. Among these are several endangered species, and, at times, even birds uncharacteristic of the steppe zone can be found here. For example, the white-winged scoter (*Melanitta deglandi*), typically found in taiga and tundra habitats, nests on Lake Bele in the steppe section of the reserve.

At the beginning of the century, the now endangered swan goose (*Anser cygnoides*) nested in high concentrations at Lake Bele. As a matter of fact, these geese were so plentiful that, according to the data of P.P. Sushkin, local residents gathered their eggs in the spring in order to raise the birds at home. Today, swan geese are seen intermittently in flight. It is hoped, however, that this species will return to its native nesting sites now located on protected territory.

Lake Bele is one of the "green corridors" on the flight itineraries of the grey (*Anser anser*), bean (*Anser fabalis*), and white-fronted (*Anser albifrons*) goose, and occasionally, even the red-breasted goose (*Branta ruficollis)* flies through. In the spring and fall, migratory whooper swan (*Cygnus cygnus*) and Bewick's swan (*Cygnus bewickii*) stop in the reserve, usually in a flock of more than 500 individuals.

Ornithologists visiting Lake Ulukh-Kol are continually struck by the mass of bird life there. Such a gathering of waterfowl and wading birds is unrivaled in southern Siberia. Ruddy shelduck (*Tadorna ferruginea)* nest there, and before they fly away, they can number up to 35,000. Dozens of fledglings are hatched at Lake Ulukh-Kol, and the shelduck *(Tadorna tadorna)*—a rare bird for southern Siberia—also nests there. The largest nesting population in the region (up to 100 pairs) of the endangered shorebird, avocet *(Recurvirostra avosetta)* has also been registered at this lake. In the fall, 8,000 to 11,000 ducks gather, and sometimes as many as 1,500 geese can be counted. But the main attraction of Ulukh-Kol is the Bewick's swan, of which more than 3,000 gather each spring and fall. This is the destination of 15 percent of all of the swans of this species living in Russia.

Mountain Taiga

The Maly Abakan reserve is in the mountain taiga zone. The steep slopes of the Western Sayan Range blocked the timber industry from harvesting cedar in this region. Thus, little-disturbed forests still grow in the Zapovednik. Economic activity before the Zapovednik existed was limited to hunting, primarily for sable.

The Maly Abakan Zapovednik can be considered a model of untouched Western Sayan mountain taiga. There is not a single human building within the Zapovednik, not even housing for Zapovednik staff. Fortunately for nature, this is the only "island" in the mountains of Khakasia where there are no underground mineral resources, which means there has been no infringement on its territory. When the reserve was established, only hunters expressed dissatisfaction since four lots were taken from their hunting grounds. This problem has now resolved itself. Even though they have less hunting land near the borders of the reserve, the hunters have begun to trap more sable, due to an increased population coming from the Zapovednik.

Steppe Versus Forest

The steppe and forest Zapoveniks differ not only in their natural characteristics, but also in the approach they take to protecting their territories. This is very well understood, particularly by those who work for the joint administration of Chazy and Maly Abakan. Even though Chazy Zapovednik is four times smaller than Maly Abakan, the volume of work done at Chazy is four times larger. Consider the task of guarding boundaries, for example. The number of violations in Chazy exceeds those in Maly Abakan by 100 times, and in some years, 200 times. Occasionally, the violations in the Chazy reserve account for up to 20 percent of the total number of violations in all of Russia's Zapovedniks. Scientific research of the steppe is also conducted on a wider scale than that in the mountain taiga region.

Both of Khakasia's Zapovedniks are young: Chazy was established six years ago and Maly Abakan four years ago. They are both striving to attain the status of a Biosphere Zapovednik in the Altai-Sayan Oblast, an honor that will distinguish them among Russia's Zapovedniks.

This article was compiled with material from the scientists ***Yu. I Kustov*** *and* ***S.M. Prokofiev*** *from the joint Maly Abakan and Chazy administration.*

Kaluzhskie Zaseki Zapovednik: A History of Ancient Forests and People

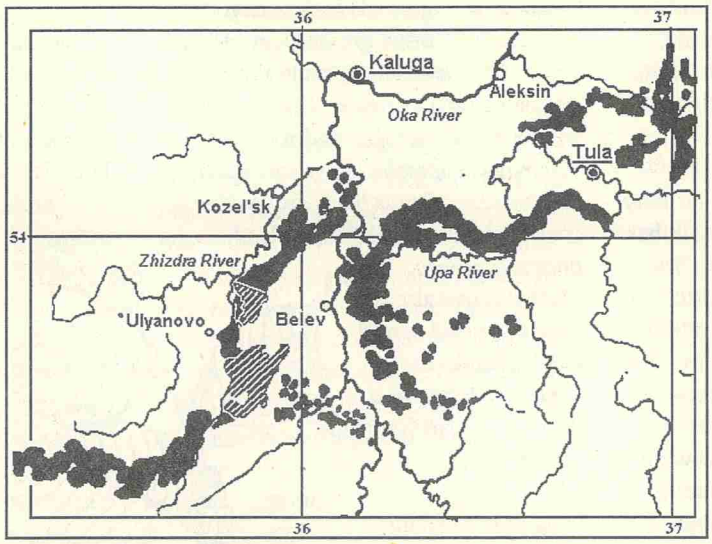
*by **Maxim Bobrovski***

The wide swath of broadleaf forests populated by oak, beech, ash, elm, linden, and maple that once stretched from the Black Sea to the White Sea in European Russia has long disappeared from the landscape and the human mind. These broadleaf tree species have yielded to narrow-leaf (birch, aspen) and coniferous (spruce, pine) species in the central and eastern parts of European Russia. Forest and forest-steppe areas have vanished in the southern parts of this region. This transformation of the land commenced in the Late Stone Age, when human activity began to have a cumulative effect on the environment.

Today, the broadleaf forests that remain within the area of the former Soviet Union are squeezed into a narrow band in the transition zone between the forest-steppe and taiga. Kaluzhskie Zaseki Zapovednik is the sole strict protected area in Russia located within this zone. Its 18,500 hectares in the southeastern part of the Kaluga Oblast, Ulyanovski Region, are divided into two sections: the northern section consists of forests up to approximately 130 years old, while forests in the southern section range from 230 to 250 years old.

Kaluzhskie Zaseki originated in a quest for old-growth broadleaf forests by the ecologists Olga Smirnova and Roman Popadyuk. Beginning in 1984, they visited dozens of forest management offices and forestry farms in Central Russia and the Ukraine, perusing a large volume of forest inventory data. Their search turned up a few plots of old-growth broadleaf forests. The best of these were forest plantations dating from the nineteenth century, or small plots of broadleaf forests formed by selective cutting on a regular basis.

In 1986, their extensive search finally came to fruition. They found a unique forest tract in the Kaluga Oblast. This site was characterized by an abundance of huge trees reaching diameters of 2 m, and numerous fallen trees enveloped in grass and moss. In 1987, this area was distinguished as a Nature Monument*—the first step toward the creation of Kaluzhskie Zaseki. Thanks to the efforts of many people, the area became an official Zapovednik in 1992.



Forests of the "Zaokskaya Zasechnaya Cherta" that have been preserved to the present day. Kaluzhskie Zaseki Zapovednik is indicated by the shaded area. *Map by M. Bobrovski*

The Russian word "zaseka" means a barricade of felled trees (also called "abatis line" forests) cut to thwart enemy forces. These linear blockades were impassable by cavalry, and were serious obstacles for troops on foot. Together with ramparts, moats, and palisades, these barricades formed complex defenses called "zasechnaya cherta." The forests within these barricades received strict protected status where even visitors were forbidden.

The use of these barricades was first chronicled in the twelfth century, when Moscow state was founded. At that time, a zaseka was built along its southern border, south of the Oka River. This barricade was named "Zaokskaya Zasechnaya Cherta," meaning "barricade beyond the Oka River." By the mid-sixteenth century, this barricade stretched 600 km. from Kozelsk to Ryazan through Likhvin, Tula, and Kashira, and constituted a defense against the Lithuanian state to the south and southwest, and against raids by the Crimean and Kazan Tartars. This defensive forest was so important to Russia's security that in 1566, the Russian Tsar Ivan the Terrible inspected it himself. From the sixteenth to the seventeenth centuries, more barricades were built to safeguard newly colonized territories in the south and east of Moscow state.

Because of the changing political landscape, by the late eighteenth century, "Zaokskaya Zasechnaya Cherta" was no longer needed for defense. The majority of protected forests within this barricade were parceled out to private owners who farmed them. The forests of the "Kozelski" zaseka in the Kaluga region, however, had a different destiny. These forests managed to escape agricultural conversion because of Peter the Great's mandate to reserve certain forests for military and shipbuilding purposes. This forest tract remained in state ownership, carefully protected. In contrast, 50 percent of the unprotected forests in the region were clear-cut in the eighteenth and nineteenth centuries.

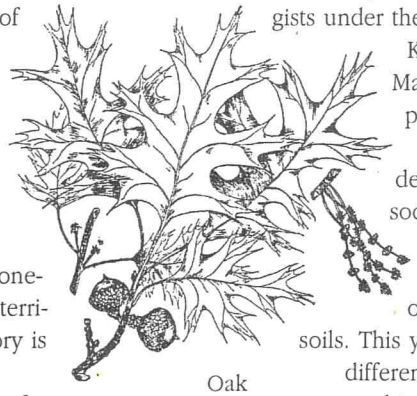
The unprotected forests surrounding those set aside by Peter the Great were apparently some of the first forest tracts to be restored in Russia during the eighteenth century. Special decrees issued by Russian tsars Peter the Great, Anna Ioanovna, Pavel I, and others stipulated tree plantings on denuded areas within the "Kozelski" zaseka during the eighteenth through early twentieth centuries.

Today, the forests that were once part of the Kozelski Zaseka are enclosed by other boundaries—the Kaluzhskie Zaseki Zapovednik and two recently formed national parks, Orlovskoe Polese (84,200 ha) and Ugra (98,600 ha). Although these protected areas have only been in existence for a few years, this territory has a nearly 1,000-year history of protected status. From the ninth until the thirteenth centuries, this area was known as Verkhovski Les, a forest tract virtually void of humans. Through the ensuing centuries, zaseki and various government mandates shielded the area from human activity, and the absence of passable roads in the area after World War II led to declining human populations.

Ash

Soil analyses confirm that a small territory within Kaluzhskie Zaseki Zapovednik has never been touched by agriculture. This is highly uncommon in central Russia. Long periods of little disturbance in the Zapovednik fostered the preservation of a wide variety of tree, shrub, and grass species typical of eastern European broadleaf forests. Moreover, this low disturbance level has resulted in the development of a gap-mosaic structure, produced by the natural falling of aged trees in the forest. The fallen trees' natural decay processes result in soil and microrelief differentiation, creating a variety of habitats, or microsites, suitable for species of different ecological groups, including light-requiring, shade-tolerant, moisture-requiring, and xerophytic plant species.

In addition to thousands of 100- to 150-year-old oaks, pines, and spruce, hundreds of ancient oaks planted in the eighteenth century abound in the Zapovednik. These little-disturbed forests occupy one-fifth of the Zapovednik's territory; the remaining territory is covered with ecosystems marked by human impacts from logging, plowing, and livestock grazing during the past centuries. Aspen forests have filled in old clear-cuts; park-like oak forests now grow on land formerly used for livestock grazing. Pine, spruce, and birch forests have taken over former agricultural lands abandoned after World War II.



Oak

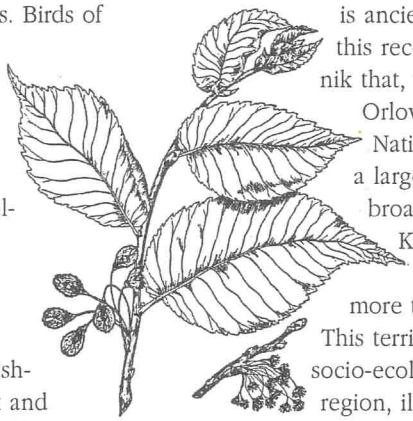
Compared to the diverse flora in the Zapovednik, the fauna found here is sparse. Before Kaluzhskie Zaseki Zapovednik was established, this remote land was a hunting grounds for military and other government officials. Since 1992, however, the numbers of ungulates such as moose *(Alces alces)*, wild boar *(Sus scrofa)*, and roe deer *(Capreolus capreolus)* have increased, and beavers *(Castor fiber)* are making a comeback in small rivers. Birds of prey and grouse *(Tetraonidae)* also have increased considerably, thanks to the Zapovednik and to a decline in nearby agricultural activity.

Long-term scientific research in the area began before the establishment of the Zapovednik and continues today. Directed by O. Smirnova, the Department of Systematic Ecology at Pushchino State University studies little-disturbed broadleaf forests here—their structure and function, succession mechanisms of plant communities, and plant ecology. Ornithologists under the leadership of A. Kostina and B. Margolina monitor bird populations.

Researchers also delve into the region's socio-ecological history, analyzing the effects of human activities on vegetation and soils. This year, researchers from different organizations working in Kaluzhskie Zaseki began flora and fauna inventories. Annotated lists of species found in the park have been compiled this year as well. To date, 703 vascular plant species, 45 mammalian species, 140 avian species, and 14 amphibian and reptile species have been recorded in the Zapovednik.

The Zapovednik staff has involved the local community in exploring the region's natural riches. For instance, the youth naturalist society in Kaluga, "Stenus," studies the soil biota and small vertebrates here. Also, the Zapovednik staff organizes ecological camps for children and arranges for local school groups to participate in the planting of oak trees.

In Russian, the word "zaseka" has an additional meaning—"protected forest." This meaning originates from the old tradition of marking the trees along the boundaries of private lands or protected areas. Although the name "zaseka" is ancient, it is very fitting for this recently formed Zapovednik that, together with the Orlovskoe Polese and Ugra National Parks, encompass a large area of preserved broadleaf forests. Yet, Kaluzhskie Zaseki derives its value from more than just its ecology. This territory illuminates the socio-ecological history of the region, illustrating how natural processes and human activities have coincided throughout the centuries.



Elm

* A Nature Monument is a protected area restricting particular human activities to preserve natural objects of special interest such as rock formations, champion trees, bird colonies, or scenic landscapes. Nature Monuments are typically small in size (ranging from 100 square m. to 500 ha.). They are usually established at the local or regional level, and may be created for a temporary period or on a permanent basis. Nature Monuments rarely have scientific or enforcement staffs.

Maxim Bobrovski *is a senior professor in the Department of Systematic Ecology at Pushchino State University.*

Divnogore Museum-Zapovednik: Preserving the Geology, Culture, and Steppe of Central Russia

From the editors: *For the first time, in this issue of RCN we bring you an article about a special category of protected areas, Museum-Zapovedniks. Like Zapovedniks (strict nature reserves), Museum-Zapovedniks have a conservationist mission; however, whereas Zapovedniks are meant to preserve wild nature, Museum-Zapovedniks focus on conserving cultural heritage in a natural environment. Museum-Zapovedniks have three major fields of activity: preservation, research, and recreation. Like the nature reserves, Museum-Zapovedniks have their own staffs and are federally-administered organizations. Museum-Zapovedniks are administered by the Ministry of Culture. To date, Russia has 86 Museum-Zapovedniks, the most famous of which is Kizhi Island Museum Zapovednik on Karelia's Lake Onega.*

The following article describes Divnogore Museum-Zapovednik, which was created seven years ago as an initiative of Voronezh University's Geography Department to conduct in-depth research of the region's unique landscape and archeological remains.

by ***Marina I. Lylova*** *and* ***Marina.V. Chernobylova***

No more than a small patch of land (1100 ha) at the confluence of the Quiet Pine (Tikhaya Sosna) and Don Rivers, Russia's Divnogore Museum-Zapovednik (hereafter referred to as simply "Divnogore") contains an extraordinary variety of geological and cultural features. Established in 1991, this protected area represents a chapter in the human and natural history of the Voronezh Oblast (region, or province). Voronezh is found in the *chernozem*, (black earth) region and is part of the southern forest-steppe zone of Central Russia. The name "Divnogore" is derived from the natural chalk pillars here, called "Divy," which rise vertically on steep slopes and are the only formation of this kind in the Oblast.

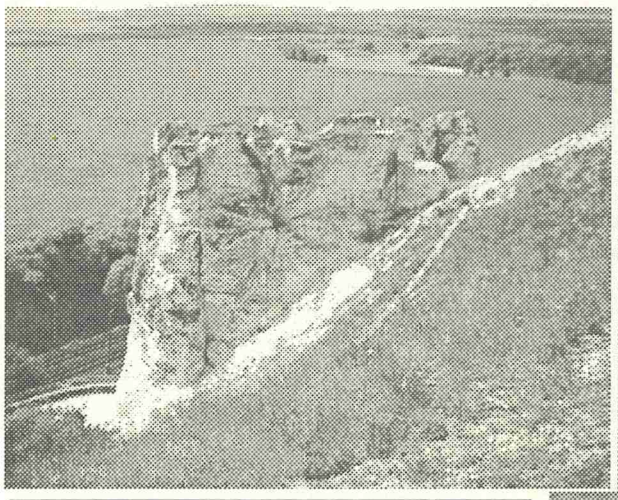
Divnogore's picturesque landscape is defined by two main features, a pleateau which separates the two rivers and the valley where they converge. The main, right steep slope of the river valley preserves outcroppings of calcareous substrate and marl (a deposit containing lime, clay, and sand). Rising to 100 m in some sections, the slope is deeply carved with gullies and small waterways. Talus slopes and karst formations are characteristic of the terrain, which is often subject to landslides and erosion.

