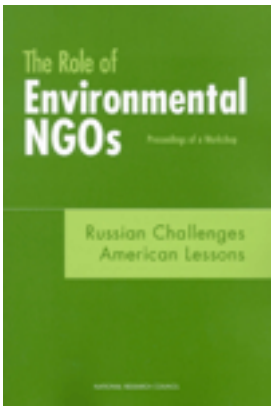

The Role of Environmental NGOs--Russian Challenges, American Lessons: Proceedings of a Workshop

Committee on Improving the Effectiveness of Environmental Nongovernmental Organizations in Russia, Office for Central Europe and Eurasia Development, Security, and Cooperation, Policy and Global Affairs,National Research Council

ISBN: 0-309-07618-8, 216 pages, 6x9, (2001)

The Role of Environmental NGOs

Russian Challenges American Lessons

Proceedings of a Workshop

Committee on Improving the Effectiveness of Environmental Nongovernmental Organizations in Russia

Office for Central Europe and Eurasia Development, Security, and Cooperation
Policy and Global Affairs

National Research Council

In cooperation with the Russian Academy of Sciences

NATIONAL ACADEMY PRESS
Washington, D.C. 2001

NATIONAL ACADEMY PRESS 2101 Constitution Avenue, N.W. Washington, D.C. 20418

NOTICE: The project that is the subject of this report was approved by the Governing Board of the National Research Council, whose members are drawn from the councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The members of the committee responsible for the report were chosen for their special competences and with regard for appropriate balance.
This study was sponsored by the United States Environmental Protection Agency. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the organizations or agencies that provided support for the project.

International Standard Book Number 0-309-07618-8

A limited number of copies of this report are available from:
Development, Security, and Cooperation
National Research Council, FO 2060
2101 Constitution Avenue, N.W.
Washington, DC 20418
Tel: (202) 334–2644

Additional copies of this report are available for sale from: National Academy Press 2101 Constitution Avenue, N.W., Lockbox 285 Washington, D.C. 20055 Tel: (800) 624–6242 or (202) 334–3313 (in the Washington metropolitan area) Internet, http://www.nap.edu

Printed in the United States of America

THE NATIONAL ACADEMIES

National Academy of Sciences
National Academy of Engineering
Institute of Medicine
National Research Council

The **National Academy of Sciences** is a private, nonprofit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare. Upon the authority of the charter granted to it by the Congress in 1863, the Academy has a mandate that requires it to advise the federal government on scientific and technical matters. Dr. Bruce M. Alberts is president of the National Academy of Sciences.

The **National Academy of Engineering** was established in 1964, under the charter of the National Academy of Sciences, as a parallel organization of outstanding engineers. It is autonomous in its administration and in the selection of its members, sharing with the National Academy of Sciences the responsibility for advising the federal government. The National Academy of Engineering also sponsors engineering programs aimed at meeting national needs, encourages education and research, and recognizes the superior achievements of engineers. Dr. Wm. A. Wulf is president of the National Academy of Engineering.

The **Institute of Medicine** was established in 1970 by the National Academy of Sciences to secure the services of eminent members of appropriate professions in the examination of policy matters pertaining to the health of the public. The Institute acts under the responsibility given to the National Academy of Sciences by its congressional charter to be an adviser to the federal government and, upon its own initiative, to identify issues of medical care, research, and education. Dr. Kenneth I. Shine is president of the Institute of Medicine.

The **National Research Council** was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government. Functioning in accordance with general policies determined by the Academy, the Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public, and the scientific and engineering communities. The Council is administered jointly by both Academies and the Institute of Medicine. Dr. Bruce M. Alberts and Dr. Wm. A. Wulf are chairman and vice chairman, respectively, of the National Research Council.

www.national-academies.org

WORKSHOP COMMITTEES

NATIONAL RESEARCH COUNCIL COMMITTEE

John H.Gibbons (Chair) Fellow National Academy of Engineering
Mark E.Schaefer President Association for Biodiversity Information
Debra Knopman Senior Engineer RAND Corporation

RUSSIAN ACADEMY OF SCIENCES ORGANIZING COMMITTEE

Nikolai P.Laverov Vice President Russian Academy of Sciences
Natalia P.Tarasova Chair, Committee on Liaison with NGOs Russian Academy of Sciences
Yuri K.Shiyan Foreign Relations Department Russian Academy of Sciences

STAFF

Glenn E.Schweitzer Project Director National Research Council
A.Chelsea Sharber Program Specialist National Research Council

Kelly L.Robbins Senior Program Officer National Research Council
Rhonda O.Busing Editorial Consultant Salt Box Graphics

CONTENTS

PREFACE

In June 1999, the Presidents of the National Academy of Sciences and the Russian Academy of Sciences agreed that a joint project on the role of environmental nongovernmental organizations (NGOs) would be of considerable interest to both Russian and American specialists in the environmental field. Staffs of the two academies subsequently agreed that an interacademy workshop on this topic would be a good first step in carrying out such a project. The U.S. Environmental Protection Agency has been very interested in the activities of NGOs in Russia and therefore provided most of the funds required for the workshop. The National Research Council, using private funds, provided the remainder of the required financial support.

A workshop was held in Moscow in November 2000. Ten Americans and 80 Russians attended the workshop. This report includes the papers that were presented. The papers highlight many important issues concerning the role of a sampling of different types of environment NGOs in the two countries. Since there are hundreds of NGOs of many types operating in all regions of the two countries, a comprehensive overview of their activities was not feasible. However, the workshop was a good first step in identifying many of the successes of NGOs and the difficulties that they often face.

Of course the role of NGOs in Russia in contributing to environmental improvement is greatly impeded by the current economic crisis in the country. Also, environmental NGOs are much more mature in the United States with several decades of experience in influencing environmental policies at the federal, state, and local levels. Nevertheless, there are common concerns and common approaches that provided a basis for useful interactions among the specialists from the two countries.

The workshop was held shortly after the Russian Government decided to reorganize the federal structure of the country and incorporated the previously independent State Committee for Environmental Protection into the Ministry of Natural Resources. This decision was met with mixed reactions in Russia and abroad. The workshop did not address this organizational issue, which became a lively topic for informal discussions during the breaks at the workshop.

Also, prior to the workshop the Russian Academy of Sciences established a special standing panel of its Scientific Council on Ecological Problems and

Emergency Events to strengthen liaison with NGOs. This organizational step enhanced the interest of many Russian specialists in the topics that were discussed.

I would like to express my appreciation to the other members of the National Research Council Committee on Improving the Effectiveness of Environmental Nongovernmental Organizations in Russia who assisted in the selection of the western participants and reviewed the proceedings of the workshop. Also, we are indebted to the members of the organizing committee of the Russian Academy of Sciences who selected the Russian participants and made the necessary arrangements in Moscow for a successful workshop.

—John H.Gibbons

OPENING REMARKS

N.P.Tarasova
Russian Academy of Sciences

Allow me to welcome you on behalf of Academician N.P.Laverov, vice president of the Russian Academy of Sciences (RAS) and chairman of the RAS Scientific Council on Ecological Problems and Emergency Events, and convey his wish for a successful workshop.

The workshop topics demonstrate the deep perception by the scientific community of the necessity to cooperate with social organizations. This necessity comes from global processes of interaction between humans and the natural environment.

On the threshold of the twenty-first century, degradation of the environment is a global problem. The consequences of social impact on the biosphere can be compared now with those of natural disasters. People have begun to change ecosystems that were created by nature long before human existence on the planet.

The population of the Earth has doubled in the last 40 years and reached six billion people by 1999. Achievements of civilization in improving living conditions have resulted in population growth far beyond the limits specified by nature's ecological capacity.

The scheme suggested by D.Meadows is very important. Most people on the planet worry only about their own families and some close friends, and only for a short period. A few people think about problems of their city or country. D. Meadows expects that more than 90 percent do not think about future milleniums. Billions of people wish to satisfy their requirements immediately and behave on the Earth as if the future does not concern them. They readily waste natural resources, pollute the natural environment, and are hostile to each other.

However, quite different thinking is necessary to ensure that the biosphere will survive. It must include social projections for at least 25 years. Politicians, leaders, and decision-makers need such projections. According to J.Mayer, an initiator of the Talloires group University Presidents for a Sustainable Future, the number of people who are able to analyze global social forecasts does not exceed one thousand. These people do everything possible to save the planet.

Nongovernmental organizations should play a key role in realization of scientific principles by the general public. As a matter of fact, they are an example of self-organization of human society and a response to the changes in nature and in the social environment. So I should like to express a hope for identification and articulation of future directions as a result of cooperation among our workshop members representing a wide spectrum of nongovernmental and scientific organizations. I also wish to express our special thanks to the U.S. Environment Protection Agency for financial support of this workshop.

INTRODUCTORY REMARKS

M.E.Schaefer
Association for Biodiversity Information

Thank you and good morning. We commend and thank the Russian Academy of Sciences for organizing this meeting. The Russian Academy has unparalleled capabilities in Russia of direct relevance to environmental problems and for decades has sponsored research activities that touch on all aspects of environmental protection. While the Russian Government has gone through a number of organizational adjustments in recent years, the Academy remains a stabilizing force; and we are hopeful that the Academy will carry forward recommendations that are put forth at this workshop.

The head of the Russian group at this workshop, Academician Nikolai Laverov, is well known throughout the world for his leadership role in promoting environmental policies—as a leader within the government, as a leader of the Academy of Sciences, and as a leader in the field of environmental geology.

Dr. Jack Gibbons, former science advisor to President Bill Clinton and the chair of the American group, is a leader as well in the area of environmental and energy policy, and is highly respected in the United States for his efforts to advance science and technology policy more broadly.

The role of nongovernmental organizations (NGOs) in bringing balance to environmental policies and to decisions that affect the environment is increasingly recognized throughout the world. This workshop will highlight many examples of the importance of such balance.

The American experience goes back several decades, with NGOs finally gaining a prominent role at both the national and state levels in the 1970s. While the political, economic, and judicial frameworks for environmental actions are different in the United States and in Russia, a number of lessons have been learned in Washington and throughout the country that may have relevance to

current-day Russia. However, we recognize the unique history of Russia and understand that successful approaches in the United States may not be effective in Russia and vice versa.

The United States is still adjusting to the role of NGOs. While they have become a permanent fixture on the American landscape, there are still creative tensions and synergies both within the NGO community and between the NGOs and governmental and economic interests.