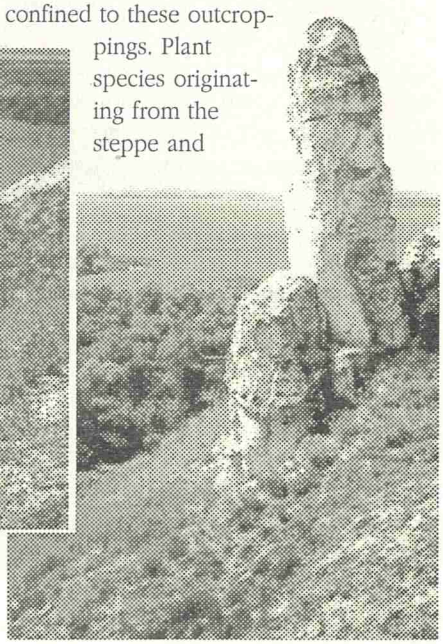
Like much of the steppe region, vegetation in Divnegore has suffered from intense anthropogenic pressure, primarily overgrazing, hay harvesting, and partial plowing. Consequently, much of the plant life, including rare, endemic, calciphilous (those adapted to calcium-rich soils) and steppe species, has nearly been destroyed. Thus, since the establishment of Divnogore, the most complicated and greatest challenge has been the conservation of steppe vegetation.

As a first step toward conserving the Museum-Zapovednik's native vegetation, the authors have conducted a series of systematic, biomorphologic, geographic, and ecologic analyses of flora and have recorded 652 species of vascular plants. Additionally, we have classified plant communities and undertaken large-scale geobotanic mapping. The first mapping effort was completed from 1988 to 1989 before this territory received protected status and again in 1996. Using this data, we are able to make comparisons of changes in the vegetative cover, gaining a better understanding of the natural distribution of plant species and plant dynamics. Currently, a set of measures to preserve steppe vegetation as well as calciphyte plant communities (those which can grow only on calcium-rich soils) on the cliffs at Divnogore is being developed.

Divnegore's unusual geology supports a unique community of plants which are closely tied to the site's calcium-rich soils. A special niche created by the calcareous substrate provides habitat for twelve endemic species: cretaceous treacle-mustard *(Erysimum cretaceum),* fragrant stock *(Matthiola fragrans),* calcareous thyme *(Thymus calcareus),* Ukrainian flax *(Linum ucranicum), (Androsace kosopoljanskii),* woodruff *(Asperula tephrocarpa),* cretaceous figwort *(Scrophularia cretacea),* burnet saxifrage *(Pimpinella tragium),* cretaceous wall-rocket *(Diplotaxis cretacea),* cretaceous milkwort *(Polygala cretacea),* cretaceous fescue *(Festuca cretacea),* Taliev's hair grass *(Koeleria talievii).*

The diverse flora of Divnogore is not confined to these outcroppings. Plant species originating from the steppe and





Above: Top view of the Great Divy.
Right: "Divy," the natural chalk pillars at Divnogore.
Photos by S. Hitztaler

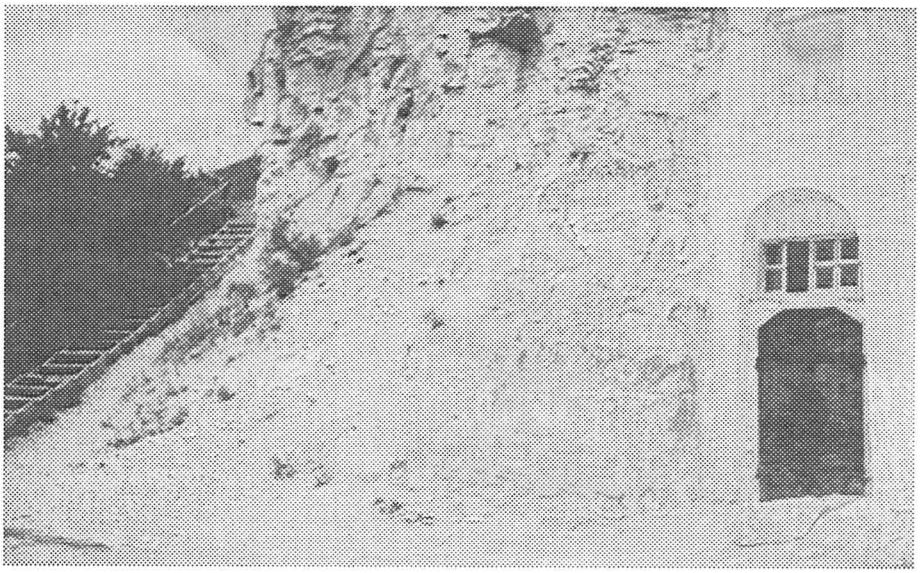
desert-steppe zones of Eurasia dominate in Divnogore. With the advent of spring in the middle of April, bright green islets of dwarf sedge *(Carex humilis)* begin to peek out from under the snow, and pheasant's eye *(Adonis vernalis)* dot the steppe landscape with bright yellow. The gentle May winds encourage a splendid array of flowers to bloom: anemone *(Anemone sylvestris),* sea kale *(Crambe tataria),* needle grass *(Stipa pennata),* iris *(Iris pumila),* and hyacinth (Hyacinthella leucophaea).

Throughout the summer the color scheme metamorphoses nearly every week. This display of color ranges from the flaxen heads of knapweed *(Centaurea orientalis)* scattered over the tali to the purple thyme *(Thymus)* to the bright golden stars of yellow flax *(Linum flavum)* on delicate stems. Waves of sage *(Salvia)* and milk vetch *(Astragalus onobrychis)* turn the steppe into a sea of violet. In the fall, shrubs *(Vincetoxicum sp.)* and grasses bathe the steppe in yellow.

Divnogore also possesses a colorful human history: its past stretches back into the Stone Age when people first began to infiltrate this area. For many centuries, the Middle Don region served as a junction where different cultures mingled together. Remnants from past ages, for example the Bronze Age, are still uncovered on the territory.

Dated from the ninth to tenth century A.D., the most noteworthy monument in Divnogore is the Mayatski settlement, representing the ancient Salvatic-Mayatsk culture. Once located on the border of the Slavonic world, this settlement was the farthest northeastern outpost of the Khazar Kingdom, which occupied the area to the north and northwest of the Caspian Sea. From the ninth to the eleventh centuries, this kingdom dominated parts of Russia's territory.

Mayatski settlement attracted the attention of a Soviet-Bulgarian-Hungarian archaelogical team that conducted research here from 1978 to 1982. The archaeologists examined fragments of a white stone fortress, built according to the best Byzantine technology. They also studied the remains of unfortified communites—cemeteries and a pottery workshop—left behind by Bulgarian tribes. (The findings have been described in various monographs and scientific papers). That archaeological research set the stage for current plans to reconstruct this settlement and turn it into a museum. From 1994 to 1995 we took the first step toward this goal. Collaborating with the Archaeological Institute of the Russian Academy of Science, we fine-tuned excavation methods using computer programs and aerial photographs of the settlement.



Church in the Great Divy. *Photo by S. Hitztaler*

Other outstanding structures on the territory of Divnogore created by humans hands are the churches carved into the rock of the Great (Bolshie) and Small (Malye) Divy during the seventeenth century, when the southern territories of Russia were colonized. These remarkable ancient monuments—masterpieces of underground architecture—are unmatched in the Voronezh Oblast. The church in the Great Divy has already been restored by employees at Divnogore Museum Zapovednik. This renovation effort, which utilized special technologies designed for the underground churches, set a precedent for future work here and in 1998, together with Divnogorski Monastery of the Assumption, we began restoration of the church in Malye Divy.

Throughout the territory of Divnogore, a landscape of intricate sculptures—both human and natural—show the intimate links between nature and the cultures that thrived here. The underground cave architecture, for example, seems to be a mere extension of the natural landscape. The towering columns of the Divy and the surrounding limestone formations are like spires belonging to the churches beneath the earth's surface. Such images of Divnogore leave a lasting impression on visitors to this area.

Indeed, to fully grasp the beauty of Divnogore, it is essential to visit and observe its treasures with one's own eyes. Divnogore is open from early spring until late fall. Tours are offered and can be tailored to meet the needs of particular experts, students, and tourists. During the summer, historical camps organized along the themes of "Ancient Slavs" and "Ancient Nomads" are held for children.

The employees here hope to further develop Divnogore Museum Zapovednik as a research, ecological, and cultural-historical center. We would appreciate any help, suggestions, or proposals from our colleagues abroad for joint projects aimed at expanding and promoting nature conservation here.

Marina I. Lylova *is the Director of Divnogore.*

Marina V. Chernobylova *is a senior research scientist at Divnogore.*

ENVIRONMENTAL EDUCATION

Indigenous Cultures and Zapovedniks: A Case Study of Bolshaya Kokshaga Zapovednik and the Mari People

by ***Svetlana Popova***

Just east of the Volga River, between Vyatka and Kazan, lies the small Autonomous Republic of Mari El. Mari El is home to one of Russia's indigenous peoples, the Mari, and more recently, Bolshaya Kokshaga Zapovednik. The Mari people have long known about the nature that characterizes this region where they have lived for hundreds of years. The Zapovednik staff, on the other hand, is just beginning to understand the Mari.

One distinctive feature of this group is their simultaneous adherence to their traditional religions and Christianity. Their traditional rites take place in a sacred grove. The Mari revere the spirits of wild nature, such as the spirits of the forest, of the river, and of the sun.

Environmental education specialists claim that the Mari's world outlook is tied to the environment. Because of this, it seems that the Mari would regard the establishment of protected areas favorably. We decided to test this opinion by studying Mari attitudes toward the creation of Bolshaya Kokshaga Zapovednik in 1995.

Using a specially developed questionnaire, we surveyed more than 200 Mari of different ages and social backgrounds. We were pleased by the results: more than 50 percent of those surveyed expressed positive attitudes toward the Zapovednik. Our findings indicated several factors that influence these attitudes. These factors include:

- **Place of residence.** The further away from the Zapovednik, the more positive the attitude;
- **Level of information.** Knowledge of the primary purposes and tasks of the Zapovednik contribute to a high opinion of this area;
- **Degree of satisfaction with the use of natural resources to meet basic requirements.** Deprivation of essential resources fosters negative thoughts about the Zapovednik;
- **Age.** The younger the person, the more positive his/her attitudes about protected areas.

Our survey, however, did not disclose a connection between the attitudes of the Mari toward the Zapovednik and their traditional beliefs. Yet, by comparing statistics of Bolshaya Kokshaga's nature protection department with the statistics of these departments in other Zapovedniks, we can infer the existence of such a connection.

We discovered that the frequency of violations in the Zapovednik is lower in Bolshaya Kokshaga than in other Zapovedniks. In fact, in Bolshaya Kokshaga, there are practically no incidences of serious violations. Why is this the case, especially considering that Bolshaya Kokshaga is located close to settlements where people are heavily dependent on the surrounding environment to provide for their basic needs? We hypothesize that the law-abiding nature of the Mari is not driven by a fear of being reprimanded, but is rather a consequence of their deeply-rooted reverence for nature. We are continuing our research to shed more light on this unanswered question.

Mari girls dressed in traditional clothing. *Photo reprinted from the brochure, "Kraski Kokshagi"*

History and Culture of the Mari

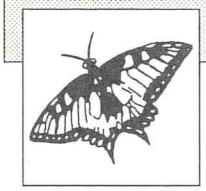
The Mari people belong to the Subural race (an anthropological branch of the Ural race), a hybrid of Europeans and Mongols. Yet, throughout their 1,000-year history, they have also assimilated with Turkic-speaking Bulgarians (the ethnological base of the lower Volski Tartars). They share an abundance of common cultural analogies with the Chuvash people (inhabitants of central European Russia). The discovery of ancient Iranian words in their language and the more recent incorporation of the Turkic language indicates the close contact they have had with these groups. Interrelations among Mari and Russians have been traced back to the thirteenth century.

The Mari lands were incorporated into Russian territory following the Russia/Kazan struggle in 1551-52. During the sixteenth, seventeenth, and early eighteenth century, the Mari resisted conversion to Christianity and opposed the development of the Russian state administration. Despite Russia's rapid transformation to an industrial society at the beginning of the twentieth century, the Mari culture has remained relatively unchanged. The natural and geographical conditions of the Mari ethnographic territory, located on the junction of coniferous and broadleaf forests, have set the stage for the devel-

opment of a settled farming/animal husbandry economy in conjunction with ancient hunting, gathering, fishing, and apiarian techniques. Applied arts in the Mari culture—carvings, imprints, wood burning on trees, and ornamental embroidery—also have ancient roots.

Today, most Mari live in the Russian Federation, where their population is approximately 600,000 people. More than three-fourths of this population live in villages. The most densely populated areas are Mari El, with 57 percent of the population, and the Bashkortostan and Sverdlovsk Regions, with twenty-one percent of the population. (The latter two areas are located in the central Urals.) The Mari people are divided into different categories, depending on their geographic orientation: one group of Mari (with the stress on the "i") inhabits flatter lands to the east of the Volga River; another group of Mari (with the stress on the "a") densely populate the right, elevated bank of the Volga. Four dialects of the Mariiski language, which belongs to the Volskoi group of Finno-Ugric languages, have been distinguished. The dialects are different enough that it is difficult for Mari from the east to understand the Mari dwelling in the west.

Svetlana Popova *is the head of the Environmental Education Department at Bolshaya Kokshaga Zapovednik.*



ENDANGERED SPECIES

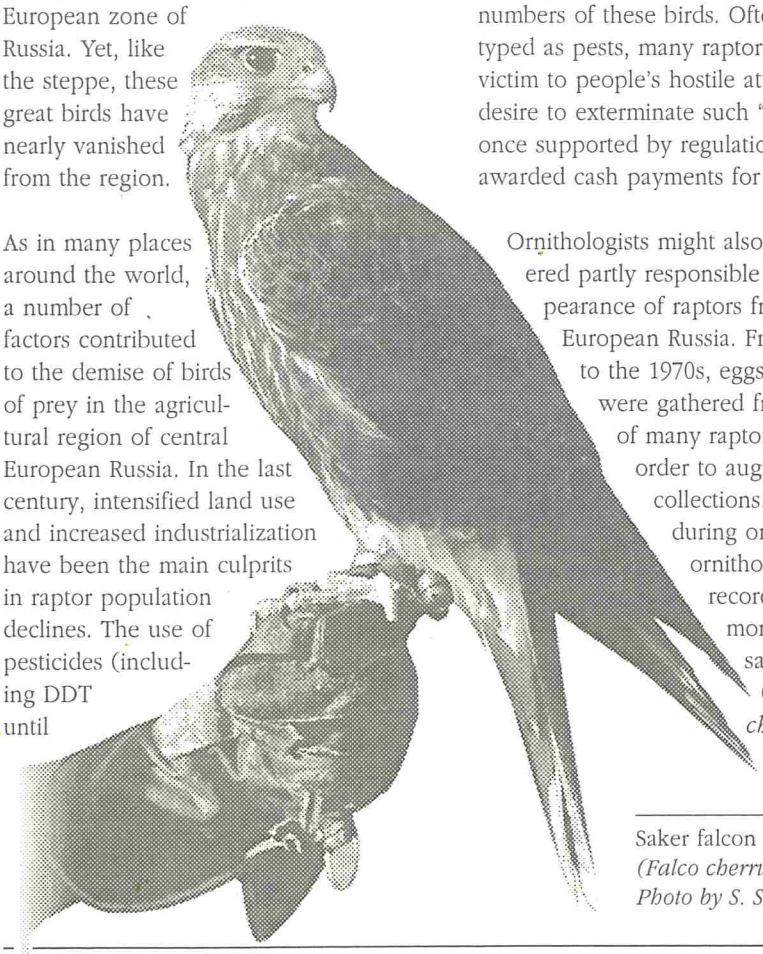
Returning Raptors to Central European Russia

by ***Petr I. Dudin, Igor Berezhnov*** *and* ***Sergei L. Sobolev***

Soaring above fields and forests while scoping the landscape for prey, a host of raptor species once graced the central European zone of Russia. Yet, like the steppe, these great birds have nearly vanished from the region.

As in many places around the world, a number of factors contributed to the demise of birds of prey in the agricultural region of central European Russia. In the last century, intensified land use and increased industrialization have been the main culprits in raptor population declines. The use of pesticides (including DDT until the 1970s) and chemical fertilizers especially affected the reproductive success of many species, while deforestation and the loss of important habitat also contributed to population declines. Hunting, too, has directly influenced the numbers of these birds. Often stereotyped as pests, many raptors have fallen victim to people's hostile attitudes. The desire to exterminate such "pests" was once supported by regulations which awarded cash payments for killed birds.

Ornithologists might also be considered partly responsible for the disappearance of raptors from central European Russia. From the 1950s to the 1970s, eggs and chicks were gathered from the nests of many raptor species in order to augment scientific collections. For example, during one season, an ornithologist recorded taking more than 30 saker falcons (*Falco cherrug*) from their nests.



Saker falcon (*Falco cherrug*). *Photo by S. Sobolev*

Times have changed and now new laws have been put into effect that punish poachers of any raptor species. Nonetheless, the general attitudes towards these birds have shifted little, and still, few hunters forfeit the opportunity to shoot a bird of prey. Just recently, a case of poaching was recorded near the only white-tailed eagle (*Haliaeetus albicilla*) nest in the Lipetsk Oblast.

As these negative trends continue, the breeding center for rare raptor species at the Galichya Gora Zapovednik (Lipetsk Oblast) persists in its work to revitalize local populations of raptor species. This center, established in 1990 by Voronezh University, aims to restore severely dwindling bird populations in the territory of the Middle Don River through the reintroduction of birds bred in captivity. The breeding facility is equipped with four enclosed blocks partitioned into separate units, plus a large circular cage used for pairing birds. There is also a laboratory on the premises complete with incubators, freezers, and other equipment. The center is funded mainly by the university and in part by the Lipetsk Regional Committee of Nature Protection, which supports a program on saker falcons in the region.

Today seven species of birds reside at Galichya Gora Zapovednik, almost all of which are listed in the Red Data Books of Rare and Endangered Species of Russia and in some cases the "Red Book" of IUCN (World Conservation Union). These birds are the saker falcon (*Falco*

cherrug), gyrfalcon (*Falco rusticolus*), peregrine falcon (*Falco peregrinus*), imperial eagle (*Aquila heliaca*), golden eagle (*Aquila chrysaetos*), tawny eagle (*Aquila rapax*), and booted eagle (*Hieraaetus pennatus*).

One of the species with which the center has been working closely is the saker falcon. The center began raising this species for reintroduction into the wild in 1991. To date, 35 breeding adults have been raised, five pairs of which produced 38 chicks in 1998. So far this year, 15 of these chicks have been released into the wild. Prior to 1998, 32 individuals were reintroduced.

Scientists at the center use two different approaches in raising the saker falcon, both the traditional method of nest platforms (boxes) and the use of foster parents. Nest platforms were first used by American scientists working with the peregrine falcon in the Rocky Mountains in the western US. Later, the use of such platforms was widely applied for the reintroduction of the peregrine falcon and golden eagle in urban environments.

The use of nesting platforms provides the chicks with a nearly ideal environment, shielding them from natural threats and at the same time, limiting their contact with humans. The system has a fairly simple design: a special pulley is attached to the nesting box, which is placed about 15 m high in a tree and allows for birds to receive their food with minimal human contact. The young birds stay in these boxes for around three to four weeks, during which time they are fed carrion and learn to acquire a taste for prey species they must later hunt themselves. The use of such nesting boxes, while effective, has proven to be costly and labor-intensive. As an alternative to the nest platforms, the method of "foster" parenting has been incorporated in the Galichya Gora raptor center.

In foster parenting, eggs of rare species are removed from the nests of their parents and placed in the nest of "foster" parent birds, typically common species that occupy similar habitats as the raptors of concern. The removal of eggs from the parent bird is believed to stimulate the laying of a new clutch of eggs, thereby increasing the chances for reproductive success. Meanwhile, the first clutch is raised to adulthood in the nest of the foster parents. In this part of Russia, the surrogate parent species include the buzzard (*Buteo buteo*) or the goshawk (*Accipiter gentilis*).

While less expensive and invasive than the nesting platform method, the foster parent method of raising young raptors does have its risks. The chicks of foster parents are more vulnerable to predators such as the marten (*Martes martus*) than young birds which are raised in the more protective nesting boxes. Also, the foster parents will occasionally abandon their adopted chicks. Fortunately, when the Galichya Gora Raptor Center tested this method to hatch imperial eagle chicks, the buzzards

Are They Really All Gone?

Although most of the birds of prey bred in the Galichya Gora Zapovednik raptor center are endangered species or on the verge of extinction in the Voronezh and Lipetsk Oblasts, they have not entirely disappeared from this region of Russia.

Saker falcon *(Falco cherrug)* was commonly found in this area in the mid-twentieth century, but by the end of the 1980s, only one or two pairs were found nesting in Galichya Gora Zapovednik. It is estimated that between four to seven pairs are now found in this region. This species is listed in the Russian Red Data Book. In the Lipetsk Oblast it is on the verge of going extinct; in the Voronezh Oblast it is classified as an extremely rare nesting species.

Gyrfalcon *(Falco rusticolus)* does not nest in this region. The only sighting of it here was in 1897. It is listed in the Russian Red Data Book and the IUCN Red Book.

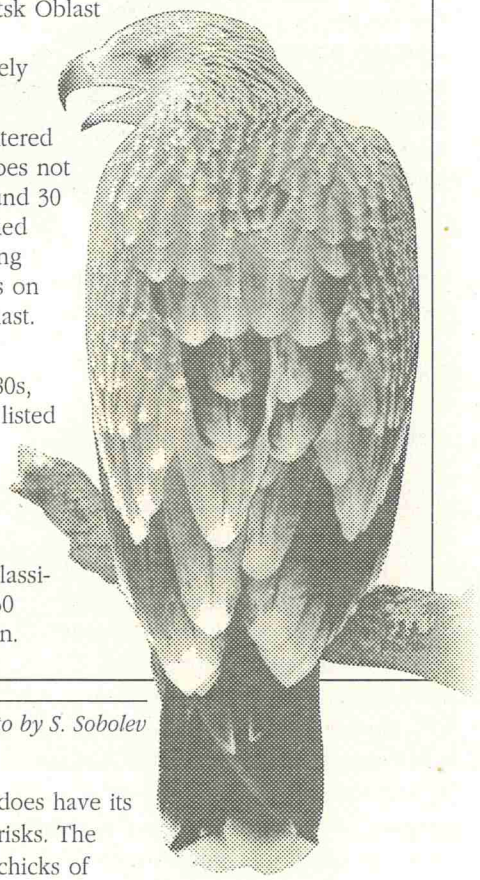
Peregrine falcon *(Falco peregrinus)* was found in small numbers in this area at the beginning of the century. Today this population has been severely curtailed and only a few pairs reside here. This species is listed in the Russian Red Data Book and is on the verge of going extinct in both Oblasts.

Imperial eagle *(Aquila heliaca)* was a common nesting species in this area in the mid-nineteenth and early twentieth centuries. Today, between five to eight pairs remain, two of which are nesting. This species is listed in both the Russian Red Data Book and IUCN Red Book. In the Lipetsk Oblast it is on the verge of going extinct; in the Voronezh Oblast it is classified as an extremely rare nesting species.

Golden eagle *(Aquila chrysaetos)* is encountered in this area during the winter; however, it does not nest here. Its population is estimated at around 30 to 40 individuals. It is listed in the Russian Red Data Book and is classified as a rare migrating winter species in the Voronezh Oblast and is on the verge of going extinct in the Lipetsk Oblast.

Tawny eagle *(Aquila rapax)* has not been observed nesting in this region since the 1980s, when two nests were found. This species is listed in the Russian Red Data Book and is an extremely rare nesting species (Voronezh Oblast).

Booted Eagle *(Hieraaetus pennatus)* is not listed in any Red Data Book; however it is classified as a rare species. Approximately 20 to 30 nesting pairs are reported to be in this region.

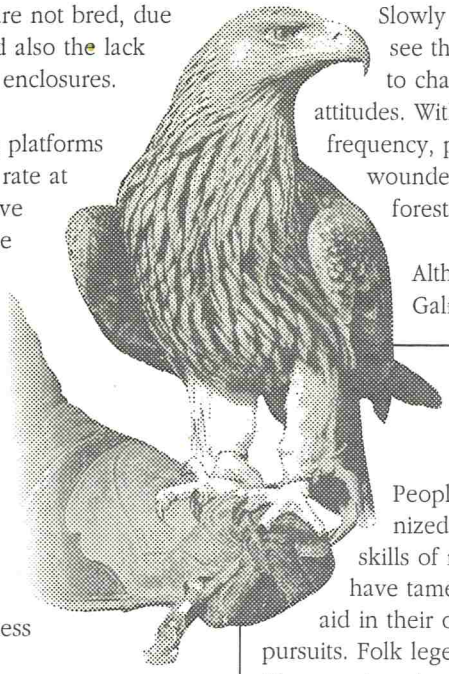


Golden eagle *(Aquila chrysaetos). Photo by S. Sobolev*

reared their adopted chicks successfully. Two chicks were raised this way each year from 1995 to 1997.

In addition to the breeding and release of the saker falcon and the imperial eagle, a pair of kestrels (*Falco tinnunculus*) were raised on nesting platforms and released into the wild in 1991. The remaining species in the center are not bred, due to their immaturity and also the lack of necessary breeding enclosures.

It appears that nesting platforms have a higher success rate at the center, as there have been some cases of the chicks falling victim to the marten when using the foster parent method. Unfortunately, due to the absence of telemetry equipment to monitor the birds that have been released into the wild, we cannot evaluate the effectiveness of the two methods we have used in the program.



Golden eagle *(Aquila chrysaetos). Photo by S. Sobolev*

Every bird bred at the center, however, is ringed with a metal band plus a bright plastic tag to aid in identifying it from long distances. Thus far in 1998, one individual saker falcon has been encountered three times on the territory of the Zapovednik, indicating that at least one introduced individual has remained in the surrounding environs. Judging from its tag, this individual was released sometime in the past years. Altogether, we have released 47 individuals since the onset of our program. We believe that it at this point in our program, it is premature to talk about the effectiveness of these reintroductions in increasing the raptor populations of the region.

In addition to our breeding program, we have initiated educational activities, such as tours of our premises, as well as lectures and presentations in the Zapovednik and local schools. During these outreach sessions, we emphasize the important role that raptor species play in the ecosystem and describe the severe consequences that can occur when these birds are removed from the environment. We also try to paint a picture of these falcons and eagles as majestic symbols of Russian nature, and as creatures worthy of respect. Slowly we are beginning to see the fruits of our efforts to change peoples' attitudes. With increasing frequency, people are bringing wounded birds found in the forests to our center.

Although the program at Galichya Gora is still young, it has not gone unnoticed. In 1996, the center received the Andrew Sabin award for the successful organization of breeding rare and nearly extinct raptor species. (The Andrew Sabin award is a high honor presented annually to two to three individuals who have made great contributions to the conservation of biodiversity in Russia.)

In the future, the center plans to strengthen its existing program by increasing the number of birds reintroduced into the wild; researching new, effective release methods; and expanding the geographical territory into which the birds are released. The center is highly interested in potential collaboration with foreign organizations or individuals who may be interested in developing this program.

Petr I. Dudin *is the Director of the raptor center at Galichya Gora.*

Igor Berezhnov *is a scientist at the raptor center.*

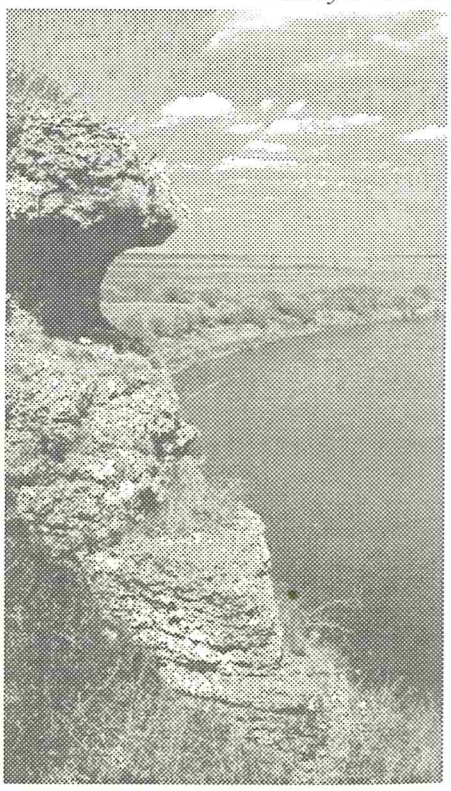
Sergei Sobolev *is a scientist at Voronezh University's Biological Center.*

Adept Hunters

People have long recognized the keen hunting skills of raptor species and have tamed these birds to aid in their own hunting pursuits. Folk legends tell of the Kievan prince in ancient Rus' who hunted with the first group of falcons trained for this purpose. Throughout the centuries in Russia, falcons have received special recognition as hunters, especially from tsars and princes. In the eleventh century, the Tsar Yaroslav the Wise was the first to enact legislation regulating hunting birds. Hunting birds, in particular the gyrfalcon, pursued cranes, swans, geese, and ducks.

Today, the practice of using raptor species—saker falcon and buzzard—in hare and pheasant hunting has been successfully developed in several European countries. At the breeding center, we try to continue the Russian tradition of hunting with raptor species, using long-standing methods to tame and train the birds according to their abilities. As in other European countries, the two species we raise as hunters are the saker falcon and the buzzard. The main target of their hunt is the partridge *(Perdix perdix)*.

Galichya Gora Zapovednik. *Photo by S. Sobolev*



ENDANGERED ECOSYSTEMS

The Effects of Hydroelectric Projects on Ecosystems of the Zeya River Valley: Will History Repeat Itself?

by ***Sergei A. Podolski***

An immense reservoir was created when the Zeya Hydroelectric Power Station was built in 1974, blocking the flow of the Zeya River. The result was unprecedented damage to ecosystems of the Zeyski River Valley, in the Amur Region of the Russian Far East. This enormous body of water seems to extend beyond the horizon, covering 2,420 square km and up to 70 km in width.

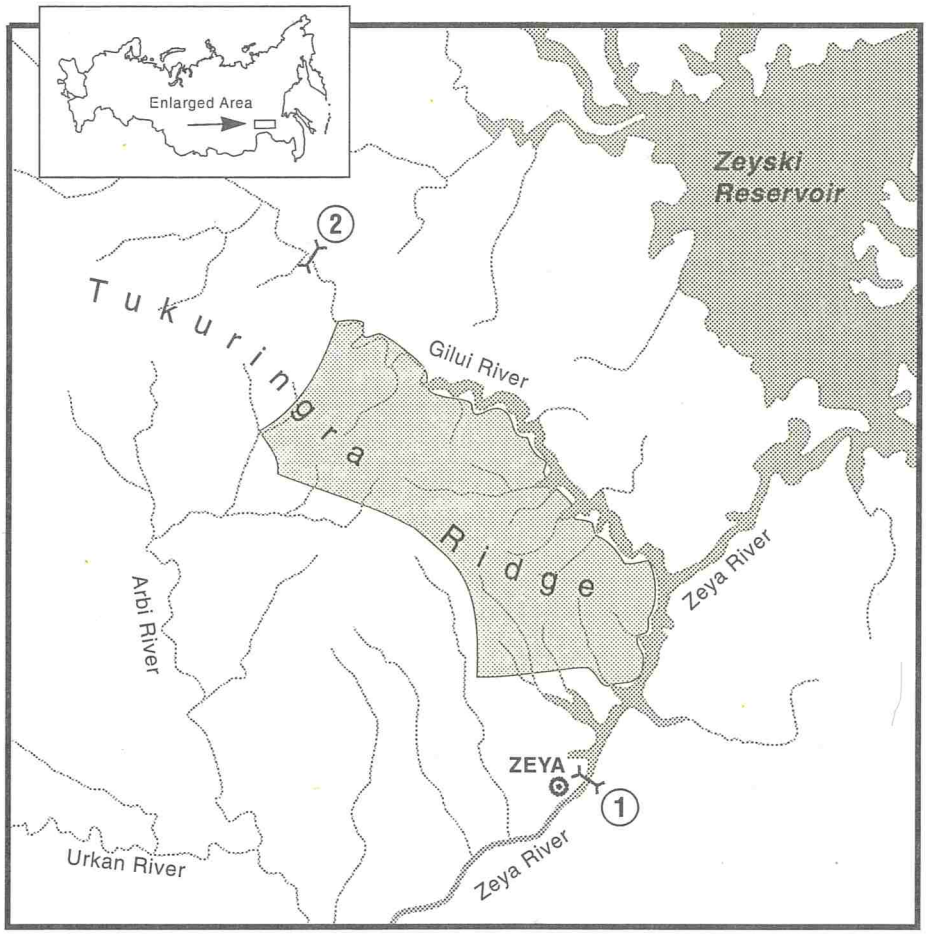
The Zeya River Valley (in the southeastern part of Zeyski Zapovednik), now half-flooded, was once an important corridor for migrating species. Denuded of once abundant vegetation, only skeletons of dead trees and scars of landslides remain in the basin. Other valleys in this part of the Zapovednik—habitats with high species diversity—were also inundated in the water project.

Long-term studies of ecosystems in the Zapovednik confirm that stark changes have taken place as a result of the reservoir. Species that once depended on the Zeyski Valley, such as the long-tailed suslik (*Citellus undulatus*), harvest mouse (*Micromys minutus*), vole (*Microtus maximiwiczii*), wild boar (*Sus scrofa*), badger (*Meles meles*), otter (*Lutra lutra*), and raccoon dog (*Nyctereutes procyonoides*), have since disappeared from the region.

Most importantly, the reservoir severed the main routes of migrating species such as roe deer (*Capreolus capreolus*) and moose (*Alces alces*). Directly following the flooding, many roe deer perished in the water and while crossing the ice. Roe deer populations have decreased tenfold since the power station was built, while migration near the mouth of the Gilui River, a tributary of the Zeya River, ceased completely from 1978 until the beginning of the 1990s. The slippery ice of the Gilui Bay presented a nearly insurmountable obstacle during the spring migrations of roe deer.