There are many different types of NGOs, with various agendas, with different constituencies, and with different capabilities. Advocacy, data-gathering, and analytical groups, in particular, are represented at this workshop.

Of special interest to the American specialists are several aspects of environmental activities in Russia. How are NGOs able to participate in the governmental decision-making process? Does the government try to discourage such participation? Do NGOs have access to data used by the government in its decision-making—and how do they bring their own data to the process? Do NGOs have the scientific capacity to be credible advocates for specific policies and how well do they link to Russian scientific institutions?

Again, we thank the Russian Academy of Sciences, in particular Dr. Natalia Tarasova, for organizing this meeting, and we look forward to productive discussions about the role of environmental NGOs in the decision-making processes.

HISTORY OF THE DEVELOPMENT OF ECOLOGICAL NONGOVERNMENTAL ORGANIZATIONS IN RUSSIA

I.A.Haliy
Institute of Sociology

The beginning of sustainable development in Russia as a political objective was established by a presidential decree and became more specific as a socioeconomic program during the first Russian Environmental Protection Congress.

The direction for achievement of a balance between economic development and nature preservation was set at a time of radical transformation of the whole social order in the country during the last decade of the twentieth century.

On the one hand, it was to be a positive process, because the approach to sustainable development could be initially taken during the process of structural transformations.

On the other hand, the most complex processes occur in the social sphere. The development of a new social structure meant new actors operating in an ecopolitical arena. It turned out that nongovernmental non-commercial ecological organizations (NGOs) had the best educational and experimental backgrounds. The history of their development covers more than 30 years. All other structures were developed during the State reorganization at the end of the 1980s, including the State Environmental Protection Committee, ecological departments of industrial enterprises, and environmental protection bodies in regional administrations.

Public consciousness began to acquire an ecological orientation only at the beginning of reorganization, when ecological problems became one of the first freely surveyed issues in the mass media (magazines, TV, radio). Up to that time, sharp problems of ecological infringement had not been reported in the mass media. Newspaper articles that glorified nature only in general terms were being published.

At the end of the 1990s, it had become possible to talk about a system of environmental protection structures, ways of their interaction, and technologies that promoted cooperation. However, the variety of socio-economic development models for different Russian regions resulted in a variety of such systems.

Due to the severity of ecological problems, the variety in regional socio-ecological development, and the development of decentralization processes, the State is expected to retain a leading position in the formation of environmental protection legislation consistent for the entire country. Also, it takes on monitoring functions. However, the levers of economic management and protection of nature belong to regional actors.

Thus, civil society initiatives of the population about environmental quality remain a stimulant of policy formation and realization.

HISTORY OF NGOS

The oldest environmental protection public organization is the Russian Environmental Protection Organization (REPO), which was founded in Soviet times. It originally was a semi-official structure that had some environmental protection functions of today's State Ecological Committee while legally remaining a public organization.

During the 1960s, Nature Protection Teams (NPT) were formed by university students and teachers. These teams were engaged mainly in monitoring activities. They struggled with poaching (fishing, hunting, cutting trees for the New Year, collection and sale of wild spring flowers). NPTs helped maintain nature preserves. The main forms of interaction of NPTs with the State were protest letters and collection of signatures, with appeals to the State authority for help in solving ecological problems.

Thus, public ecological organizations acquired extensive experience in self-organizing and self-management and skills in the solution of ecological problems using only their own resources and interacting with State authorities. They were ready to prepare various documents (including ones for the establishment of NGOs), to develop ecological programs, and to participate in socio-political events. Therefore, at the end of the 1980s they led the creation of local organizations, based on the initiative of the public, which have expanded all over the country. NGOs were established in each large city and in the majority of small towns. The NPT movement became a part of the overall Russian environmental movement.

At this time NGO activities were primarily of a protest character. As a result, a number of ecologically dangerous projects were stopped: the reversal of the north-flowing rivers to the south, the increase of the Cheboksary water level,

the construction of the Katun hydro-electric power station, and the building of a number of nuclear power stations.

CURRENT STATUS OF THE ECOLOGICAL MOVEMENT IN RUSSIA

During the current economic crisis with the decline of industrial production, the ecological movement has been reduced. It has been replaced by small NGOs, which today continue the tradition of popular initiatives and initiatives by different professional organizations in the sphere of ecological activities—for example, ecological management, ecological expert examination, research, and education.

The severe ecological conditions have required the formation of umbrella-like organizations at the federal level. These organizations are international— Socio-Ecological Union (SoEU) and Green Cross—as well as Russian ones— Russian Ecological Movement, Russian Socio-Ecological Union.

Regional NGO associations have been established, for example: Save the River (Povolzhye), Rostov Anti-nuclear Movement, Tatarstan Youth Ecological Movement, Vologda Public Movement.

To assist in the mobilization of resources several Russian regional resource centers have been created: Coordination and Information Center of the Socio-Ecological Union (Moscow), Ecocenter "Dront" (Nizhny Novgorod), Institute of Assistance to Public Initiatives (Moscow), and Center of Assistance to Public Initiatives (Saratov). Their main functions are data collection and distribution, education, sharing of NGO experience, provision of financial resources, and organization of meetings, seminars, conferences, and congresses.

A number of Russian organizations are specialized in their ecological activities: the development of preserves, eco-management, examination by experts, research, education, technical assistance. Those types of organizations include the Center of Wild Nature Protection, the Center of Ecological Policy, Ecoline, Institute of Social Ecology, the Association EcoSociology, the Association of Socio-Ecological Education.

REPO continues as a part of the ecological society. The functions of the regional branches of REPO are diverse. REPO on the regional level represents a resource center, providing a meeting place, a legal address, and telephone services. This function was mainly inherited from Soviet times. Sometimes REPO can provide use of office equipment—computer, fax-modem, printer, and copier. An important REPO activity is ecological education and training. Also REPO often receives financial support from ecological funds of regional authorities.

The NPT movement helps attract new members into the ecological movement. But NPT members from previous generations are the most active. In the beginning of the 1990s, the Russian Green Party and the Russian

Constructive Ecological Movement (KEDR) were founded. The Green Party participates in elections, and develops an ideology and political programs at all levels—central, regional, local. KEDR, as a political unit, is active during pre-election campaigns but has not yet had positive results.

Radical green associations occupy a special place in the modern movement. They include the international organizations Rainbow Keepers and Russian Greenpeace. Their activity addresses ecologically dangerous projects such as import and burial of radioactive waste from abroad. They urge the authorities and industrial circles to cooperate with Russian green organizations.

The main problems of NGO development at present are recruitment of new members and financing. Both of these problems are directly linked to the deep economic crisis. The population, worried about physical survival due to the low level of wages and delays in wage payments, is unable today to address environmental quality, let alone new actions. The financing of NGO activities is not possible from sources within the country. The main support is from foreign charitable funds, which is not sufficient.

The main directions of Russian NGO activities are nature protection, the anti-nuclear struggle, ecological education and training, sanitation of the urban environment, the struggle against chemical pollution (especially in connection with destruction of chemical weapons), ecological policy formation and ecological program development, and restoration of water basins and large tracts of forest.

Russian NGOs can be divided into five groups.

Conservationists: Biologists and other expert-professionals involved in the process of nature protection. They are especially interested in nature reserves.

Alternativists: New generation of eco-anarchism and community supporters. They prefer radical actions and are engaged in development of a theory of ecologically oriented society and its ideological basis.

Deep ecologists (or traditionalists): Representatives of Russian intelligentsia who seek harmony of man and nature, achievable through voluntary self-restraint, and using traditional forms of social life and technologies.

Civic initiatives: Groups of activists worried about local environmental problems. They use any method, from protests to cooperation with the authorities and other social structures.

Pragmatists: Urban inhabitants characterized by their involvement in the political process. They believe it is possible to change ecological conditions only when ecologists have authority.

At present the Russian ecological movement must survive economically and increase its efficiency. Taking into account the democratization process and orientation of progress toward sustainable development, efficiency means growth of influence on society and of participation in decision-making.

INTERACTION WITH THE AUTHORITIES

The process of decision-making is where the essence and scale of NGOgovernment interaction are defined. In other words, it is the point to strengthen the role of NGOs in the eco-political arena.

The new political orientation toward sustainable development in official state ecological documents creates the opportunity for closer interaction of the ecological movement with the authority structures at all levels. Interactions can be not only in the form of tension or protest but in cooperation and consultations.

Environmental protection authorities at all levels gradually become the main partners of NGOs. They become two main interacting participants of eco-policy. This dual approach takes place when public interest is high. Also, the scale of NGO participation depends on the readiness of the authorities for such participation.

The legislative base for realization of such a process exists. Specific mechanisms of public participation have been determined: legislative requirements for public hearings; the right for public ecological examination of projects before or in parallel with the State; the right of the public to participate in the assessment of impacts on the environment; and the opportunity to influence government representatives.

Public participation is also realized by inclusion of eco-activists in government. There are numerous cases when NGO leaders became chiefs of regional environmental protection bodies or served in such federal bodies as the Ministry of Natural Resources and the State Duma.

Specialized NGOs, which involve a large number of scientists, have become partners with government in fulfillment of specific environmental protection measures, especially the development of preserves. Special successes in this area has been achieved by eco-activists from the Ecological Center “Dront” of Nizhny Novgorod. Also, they investigate environmental quality—air, soil, and water basins. Some NGOs have their own laboratories, and in some cases monitoring is conducted by children’s collectives supervised by scientists, such as in Ryazan. NGOs play an important role in assessment of ecological infringements on health. The Krasnopresnensky District Fund of Nature Protection and Population Health has discovered two large areas with high rates of cancer in the center of Moscow. The Sanitary-Epidemiological Inspection Service knew nothing about this problem. As a result, the Government has forced several enterprises to leave the city. NGOs also deal with clearing debris from rivers and shorelines and with gardening within cities. Examples are activists from Nizhny Novgorod, Vladimir, and Vologda.

Environmental protection bodies need the help of NGOs and the public in discovering ecological infringements, as well as public support in clearing up problems.

Also, public organizations now frequently apply to the courts, especially in the cases of contested land ownership, illegal forest cutting, and construction of parking places. Building of dachas by Russian businessmen in green zones has led to struggles with local NGOs in Novosibirsk, Vladimir, and Cherepovets.

NGOs actively cooperate with legislative authorities at all levels. Two Moscow organizations of lawyers and ecologists, Ecojuris and Ecology and Justice, participate in development of federal laws and actively assist eco-activists at the regional level.