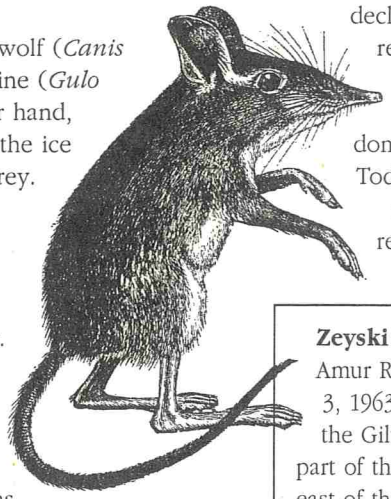
Moose did not attempt to traverse the frozen Gilui Bay at all and were forced to circumvent it. Ten years passed before moose were able to establish a new migration route. The new path over mountain tundra proved to be considerably longer and more difficult to cross. Two-thirds of the moose population now follow this route on seasonal migrations. The remainder spends the summer in the mountains, deprived of foraging in the lush river valleys.

The reservoir creates difficulties for other wildlife as well. The Siberian musk deer (*Moschus moschiferus*) and the red deer (*Cervus elaphus*) are particularly affected during winter months. The steep, rocky banks of the reservoir are covered with an unstable and brittle layer of ice, punctured with deep cracks, due to the 5- to 15-m drop in water levels. Animals that graze along the upper banks of the reservoir risk falling into one of the cracks or skidding down the slopes, causing injury to limbs or even death. Zapovednik employees register an average of



Map of Zeyski Zapovednik and surrounding area. 1. Existing Dam, 2. Proposed Dam. Shaded area: Zeyski Zapovednik. *Map by S. Podolski, edited by K. Pakhorukova*

seven to ten cases of accidental deaths of the musk deer per year.



Predators such as wolf (*Canis lupus*) and wolverine (*Gulo gulo*), on the other hand, take advantage of the ice sheet to capture prey. They attack their prey on the ice, cornering them in the capes that jut out over the water.

Although the influence of the reservoir on regional ecosystems is more vivid during winters and seasonal migrations, it is nonetheless pervasive year-round. The reservoir isolated many populations of land animals, acting as an interminable geographic barrier. The greatest negative impact has been felt by species at the edge of their range. Dr. V. Ilyashenko, the first scientist to study the reservoir's impact on local ecosystems, found that the vole population (*Microtus maximoviczii*) diverged into several subpopulations near the mouths of tributaries flowing into the reservoir. These groups could not exist under strict isolation and went extinct after a few years.

Creation of the reservoir paved the way for increased human presence in the area via motorboats, snowmobiles, and motor vehicles. Greater accessibility to protected areas has resulted in more incidents of poaching for some animals. In the winter of 1991-92, for instance, at least 12 red deer were killed on the shore of the reservoir, and 4 in the winter of 1993-94.

Besides direct effects on wildlife, the reservoir prompted climatic changes, namely an increase in humidity and precipitation and a decrease in the mean annual temperature in the valley. This alteration in climate is linked to a reversal in dominant species of rodent communities. The gray large-toothed redback vole (*Clethrionomys rufocanus*) dominated in the majority of habitats before the reservoir's creation. Beginning in 1980, the proportion of this species in the community began to decline, while the northern redback vole (*Clethrionomys rutilus*), better adapted to humid conditions, began to dominate the community in 1981. Today, the gray large-toothed redback vole population has recovered after adjusting to the changes caused by the reservoir, but this occurred only after almost twenty years.

Zeyski Zapovednik (Zeyski Oblast, Amur Region), founded on October 3, 1963, occupies 99,400 ha along the Gilui River Basin on the eastern part of the Tukuringa Range (northeast of the Zeya Reservoir). The region is characterized by an unusual combination of mountain tundra and dwarf Siberian pine (*Pinus sibirica*), larch, birch-larch, and Jeddo spruce (*Picea jezoensis*) forests. A variety of Manchurian and Daurian vegetation types grow at the edge of their range under the canopy of flood plain oak and birch forests.

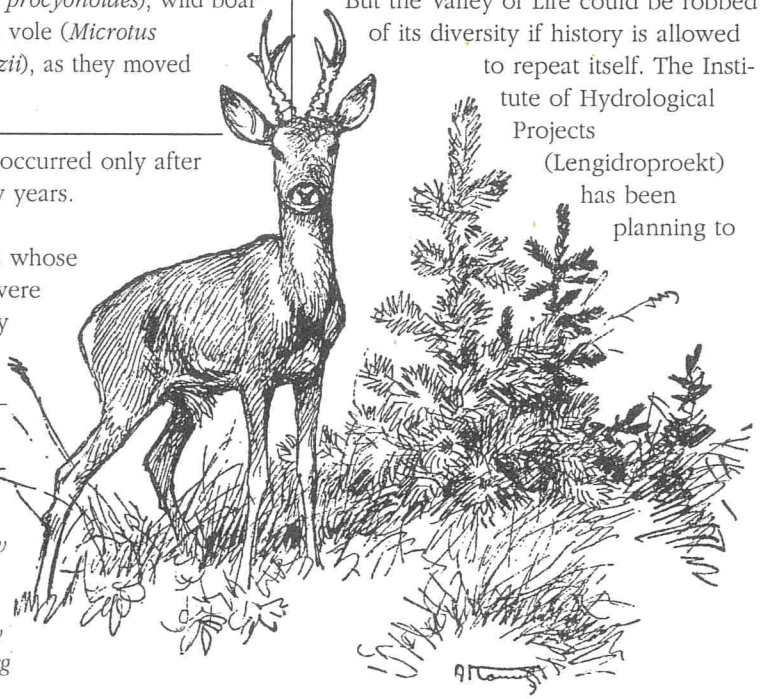
The Tukuringa Range forms an important biogeographic boundary in an area where eastern Siberian, Okhotsk, Daurian-Mongolian, and Manchurian fauna overlap. The Zeya River Basin used to be a significant passageway for southern species, such as badger (*Meles meles*), raccoon dog (*Nyctereutes procyonoides*), wild boar (*Sus scrofa*), vole (*Microtus maximowiczii*), as they moved northward.

Other species whose populations were suppressed by the reservoir, such as roe deer and lynx (*Lynx lynx*), made a gradual comeback between 1992 and 1994 as ecosystems in the region began to stabilze. Increasingly more roe deer and moose are beginning to resume former migration routes. Following an absence of more than ten years, the lenok fish (*Brachymystax lenok*) was observed in some rivers flowing into the reservoir.

Stabilization of ecosystems in the Zapovednik, however, does not mean that productivity will reach previous levels. Population densities of key species are lower now than before the reservoir, and are also lower than in areas outside the influence of the reservoir.

One region that has managed to remain unscathed is the Valley of Life, situated on the Gilui River above Zeyski Reservoir. This intact natural landscape furnishes essential valley vegetation, serving as a valuable sink habitat for accumulation of animal populations. Seasonal concentrations of red deer, moose, and brown bear (*Ursus arctos*), as well as increased numbers of hare (*Lepus sp.*), musk deer, and sable (*Martes zibellina*) have been recorded here. Lenok and taimen (*Hucho taimen*) are still present in this part of the Gilui River.

But the Valley of Life could be robbed of its diversity if history is allowed to repeat itself. The Institute of Hydrological Projects (Lengidroproekt) has been planning to



Roe Deer (*Capreolus capreolus*). *Drawing by A. Komarov in "From the Life of a Naturalist," by E. Spangenberg*

construct a hydroelectric power station on the Gilui River since 1983. The project would flood an area of the valley 30 km upstream from the Zeyski Reservoir. The plan has received a steady stream of criticism from different sources, including the State Expert Commission of the USSR, which brought attention to the dangers and economic inefficiency of the proposed station.

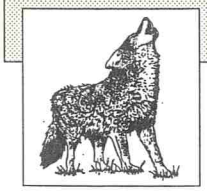
The dam would be built on a precarious, deep tectonic cross-section within a high seismic zone. Seismic activity could result in damage to the existing hydroelectric power station downstream, not to mention local communities. Water contamination by the stations is another sober threat: the phenol content of the water currently released from the Zeyski hydroelectric power station exceeds the allowable level by 12 times. Little is known on how much the water quality will deteriorate after the construction of a second power station. Not surprisingly, surveys of local communities showed that the vast majority opposes the Gilui power station, despite generous benefits promised by local authorities.

What will happen to Zeyski Zapovednik and the region if the Gilui hydroelectric power station is built?

- A 19-km reach of the valley in the Zapovednik will be flooded. Winters here will be reduced to swirling streams originating from unfrozen patches of water dotting the ice. Freezing fog will drift up the slopes bordering the reservoir, threatening habitat of the Siberian spruce grouse *(Falcipennis falcipennis),* an endangered species listed in the Red Book Data Book of IUCN (World Conservation Union).
- Migration routes of moose and roe deer will be severed once again. Moose will be unable to circumvent the cascade produced by two stations. This will cause a decline in moose populations by two-thirds. Local passageways of musk deer and red deer will vanish, separating them from their main food and shelter. Moreover, human disturbance of the territory and poaching will reach new limits.
- Not only biodiversity, but geological diversity will be wiped out as the result of this new station. A geological cross-section formed by the Gilui River will be submerged by the new reservoir. This extraordinary formation, which preserves ancient strata from the early pre-Cambrian period, earned the distinction of an historical relic, worthy of nomination as a UNESCO World Heritage Site.
- Successive drastic alteration of the environment by the proposed dam would result in a second major destabilization of local ecosystems. Most significantly, the last intact river valley harboring natural ecosystems in the Gilui River Basin—an important buffer zone for diffusing the effects of the Zeya Reservoir—will be practically destroyed.

The current economic crisis has stalled project implementation for the time being. But the possibility still exists that one day the project will materialize. If the project is allowed to continue, despite lessons learned from past mistakes, destruction of natural ecosystems in the Zeya River Valley will reach new heights.

Sergei A. Podolski, *Ph.D., is the head engineer in the Laboratory of Surface Water Ecosystems at the Water Research Institute in Moscow.*



FOR DISCUSSION

Ecotourism in Russia's Zapovedniks: Sustainable Development, or a Direct Road To Ruin?

From the Editors*: Since their creation in the early part of this century Zapovedniks [strict scientific reserves] have been managed for three main purposes: scientific research, conservation of ecosystems, and education. Education, however, was defined narrowly. For most of the past 70 years, Zapovedniks' educational activities were oriented toward students of biology and other sciences. With the exception of being able to visit Zapovednik natural history museums, the general public had little access to these reserves. With regular funding from the state, reserve managers seldom had to worry about fundraising and had little need for public participation in management.*

Today, however, Zapovednik managers face a dire need for funding to support even the most basic operations in their reserves. In this post-Soviet era, they can no longer rule by decree and realize that public support for protected areas will be critical for successful conservation. In many reserves, ecotourism is being touted as the solution to both economic and social problems. With permission from the Department of Nature Reserve Management, many managers throughout Russia are trying it out.

This increased access to wilderness areas and the new focus on income generation represents a sharp departure from historical management practices. A highly controversial issue being discussed among Russians and their foreign colleagues, ecotourism appears to offer significant benefits for people in and around protected areas. But what about the costs? Are they being calculated adequately, too? The following section presents two opposing viewpoints on the subject.

Ecotourism: Direct Road to Ruin

by ***Dr. Olin E. Rhodes, Jr.***

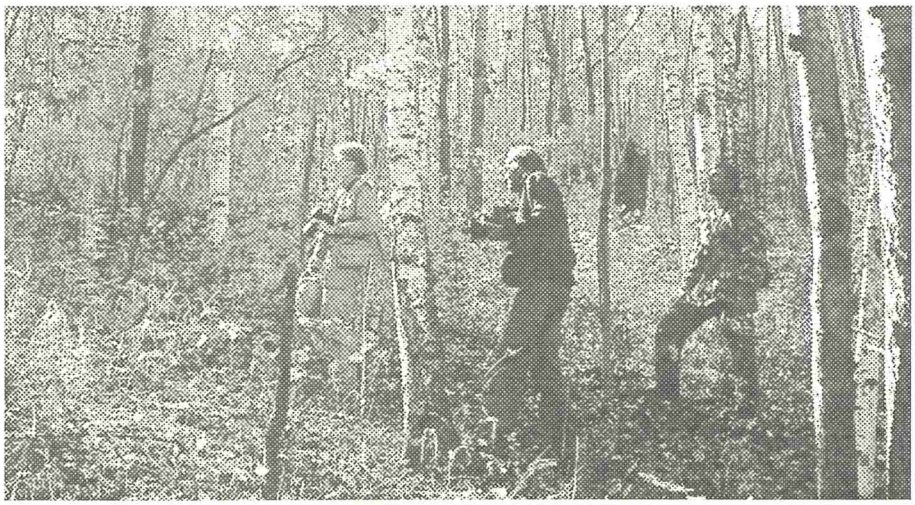
I write these words having just spent four days within Denezhkin Kamen, a Zapovednik located deep in the Ural mountains. I am fortunate to have experienced this adventure and to have worked with the Zapovednik staff over the past two years from my position as an Assistant Professor of wildlife ecology at Purdue University. Our work together has focused on the scientific aspects of the Zapovednik system, encompassing both nature protection and long-term ecological monitoring. The goal of our collaboration and that of the symposium we have just held with a subset of the Ural mountains Zapovedniks is to use modern technologies, such as GIS, to enhance the abilities of the preserve personnel to collaborate with one another, as well as with western scientists. We recognize that there are many challenges ahead for the Zapovednik system, in light of the economic and political changes that are now occurring in Russia, and our strategy is to help the preserves to survive without altering their basic mission and unique status in the global environmental scheme. Russian Zapovedniks, despite their turbulent history, represent a rather unique opportunity for the global environmental community to invest in true preservation of natural territories and a chance for long-term ecological research to exist within the framework of large, setaside areas rather than within the matrix of a human dominated landscape.

The issue it seems is how to help Zapovedniks survive in light of the current financial crisis. I am told that tourism and the dollars that such activities would bring is one potential solution to the problem. I will not argue that tourism would not in fact bring dollars to the preserves, it probably would. However, when the last guest lodge is built and the multitude of amenities that tourists require are in place, there will be no more Zapovedniks. For it is the very absence of people that defines the Zapovednik system. In essence, to save the Zapovednik system with tourist dollars would be to destroy it and with that destruction comes the loss of something that is integral to Russian society and the oneness of the Russian people with their land.

I am a scientist, and being a scientist I see the value of the Zapovednik system for what it is today and has been for decades. It is a wealth of knowledge and promise for our future. It is a system of strictly protected lands in a world where so few such lands exist. It is a basis to stimulate collaboration between east and west using the language of science as its foundation. It is a global resource that deserves our best efforts for its protection, not its well-intended, yet unknowing destruction. It is an opportunity for preservation in a world where few such opportunities are left.

Russia is a country with vast natural resources and many opportunities for tourist activities that would not involve the loss of the Zapovednik system as a cost. For instance, many of the lands now managed by the Federal Forest Service of Russia would make spectacular additions to the National Park system of Russia and would not require the loss of the Zapovednik mission. A Zapovednik changed to a national park for tourists is forever a national park; the land cannot be recovered to its former purpose.

Ironically, as is often the case, we are on the same side. While we all wish to save this undeniably unique resource for posterity, we differ only in our method of salvation. My arguments are simple in that I am convinced that the introduction of tourists into the Zapovednik system will inherently lead to its destruction. My strategy is based on the fact that Zapovedniks are valuable scientific and societal resources. However, as with all such assessments of natural value, the global value of Zapovedniks is a human-derived quantity and cannot be demonstrated without our help. Given the length of time that Zapovedniks have persisted and the wealth of information that they have accumulated in their Chronicles of Nature (Letopis' Prirody), I submit that their scientific and societal values can be demonstrated effectively. Furthermore, I propose that their worldwide value can be demonstrated by building effective collaborations with western scientists, leading to the generation of funding toward the support of their mission and the achievement of a greater public awareness of what the Zapovednik system has to offer the world.



Wandering ecotourists in the mixed forest at Lazovski Zapovednik. *Photo by E. Nikitina*

Dr. Olin E. Rhodes, Jr. *is an Assistant Professor of wildlife ecology at Purdue University.*

Ecotourism: an Opportunity for Sustainable Development

by ***Elena Nikitina***

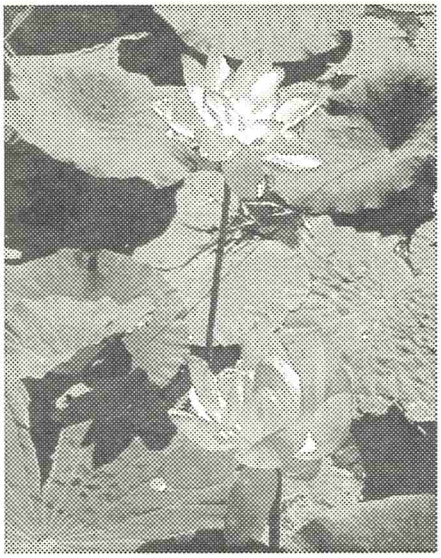
After 80 years of isolation, Russia's Zapovedniks are beginning to seize the attention of "adventure tourists" worldwide. During the Soviet period, strict limitations and prohibitions against entering nature reserves helped to protect nature in its wild state. Today, with more relaxed international borders and changes in the management regime of these reserves, Zapovedniks are more accessible to "ecotourists" and can offer a wilderness experience unparalleled in the world.

Ecotourism, which encompasses a range of activities including scientific tours, student internships, trips for nature lovers, bird-watching trips, and filming expeditions, is a relatively new phenomenon in Russia. One of the first tours occurred in 1992, when a British film crew shot footage of the Amur tiger in Lazovski Zapovednik in the Russian Far East.

In 1995 a feasibility study on ecotourism was conducted in the Russian Far East within the framework of the Environmental Policy and Technology (EPT) project. This study revealed great potential to develop ecotourism as an attractive and economically viable activity. Also, it concluded that ecotourism, taking the need for resource conservation into account, was the most logical type of tourism to promote in the region.

The following year, in 1996, the Russian Programme Office of the World Wide Fund for Nature (WWF) launched a project for the development of ecotourism in the Primorski (Maritime) Region of the Russian Far East (*please refer to the accompanying article "WWF Ecotourism Project: Lessons Learned from the Russian Far East"*). The project demonstrated that although there are divergent opinions about ecotourism development in nature reserves, many Zapovednik managers view the idea positively and believe that they could be successful in organizing ecotours.

Under the right circumstances, ecotourism can greatly enhance the activities of Russia's nature reserves. For instance, ecotourism can play an important role in environmental education. Zapovedniks in the Primorski Region are now beginning



Lotus *(Nelumbium),* Khankaiski Zapovednik. *Photo by E. Nikitina*

to realize that their work cannot be successful without the understanding and strong support of the general public. Ecotourism offers an effective tool in raising public awareness: nothing is more effective in encouraging respect for protected areas than direct personal experience with nature. Ecotourism may also take the form of scientific tours, which open the door to the international scientific community and opportunities to start joint projects.

Besides its educational value, ecotourism can provide an additional source of financial support sorely needed during this time of drastic budget cuts in governmental funding for protected areas. Because ecotourism does not require extensive infrastructure, it is not a great imposition on the Zapovednik; it can provide revenue with minimal initial investments. In addition to the basic fee paid by tourists, Zapovedniks occasionally receive supplemental donations or other contributions from guests who realize that a little extra funding can be of great help to the Zapovednik.

The benefits of ecotourism also extend beyond the reaches of the Zapovedniks. Following the dissolution of the Soviet Union, many regional economic activities have collapsed. Faced with high unemployment, local communities have begun to depend on traditional economic activities such as keeping livestock, haymaking, and hunting. Ecotourism can help alleviate the negative influence of these activities on nearby protected areas by providing an alternative economic incentive for the local people.

One of greatest advantages of ecotourism development is its minimal negative ecological impact. Most of the ecotourists visiting Zapovedniks are very conscious of the area's fragility. Experience has shown that if tourists are informed about the rules and regulations in a protected area, it is highly likely that they will observe them. Moreover, ecotourists set positive examples for local people by gathering litter left on the trails and hauling it back to the villages.

Nonetheless, a certain compromise always exists between ecotourism development and the conservation of completely intact wilderness areas. In order to minimize negative consequences of ecotourism and maximize its benefits, serious planning and preparation are required. The number of tourists in Zapovedniks should be limited and regulated through a detailed selection process. The organization of long and highly specialized (and more expensive) ecotours for a few groups seems to be the most appropriate option for Zapovedniks.

Another way to reduce the effects of ecotourism is to restrict tourists to the buffer zones of the Zapovedniks, areas surrounding the core protected area in which some limited human activities are permitted. This allows the Zapovednik to maintain a strict nature protection regime

and conduct scientific research on the primary part of their territory. Ecotourism in the buffer zone does not necessitate the construction of large, new lodges on the territory of the Zapovedniks. Rather, accommodations could be arranged in bordering villages with host families, an option often more desirable for ecotourists who wish to become acquainted with local culture as well as nature. Thus, if properly organized, it is evident that ecotourism can simultaneously meet conservation, education, publicity, and economic objectives of the Zapovednik.

WWF Ecotourism Project: Lessons Learned from the Russian Far East

by ***Elena Nikitina***

This project, initiated by the Russian Programme Office of the World Wide Fund for Nature (WWF) with financial support from the US Agency for International Development (USAID), aimed to lay the groundwork for ecotourism in the Russian Far East Zapovedniks and to address existing problems hindering its development in this area. Pilot tours were organized for tourists in several nature reserves and other studies were conducted to evaluate the feasibility of developing ecotourism in specific protected areas. The nature reserves that participated in the WWF project were: Lazovski, Dalnevostochny Morskoi (Far Eastern Marine), Ussuriski, and Khankaiski Zapovedniks. Bolshekhekhtsirski, Khinganski, and Bureinski Zapovedniks were added later, with additional funding from the ROLL Program (Replication of Lessons Learned) managed by the Institute for Sustainable Communities (ISC) with funding from USAID.

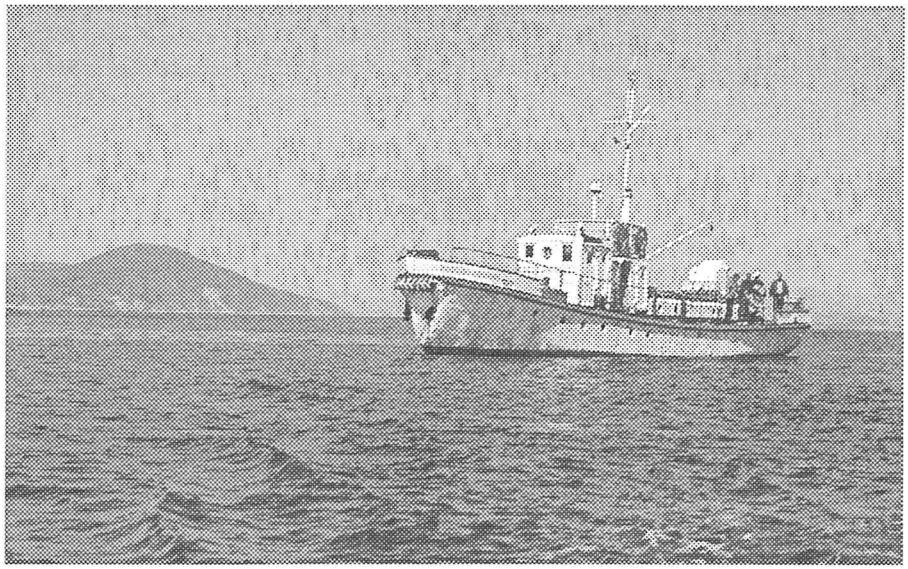
At the very beginning of this project, we interviewed several ecotourists in this region. Their feedback was used to pinpoint the most crucial problems affecting ecotourism and help design our project. We were surprised to learn that many of the ecotourists were not bothered by primitive accommodations, transport, trails or lack thereof. In many cases, the lack of infrastructure was even an attraction.

The ecotourists said that a paucity of detailed background information on the region, including scientific data such as lists of plant and animal species, was a drawback. Such information, they explained, would have been particularly useful for their own preparation for the trip. They also pointed out the lack of interpretative programs at the Zapovedniks. Another difficulty highlighted by the respondents was poor communication between the Russian hosts and their foreign visitors. Although Zapovedniks have qualified scientists and rangers, the personnel have had little training and knowledge in the areas of guiding, interpretation, and organization.

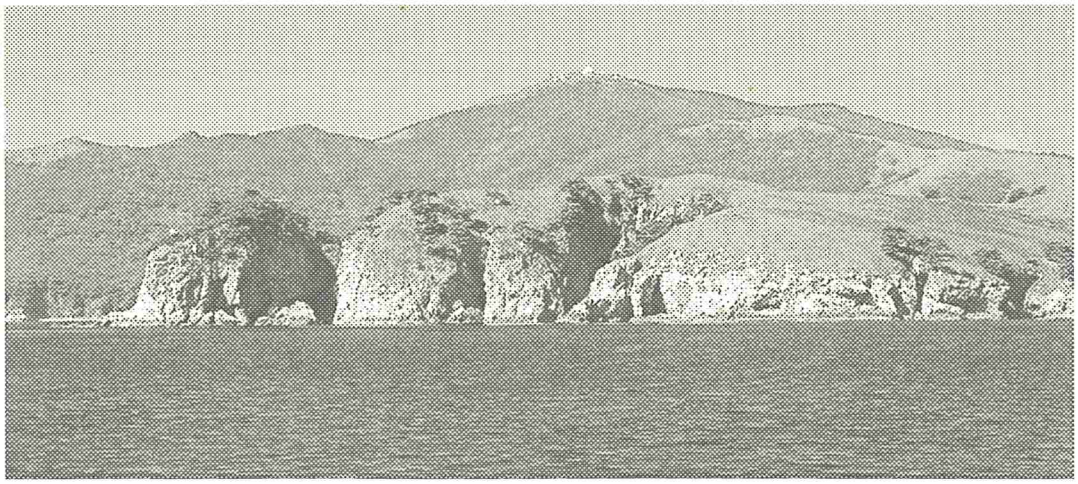
Following the interviews, initial surveys were conducted to assess each reserve's potential for ecotourism as part of the project's preparatory phase. For example, total human carrying capacities were calculated and tourist routes (i.e. hiking trails and waterways for boating) were planned. Consultations were held at which nature reserve staff members were briefed on management issues surrounding ecotourism, including financial management.

Additionally, this stage included an analysis to identify optimal categories of visitors for each Zapovednik. These categories were selected based on the Zapovedniks' attractiveness to a variety of tourists, existing natural and human resources, and the administration's willingness to work with different groups. A variety of potential tourist packages were designed to appeal to diverse tastes through a combination of lectures, wildlife viewing, and hiking trips.

This preliminary work showed that opportunities for ecotourism differ greatly among the Zapovedniks, despite their close proximity to one another, and underscored the importance of taking an individual approach towards each Zapovednik. Several Zapovedniks, such as the Far Eastern Marine Zapovednik, are able to host a wide range of prospective visitors: foreign ecotourists; "recreational" tourists; bird watchers; foreign scientists; foreign businessmen staying in the region; foreign students on internships; and local people and schoolchildren. Other Zapovedniks, however, are more limited in their scope of



A seaside view at Dalnevostochny Morskoi (Far Eastern Marine) Zapovednik. *Photo by E. Nikitina*



Southern part of Peter the Great Gulf, Dalnevostochny Morskoi (Far Eastern Marine) Zapovednik. *Photo by E. Nikitina*

visitors. For example, Ussuriski Zapovednik primarily accommodates foreign students and specialists, as well as local people and schoolchildren. Usually, trips for the local people and schoolchildren last one day; the tours for specialized groups are much longer.

The next step in this project involved designing and publishing leaflets and booklets promoting the new tourist packages. Leaflets have been produced for Ussuriski, Far Eastern Marine, Khankaiski, and Kedrovaya Pad Zapovedniks; illustrated booklets have been published for Lazovski, Bureinski, Khinganski, and Khankaiski Zapovedniks; calendars and emblems have been made for Bolshekhekhtsirski Zapovednik. Furthermore, a Web site with detailed informational packages about Zapovedniks in the Russian Far East has been developed. The site is complete with draft itineraries of possible tours, a photo gallery, and lists of plant and animal species. It may be accessed at: <http://www.bcc.ru/homepages/wwf/webcont.htm>

Besides the dissemination of information through various mediums, the development of environmental education centers has proven to be an integral component for building a successful ecotourism program. As part of the WWF Russian Far East Program, (which includes the ecotourism project), environmental education centers in Ussuriski and Far Eastern Marine Zapovedniks have been renovated as part of model projects. The new programs implemented at each center have become focal points in their communities, and are visited by hundreds of schoolchildren, local people, visitors from other regions of Russia, and foreign tourists. The centers have helped to instill a positive image of Zapovedniks among local communities as well as district and regional administrations. Moreover, they have become a source of additional financial support for the nature reserves.

After two years of work on the ecotourism project, WWF has formulated a new vision for developing ecotourism in Russia's Far Eastern nature reserves. On this basis, future plans for the continuation of ecotourism include:

- Improvement of infrastructure in Zapovedniks: lodging facilities, viewing towers and platforms for bird watching; creation and improvement of trails;
- Organization of training workshops for Zapovednik staff and representatives of travel agencies to increase their knowledge and skills in leading ecotours and establish contact with one another;
- Publication of methodological literature;
- New informational materials describing the natural treasures of the Russian Far East, such as Zapovedniks and rare and endemic species, as well as travel opportunities for visitors;
- Development of brochures with rules and regulations for visitors to Zapovedniks, to educate them about the need for low-impact activities and sensitivity toward fragile natural areas;
- Creation of craft workshops based at the ecocenters in the Zapovedniks, in order to enhance small business development, provide the Zapovedniks with additional funding, and encourage interaction with the local population;
- Collaboration with regional authorities to integrate ecotourism in the regional economic development plan;
- Marketing ecotourism in the Russian Far East in Russia and abroad and promoting partnerships among Russian Zapovedniks and American, Japanese, and Western European travel agencies specializing in ecotourism.

Judging from the initial project, we believe that there is great potential to further advance ecotourism in the Russian Far East, rendering it a more effective means of support for Zapovedniks. To provide for the long-term, sustainable development of ecotourism, a new NGO, the Ecotourism Development Fund "Dersu Uzala," has been established in Moscow (branches of this NGO are to be established in the Russian Far East as well as in other regions of Russia). The Ecotourism Development Fund is responsible for writing new project proposals, fundraising, and implementing projects in the Russian Far East and in the Altai-Sayan region in southern Siberia. Other tasks of the Ecotourism Development Fund include coordination among Zapovedniks and foreign partners in organizing ecotours; expert and informational consulting; marketing and advertising campaigns; and the dissemination of information about model ecotourism projects throughout the whole system of Zapovedniks.

Elena Nikitina *is the coordinator of the ecotourism project within WWF's Russian Far East Program.*

NGOs

Children of the Baltic: On the Finnish Gulf 's South Shore

"I am a strong advocate of the belief that we have not inherited the earth from our ancestors, but are borrowing it from our children. That is why I take my work with Children of the Baltic so seriously. I believe the most effective way to change our world is to try to create a need within children to see their place in nature differently—to be a part of it. When I am on expeditions or participate in actions with Children of the Baltic, I never cease to be amazed by the outflow of sincerity and live energy in these children. They are not only our students, but our partners as well."
Oleg Bodrov, chairman of Green World in Sosnovy Bor, on the south shore of the Gulf of Finland.

Olga Senova and Children of the Baltic, 1998 summer expedition. *Photo provided by O. Senova*

by ***Olga Senova***

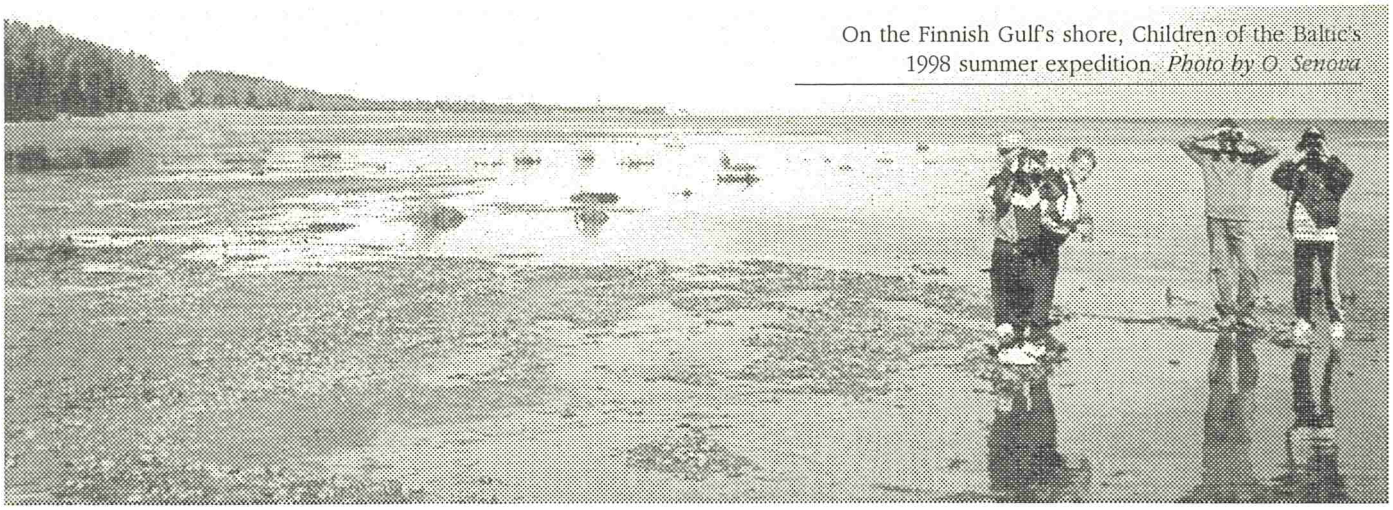
The Gulf of Finland, tucked away from the Baltic Sea, is experiencing increasingly complex environmental problems. These issues have not gone unnoticed by the people living in our small city of Lomonosov (40,000 people), approximately 43 km west from the center of St. Petersburg. In 1994 Oleg Bodrov and I formed a non-profit environmental organization for children. Its first members were the children who participated in an expedition we organized to the source of the Karasta River—the main water artery running through Lomonosov. The kids were amazed at how quickly our river was reduced to a polluted "gutter" as it ran its course to the Gulf of Finland. They decided we must do something for our river and our gulf. Our organization, "Children of the Baltic," emerged from this desire to change our environment.