Yet another significant form of participation in the process of decisions is referendums, which deal with ecological problems that cannot be solved by other methods, such as attempts to construct new nuclear power stations.

The interrelationships of NGOs with industrial enterprises have revealed pollution impacts which require penal actions, the use of new technologies, and the monitoring by the government. NGOs together with environmental protection bodies establish norms of permissible releases from industrial enterprises, which should be regularly revised. But, industrial enterprises still remain one of the main opponents of the ecological movement.

Current Russian authorities are searching for ways to end the economic crisis, which is accompanied by constant political instability. Complex actions in the environmental protection sphere are impossible without a base in the political system. The base will consist of such foundation stones as public consciousness, self-organizing ability, level of knowledge, skills and experience of administrative structures, and readiness of the federal government to create a State strategy in the sphere of ecology. It will also depend on the theoretical and practical bases of interaction between society and nature.

A new stage of eco-political process development has begun. It is characterized by the orientation of federal authorities at the end of the economic crisis with the help of maximum use of natural resources. The first steps of the government to restructure federal management bodies (elimination of two main environmental protection organizations) reflect this orientation.

In these conditions, it seems probable that the activity of the ecological movement will be important to determine the level of State activity in environmental protection.

DEVELOPMENT OF A LEADING ENVIRONMENTAL NGO: THIRTY YEARS OF EXPERIENCE

T.J.Graff
Environmental Defense

ANTECEDENTS

Conservation of natural resources and the protection of the environment have long been a part of the political and social fabric of the United States. The first national parks, Yosemite in California and Yellowstone in Wyoming, were created late in the nineteenth century. President Theodore Roosevelt and his Forest Service Chief Gifford Pinchot were enthusiastic promoters of the stewardship of public lands in the early twentieth century and popularized such ideas as the sustained yield of forests over long periods of time. Others, such as John Muir, founder of the Sierra Club, promoted the concept of preserving wilderness for its own sake, and occasionally clashed with Roosevelt and Pinchot, as over the development of Hetch Hetchy Dam and Reservoir by the City of San Francisco within the boundaries of Yosemite National Park.

Concerns over pollution of the air and water have even longer antecedents. Public health professionals over the millennia increasingly came to understand the dangers caused by inadequate sanitation, polluted drinking water, and toxic fumes engendered by increased industrialization in the Northern Hemisphere. By the 1960s these concerns expanded to encompass more subtle threats to public health and ecological values. Rachel Carson's *Silent Spring* popularized the scientific arguments against the use of then common pesticides, such as DDT, whose persistence and ecological magnification in the food chain were causing severe damage to such birds of prey as eagles, ospreys, and pelicans.

By the 1960s the organization of professionally dominated citizens groups who were dedicated to promoting social and legal change had emerged as major factors in other branches of American society. To name two examples, the NAACP Legal Defense Fund had been at the forefront of the struggle for

desegregation for several decades and the American Civil Liberties Union had pioneered legal approaches to the protection of various constitutional rights, including freedom of speech and association and the free exercise of religion.

FOUNDING OF THE ENVIRONMENTAL DEFENSE FUND, 1967

These two social phenomena—increased scientific concern about environmental degradation and the development of a litigation-oriented approach to addressing social/political issues in the United States—were combined in 1967, when a group of scientists concerned about the effects of spraying DDT to control mosquitoes on the eastern end of Long Island in New York State formed a new organization. Calling it the Environmental Defense Fund (EDF), they launched a series of lawsuits at the local, state and federal levels to compel government to stop the ecological damages caused by DDT spraying. Within six years, the U.S. government's newly formed Environmental Protection Agency formally banned DDT spraying for most uses, largely in response to the scientific and legal case EDF had presented.

During this formative period, EDF turned itself into a membership-based organization, with many thousands of contributors of small sums. In addition, a few wealthy individuals and several large private foundations, including most notably in the early days the Ford Foundation, supported EDF's activities. EDF's scientific credentials originally were based on the volunteer efforts of its founders, who included professors at several universities and researchers at U.S. government scientific laboratories. Soon, however, they were joined by a professional staff of scientists, lawyers, and economists with equally impressive credentials.

EARLY AGENDAS, THE 1970S

EDF's efforts to control the wide distribution of pollutants into the environment did not stop with its DDT victory in 1973. Especially active with respect to PCB's, other chlorinated hydrocarbon pesticides, lead-in gasoline, and dioxin, EDF pressed for stricter regulation of various toxic substances with deleterious environmental effects. It also joined other like-minded organizations, such as the Natural Resources Defense Council, in addressing even more ubiquitous pollutants including carbon monoxide, hydrocarbons, and nitrogen oxides emitted by motor vehicles. The early 1970s, with Republican President Richard Nixon at the helm, and with senior Democrats such as Senator Edmund Muskie taking leadership roles as well, saw a wide range of environmental legislation enacted by Congress.

The National Environmental Policy Act, the Endangered Species Act, the Drinking Water Act, and major overhauls of the Clean Air Act and the Federal Water Pollution Control Act all took place in this era.

EDF perceived early in its existence, however, that even comprehensive federal legislation was insufficient to address the broad-scale environmental effects caused by major sectors of the booming American economy. Of these sectors, two, water and electricity, became the centers of focus for much of EDF's agenda in the 1970s. Water projects, mostly sponsored by federal water development agencies such as the U.S. Army Corps of Engineers and the U.S. Bureau of Reclamation, were causing widespread ecological devastation. Wetland conversions, stream channelizations, and water depletions and diversions caused major environmental losses, including species extinction, habitat degradation, and loss of ecological function. In many cases, the purported economic benefits of the projects did not outweigh the costs, environmental and economic, and the distributional effects were open to severe question as well. The direct beneficiaries of water projects were often few in number, albeit with considerable economic clout and political influence, while the adversely affected were many, although often relatively poor and difficult to organize.

The electricity sector in many ways posed an even more significant set of environmental threats. The environmental, safety, and health risks associated with both of the major sources of increased electricity generation in the 1970s, nuclear and coal, were substantial. Large-scale nuclear and coal plants were being developed at an astonishing rate throughout the country, but especially in such high growth areas as the southwest and the Pacific Coast states.

Even as grassroots protest groups increased their efforts to combat particular projects in these sectors, EDF developed systems-oriented analyses and prescriptions to tackle the sectors as a whole. Overall critiques of water project economics and of electricity rate-setting and investment policies, combined with citizen pressure, eventually led to significant changes in growth patterns in both sectors. By 1982 in a statewide referendum, California voters overwhelming rejected a legislatively-passed proposal to build a new generation of water projects in that state. Likewise, in the early 1980s electric utilities, first in California and then elsewhere in the country, substantially curtailed their investments in large central-station nuclear and coal facilities, substituting instead a portfolio of investments in a variety of renewable resource technologies such as wind, solar, and biomass, and in various efficiency and conservation-oriented technologies as well.

LESSONS LEARNED IN THE 1970S AND 1980S

The principal advocacy tools which were adopted by EDF and like-minded organizations in the 1970s involved litigation, both before the courts, federal and

state, and before administrative agencies within the executive branches of government. Restricted by the tax laws in how much lobbying they could do, these NGOs used confrontational tactics as their chosen means of pursuing reform agendas. Litigation, however, rarely was successful on its own in changing government policies. Important issues often were debated in many forums, not only in political arenas such as Congress and the state legislatures, but also in scientific circles, including the National Academy of Sciences and a number of leading scientific journals such as *Science* and *Nature*.

In many of the controversies of this era, as has already been stated, governments, both federal and state, were widely viewed as causing the problems involved. Environmentally damaging water projects were generally sponsored and built by government agencies. And some of the most ambitious and least economically sustainable electricity generation projects were also sponsored by government agencies, such as the notorious Washington Public Power Supply System in the Pacific Northwest. Government agencies, however, were also often at the forefront of addressing environmental problems. The Environmental Protection Agency and its state counterparts issued comprehensive regulations and conducted major enforcement programs under both the Clean Air and Clean Water Acts that have brought about substantial improvements in atmospheric and water quality conditions throughout the country. Similarly, the U.S. Fish and Wildlife Service launched major species and habitat preservation programs that have reduced the rate at which extinction and other environmental losses would otherwise have occurred.

Just as it became evident that government could both be part of the problem and part of the solution in environmental controversies, the same could be said of private firms. Ironically, private firms such as the Pacific Gas & Electric Co. and the Southern California Edison Co., two of the United States' largest electricity generation firms, changed course and retreated from highly expensive and environmentally damaging investment plans well before many of their public agency counterparts, including the aforementioned Washington Public Power Supply System. Later, the California Business Roundtable, a consortium of that state's largest business firms, was a leader in reforming federal water policy, preferring economic efficiency and environmental balance to the irrigation sector subsidies that previously had dominated federal water policy.

Also in these crucial decades, conventional environmental regulation began to develop critics, as the easier targets fell and more complex problems and entrenched interests offered greater resistance to the heavy hand of government regulation. Particularly contentious battles over a regulatory regime could often drag on for a decade or more, as in the case of acid rain falling in the American Northeast. Other efforts to regulate pollutants were simply abandoned, as in the case of so-called non-point sources of water pollution flowing from the fields of America's farmers. These problems helped lead to a new group of initiatives that

have tended to characterize much of the environmental NGO activity of the 1990s.

EVOLVING RESPONSES OF THE ENVIRONMENTAL NGOS

Litigation, as was noted above, was EDF's principal advocacy tool in its early years. Increasingly over the years, however, other methods of advocacy have come to much greater prominence. Among these, direct conversation and negotiation with decision-makers in both government and private firms have become increasingly common. So has participation in forums, official and informal, in which much larger groups of interests are represented and strong effort is expended to reach consensus-based negotiated outcomes. In these kinds of negotiations, and even in more heavily contested litigation and legislative settings, environmental NGOs have also set about building alliances with diverse stakeholders, including labor unions, business firms, social activists, native Americans, and many other interests who are affected in one way or another by environmental problems and solutions.

In many of these controversies, the use of economic incentives, instead of, or in addition to, the more traditional so-called command-and-control style of regulation, came to be a much more prevalent approach to solving environmental problems. Thus, the use of markets and voluntary transfers among water users emerged as a more efficient and less environmentally damaging means to meet water needs than new dam and reservoir construction. Similarly, the trading of emission rights and the taxing of pollutants and of energy use came to be accepted as methods to meet environmental objectives such as reducing acid rain.