Today, Children of the Baltic unites approximately 80 members—school-aged children, teachers (between five to seven), and other residents on the south shore of the Gulf of Finland. We instruct children on environmental issues, as well as the traditional subjects of biology, ecology, and chemistry, and we enable them to use this information. Most of our activities take place on a local level, within Lomonosov and along the neighboring shoreline. For example, our children are involved in long-term monitoring and research of the Karasta River. This research has earned us honors in the contest "Water on the Earth," sponsored by the Association of Chemistry Education in Russia.

The children have also become acquainted with our city's cultural heritage through numerous trips to the Museum-Zapovednik, Oranienbaum. Situated on the right shore of the Karasta River, this historical reserve preserves an eighteenth century palace and its grounds. Our activities are, however, not limited to local issues. We have established international contacts and work closely with colleagues from Sweden and participate in the Agenda 21* process. We have also organized an international Deep Ecology seminar for teachers in St. Petersburg and the Leningrad Oblast.

During the summer of 1996 we designated a day to clean up the Karasta River in commemoration of the Year of the Baltic Sea. We explained to the children that our efforts to clean up this river in Lomonosov really did matter, that even a slightly cleaner river in Lomonosov meant less trash would eventually end up in the Gulf of Finland and the Baltic Sea—the world's most polluted sea. We took an integrated approach and focused not only on the actual removal of trash from the river and its banks, but went right to its source, literally. Like our first expedition

Observing rare birds during Children of the Baltic's 1998 summer expedition. *Photo by O. Senova*



On the Finnish Gulf's shore, Children of the Baltic's 1998 summer expedition. *Photo by O. Senova*

to the source of this river in 1994, we again found its very beginning, hidden in forests outside of Lomonosov, and followed it to its mouth. The piles of debris we pulled from the river were a sharp contrast to the pure waters at its origin.

Our one-day clean-up in Lomonosov focused the community's attention on our city's immediate environmental problems and left a lasting impression. Working with Gennadi Sharbarin of the Sustainable Development Information Agency in St. Petersburg, we shot a documentary film depicting our journey along the river. It captures our impressions and also our discussions with the children about how to ameliorate the environmental problems ailing our river. Our film, entitled "The River of Our Hope," has traveled to Norway, Sweden, Denmark (Aarhus), and even to South Africa, where we have entered it in a film contest. Closer to home, in St. Petersburg, it was shown at an international conference on environmental education and also received an award at the Biology Olympics.

Following our debut film, we shot a ten-minute film with Sharbarin, "The Southern Shore of the Gulf of Finland," during our 1997 summer expedition. Together with Green World, we produced another film that summer, "Horror along the Gulf," with footage of the Batareinaya Bay, an area listed in the Ramsar Convention and home to rare bird species such as the Bewick's swan (*Cygnus bewickii*). This bay is also the area of a planned oil terminal. This film records our opposition against proposed port construction in the Gulf. This past September, it was shown at an ecological film festival in Novorossiisk (on the Black Sea). We hope our films stimulate a sense of urgency to protect the remaining natural areas.

This past summer, Children of the Baltic and the Children's Tourism Center in Lomonosov organized our third expedition. During this expedition, we traveled to three Zakazniks (special purpose reserves) preserving some of the last pristine areas on the Gulf of Finland's coast: Lebyazhi, Kurgalski, and Kotelski Zakaznik. Under the leadership of specialists from the biological institute of St. Petersburg State University and the Tourism Center, the children participated in research in hydrology, hydrobiology, ornithology, and environmental chemistry. During the course of field work, the children saw how ecosystems they had studied throughout the year function in our region.

Against the backdrop of imminent (and in some cases already initiated) port construction in the Gulf, our 1998 expedition had special significance. Besides acquiring new scientific information, the children observed port construction already underway, juxtaposed against the still relatively unspoiled natural beauty in the Kurgalski Zakaznik. In the Lebyazhi Zakaznik, we sighted a small clearcut and a bulldozer beginning road construction. Our observations confirm the growing trend of small green oases along the shore being squeezed between industrial developments and other human activities.

Following our 1998 expedition, we plan to campaign for official protected status of the Kotelski Zakaznik. It is a rare find on the gulf shore, with a chain of four lakes and thriving plant and animal life. We are also working jointly with Green World on an ecological map of the southern shore of the Gulf of Finland to portray the nature, culture, and technological influences in this area. It will also present the children's vision of their environment. Our map will appear on the Children of the Baltic's web page **<http://www.baltchild.homepage.ru>** as well as on Green World's web page: **<http://spb.org.ru/greenworld>**

We aspire to give our children of the Baltic a chance to understand our world today and what it might become tomorrow, if we do not change our current ways of thinking. We know that most of our children will not become environmental scientists or ecologists. However, we hope that they now understand, and will continue to appreciate as adults, that where they live is a part of themselves.

*Formulated at the 1992 Rio Summit Meeting, Agenda 21 outlines an approach for dealing with major environmental problems into the next century, and for creating a sustainable society. Agenda 21 is incorporated on both an international and local level.

Olga Senova *is the chair of Children of the Baltic.*

CONSERVATION MANAGEMENT

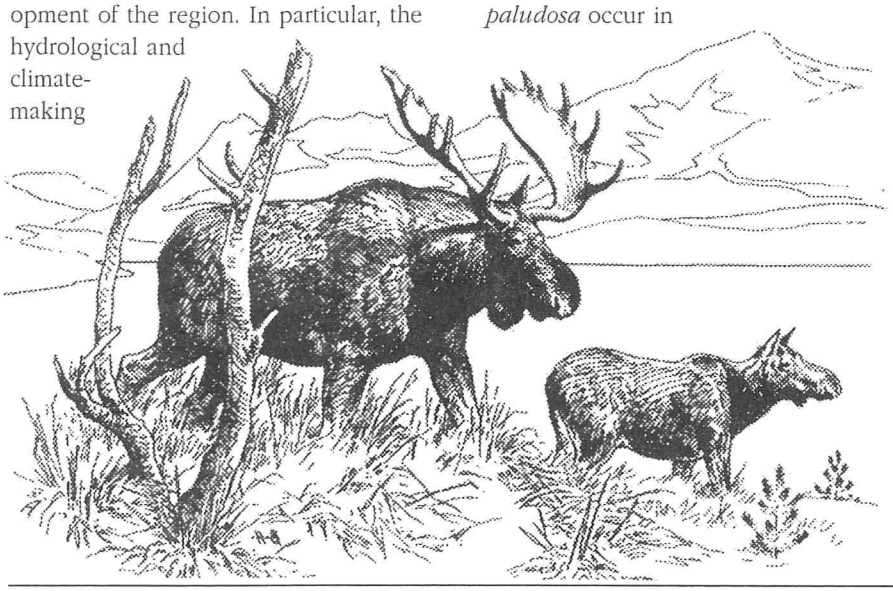
The Wetlands of Tomsk Region, Western Siberia

by ***Drs. Sue Shaw, Jeremy James, Elena Lapshina, Andrei Zverev,*** *and* ***Natasha Semenova***

It's well known that the western Siberian plain is the largest peat region of the world, with peat deposits covering more than 33 million ha and stocks of peat of about 118 million tons, i.e. about 50 percent of the total world peat resource (Markov *et al*, 1996). Although the natural process of peat bog formation (paludification) continues to increase the total area of wetlands in the region, there is little cause for complacency about their future; currently there are no guarantees for protection of these ecosystems from human exploitation. Judging from the development of former lowland bogs of northern Europe (northern Germany, Holland), it is clear that a well-thought-out and scientifically-based plan for preserving wetland landscapes in their natural condition must be launched before development begins to cause irreversible damage to wetland habitats.

Furthermore, it is important to emphasize the significance of bog formation in western Siberia. This is the chief natural process, which defines the whole development of the region. In particular, the hydrological and climate-making roles of bogs and their participation in the maintenance of atmospheric gas composition are of global importance.

Wetland landscapes possess enormous value in forming and maintaining biodiversity of the region. Shaw et al (1998) have started describing the botanical diversity of the wetlands of Tomsk Region. The southeastern area of the Tomsk Region supports a large diversity of wetland species, communities, and habitats, representing a transitional zone between the western-Siberian plain and the Altai-Sayan mountain country. The wooded (forest) wetlands of river valleys and margins of watershed fens are the richest in plant species, supporting up to two-thirds of all varieties of leafy mosses and three-quarters of the liverworts of the forest zone of Western Siberia. Open and sparsely-wooded sedge–moss mires in the south of the forest zone are also of significant interest, being distinguished by the abundance of orchids and arctic-alpine species. Orchid species present in open sedge–brown moss mires include *Dactylorhiza incarnata, Epipactis palustris, Herminium monorchis, Liparis loeselii, Cypripedium calceolus* and *C. macranton. Dactylorhiza hybridensis* and *Hammarbya paludosa* occur in mesotrophic sedge–*Sphagnum* mires, while *Listera ovata, Malaxis monophyllus, Corallorhiza trifida* and *Epipogium aphyllum* are common in forest 'sogras' (swamp). Arctic-alpine species are rare in the forest zone, and here have a 'relict' distribution—examples include *Saxifraga hirculus, Minuartia stricta, Triglochin palustre, Betula nana, Eriophorum gracile* and *Stellaria crassifolia.*



Associated with these extensive tracts of pristine wetland are a wide range of fauna including, among the larger animals, moose (*Alces alces*), brown bear (*Ursus arctos*) and wolf (*Canis lupus*). Furthermore, there is no doubt that this region presents an internationally important area for bird life. For example, there is a slight possibility that the slender billed curlew *(Numenius tenuirostris),* one of the world's rarest birds, may breed in the area.

Recent decades of intensive development (business, farming, industrial) in western Siberia (oil-gas extraction, timbering) has led to permanently increasing impacts on wetland landscapes. There is a real threat of deterioration and elimination of vast bog landscapes and complexes!

Around 2 percent of the peat lands in the region have been drained, mostly for agricultural purposes. In addition, a much larger proportion has been disturbed or otherwise affected by human activities, including agricultural conversion, hunting, oil exploration and extraction, timber production, and construction of new roads. Besides direct human impacts, there are also problems caused by chemical and radioactive pollution from industrial enterprises from within Tomsk Region and its two neighboring regions, Kemerovo and Novosibirsk. The extraction of peat has been carried out, but only on a fairly small scale and mainly for agricultural needs only (as fertilizer/soil conditioner) and is no longer considered to be economical. Peat has not been used as a major source of fuel.

About 6 percent of the land area of Tomsk Region is under some form of special protection. This includes 18 special purpose reserves, or Zakazniks (mainly for the protection of game species) (2.6 percent), 144 Nature Monuments, plus green zones around settlements, protective strips along shores of rivers and lakes and along roads, and zones for seed collection *(Pinus sibirica)*. However, peat lands remain relatively unprotected against different types of anthropogenic influence—according to the nature conservation laws, only the land within a Zapovednik is completely excluded from economic activities. There are no federal national parks within the Tomsk Region at present, although the first new national park (Coniferous South Taiga Park) is currently being considered.

Although the necessity for conservation of these important peat lands is recognized in Tomsk Region, the processes to achieve this are not as advanced as in western Europe. There are huge areas of yet undisturbed wetlands, for which the flora has not yet been fully described, particularly with respect to bryophytes (mosses). Recent economic problems have lead to the reduction in ameliorative activities and complete cessation of the extraction of raw peat in Tomsk Region. However, this does not mean that attempts will not be made in the future to drain large areas of peat land, once this becomes more economically viable. The peat lands in the south of the Region, which are both of greatest ecological interest and of highest agricultural value, are also the most threatened.

The "Darwin Initiative for the Survival of Species" was set up by the British Government in response to the Rio Biodiversity Convention of 1992, in order to assist countries rich in wildlife but lacking in resources to implement their commitments under the Rio Convention. Of the 317,000 square km of the Tomsk Region, more than half is occupied by wetlands which are thought to represent a resource of global importance to biodiversity, but there is little detailed information available at present on the plant communities and species of this region upon which to assess requirements for their protection. Funding from the Darwin Initiative has been awarded for a three-year project which will enable British and Russian scientists to collaborate in undertaking a detailed inventory and evaluation of the wetland resource of the Region, through a project which aims to build on the limited existing information to promote the conservation and management of these important wetlands.

The project is led by Dr. Sue Shaw and Dr. Bryan Wheeler (University of Sheffield, UK) while the team from Tomsk State University is led by Dr. Elena Lapshina. The project started in April, 1997 and fieldwork was undertaken throughout July and August, 1997. A database has been established for the storage and evaluation of data. In the second year we continued to gather and to collate information and hosted Russian scientists in the UK. The data and information gathered will also be used in the development of a 'Biodiversity Action Plan,' in collaboration with the State Committee on Ecology and Natural Resources. The Biodiversity Action Plan is being developed by the collaborators within the framework of the current project. The plan is funded by the UK Government's Darwin Initiative and aims to present a framework (agreed upon between scientific collaborators and the State Committee) for the conservation of important wetlands in Tomsk Region.

Most importantly, throughout the project we will seek to ensure the widest dissemination of the aims, objectives, and findings of what we hope will be a long term biodiversity initiative. It is our goal to develop strong scientific links between the UK and Tomsk. We hope this project will provide a basis and incentive to carry the project forward into appropriate action for the conservation and management of the wetland resources in Russia. This will require the training of the local staff, establishment of a resource inventory and local commitment to implementation of the Biodiversity Action Plan. The authors suggest that this program is the best way to provide future protection for wetland species and habitats of the western Siberian Plain.

The main thrust of our project is therefore firstly to increase the knowledge of the natural biodiversity of the wetlands, in order to help the local authorities make decisions with regard to their adequate protection. For example, consideration will be given to (i) the area of natural, undisturbed wetlands that need to be conserved to maintain ecological balance and biodiversity, while allowing anthropogenic developments in certain areas, and (ii) what criteria should be used to identify which peat lands should be subject to nature protection.

The present project therefore intends to make use of the current economic 'window of opportunity' to identify natural associations of rare plant species and vegetation communities and thereby make recommendations for the protection of the most valuable sites. Identification and protection of these sites before further damage is caused will ensure the conservation of these internationally important wetlands, and will help to avoid the need to restore former biodiversity on damaged peatlands, a problem ecologists in western countries now face.

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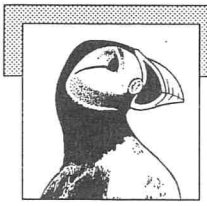
Drs. Sue Shaw *and* ***Jeremy James*** *coordinate the Tomsk Wetland Research project on behalf of the Department of Animal and Plant Sciences (ECUS) at the University of Sheffield, UK.*

Drs. Elena Lapshina *and* ***Andrei Zverev*** *of the Department of Botany at Tomsk State University are the chief Russian researchers in the project.*

Natasha Semenova *works for the Research Institute of Biophysics in Tomsk.*



LIVING ARCTIC

Yamal Peninsula: Land of 79,000 Lakes...and Home to Siberia's Largest Gas Reserves

by ***Nikolai V. Savchenko***

Far above the Arctic Circle on the frozen northern edge of Russia's great western Siberian plain lies the gigantic Yamal Peninsula, jutting out into the unfriendly Arctic Ocean. The Bely (White) Island, the archipelago Novaya Zemlya, and Franz Josef Land extend still further to the north and northwest, as if a continuation of this already vast peninsula.

Yamal's size stuns the human imagination: this peninsula is 900 km long and 250 km wide. Among the most impressive features of this vast country are the infinite tracts of tundra and the unparalleled concentration of lakes. Roughly 79,000 lakes are found on the Yamal Peninsula. Only 24,520 of the Yamal lakes are larger than .25 square km, and the total area of these small lakes is 9,817 square km. The lakes cover more than 9,850 square km of Yamal's total area (80,800 square km), which is comparable to the total size of Puerto Rico or Singapore! (*Please see Table 1*).

Yamal is also remarkable in that it is the largest repository and producer of high quality and still relatively pure lake water. The average amount of dissolved matter in Yamal's lakes is around 50 mg per liter. This is 2.5 times less than that of Lake Baikal, containing 120 mg to 130 mg of dissolved matter per liter—the world standard for purity. The renewal rate of the water in most of the small (less than 0.25 square km) and medium-sized (from 0.25 to 50 square km) lakes on the Yamal Peninsula ranges from two to three months up to two years, while the renewal rate of Lake Baikal's waters takes approximately 5,000 years. Another unique feature of Yamal's lakes is their transparency, which ranges from 15 m to 26 m deep.

Map of the Yamal Peninsula by *K. Pakhorukova*

The special qualities of these lakes are attributed to their physical and chemical properties. The water in all of the lakes is ultra-fresh and is divided into different categories: the hydrocarbonate class; the sodium hydroxide and, less commonly, the calcium groups. Only nine percent of the lakes have water of a sodium chloride (Lakes Serto and Yambuto) or sodium sulfate (Lakes Malto, Yavto, and Yarato) composition. The homogeneity of the water's chemical composition is created by the hydrological connectivity among the majority of the lakes and the pressure of constant wind turbulence and circulation within the lakes which regularly stir the water column. This intermingling leads to a high oxygen saturation level. Even in the deepest lake (Yasaveito, which has a depth of 79 m) the oxygen saturation of the water is 80 percent.

The oxygen saturation of the water is also facilitated by its comparatively low temperature regime. In the shallow small lakes, the water temperature in July varies between 8 and 14 degrees Celsius, and in deeper lakes from 5 to 14 degrees Celsius. The largest lakes (Tetanto,Yaroto-1, Yaroto-2, Neito, Neito-1, Yambuto, and Malto, which have an area of 50 to 250 square kilometers each) are completely uniform thermally, i.e., there are practically no temperature differences. The temperature in these lakes varies only from 5 to 6 degrees Celsius.

Almost all of the lakes on the Yamal Peninsula are oligotrophic i.e., poor in plant nutrients but rich in oxygen. Both quantitative and qualitative hydrobiological indications confirm their purity: phytoplankton (algal composition) is generally represented by 104 types, among which diatoms—representatives of the organisms that live in the purest

fresh water—prevail. Similarly, 70 types of zooplankton (invertebrate animal population) have been discovered, and they also show a predominance of organisms suited to pure fresh water—rotifers. The fish population consists of the 20 types and forms that usually inhabit the purest and most oxygen-saturated water bodies of the polar regions.

Due to the relative youth of Yamal's lakes (the large bodies of water were formed during the last glaciation, while the small lakes were formed within the past 20 to 100 years) and the fact that they are oligotrophic, their resistance to outside disturbance is extremely weak. The vulnerability of these ecosystems is made especially apparent by the current development of natural gas reserves in the region which are among the largest in the northern hemisphere. Geologists estimate that the reserves in the Kharasavei and Bovanenchko deposits alone are comparable with the gas resources of the entire United States!

The current development of these gas reserves represents a host of threats to the lakes of the Yamal Peninsula. For instance, the widespread use of caterpillar-type (track) vehicles in projects such as gas exploration and drilling, construction of the trans-Yamal railroad, and laying of gas pipelines greatly disturbs the lake watersheds' soil and plant cover, which accounts for more than 60 percent of Yamal's territory. In turn, these disturbances are quickly leading to the thawing of permafrost soils, and the erosion of soils by water and wind. As a result, various chemical elements—the majority of which have been accumulating in the soils for thousands of years—are being washed into the lakes at a swiftly accelerating rate. Consequently, the lake waters are being enriched by organic matter, and micro- and macro-elements.

Table 1. Yamal Peninsula's Lake Resources

Parameters Measured	Units
Number of Lakes*	24,520
Total Area of Lakes	9,817 square km
Greatest Depth	79 m
Average Depth	9.4 m
Total Volume of Water	33,377 cubic km
Lacustrine Qualities: • Upper and Lower Limits (Range) • Average	 0.5-88% 12.2

* Only lakes with an area greater than 0.25 square km have been taken into account.

In particular, the concentration of elements in the waters collecting in the ruts created by caterpillar-type vehicles at Lake Neito (in central Yamal) exceeds the concentration in the lake's water: the concentrations are 6 times higher for cobalt; 3 times higher for chromium; 11 times for nickel; 1.6 times for lead; 2.2 times for zinc; 2.7 times for strontium; 12 times for iron; 26 times for manganese; 10 times for vanadium; 2.9 times for molybdenum; 4.7 times for rubidium; 2.5 times for potassium; 12.3 times for sodium; 14 times for magnesium; 7 times for calcium; 6.3 times for lithium; 1.6 times for titanium; 1.2 times for boron; and 3.3 times for copper!

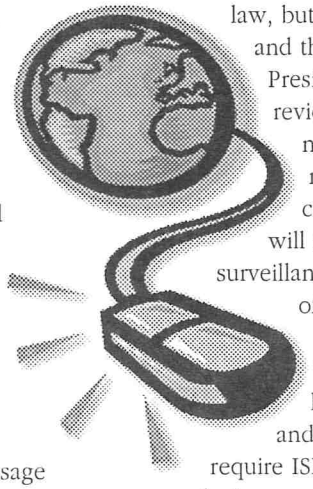
Thus, preservation of the oligotrophic status of the Yamal lakes under the existing system of industrial land assimilation is extremely problematic. Owing to the economic recession, Russia is not in a position to allocate resources to replace the current caterpillar-type vehicles with wheel-chassis equipment in order to halt the further disturbance of the soil and plant cover. However, environmentally less damaging measures can be implemented: caterpillar transportation traffic can be regulated; protected areas can be created in areas with high concentrations of large lakes (the Lake Yaroto and Neito systems in the central part of the peninsula); and preventive measures can be adopted to impede the thawing of perennial frozen grounds in areas where gas fields are being actively developed.

Nikolai V. Savchenko *is an Associate Professor at the Siberian University of Consumer Cooperation.*

NEWS OF THE DAY

SORM May Spell Trouble for Russia's Internet Users

The number of people in Russia going on-line doubles every year. Because of this astounding growth, there are 350 Internet service providers (ISPs) serving one million people in Russia. This surge in Internet usage is, however, threatened by the proposed expansion of the government security program known as SORM. SORM stands for "system of ensuring investigative activity" and now applies to any type of electronic communications connection, e.g., paging, telephone or Internet.



This proposed expansion, "SORM-2," will compel Internet providers to install a high-speed communication link in their main computers (a "black box") connected to the Federal Security Service (FSB, formerly the KGB). This would give the FSB access to every e-mail message and every web site visit without the user being aware of this surveillance activity.

SORM-2 suggests that the FSB has not relinquished the idea of government interception of private communications, reminiscent of the days when the KGB, on its own initiative and without review, routinely snooped in the mail and tapped phones. Proponents of SORM-2 contend that such close monitoring of electronic communications is necessary to curtail tax evasion and other economic crimes. Anatoli Levenchuk, an independent Internet expert whose web site seeks to reveal SORM-2's potential dangers, acknowledges, "We need to catch criminals, but together they cannot bring more harm than uncontrolled power agencies, which can oppress the whole nation."

The Russian constitution guarantees citizens the right to confidentiality when communicating via telephone, mail, telegraph, or other connections (Article 23.2). Yet, despite this official protection, "there is no concept of privacy anywhere in Russian legislation," according to Andrei Sebrant of GlasNet, one of the country's leading Internet providers. Moreover, Russia does not have laws specifically governing the use of the Internet. This gives the government great flexibility. The SORM-2 proposal is not a law, but rather a departmental act and the Duma, the Senate, or the President need not officially review it. Nonetheless, "ISPs will not be able to avoid this regulation," Levenchuk confirmed. Many fear that it will set the stage for unchecked surveillance by the FSB—a clear sign of Russia's faltering democracy.

The SORM-2 regulation could have more than just political and legal implications. It would require ISPs to pay for surveillance devices, even though Russian law obligates the government to finance FSB investigative activities. These extra costs would be passed on to Internet users, increasing their monthly fees. A price increase, particularly now during Russia's economic crisis, could sharply curtail Internet usage in Russia. "ISPs will have to make additional investments to have a license, and that means that there will be fewer Internet providers because it will be more expensive to establish Internet service," stated Levenchuk. If the ISPs refuse to cooperate with the FSB, they risk losing their operating licenses from the Ministry of Communications, which has been working with the FSB in drafting SORM-2. Most providers have kept silent on this issue because they fear losing their licenses and growth opportunities.

Draft documents on the technical requirements and the implementation order for SORM-2 have been circulated in a working group that includes members from the FSB and the Ministry of Communications. The regulations may be promulgated some time near the end of the year. Some, however, doubt that the FSB is currently able to execute SORM-2. The Internet is still a foreign technology for the FSB, and it needs a complex system of super servers and channels to analyze the enormous flow of information that passes through the ISPs. Even if the FSB does manage to create such a system, there are encryption programs now available that would allow users to avoid detection by the FSB. Indeed, those with enough money can dial long distance to a non-Russian Internet provider.

Despite these objections and the doubts about its effectiveness, the FSB may issue the SORM-2 regulation. Says Levenchuk, "I think none of the SORM-2 enactors understand how deeply they are violating freedoms, civil rights, and the law. Nor do the providers or clients of the providers understand what precise rights SORM-2 will violate." In our increasingly interconnected world, the scope of this project—if it becomes a reality—will not be isolated to Russia. It could most likely change the way that foreign companies and NGOs working in Russia or with Russian partners communicate.

Please refer to Anatoli Levenchuk's home page for the latest developments on this issue:
http://www.ice.ru/libertarium/ehomepage.html (in English)

Compiled by ***Stephanie Hitztaler,*** *assistant editor of RCN, from the following sources: "Russian Legislation Strikes Fear on the Net," Jeanette Borzo, IDG News Service in Paris; "Surfing With The KGB," Christian Caryl, Science; "Russia Prepares To Police Internet," Julia Solovyova, The Moscow Times; "Russia: Secret Police Lowering Iron Curtain On Internet," Julie Moffett, RFE/RL; "Bringing SORM out of the Dark," Alexander Selivanov, Itogi; report from the conference "Window to the Free World," Budapest, September 6, 1998.*

Lake Baikal in Danger of Losing World Heritage Site Status

The steady environmental degradation of Lake Baikal may spell the end of its status as a UNESCO World Heritage Site. In June, 1998, a preliminary decision to include Lake Baikal on a list of "World Heritage Sites in Danger" was made at a UNESCO meeting after a lengthy discussion about the ecological situation at Russia's most famous natural site. At the meeting, Russian government officials claimed that Lake Baikal's environmental conditions are favorable. Greenpeace members, however, disagreed, contending that the ecological situation in this area has taken a steady downturn since Lake Baikal's official designation as a UNESCO World Heritage Site in December, 1996.

Examples of deterioration around the lake include clear-cutting within its watershed. Also, the Baikal Cellulose and Paper Products plant continues to operate on the banks of the lake. The plant's outdated machinery has increased the discharge of pollution into the lake on a yearly basis. Other serious problems affecting Baikal include the rising level of pollution in the Selenga River feeding into Lake Baikal, the poor enforcement of environmental legislation, curtailed government financing for the protected areas in this region, and the termination of environmental monitoring by the government.

UNESCO's final decision to remove Baikal's status as a World Heritage Site will be made this December. Apparently reluctant to acquire a worldwide reputation that Russia is incapable of nature protection, the Russian Duma is working quickly to enact new legislation such as a law regulating industrial pollution in the Baikal region. Such legislation will help ensure the preservation of Lake Baikal, and hopefully, its place on the list of World Heritage Sites.

Compiled from information provided by ***Roman Pukalov*** *from Greenpeace Russia and* ***Jennie Sutton*** *from the NGO "Baikal Environmental Wave."*

Discovering Wild Russia

by ***Anastasia Murashko***

The Russian branch of the International Student Organization (AIESEC) at Moscow Aviation Institute conducted its second "Discovering Wild Russia" program this past summer. AIESEC is a non-profit organization seeking to develop greater understanding and cooperation among countries through their students. "Discovering Wild Russia 2" joined our Russian AIESEC branch with members from Great Britain, Slovenia, Poland, Switzerland, and Germany. Our group of 40 became acquainted in Moscow at a series of educational seminars about social responsibility in business, including environmental ethics.

Our group then traveled to the far north to Kirovsk and Apatity, south of Murmansk, on the Kola Peninsula. For a week, in the constant daylight, amid the rugged beauty of the mountain landscape, we collected heaps of trash and constructed trail markers in the proposed Khibiny National Park. Awed by our picturesque surroundings, we were disappointed by the carelessness of visitors to this area. We gathered over 60 kg of garbage! We were able to explore nature and better understand our role in protecting it, while becoming acquainted with both the local people in a village adjacent to the park and the region's harsh economic realities. This experience left us with a deeper awareness of what it means to be environmentally and socially responsible.

Our thanks to the specialists from Greenpeace and World Wide Fund for Nature (WWF), who supplied background information on the region's environmental issues, and also to Procter & Gamble, one of the main sponsors of our program.

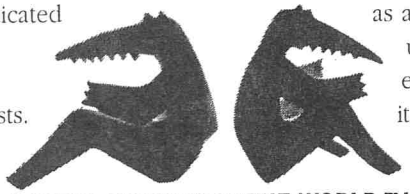
Anastasia Murashko *is a member of the AIESEC Committee at the Moscow Aviation Institute.*

Participants of "Discovering Wild Russia 2" help clean up the area of the proposed Khibiny National Park. *Photo provided by the AIESEC Russian Branch, Institute of Aviation.*

Fourth Bi-Annual Taiga Rescue Network Conference

by ***Stephanie Hitztaler***

In an effort to broaden the scope of boreal forest conservation, TRN (Taiga Rescue Network)* dedicated its fourth bi-annual conference to the cultural values of forests. Hosted by the Estonian Green Movement in Tartu, Estonia in early October, this conference drew about 150 participants from diverse backgrounds and cultures. Several countries, including Estonia, Finland, Sweden, Norway, Russia, Germany, Scotland, UK, the Netherlands, Canada, Japan, and the US, were represented.



BOREAL FORESTS OF THE WORLD IV:
Integrating Cultural Values into Local and Global Forest Protection

Participants discussed taking a more holistic view towards forest protection by looking beyond the immediate causes of deforestation, such as logging and mining, to the underlying causes of these problems. The recognition of cultural values, including spiritual and emotional values of forests, was emphasized as an approach to better understand global deforestation and ways to halt it. The role that forests have played in shaping cultural heritage was also addressed during the conference. During an excursion to different forest areas and a site inhabited by an ancient, sacred linden tree, conference participants learned how forests have influenced past and present-day Estonian culture.

Key issues highlighted during the conference include globalization of economies, increasing consumption of forest products, illegal logging and trade, and free trade agreements that allow for deforestation. Participants proposed a two-tiered approach to tackle these issues: a global vision for TRN and a plan for addressing current, specific problems, which would incorporate increased local control over resources and heightened sensitivity to cultural and spiritual values.

Another key part of the conference was the presentation of a strategy for forest protection in the Primorye Maritime Region in the Russian Far East proposing the following: the establishment of an efficient media network; the support of small timber operations; the development of both regional and global media campaigns; and the promotion of non-forest timber products and sustainable forestry models.

*The purpose of the **Taiga Rescue Network** is to support local struggles and strengthen the cooperation between individuals, NGOs, and indigenous peoples concerned with the protection, restoration, and sustainable use of the world's boreal forests.

Stephanie Hitztaler *is the assistant editor of RCN.*

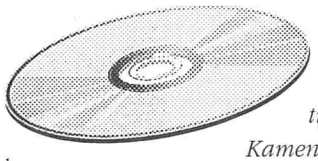
GIS Technology Arrives in the Urals

by ***Anna Sekerina***

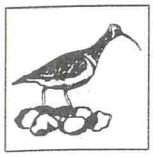
In September, 1998 a joint seminar was held at Denezhkin Kamen Zapovednik, organized by Zapovednik staff and professors from the Forestry Department at Purdue University in Indiana, Olin Rhodes and Martin Spetich. Other participants included representatives from the State Committee of Ecology in Sverdlovsk, the Ural State Forestry-Technical Academy, the association "Lambaster" in Ekaterinburg, and three nature reserves from the Ural region, Bassegi, Visherski, and Visimski Zapovedniks. The conference focused on the creation of GIS (Geographical Information Systems) databases; the use of GIS technology to exchange information among Ural region Zapovedniks; and the facilitation of cooperation between Zapovedniks and foreign scientists.

To date, Purdue University has financed the installment of ARC/INFO and ARCVIEW software on Denezhkin Kamen Zapovednik's computers and has supported the creation of GIS maps in the Zapovednik. The GIS maps consist of nine layers which depict the Zapovednik's relief as well as its forests and river system. These high-quality maps, available in electronic form and hard copy, have greatly facilitated the work at Denezhkin Kamen.

Purdue University plans to equip other Zapovedniks in the Urals with GIS technology through a four-year project discussed during the seminar. At the seminar, Denezhkin Kamen Zapovednik was nominated to be an educational and consultant center in the Ural region for the duration of this project.



Anna Sekerina *is the deputy director of the scientific program at Denezhkin Kamen Zapovednik.*



Your Letters Needed to Support the Creation of Belsu National Park

Since 1993, work to create the Belsu National Park in the Mezhdurechenski District (in the southern part of the Kemerovo Region, in southwestern Siberia) has been underway. This lengthy process has involved design and surveying work and a state environmental impact review of the proposed park, which received a positive assessment.

After two years of coordinating documents, a final conference was held on April 23, 1998 to discuss the borders of the proposed park, while taking the mining prospects of the Algujski talc deposits into consideration. This conference, however, unfolded in a very unfair and non-transparent way. At the beginning, certain conference participants, such as the director of the Kuznetski Alatau Zapovednik and Alexander Arbachakov and Sergei Kostuk from the coordination center for the organization of Belsu National Park, were excluded from the mayor's office where government officials met.

After approximately one hour, the remaining conference participants were invited into the office and informed that the creation of a national park wasn't necessary. Rather, it was announced that the transfer of forests from the Third Group to the First Group [i.e. transfer to a category with a higher level of protection] would suffice. At the same time, however the option remained to exploit the talc deposits and other minerals as well as forests in this area. Those who tried to object were simply cut off; the others supported the decision of the "wise leadership." Thus, in one hour, the long-term idea of creating a national park and the fate of a unique corner of taiga forest succumbed to the interests of industrialists in a process that took place without serious discussion, the opinions of experts, or any pro and con arguments.