Still another emerging tool of environmental advocacy was the use of public disclosure as a means of changing private firm and government behavior. An early manifestation of this approach was the qualification and passage of a statewide initiative in California in 1986. Proposition 65, as it is now commonly known, requires the public disclosure by the firms involved of any discharge to air and water involving any substance that is known to be harmful (based on scientific criteria established by state, federal, or international authorities) in quantities that are not below established safe threshold levels. The principal effect of this law and of a similar federal requirement known as the Toxic Release Inventory has been to cause changes in private firm behavior that diminish or avoid altogether the requirement to disclose pollution releases to the environment. For many firms, the public relations problems of such disclosure are a sufficient deterrent to prompt changes in product and manufacturing process design.

DIRECT INVOLVEMENT IN CONGRESSIONAL, GOVERNMENT, AND PRIVATE FIRM DECISION-MAKING

The 1990s saw an ever more diversified set of environmental NGO involvements in Congressional, Executive Branch, and private firm decision-making. One example which demonstrates these various involvements and which also encompasses a variety of NGO tactics, occurred in the reform of government water policy, particularly in the western United States, and more particularly in California. As was noted earlier, the historic conventional project construction approach to western water policy had taken a serious body blow in the 1982 defeat of the so-called Peripheral Canal referendum.

It was not until 1992, however, that a comprehensive alternative approach, a key element of which was an endorsement of water marketing, passed the U.S. Congress and was signed into law by President George Bush. The basic concepts underlying the Central Valley Project Improvement Act of 1992—and especially voluntary water transfers—were contained in a letter and testimony delivered by representatives of the Environmental Defense Fund to Congress late in 1991. A tough Congressional battle ensued, in which the legislative champions of reform, Senator Bill Bradley and Congressman George Miller, were joined not only by environmentalists, but also by the California Business Roundtable and by representatives of several of California's leading urban water agencies.

The Congressional victory in 1992 occurred despite the opposition of Governor Pete Wilson of California. In 1993–94, however, the new President, Bill Clinton, and his administration sought an accommodation with Governor Wilson on water policy in California. After two long years of difficult negotiations involving myriad interest groups, including several environmental NGOs led by the Environmental Defense Fund's John Krautkraemer, a comprehensive agreement was reached between the state and federal governments on December 15, 1994. Known as the San Francisco Bay/Delta Accord of 1994, the overall agreement included elements addressing water quality standard-setting, project operations, and water policy planning in the state. Subsequent agreements have been forged on state and federal environmental restoration funding in 1996 and on a general plan for the state's water policy future in 2000. Throughout this period, environmental NGOs played a crucial role in defining agendas, negotiating outcomes, and explaining the results to the mass media and the public at large.

A similar history on a larger scale can be told with respect to the control of acid rain. After over a decade of legislative gridlock, the incoming Bush Administration in 1989 informally commissioned the Environmental Defense Fund to assist in developing a proposal to control acid rain based on the setting of declining sulfur emissions caps over the eastern two-thirds of the United States and on the granting of tradeable allowances of sulfur emissions. The Environmental Defense Fund and its allies in Congress and in other sectors,

including government, business, and academia, had proposed such a mechanism for some time. The Bush Administration's invitation was a great opportunity to prepare a plan that would win legislative approval. Once Congress passed the Clean Air Act Amendments of 1990, including the acid rain cap-and-trade mechanism, the Bush Administration, with EDF's assistance, developed regulations that ensured the smooth operation of a sulfur emissions market. That market has led to faster than expected sulfur emissions reductions at a cost of about 10 percent of what critics had estimated in opposing acid rain control legislation in the 1980s.

Not all of EDF's activities at that time, however, involved government policy. A widely reported example of influencing private firm behavior took place in an intense negotiation and joint fact-finding exploration that occurred between EDF and the McDonald's Corporation in the early 1990s. McDonald's at the time was facing considerable public pressure to reduce the solid waste and litter that its restaurants generated. Especially notorious were the so-called "clamshell" plastic boxes, which were not biodegradable and which were clogging the nation's landfills. McDonald's and EDF, working together, produced a report and an implementation plan that phased out the clamshell box, that sharply reduced McDonald's waste stream, and that greatly increased recycling at McDonald's restaurants. The resulting wave of positive publicity both for McDonald's and EDF even led to a *People Magazine* profile of EDF's Executive Director, Fred Krupp.

NEW FRONTIERS IN THE TWENTY-FIRST CENTURY

None of the principal environmental NGO techniques of the late twentieth century seem likely to disappear or even to atrophy in the new millenium. But surely new approaches and opportunities are emerging, as new technologies capture the world's attention and international problems and initiatives increasingly take center stage. One of the trends most likely to continue its expansion is the use of the internet as an environmental information and advocacy tool. EDF, renamed Environmental Defense on January 1, 2000, pioneered one such internet advocacy tool, a website it called Scorecard, www.scorecard.org. Scorecard allows any resident of the United States, with a few simple clicks of a computer, to identify all the sources of air pollution in his or her neighborhood and to obtain assessments, using established government-backed scientific benchmarks, of the risks posed by these pollution sources. Another internet-based application called Action Network allows prompt and inexpensive communication to take place between an environmental NGO, citizens who support its policy views, and decision-makers who might be influenced by hearing views expressed by significant numbers of citizens, especially those who reside in their election districts. Both Scorecard and Action

Network are now principally housed in a private for-profit firm called Locus Pocus, an Environmental Defense spin-off.

A second likely arena for expansion of NGO activity involves international issues. Residents of countries around the world sometimes have reason to concern themselves with potential environmental insults that may occur elsewhere than in their own country but that have international ramifications either in their impacts or in the identity of institutions who are involved directly or indirectly in actions leading to these environmental ramifications.

Thus, environmental NGOs in many countries, including Environmental Defense in the United States, have paid particular attention to the activities of large international public lending institutions such as the World Bank and regional development banks. And these same NGOs and others are now beginning as well to pay attention to the environmental effects involved in other international arenas such as the major trade agreements and the decisions of large private banking and development corporations as well.

Environmental NGOs have played major roles in international climate change discussions, including the November 2000 Council of the Parties in The Hague, Netherlands. They have also been well represented in other international institutional associations such as the World Commission on Dams, which is due to issue its findings to a diverse set of international constituencies via a press conference featuring the former President of South Africa, Nelson Mandela, on November 16, 2000, in London.

As international communication and travel becomes easier, cheaper, and more accessible to a larger number of NGO representatives around the world, the likelihood of networks developing across countries' borders and even across distant continents and oceans is substantial. Conservation of natural resources and protection of the environment are universal concerns. Increasingly, solutions to environmental problems will involve international communications and action.

ROLE OF NONGOVERNMENTAL ORGANIZATIONS IN THE CHEMICAL DISARMAMENT PROCESS

S.I.Baranovsky
Russian Green Cross

INTRODUCTION

Russian Green Cross is a part of an international association, organized in accordance with a decision of the UN Conference on Environment and Development which took place in Rio de Janeiro, Brazil, in 1992. Participants of the Conference representing governments and parliaments of 156 countries from all over the world decided to organize a global world organization as an ecological analogue of the Red Cross. The organization, named "Green Cross," was to be concerned about the problems of global ecological catastrophes. The former President of the Soviet Union, Mikhail Gorbachev, was invited to be a founder and the first president. Inauguration of the International Green Cross took place in Kyoto in 1993. National organizations participated. At first, three national organizations were founded in Japan and then in Russia and the United States. The U.S. organization is not named Green Cross as are the others, but Global Green. In America somebody else already used the name Green Cross. Together with Academician Nikita Nikolaevich Moiseev, the most noted ecologist of the country, we established the Russian Green Cross (RGC).

RGC is registered with the Ministry of Justice. Its principal activity is protection of the environment. "Collaboration, not confrontation" is the main motto of both the International Green Cross and our organization. It is a basic principle. We try to solve all ecological problems using this principle. As a rule, all problems cause contradictions. Disputes between authorities and inhabitants come either from an ecological problem or from one with ecological roots affecting the environment and public health.

The general program of RGC is "Ecological Education." It deals with ecological training and organization of different ecological studies beginning in

the first years of childhood. The program includes international exchanges among pupils, students, professors; workshops and training for teachers; and an annual international conference "Ecological Education." Public hearings on ecological problems of disarmament and elimination of arms also take place.

"The Cold War Heritage" is another program. RGC deals with ecological problems of nuclear weapons, chemical weapons, and conventional armaments. It studies the impact of mass production of armaments, their storage and testing on the environment, and public health. All armaments produced during the arms race to some extent have influenced and still influence the environment. Unfortunately, they will influence it further. They cause many ecological problems that need resolution. Our authorities are not ready to resolve them now. Only nongovernmental organizations try to resolve the issues.

More than one thousand nongovernmental ecological organizations are registered in Russia. RGC is not alone in the NGO world. However, in contrast to the Wildlife Fund, for example, which is busy with conservation of biodiversity and environment protection in the most beautiful parts of the country, we have to work in the territories with difficult ecological problems, such as nuclear contamination, storage or destruction of chemical weapons, polluted aerodromes, and missile depots. They are the territories where the military-industrial complex left behind a difficult heritage in the earth, water, and atmosphere.

PUBLIC HEARINGS ON ECOLOGICAL PROBLEMS OF DISARMAMENT

Public hearings are an effective way to resolve conflicts between residents and officials—conflicts due to the reluctance of the authorities to listen to citizens who live in these godforsaken regions of the country. In the case of civil society, it is the responsibility of the State to sponsor dialogs and reach conclusions from conversation with the people. But while Russia is just searching for its path to civil society, a difficult role belongs to public (nongovernmental) organizations, and RGC in particular.

The concept of hearings has a history. In post-Soviet society, RGC carried out open public hearings in 1995 in Saratov. They were devoted to the problem of future destruction of chemical weapons in the settlement of Gorny in the Krasnopartizan region of Saratov Oblast.

At this time, society has come to understand that difficult political, social, ecological, and other types of problems need new ways of solution. Many people know the case of Chapaevsk. When the Soviet leaders made the decision on elimination of chemical weapons stored in the Soviet Union, it was done in secret. They began to build a plant for destruction of chemical weapons in Chapaevsk, Samara Oblast. Neither the population of Samara Oblast, nor people

living near the factory, knew about the decision. Moreover, they were told it would be a semiconductor plant.