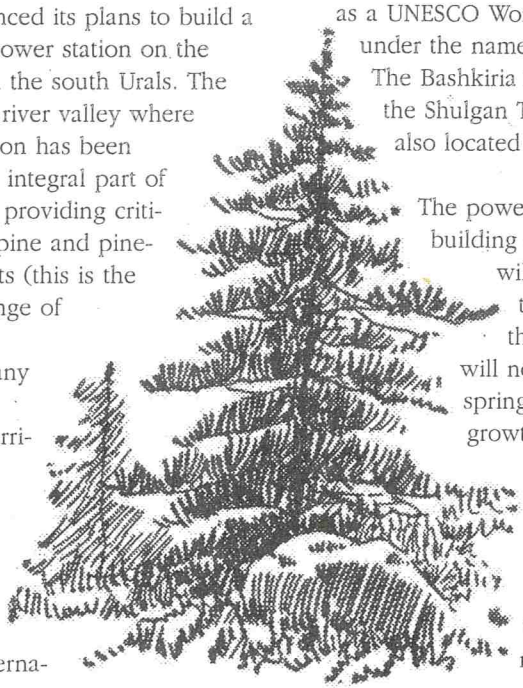
Public support in defense of Belsu National Park is now being sought! Please send letters of support via e-mail or fax to A. G. Tuleev, Governor of Kemerovo Region and C. F. Shcherbakov, Mayor of Mezhdurechensk.

Sergei Federovich Shcherbakov, Mayor of Mezhdurechensk,
Fax: +7 (38475) 2-89-84;
E-mail: <shatina-marina@AKO.kemerovo.su>

Aman Gumirovich Tuleev, Governor of Kemerovo Region,
Fax: +7 (38422) 36-34-09;
E-mail: <Galeev-mihail@AKO.kemerovo.su>

Help Save the Belaya River and its Forests!

The Cabinet of Ministers in Bashkiria has announced its plans to build a hydroelectric power station on the Belaya River in the south Urals. The narrow Belaya river valley where the power station has been proposed is an integral part of the ecosystem, providing critical habitat for pine and pine-broadleaf forests (this is the easternmost range of pine-broadleaf forests) and many rare animal species. This territory has been recognized as one of the most valuable areas in Europe: it is listed as an International Bird Area and has been proposed as a UNESCO World Heritage Site under the name of Bashkirian Ural. The Bashkiria National Park and the Shulgan Tash Zapovednik are also located in this area.



The power station entails the building of three dams that will flood an area of 80 to 90 km. Although the main construction will not begin until next spring, large areas of old-growth forests have been slated for cutting by the end of autumn. Thus far, these forests have not been harvested due to their important role in protecting the watershed and their location on the steep valley slopes.

The necessity of this power station is highly questionable since more than enough energy is already generated in this region, even in the present economic conditions. Unfortunately, the unsettled Belaya River means a dearth of public support in defense of this area. Currently, only a small group of conservationists and scientists have taken a stand for the protection of the river. Their voice, however, will be small against the government officials in Bashkiria. We urge you to disseminate this information as widely as possible to help reverse the fate of the Belaya River! Please contact us if you are interested in doing more:

Alexei Pazhenkov <lynx@infopac.ru>

Igor Karyakin <wildlife@pi.ccl.ru>

Ilya Smelyanskii <ilya@ecoclub.nsu.ru>

Zhenya Chelaznova
<zhenya@ecoclub.nsu.ru>

Uzbekistan Experts Fear Aral Sea May Disappear By 2015

Adapted from INFOTERRA, Sept. 23, 1998

By ***Shamil Baigin***

Central Asia's dying Aral Sea may disappear by 2015, causing harmful and irreversible consequences for the population and the environment, according to Uzbekistan ecology officials. "If no measures to save the Aral are taken, its area will decrease to 9,000 square km from today's 41,000 square km and the sea will turn into a number of small salt lakes," Askhad Khabibulayev, head of the State Committee on Ecology, told delegates to an international environmental conference in the Uzbek capital.

Another official told the conference, sponsored by the Organisation for Security and Cooperation in Europe (OSCE), that the shrinking of the sea might lead to large-scale migration. "Given today's population explosion in the region, people may be unable to feed themselves from the remaining allotments of (fertile) land, and that may lead to massive migration" said Ozod Mukhamedzhanov, ecology expert at the National Development Bureau. Uzbekistan shares the dying sea with Kazakhstan and Mukhamedzhanov said that at least 10 million people might be involved in chaotic migration early in the next century.

The roots of the region's worst ecological disaster lie in the 1960s when the Soviet leadership decided to boost cotton output in its central Asian republics and ordered vast amounts of water to be drawn from the mighty Syrdarya and Amudarya Rivers, which feed the Aral Sea, to irrigate the crops.

Four decades ago, about 60 cubic km of water flowed into the sea every year. Now only one to five cubic km trickles through annually, depending on rainfall. At least 35 cubic km is generally considered the minimum to end the shoreline shrinkage.

Uzbekistan, a largely agricultural state of 24 million people with a natural population growth of two percent a year, appears to have been worst hit by the disaster. Hulks of ships and piles of anchor chains lie rusting in a sea of blowing sand in what used to be bustling fishing towns in former Soviet Uzbekistan. Due to the expansion of desert and shrinking reserves of drinking water, cases of anemia, tuberculosis and kidney diseases are widespread

While raising the problem of the Aral Sea at international conferences, Uzbek officials are reluctant to cut areas under cotton to let more water flow into the dying sea. As in the past few years, Uzbekistan, has set a target to gather four million tons of the cotton. Although this "white gold" accounts for more than a third of export revenues, locals refer to it as something that "has drunk up the sea."

BULLETIN BOARD

Now Available: State of Russia in the Surrounding World

Similar to the *State of the World* publications, this annual series reflects the state of Russia's environment throughout the past year and introduces the reader to the most significant developments that have affected it. It contains analytical articles written by leading environmental specialists on a wide variety of issues pertinent to Russia, including sustainable development, public health, natural resource extraction, and nuclear energy. Numerous references and diagrams accompany each article. In addition to the articles, the appendix contains valuable information including a list of the main laws and decrees issued by the president as well legislation passed by the Russian Government concerning ecological safety and the fulfillment of international conventions.

The book (published in Russian) and abstracts (in Russian and English) were developed by the Center for Theoretical Analyses of Environmental Problems (CTAEP) of the International Independent University of Environmental and Political Sciences (IIUEPS). For free abstracts, please contact:
CTAEP, Phone/Fax: +7 (095) 918-14-42
E-mail: <ctaep@ iiuep.mpei.ac.ru>

To order the book, please contact the IIUEPS publishing house: 111250, Moscow, Russia, PO Box 20, IIUEPS Publishing House
Phone: +7 (095) 362-76-82
E-mail: <isdat@iiuep.mpei.ac.ru>

Now Available: Book on Yuganski Zapovednik

Numerous original photographs depict the nature of Yuganski Zapovednik, located in western Siberia, in this informational book by A. Baikalova, E. Strel'nikov, and O. Strel'nikov. It also contains two appendices with full lists of vascular plant and vertebrate animal species that are found within the Zapovednik. Written in both Russian and English, this book costs 25 rubles (approximately $2).

For more information, please contact:
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Correction: In the last issue of RCN, the caption of this photo incorrectly identified this species as a Siberian crane. The bird is actually a Japanese, or red-crowned crane, (*Grus japonensis*). *The photo was taken in Khinganski Zapovednik by Yuri Darman for the publication "The Far Eastern White Stork and Other Rare Birds of the Amur Region."*

BULLETIN BOARD

Siberian Serengeti?

Check out the October 2, 1998 issue (Vol. 282, No. 5386) of Science Magazine (pages 31-34) for a fascinating description of a Russian scientist's plans for a mammoth-scale program to restore Pleistocene-era ecosystems in Siberia. While his dream project may sound like science fiction fit for a Spielberg film, Sergei Zimov is seriously pursuing this ecological experiment. A team of colleagues from the US and Canada has joined him in this Siberian undertaking.

The journal's web site:
http://www.sciencemag.org

Now Available: Survey of Old-Growth Forests in Northwest Karelia

This report is the first in a series to be published on an old-growth forest survey project by Luonto-Liitto (the Finnish Nature League). The aim of the project is to survey the ecological values of potentially valuable areas in certain regions of the Karelian Republic and the Murmansk and Leningrad Oblasts in cooperation with Russian NGOs. In this report, the results of the surveys made during the summer of 1997 in Paanajarvi and Viena Karelia as well as Vuoska and Vorobevo (located on the Karelian isthmus in the Leningrad Oblast) are presented.

For more information, please contact
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Luonto-Liitto
PL 226 (Perämiehenkatu 11 A 17)
SF-00151 Helsinki, Finland
Phone: +358 (9) 630 300
Fax: +358 (9) 630 414
E-mail: <otso@sll.fi>
http://forest.sll.fi/ll

Now Available: New Reports on the Bering Sea

The inter-agency organizing committee (composed of representatives of the US Department of Commerce; National Oceanic and Atmospheric Administration, Alaska; Department of Fish and Game; and the Department of the Interior) for fostering planning and cooperation in Bering Sea ecosystem research is pleased to announce the availability of the following reports: "Report of the Second Bering Sea

Ecosystem Workshop" (held on June 2-3, 1998) and "Draft Bering Sea Ecosystem Research Plan" (September, 1998). These documents are available on the World Wide Web through NOAA's Bering Sea Theme Page at the following web address: http://www.pmel.noaa.gov/bering/-pages/inter-agency/.

Now Available: Journal on the Azov-Black Sea Region

"Svet u Dolonyakh," (1[5], 1998) highlights the ecological problems in the Azov-Black Sea Region, including articles written on the following issues: international collaboration in protecting this region's environment; the restoration of the Azov and Black Seas; the Black Sea Biosphere Reserve; ecology of the gulfs and recreational zones in the Black Sea; and the prospective creation and fulfillment of the "Black Sea Basin" project. This issue also includes maps of internationally significant wetlands and protected areas in this region of Ukraine.

Published in Ukrainian and English by the National Ecological Center of Ukraine with support from the Ministries of Agriculture, Environment, and Fisheries of the Netherlands, and the Dutch Embassy in the Ukraine, this journal is distributed free of charge to governments and NGOs.

For more information, please contact:

252025, Kiev-25, Ukraine,
PO Box 89/7,
National Ecological Center of Ukraine
Phone: +7 (38-044) 444-63-77
Fax: +7 (38-044) 220-10-28
E-mail: <palms@ecocentr.freenet.kiev.ua>

Now Available: New Tool Kits for NGOs

New tool kits have been published by the Tacis Environmental Awareness Raising Programme, which covers twelve NIS countries and Mongolia. These capacity-building kits have been especially designed to help newly established environmental NGOs at the grass-roots level throughout the NIS. The first kit entitled, "Place under the Sun," addresses how NGOs can increase the effectiveness of their work and widen their sphere of influence. The second kit, "Partnership in the Name of the Future," provides a guideline for NGO participation in decision-making processes that concern important environmental issues. These kits, which exist both in Russian and in Mongolian, are distributed free of charge to interested NGOs in the NIS and Mongolia.

To inquire about receiving these kits, please contact:

Mary Mojaisky
252001, Ukraine, Kiev-001
Kreshchatik Street 4, Room 12
E-mail: <mojaisky@gluk.apc.org>

Now Available: Atlas Showing the Distribution of Hazardous Waste from Chernobyl

A new atlas of Europe depicting the regions that have been polluted by cesium as a result of the Chernobyl catastrophe has been prepared by the European Commission and official representatives from 32 European countries. The regions with the highest concentration of cesium encompass 2600 square km of Belarus, 560 square km of Ukraine, and 460 square km of Russia. Other regions with high concentrations are located in Sweden, Great Britain, and Italy. The atlas, in Russian and English, contains 45 pages of text and 130 maps.

For more information, please contact:
Arwyn Jones, Marc Van Liedekerke,
Marc De Cort
Commission of the European Communities
Joint Research Centre
Phone: +39 (332) 789-162
Fax: +39 (332) 789-256
Å-mail: <arwyn.jones@jrc.it>

Eco-Photo '98

In January, 1999, a photo exhibition highlighting natural wonders and a myriad of different species will be held in St. Petersburg. This exhibition is especially intended to attract a large audience of young people. Participants of all ages from Russia and abroad are invited to submit photos in one of the following categories:

- Biodiversity, including little-known or recognized species.
- Chronicle of environmental events or problems; participation of children and young people in the protection of nature.
- Compilation of photos depicting picturesque landscapes.

The organizing committee (Biocenter in St. Petersburg, Public Environmental Council of St. Petersburg and the Leningrad Oblast, the Russian Union of Culture, and the association "Clean City") requests that all submissions be made by November 30, 1998. Please send sample 10x15 cm prints to:

196070, M-70, Russia
PO Box 90
Evgeni Popov, Eco-Photo '98
For more information, please contact:
Evgeni Popov
E-mail: <ecos@ecos.spb.org>

CONSERVATION CONTACTS

AIESEC, Anastasia Murashko, member of the Russian branch. Moscow Aviation Institute, Volokolamskoye Shosse 4, 221, 125871, Moscow, Russia. Phone: +7 (095) 158-41-38; Fax: +7 (095)158-29-77. E-mail: <aiesec@mai.ru>, <klimvmav@glasnet.ru>

Baikal Ecological Wave, Jennie Sutton. PO Box 21, 664003, Irkutsk, Russia. Phone: +7 (3952) 46-75-47, Phone/Fax: +7 (3952) 46-74-76. E-mail: <sutton@bew.sei.irk.ru>

Belsu National Park Coordination Center, Alexander Arbachkov and Sergei Kostuk. Prospect Kommunisticheskaya 14-31, Mezhdurechensk. Phone: +7 (38475) 41699. E-mail: <belsu@rikt.ru>

Bolshaya Kokshaga Zapovednik, Svetlana Popova, Head of the Environmental Education Department, Lenin Square 1, Apt. 110, 424000 Yoshkar-Ola, Russia. Phone: +7 (8362) 56-42-61, 56-33-57. E-mail: <kakshan@glasnet.ru>

Chazy and **Maly Abakan Zapovedniki**, Sergei A. Okaemov, Director. PO Box 189, 662617, Abakan, Russia. Phone: +7 (39022) 64233; E-mail (Chazy): <chazy@reserve.khakassia.su>; (Maly Abakan): <popchazy@freebsd.comlink.khakassia.ru>, <popchazy@dialup.comlink.khakassia.ru>

Children of the Baltic, Olga Senova, Chair. Oranienbaumski Prospect 37/2, Apt. 43, 189510, Lomonsov, Russia. Phone: +7 (812) 422-32-78. E-mail: <olga@ons.ytc.spb.ru>

Denezhkin Kamen Zapovednik, Anna Sekerina, Deputy Director of the Scientific Program. Plaksina St. 19, 624411 Vsevolodo-Blagodatskoe, Russia. Phone: +7 (34310) 902-16.

Department of Protected Areas Management, State Committee on Environmental Protection, Vsevolod Stepanitsky, Chair. 8/1 Kedrova St. 117874, Moscow, Russia. Phone: +7 (095) 125-5688; <zapchin@glasnet.ru>

Divnogore Museum-Zapovednik, Marina Lylova, Director. Regional Committee of Culture, Karl Marx St. 55, 396000, Voronezh, Russia. Phone: +7 (0732) 53-25-18.

Estonian Green Movement, Taime Puura, Rein Ahas. PO Box 318, 50002, Tartu, Estonia. Phone: +372 (7) 422-532; Fax: +372 (7) 422-084. E-mail: <for-est@erl.tartu.ee>, <rein@ut.ee>

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Greenpeace-Russia, Roman Pukalov, Senior Specialist. GSP-4, 101428, Moscow, Russia. Phone: +7 (095) 257-41-16; Fax: +7 (095) 257-41-10. E-mail: <gpmoscow@glasnet.ru>

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Institute of Biology and Biophysics (Tomsk State University), Natalia Semenova, Department of Nature Conservation, Lenin St. 36, 634050, Tomsk, Russia. Phone: +7 (3822) 41-01-06. E-mail: <aber@biobase.tsu.tomk.su>

ISAR Siberia, Yuri Shirokov, Co-Director. PO Box 130, 630004, Novosibirsk, Russia. Phone/Fax: +7 (3832) 21-48-95; E-mail: <isarsib@glasnet.ru>

ISC (Institute for Sustainable Communities), Dr. Susan Wobst, Office Director. PO Box 85, 117321, Moscow, Russia. Phone: (095) 937-50-02; Fax: (095) 937-50-03; From outside CIS—Phone: +7 (502) 937-50-02; Fax: +7 (502) 937-50-03. E-mail: <iscmoscow@glasnet.ru>

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Kiev Ecological and Cultural Center, Oleg Listopad, member of the board. Radujnaia St. 31, Apt. 48, 252218, Kiev, Ukraine. Phone: +7 (044) 213-07-92; E-mail: <list@szp.sifu.net>

Pushchino State University, Maxim Bobrovski, Senior Professor. Department of Systematic Ecology; Nauki Prospect, 3, 142292, Pushchino, Moscow Oblast, Russia. Phone: +7 (0967) 73-28-48; E-mail: <larisa@syseco.pgu.serpukhov.su>

Sergei Sobolev, scientist at Voronezh University's Biological Center. Skribisa St. 39, Apt. 2, 394031, Voronezh, Russia.

Siberian University of Consumer Cooperation, Nikolai V. Savchenko, Associate Professor. Karl Marx Avenue 26, 630087, Novosibirsk, Russia. Phone: +7 (3832) 46-19-53.

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