While the plant was under construction, the political system changed in the country, and Russia became "democratic." The secret was disclosed when Minister of Foreign Affairs Shevardnadze declared somewhere abroad that Russia had built a plant for destruction of chemical weapons in Chapaevsk. The people of Chapaevsk and adjacent regions were shocked. A protest movement began. People went into the street. The plant did not open as a result of their struggle. Large funds were wasted. The process of chemical weapon destruction stopped for a long period. This result of social confrontation is an example of the wrong approach to such problems involving our authorities and our state.

A similar situation took place in Saratov Oblast in 1994–1995, when Prime Minister Chernomyrdin issued a secret Resolution about building a plant for chemical weapon destruction in the settlement of Gorny. There were the same processes as in Chapaevsk. At that time RGC came into the political arena with the idea of public hearings. Three parties always exist. The first one is people living alongside the plant, who are interested in the purpose of the building. The second one is the local authorities, who understand the people's expectations and are also interested in the situation. Then there are the federal authorities, who are interested only in resolving the problem such as elimination of weapons, as in this case.

Hearings bring together all three components. Decision-making ought to be foregone until after a careful discussion. All the parties must obtain all information. Unfortunately, in our country decisions are made without adequate data or even in secret. We spent a year until the hearing was realized. We had to appeal to President Yeltsin to gather the three parties of the society. Representatives of the federal authorities that deal with the problem (including the Ministry of Defense, which was responsible for elimination of chemical weapons, the Ministries of Ecology, Health, the Armaments Industry, and others) agreed to take part in the hearing only after President Yeltsin wrote "I support the hearings" on the letter of RGC and after his instructions to Grachev, the Minister of Defense, to Danilov-Danilyan, the Minister of Ecology, and to Baturin, the Secretary of the Security Council. Only then, the Governor of Saratov Oblast also decided that his party would take part in the public hearings carried out by a nongovernmental organization.

The hearings were held in October 1995. They helped the people of Krasnopartizan region surrounding the settlement of Gorny obtain information directly from decision-makers. Local residents had a lot of questions. A Resulting Document was published after the hearings. It was delivered to the President, to the Federal Assembly, to the Assembly of Saratov Oblast, and to all departments and nongovernmental organizations. A lot of people, the mass media, and even foreign observers attended the hearings. Since that time RGC holds annual hearings in the regions of chemical weapon storage. Federal

representatives of interested departments go there with pleasure to meet with residents and answer their questions. Hearings help them find a decision which is suitable for federal authorities, residents, and local authorities.

The hearings conclude with a Resulting Document. It is important that the document is adopted by consensus instead of by voting. It is also important that the decisions in the document are executed even though they are only recommendations to different branches of government, residents, and public organizations. For example, the Resulting Document of the first hearing contained an idea of a public commission of experts. All the participants in the hearing approved it. So, the advice to organize a public expert examination of the plant identified for destruction of chemical weapons was adopted. This part of the decisions of the hearing was fulfilled. A public expert examination of the plant in the settlement of Gorny was carried out. Such nongovernmental organizations as Saratov's Health to Children, RGC, and Union for Chemical Security were involved. It was the first step towards a civil society.

One of the items of the Resulting Document of the second hearing (Izhevsk-Kambarka, 1996) requested the State Duma to speed up development of the Law "On Elimination of Chemical Weapons" as a starting point for a legislative base for the chemical weapon elimination process. It should be noted that it was an appeal not of RGC but of all the participants of the hearing, which resulted from open disputes and discussions. A consensus was reached concerning approaches to the problem of elimination of chemical weapons. The communities of the Republic of Udmurtia—especially representatives and officials of the settlements of Kizner and Kambarki where chemical weapons are stored— supported adopting the Law on Chemical Disarmament. After difficult disputes in the State Duma and the Federal Assembly, the Law was adopted and signed finally by the President. Surely, everybody knows that like any law this Law is not ideal. It is the first one among a series of laws that will form the legislative base for chemical weapon elimination. It is the beginning. But it is a step forward, and it is a result of the activity of public organizations.

International experience is also important. We did not invent the idea of hearings. This practice exists in other countries. It is not a secret that the United States, our former main adversary in the arms race, produced many different weapons too. So they have the same problems. They have mountains of armaments: chemical, nuclear, and conventional. They have to eliminate weapons according to international agreements. This causes just the same problems. Nobody is happy to know that somebody is going to destroy chemical weapons or solid rockets in his backyard. But a culture of interaction between people and power is better developed in the United States and Europe, so such hearings are always carried out when there are health and environment problems. We have adopted this positive experience.

ESTABLISHING PUBLIC COMMISSIONS

Establishing public commissions is another useful idea of our American colleagues. We try to realize this in our country. The population ought to take a direct part in decisions concerning chemical weapon elimination. How can people participate? In the United States public commissions called "Citizen Advisory Committees" have been working for several years in every state where chemical weapon storage facilities or plants were built and elimination has started. They unite representatives of different public organizations, reflecting interests of local residents. A Citizen Advisory Committee is organized pursuant to a Governor's order and consists of community representatives. They have a legislative mandate and take an active part both in decision-making and in monitoring implementation. These Committees connect people and officials of a state or country (republic or oblast in our case) and help develop decisions, taking into account the interests of the people.

RGC suggested this initiative at the second public hearing in Udmurtia (in Kambarka and Izhevsk) where the problem of building a plant for destruction of chemical weapons was discussed. A decision was proposed at the hearing, and it was written in the Resulting Document. But we could realize it only this year. Such a project was accomplished due to the efforts of Russian experts including ones from Udmurtia (Vadim Petrov, the president of the Union for Chemical Security of Udmurtia, participated in work) and our American colleagues who prepared a synthesized book of the rules for U.S. committee activities. Now it is published only in one region, Kurgan Oblast. Discussion of the project is underway in Udmurtia in Penza Oblast.

Many Federal departments (Ministry of Defense) and some governors (Kurgan Oblast) still do not understand the necessity of Citizen Advisory Committees.

PROJECTS TO SUPPORT RESIDENTS OF REGIONS OF CHEMICAL WEAPON STORAGE

Public Information Network for the Population

It is necessary to inform people about the processes touching their essential interests. Local residents have the moral right to express their views on chemical weapons storage. First of all, it is necessary to obtain data from the authorities and the numerous departments and bring it to the attention of the people. Then we should inform the authorities about the people's opinion and will. For such an informational exchange, RGC organized a number of public information centers in the regions of storage of chemical weapons.

The main goal of the centers is to inform people as much as possible about chemical weapons, their storage and future destruction, about the people's rights

and state guarantees, about the role of western states in chemical disarmament, and so on. For this purpose, RGC issues popular booklets and information leaflets, distributes on-line data about activities in regional and federal centers, and distributes information about international organizations (particularly, the Organization for the Prohibition of Chemical Weapons) by means of the local mass media.

Representatives of the centers visit schools, offices, and colleges where they both inform people and carry on direct dialogues with them. If representatives of the centers cannot answer questions immediately, they send the questions with the help of the Moscow Center to federal departments and specialists in destruction technologies for chemical weapons.

This complex process of communication between the people and the authorities leads both to a decrease in the level of conflict and to an overcoming of mutual suspicion, chemophobia, and other concerns caused by the atmosphere of secrecy that has surrounded chemical disarmament for many years.

It is necessary to stress that the U.S. Congress finances American informational centers within the framework of chemical disarmament expenses. In Russia, the Duma never assigns such funds, so nongovernmental organizations such as RGC have to carry out this difficult and expensive activity.

Independent Expert Examinations and Projects

In order to overcome the people's distrust of government activity in chemical disarmament, RGC has played a role of independent arbitrator in the continuing dispute between officials and residents.

For this purpose, a number of independent public expert examinations were carried out along with the state ecological expert examination. First of all, these were examinations of projects for future destruction facilities of chemical weapons in Kurgan Oblast (the settlement of Shchuchye) and Saratov Oblast (Gorny). The public examination is at a higher level than the state one. This is due to the higher professional skill of the experts and the wider range of opinions of different public organizations taking part in the examinations.

Nowadays the implementation of a disarmament project is impossible without a public expert examination. It is one more achievement of the "green" community. Other interesting initiatives of RGC were an independent examination of the people's health in different regions of the country connected with chemical weapons (Saratov Oblast, Penza Oblast, Kurgan Oblast, Bryansk Oblast, and Udmurtia) and an independent hazard assessment for residents of regions of storage of chemical weapons (Udmurtia—Kizner and Kambarka, Kurgan Oblast—Shchuchye, Kirov Oblast—Maradykovo).

The results of this independent research were reported at all public hearings organized by RGC. Reports, monographs, and popular booklets were written. Visitors to the RGC information center have access to them.

Ecological Health Centers

Taking into account the difficult social and ecological life conditions in the regions of chemical weapon storage, RGC decided to organize summer recovery camps and health centers for children from poor families living near chemical weapon storage sites. The main goal is social support of residents and invigoration and ecological education of children.

The first ecological health center of RGC in Vladimir Oblast in the summer of 1997 was visited by 300 children from all regions of chemical weapon storage. Since 1998, recovery camps and health centers have been located closer to the storage regions in Udmurtia (children from Maradykovo, Kizner, and Kambarka), in Penza Oblast (children from Leonidovka, Pochepa, Gorny), and in Kurgan Oblast (children from Shchuchansk and Shumikha regions) and Chelyabinsk Oblast. In 2000, the first winter center was organized near Izhevsk for children from Udmurtia.

Plans for 2001 include two winter and five summer health centers and camps for children from ecologically unfavorable regions of Russia.

This extensive program raised new problems for RGC, such as leader training and development of guidelines for organizers of ecological education. These problems are solved now. Swiss Green Cross carried out in Kiev a workshop for organizers of ecological recovery camps from Russia, Belarus, and Ukraine. In spring 2001, RGC is going to carry out the second leader training (the first one was in Moscow in March 2000). The Chief of the RGC National Committee of the "Ecological Education" program, Professor V.Nazarenko, prepared guidelines for teachers and organizers of ecological education of children during their rest in RGC ecological recovery camps. RGC also realizes other projects in the regions of chemical weapon storage. For example, sociological interviewing on the chemical weapon destruction problem was held in Kurgan Oblast and Udmurtia. Another example is a number of educational workshops for doctors of civilian and military hospitals in the storage regions, carried out together with Swiss Green Cross in 1999–2000. And RGC made inspections of sites of former chemical weapon destruction near Penza and studied the possible impact of the destruction "products" on the main regional water body, the Sura reservoir.

The results of this investigation were published both in the local and central mass media. The Governor of the Oblast and the Ministry of Defense have received advice for taking measures. Unfortunately, the only measure that was accepted was to ask RGC to find the funds for implementing the solution of the problem somewhere abroad. This fact proves that our authorities, on one hand, either cannot or do not want to solve conflict problems, and on the other hand, they prefer to get rid of their work by giving it to a public organization.

CONCLUSION

These results of activity in chemical disarmament of one of Russia's public organizations show the influence of the community on one of the most difficult and contentious problems of our society, elimination of weapons of mass destruction. On the other hand, one can see that both the authorities and nongovernmental organizations have a long way to go towards a civil society.

ORGANIZING IN DIRECTLY IMPACTED COMMUNITIES: THE SOCM STORY

Maureen O'Connell
Save Our Cumberland Mountains

This presentation is a case study of a particular kind of NGO in the United States that is different from others presented at this conference. First, let me paint you a picture of the situation that existed in rural coalfield communities of Tennessee at the time SOCM was organized.

In 1971 in five rural mountain counties of Tennessee where at that time 90 percent of the coal in the state was mined, conditions were very difficult for the retired underground miners, subsistence farmers, and other low-income and working class people who lived there.

- Ten large land companies, most of them from out of state and one from London, England, owned 80 percent of the mineral land and paid no taxes on their mineral holdings.
- Unregulated strip mining on steep mountain slopes brought earth, rock, and trees down the mountains and onto roads, into streams, and onto people's land. Blasting through rock also blasted and cracked homes and wells, the only available water supply. Filled up streams flooded land of residents.
- In some places land companies or coal companies legally owned the mineral rights under the surface and the mineral owners' rights were ruled by courts as superior to those of surface owners.
- The underground mines, which historically had provided many jobs, were largely closed because there was more money to be made by strip mining; unemployment was very high.
- These were some of the poorest counties in the state with few basic county services, partly because little revenue was generated for the county from the land and coal companies.

In 1972, after seeing research by some university students about land ownership and taxes paid in the five counties and the fact that the state constitution requires taxes be paid on minerals, 13 citizens filed a legal petition to make the local tax assessors appraise minerals as part of the value of land. They won the petition and, having obtained several hundred supporting signatures, decided to form an organization they called Save Our Cumberland Mountains (SOCM, pronounced "sock-em"). Unregulated strip mining of coal was one of the first issues they decided to take on.

From the beginning, SOCM was organized to be membership-based and member-run. People would speak for themselves, not have staff speak for them. SOCM would work on projects members chose to work on. Through the method of community organizing, members in a local community came together to form a group. They listened to each other, told stories about how they were affected by problems in the community, and received strength from being together. As a local group they decided what to work on, who were decision-makers who could do something about their problem and how to influence them. They found scientists who were allies, and they learned science themselves. They always knew, however, that in order to win, they needed to build a strong grassroots base of political power to influence decision-makers and public opinion.

They incorporated culture into their meetings, singing old union struggle songs and writing their own songs. Staff did lots of training and leadership development. Members learned how to research issues and how to think through a comprehensive strategy. They developed stronger skills in running their own meetings, talking with the media, recruiting new members, and conducting grassroots fund raising. Members practiced and role-played before taking action, had lots of encouragement, and evaluated activities later for lessons learned.

SOCM's organizing is based on the belief that regular citizens, both those with little formal education and those with more, have great potential to learn, to speak, and to act for themselves, and that participating in public life is what democracy means.

For the first several years as SOCM members took action, there was a backlash from the coal companies. Many people received threatening phone calls. Some homes were burned by arsonists, but no one was ever prosecuted. Some members were physically attacked. Because of the principle of multiple leadership, however, coal companies couldn't destroy SOCM by intimidating any one or several leaders.

From the beginning SOCM was multi-issue and multi-county. In local communities members worked to have roads improved and streams cleaned up. They worked together for a severance tax on coal which was passed by the state legislature to bring in revenue to the coal counties for roads and schools. They

worked with others in the state to have a state strip mine law passed and then worked even harder to have it enforced.

Over the years (SOCM is now 28 years old) the organization expanded in a number of ways. Geographically it expanded first to Cumberland Plateau counties, called the "southern coalfields of Tennessee," and then both east and west beyond the mountains. More recently, SOCM has formed new multi-racial chapters in middle Tennessee. It expanded from several hundred to nearly 3,000 members. Currently, there are SOCM members in about two-thirds of Tennessee's counties. From working primarily on coal-related issues, SOCM members have gone on to address both locally in their communities and state-wide a range of other issues that impact them, including problems related to toxic and hazardous waste, solid waste, oil and gas, other extractive minerals, forestry practices, state tax reform, and abuse of temporary workers. SOCM has helped form and provided leadership for many coalitions and alliances at the state, regional, and national levels.

STRUCTURE

In a county, members form a local chapter to work on local issues, to build a stronger grassroots base in that area, and to support SOCM's organization-wide work. Governance at the organization-wide level is provided by a Board made up of representatives elected from each chapter and officers and three at-large delegates elected by the membership as a whole. Issue committees are organized to focus on strategies for broader campaigns to address roots of problems being faced by many local communities. Internal committees, also made up of members, oversee the internal functioning of the organization's finances, personnel, and long-range planning

HIGHLIGHTS OF SOME STRATEGIES USED

Highlighted here are some strategies that may be of interest to Russian colleagues.

Research We've always known in SOCM that we need accurate information and sound research for campaigns. We need access to research that others have done, and in some cases we must do our own. Here are two examples of SOCM research studies to address situations of concern to members.

- To show that reclamation seldom works when mining in very toxic coal seams (in Tennessee the most toxic is the Sewanee coal seam), SOCM interns field tested water quality coming off areas that enforcement agencies called

"reclaimed mine sites" (where the bond had already been released). They found that over 80 percent of these sites were still leaching acid mine drainage with an average pH equivalent to that of vinegar. That research was used as SOCM pressed for and won precedent-setting rulings about the need for special kinds of toxic material handling plans when mining the Sewanee seam.

- To show that the state regulatory agency was not enforcing the state strip mine law, SOCM researched hundreds of files of enforcement actions in state agency offices and prepared an "Enforcement Study," a documented expose of poor enforcement. Partly based on that study, the federal government took over the regulation of strip mining in Tennessee.

Help from the Scientific Community SOCM has had wonderful help from volunteer scientists who have given significant amounts of time to review documents and to testify at public hearings along with regular SOCM members. Included in this group are geologists, hydro-geologists, ecologists, soil scientists, biologists, and others. These scientific allies come from universities in Tennessee, from the Oak Ridge National Laboratory, and from private firms. SOCM is grateful for the important contribution of their thousands of hours of time.

Emphasis on Economic as Well as Environmental Aspects of Issues SOCM stresses the economic as well as environmental and human health aspects of issues it works on. Here are two recent examples:

- In an almost ten-year campaign to force the Department of Interior to declare the watershed of Fall Creek Falls State Park unsuitable for mining (members of a SOCM chapter live in the watershed), an economics professor from the University of Tennessee compiled a study of the impact of the park on the economy of surrounding counties. The study concluded that pollution of the spectacular waterfalls and other water features of the park could result in loss of over 700 jobs and millions of dollars in revenue to nearby counties. SOCM was also able to obtain resolutions of support for our petition from local county governments in those surrounding counties. Last June after years of SOCM's work, the Department of Interior designated 61,000 acres of the watershed off-limits to mining.
- A current effort involves obtaining some regulation of giant chip mills that are increasingly locating in the south. In an eight-hour shift a chip mill can grind up 60 acres of forest land. Besides the impact on land and water and the threat of over-harvesting SOCM members stress the loss of value-added jobs that rely on the availability and affordability of hardwoods. A group of hardwood-using businesses are supporting our current effort for state legislation.

Use of the Media SOCM uses the media in campaigns both to help mold public opinion around particular issues and to establish SOCM as a player in the public arena. Here are two examples:

- In an eight-year successful effort to win the strongest surface owners' rights law in the country, SOCM members met with editorial boards and received editorial endorsements from every major newspaper in the state.
- On several occasions SOCM has used a major media campaign strategy which involves an intensive several-month effort to place as many stories in as many media outlets as possible (newspapers, radio, magazines, talk shows, etc.). The campaign culminates in a major event and press conference. In the Fall Creek Falls campaign, a 150-foot banner was lowered next to the park's spectacular 256-foot waterfall with the message, "Bruce Babbitt, Don't Let the Falls Down!" In a campaign to highlight the need for forestry legislation, volunteer pilots flew reporters from all over the state over a 1,600-acre clear-cut site, showing filled up streams from erosion on the site, in conjunction with a press conference.

Lawsuits as a Strategy of Last Resort When other strategies fail, SOCM has used lawsuits as a strategy. Here are two instances:

- SOCM forced the state of Tennessee to implement its own water quality law and to set up a division of surface mining
- Along with another organization, SOCM forced the federal government to collect fines and set up a system to track down violators of the federal surface mining law

Grassroots Fundraising From its earliest history when SOCM members "passed the hat" at meetings for money to help pay for expenses of the organization, SOCM has emphasized member involvement (as well as staff) in raising money for the organization's budget. Money from foundations has been and still is a critically important source of operating funds. However, currently, over 40 percent of the organization's budget is raised by membership dues, mail appeals, chapter fundraisers, organization-wide fundraisers like walkathons and concerts, house parties, major donor contributions (defined in SOCM as donations of $50 or more), phonathons, and other activities.

CONCLUSION

Over its 28-year history of organizing, SOCM has learned that it sometimes takes a long time to win and that the wonderful victories are often accompanied by what seem like heart-breaking setbacks along the way. For SOCM members,

losing becomes just another way to learn. SOCM has been determined to stay in the struggle for the long haul.

While it's great to win, it's just as good to see what happens when ordinary people become more skilled and more confident and their world becomes larger as they learn about the struggles of others in different communities in the state, in the country, and even internationally. Their analysis of the roots of problems sharpens. Care is taken to develop sensitivities and understanding about the race and class barriers that so often divide people who really have much in common. It was vitally important to win the Fall Creek Falls issue. Just as important, however, was seeing Landon Medley, a factory worker from Doyle, Tennessee, and chair of SOCM's strip mine issue committee, speak eloquently about the power of citizen efforts in bringing about the victory.

There are many community organizations like SOCM in the United States in virtually every state and working with virtually every ethnic group and race in the country. My experience is that community organizing, where people themselves are transformed in the process, is both a method to bring about the changes needed for a better environment and a more just society, and a way to truly build a working democracy in our country.

Thank you so much for the opportunity to share SOCM's experiences with you and to learn from you at this workshop.

GLOBAL FOREST WATCH: AN EXAMPLE OF INTERNATIONAL PARTNERSHIP WITH RUSSIAN NGOs AND SCIENTISTS

L.Laestadius
World Resources Institute

THE WORLD RESOURCES INSTITUTE

The World Resources Institute (WRI) was founded in 1982, in Washington, DC, as a nongovernmental, not-for-profit organization. The John D. and Catherine T.MacArthur Foundation supplied a large initial grant. Today, funding comes from many sources, including private foundations, corporations, agencies and cooperating organizations (such as a number of United Nations agencies, the World Bank, agencies for development aid, and many others), and individuals. WRI currently has 125 employees from about 20 countries.

WRI is active in many policy areas. These include biological resources, climate, institutions and governance, economics, business management, and information (see Box 1). A well-known product is the World Resources Report, a semi-annual book of world statistics and topical assessments prepared together with the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), and the World Bank. The latest edition, the Millennial Edition, presents a comprehensive assessment of five of the world's major ecosystems.

From the very beginning, WRI's goal has been to propose practical policy solutions to environmental and resource problems. Attention to facts and analytical excellence has always been emphasized. In the beginning and for many years, the typical WRI product was a report, rich in text, written for official policy makers and their advisors. And this is still the case, sometimes.

But the world has changed, and so has the way that WRI works. Public participation in policy-making has become more important, and so has the positive role of industry. Our experience shows that reports, no matter how well

written, sometimes end up rather quickly on the bookshelf, where they lose much of their intended power.

BOX 1 THE WORLD RESOURCES INSTITUTE

- Provides information, ideas, and solutions to global environmental problems.
- Our mission is to move human society to live in ways that protect Earth's environment for current and future generations.
- Our program meets global challenges by using knowledge to catalyze public and private action.
- Our goals are:

- - To reverse damage to ecosystems.
- - To expand participation in environmental decisions.
- - To avert dangerous climate change.
- - To increase prosperity while improving the environment.

CONNECTIVITY

In order to maintain its influence on the policy agenda, WRI is increasingly emphasizing something we call *connectivity:* additional contacts and cooperation with individuals and organizations outside government, including both industry and the community of nongovernmental organizations (NGOs). When adding connectivity to analytical excellence, WRI is trying to make the most of the new information technology. An increasing number of people worldwide meet WRI through its website (www.wri.org). WRI is increasingly turning its website into a connectivity tool: not only a place to get information (although this is significant), but also a place for real dialogue.

Global Forest Watch (GFW) is a recent initiative of WRI that emphasizes connectivity and the use of new technology.

GLOBAL FOREST WATCH

Created in 1998, GFW is an international data and mapping network that combines on-the-ground knowledge with digital technology to provide accurate information about the world's forests and threats to them. The overall objective

of GFW is to infuse transparency and accountability into the decision-making processes that determine how forests are managed, and for whom. The GFW network includes NGOs, universities, and other institutions that are monitoring logging, mining, and conducting other development activities within major forested regions of the world. GFW is governed by an international Steering Committee consisting of representatives of national GFW Chapters, while the secretariat (GFW International) is housed within WRI. GFW is currently active in Indonesia, Canada, Gabon, Cameroon, Venezuela, Chile, and Russia. Activities are planned for the United States, the Baltic countries, Romania, and the Amazon basin.

THE GFW CONCEPT

The GFW concept is built on the power of accuracy, transparency, and connectivity.

- **Accuracy** is achieved by a scientific approach. The systematic use of modern technology is coupled with a rigorous review of all maps and data products: an expert review to build accuracy and a stakeholder review to build credibility.
- **Transparency** is achieved by sharing GFW products as widely as possible, typically at no cost to the user, again using modern technology and media approaches. Through an interactive website (www.globalforestwatch.org), and through printed reports, media coverage, and op-ed articles, GFW information reaches different stakeholders and interested citizens worldwide.
- **Connectivity** is inherent in the GFW bottom-up approach, relying as far as possible on local and national groups and capacities, creating and catalyzing new national networks, creating new international collaboration. GFW should not be seen as a limited-life project. Rather, GFW is a continuous, systematic, and rigorous civil-society based auditing process of forest conditions and utilization.

FOREST WATCH RUSSIA

The Russian Chapter of GFW, called Forest Watch Russia (FWR), was born in November 1999 at a meeting in Krasnoyarsk in Siberia. FWR is a unique national coalition of Russian NGOs with the interest and capacity to map and monitor forests. Member organizations represent all corners of Russia as well as outstanding technical expertise. The goal of FWR is to improve the conservation

and utilization of Russia's forests by means of high-accuracy forest mapping and monitoring.

RUSSIAN INTEGRITY AND WRI'S ROLE

FWR is a thoroughly Russian network (see Box 2), despite its close links with WRI and GFW. Priorities and plans reflect Russian concerns, and FWR relies entirely on technical capacity inside Russia. WRI's role is limited to fundraising, facilitation, and light overall coordination. The work is currently financed through a donation from the company IKEA.

BOX 2 FWR STEERING COMMITTEE

- Lars Laestadius, WRI (Chairman)
- Academician Alexander Isaev, International Forest Institute, Moscow (methods and data review)
- Dmitry Aksenov, Socio-Ecological Union, Moscow (national GIS function, data issues)
- Mikhail Karpachevskiy, Biodiversity Conservation Centre, Moscow (national GIS function, editor)
- Andrei Laletin, Friends of the Siberian Forests, Krasnoyarsk (coordinator Eastern Siberia)
- Anatoly Lebedev, Office for Regional Public Campaigns, Vladivostok (coordinator, Russian Far East)
- Olga Tarakanova, Transparent World, Moscow (remote sensing, administrative coordination)
- Alexey Yaroshenko, Greenpeace, Moscow (coordinator European Russia, map verification)
- Alexander Yumakaev, The Fund for 21st Century Altai, Barnaul (coordinator Western Siberia).

NGO LINKS

FWR is cooperating with environmental NGOs from all over Russia. A prominent member organization is the International Forest Institute, led by Academician Alexander Isaev, former chairman of the USSR State Committee for Forests. This informal link with the Russian Academy of Sciences is very

useful for FWR. The Forest Service of Russia has been participating as an observer.

INTERNATIONAL LINKS

Being a member of the GFW family connects FWR to the world. Maps and information on Russia can reach the world quickly and effectively through the network and communications capacity of GFW International. Approaches, methods, experiences, and people can be exchanged with other GFW countries Canada is an interesting parallel for Russia.

The international connection also allows Russian know-how to be available outside of Russia. The members of FWR have significant experience and advanced competence in forest mapping using satellite images and geographical information systems. Russia is without doubt a world leader in this kind of mapping.

STRUCTURE AND CAPACITY BUILDING

Russia is a large country where regional balance and reach are crucial. FWR has adopted a structure with four macro-regions (Far East, Eastern Siberia, Western Siberia, and European Russia), each with a Regional Data Center based in existing organizations and networks in Vladivostok, Krasnoyarsk, Barnaul, and Moscow. In Moscow the Center doubles as the FWR National Data Center. The plan is for these centers to serve as coordination points, providing organizational and technical know-how, equipment and software, training, and outreach, and also as data management centers, (such as regional libraries for satellite images and GIS data).

FWR OBJECTIVES AND ACHIEVEMENTS

The initial task of FWR is to map all remaining frontier forests, and particularly large blocks of intact forest in Russia. An FWR partner, Transparent World, has prepared a draft map at the scale of 1:1 million, which would be more than 8 meters wide if printed to scale, using recent medium resolution images from the Russian satellite *Resurs* and high resolution images from the American LandSat. This is the first map of Russian forest cover that has been made from such detailed images. FWR partners conducted field verification of the map during 2000. The map will be published at the end of 2001, following revision and review by experts and different stakeholders.

Transparent World has also supplied the Regional Data Centers with images and interpretation software and conducted training courses for their staffs. The Regional Data Centers, in turn, have trained and organized local groups to conduct field verification (ground truthing) of the map. FWR plans to continue to build technical capacity among Russian NGOs as it expands and refines its mapping activities.

ROLE OF INTERNATIONAL RELATIONS IN THE DEVELOPMENT OF ECOLOGICAL NONGOVERNMENTAL ORGANIZATIONS IN RUSSIA: THE INTERNATIONAL ASSOCIATION SIBERIAN ACCORD

M.N.Korotkevich
International Association Siberian Accord

"The Russian power will increase with the help of Siberia…" These prophetic words of the great scientist M.V.Lomonosov have become historical reality. Siberia makes a large contribution to ensure Russia a significant place among the great world powers (see Table 1).

TABLE 1 Material Resources of Some Leading States

State	Area, Million Square Kilometers	Population, Million	Population Density Per Square Kilometer	Hectares, Per Person	Oil Resources, Tons Per Person	Gas Resources, Million Cubic Meters Per Person
Russia	17.0	148.1	8.8	0.89	132.0	275.0
USA	9.2	250.0	28.0	0.75	14.0	19.0
Canada	9.2	26.6	3.0	1.73	27.0	117.0
Germany	0.35	79.5	231.0	0.15	0.8	4.4
France	0.55	56.7	104.0	0.34	0.3	0.5
England	0.24	57.4	239.0	0.12	9.3	9.5
Japan	0.38	123.5	332.0	0.04	0.06	0.3

About 90 percent of Russia's natural resources are within Siberia. They make up 45 percent of the world's gas resources, 13 percent of oil, 23 percent of coal, and 20 percent of fresh water. In recent decades, powerful intellectual and industrial potentials have been created in Siberia, including branches of three Russian academies and dozens of scientific research institutes and educational institutions.

An interregional association of economic interaction among the administrative units of the Russian Federation—Siberian Accord (hereinafter IASA)—has been created. IASA is a public non-commercial organization, uniting on a voluntary basis 19 subdivisions of the Russian Federation. IASA helps ensure the most effective use of unique Siberian resources, improving new methods of management in the conditions of economic decentralization and market relations on the regional and interregional levels, as well as achievement of sustainable development under new conditions.

More than 24 million people live in an area of 10 million square kilometers (38 percent of Russian territory).

In October 2000, IASA celebrated its tenth anniversary. Priority directions of IASA activities are: maintenance of power, food, and ecological security of Siberia, health protection of its multinational population, and unification of its socio-cultural and educational activities.

The highest body of IASA is the Association Council, uniting the chiefs of the executive and legislative branches of the 19 territorial authorities. Twenty-five coordinating councils work in various directions: legislation and law-making, scientific and technological policy, conversion and industrial policy, power, transport and communications, waste disposal, agricultural processing, engineering industry, ecology, investment and foreign trade, and social and cultural programs.

The Executive Committee directs the operations of IASA. During the current decade, the Association has demonstrated an open policy, various forms of constructive partnership, and efficient interactions with organizations on the international, federal, and interregional levels. It has cooperation agreements with the Federal Council and with the government of Russia, Ministry of Fuel and Energy, Ministry of Science and Technology Policy, Ministry of Transport, and Ministry of General and Professional Education; Siberian Branch of the Russian Academy of Sciences (RAS); Russian Aerospace Agency; Trade-Industrial Chamber; and a number of foreign organizations.

The ecological strategy of Siberia, developed in IASA together with the RAS, provides for the rational use of nature and maintenance of environmental quality. This development should ensure renewal of natural resources, a favorable quality of the environment, and the health of the people; protection of the genetic potential and landscape variety; and the opportunity of further sustainable development of the Siberian region. The main evaluation criteria of

the work in these directions are the environmental conditions and the population's health.

The development of resources and the manufacturing and processing branches in Siberia have caused pollution and degradation of the environment. This in turn has resulted in negative tendencies in the demographic situation, quality of life, and health of the present and future populations of Siberia.

A decrease in the population and its reproduction potential has caused a decrease of the able-bodied population. This threatens ecological and economic security and also has geopolitical aspects. The chiefs of all departments are responsible for radical measures to reverse this developing situation.

A Coordinating Ecological Council (hereinafter-CCE) plays a key role in decisions on ecological problems and solutions of such problems as ecological health, ecological reconstruction of food production processes, drinking water supply, and waste treatment; environmental monitoring and managing the population's health and natural resources; formation of the ecological way of thinking and solving the problems of rational use of nature; and ecological education. CCE uses the report "UN Conference on Environment and Development," prepared by Academician V. A. Koptyug, who participated in the work of the conference as a representative of Russia.

CCE joins forces with other coordinating councils to solve ecological problems, taking into account their interrelations with all spheres of life in the region.

THE PROBLEM OF WATER SUPPLY AND USE

While water is one of the main life-forming natural factors, the problems of the drinking water supply of the Siberian population and Russia as a whole have become very sharp. According to data of the State Sanitary-Epidemiological Inspection, 30 percent of the urban and 70 percent of the rural population of Russia use substandard drinking water.

Because of the unsatisfactory condition of the drinking water supply in the region, CCE recommends priority in the territorial budgets to water treatment.

According to a decision of the IASA Council (June 1995, Tyumen, with participation of Prime Minister V.S.Chernomyrdin), an Instruction of the Russian Government about the development of the Federal Special Purpose Program "Use, Restoration, and Protection of Water Resources of the Ob River Basin" was adopted in 1996. The regional experts developed the program concept. As a result of a Federal Law "On Taxes for the Use of Bodies of Water," the regions received financing in 1998.

Also CCE has paid attention to problems of water resources of world importance. The problems of land protection in the case of the Bolshoye Vasyuganskoye Swamp, the largest swamp in the world, were considered. The

international scientific community discussed its inclusion on the list of water-swamp lands of world importance (the Ramsar List) and the formation of an inter-regional preserve of federal importance on its territory.

The richest natural resources of drinking water are concentrated in several territories (Altai Region, Khakass Republic, and Altai Republic). The International Conferences "Pure Water of Altai" (August 1998 and August 2000, Lake Teletskoye) were devoted to ecological problems of the Altai Republic water fund. This republic has a special role with significant resources of fresh ground water that supply the surface runoff of the upper Ob River basin.

Taking into account the role of the territory, the development of ecological control and water resources monitoring is recommended as a strategic direction. Glaciers and snow packs of the Altai are considered. The Executive Committee of IASA included the problem of Altai water monitoring into the CCE schedule on space monitoring. But, the support of international organizations and funds is also necessary.

Significant methodological and scientific organizational work on the solution of urgent problems of water use in the Siberian region has been performed by the international faculty of UNESCO's "Ecological Education in Siberia" (Altai, 1996). International schools on water management are carried out every year. Under the aegis of UNESCO, the world community carries out complex work on the protection of the "pearl" of world importance—Lake Baikal.

PROBLEMS OF TREATMENT AND UTILIZATION OF MANUFACTURING AND CONSUMER WASTES

According to the data of the State Sanitary-Epidemiological Inspection, 80 billion tons of waste have been accumulated in Russia. In this context, the sanitary-epidemiological situation in some territorial units has a crisis character, including on the IASA territory. The Federal Special Purpose Program "Wastes" is not functioning, and therefore CCE's recommendations for the priority solution of the problems were accepted at the regional level.

Following on to the discussion "About the Sanitary-Epidemiological Conditions in Siberia" at a meeting of the IASA Council (Kemerovo, January 15, 1999, with the participation of Prime Minister Ye. M. Primakov), it was decided to develop a special purpose program "The Management System for Dangerous Wastes." It takes into account the problems of ecological safety and economic expediency both for destruction and for treatment and utilization of manufacturing and consumer wastes.

The Coordinating Councils of Ecology, Energy Saving, and Housing and Communal services joined efforts to solve the problem "On Use of Combustible Wastes of Manufacturing and Consumers as a Source of Heat." The plasma

combustion method of destruction of domestic, medical, and other harmful wastes was accepted as a method of world importance. The experimental installation in Siberia (Novosibirsk) for the combustion of used syringes and other medical wastes uses this technology. The Siberian project "CRTS" (complex regional thermal stations) was developed by the Institute of Thermal Physics and is supported by IASA. It uses domestic wastes as additional sources of thermal energy.

Within the framework of a decision of the IASA Council (December 1999, Omsk), the CCE held a meeting on "Treatment of Toxic Wastes: Business Conditions, Problems, and Ways of their Solution." This meeting analyzed the experience in Omsk and Sverdlovsk Oblasts and in foreign states (Denmark, Germany, and Austria). The participants visited the open waste dumping ground, which is unique in Siberia and up to world standards.

The meeting recommended that administrative heads provide financing for realization of a program for this special purpose. It was also recommended that normative materials, prepared with financial support of the International Bank for Reconstruction and Development, be applied in different territories of the Siberian region.

The "Regional Monitoring System of the Environment and the Population's Health" should play a leading role in the development of the program.

Space monitoring (the only possible way of monitoring for certain territories) became an important tool for the protection of the environmental conditions and the population's health in the Siberian region. In order to supply organizations with satellite data, the Natural Resources and Ecological Monitoring Center of Siberia was organized in Novosibirsk (The Siberian Center of Space Monitoring, SCSM) in May 1997. Remote sensing data help address the following problems: inventory of natural resources, yield forecasts, forest fires, floods, burning of industrial dumps, oil overflow, gas pipeline leaks, power lines, and artificial reservoirs.

With the participation of interested federal territorial bodies (Ministry of Natural Resources, Ministry of Emergency Situations, State Ecological Committee) SCSM generated "The Siberian Block" and submitted it in December 1998 to the Ministry of Natural Resources and the State Ecological Committee as the subprogram "Space Monitoring of Siberia." This formed the basis for the Federal Special Purpose Program of the General State System of Ecological Monitoring.

An important tool for realization of "The Siberian Block" is the Agreement on Technological Cooperation between the Russian Aerospace Agency and IASA signed in December 1998. Its goal is use of the newest informational space technologies for socio-economic development of the Siberian region. The IASA Council (January 1999, Kemerovo) created the Coordinating Council of Space Monitoring of Siberia (CC SMS). A working expert group of CC SMS

prepared program measures for realization of the "The Siberian Block" of the Russian General State System of Ecological Monitoring in 2000–2001.

A large role in the ideological and practical development of the Space Monitoring of Siberia was played by IASA together with interested departments, RAS, Ministry of Natural Resources, Ministry of Emergency, Ministry of Science and Technology, State Ecological Committee, Russian Aerospace Agency, Russian Hydrometeorological Committee, and the Siberian Branch of the RAS. A wide discussion of this problem was held on the regional, federal and international levels. For example:

1. A system for monitoring from space was discussed at the international seminar "Space Monitoring of Siberia" (February 1998, Novosibirsk). More than 30 organizations took part in the seminar, including the firm SPOT Image (France), the European Space Agency, federal ministries and departments, and representatives of the territories of IASA.

   The discussion resulted in a Program of Activities for Space Monitoring of Siberia. This program provides an inter-regional center in Novosibirsk for the reception of remote sensing data from foreign satellites (SPOT, ERS, IRS) and distribution of the data within the Siberian territory. Also, there is now an array of informational-space services based on remote sensing and thematic processing.
2. A working meeting of representatives of the territorial centers (Novosibirsk, Kemerovo, Tomsk, Barnaul, Khanty-Mansiysk) on space monitoring (April 1998, Tomsk) developed the Federal Special Purpose Program of the General State System of Ecological Monitoring for the Siberian region. The integration of the "Space Monitoring of Siberia" system into the All-Russian and international systems of space monitoring was supported. The proposed Subprogram of Space Monitoring of Siberian resources will promote solution of problems of the region.
3. Representatives of 48 Russian and foreign organizations (France, Norway) participated in an international meeting on application of satellite data to the solution of problems of remote sensing (December 1998, Novosibirsk). The meeting participants learned about modern technologies of radar tracking and discussed scientific research and practical applications in the field of space monitoring of the Siberian territories. They decided:

- On the basis of Article 3 of the Agreement between the Russian Aerospace Agency and IASA, to ask the Aerospace Agency to support efforts of SCSM and the Siberian region in the organization of data reception and processing using Russian and foreign all-weather satellites.
- To propose to the European Space Agency an agreement on cooperation in the field of remote sensing of Siberia.

- To consider an International Space Monitoring Center of Siberia. Its main task would be the coordination of cooperation among regional and foreign space monitoring centers and GIS-centers for reception, storage, processing, and distribution of satellite data.
- To draw attention of the Russian Aerospace Agency, the Ministry of Science and Technology, and the Russian Hydrometeorological Committee to the main characteristics of space vehicles and to parameters for receiving signals.

Since 1998, SCSM has carried out monitoring on the base of contract relations with the territories. Considering the key role of space monitoring in the rational use of resources, CCE for the first time put before the departments of Russia the problem, "Regional ecological problems resulting from separated parts of rockets." A working meeting (Abakan, March 1999), with participation of representatives from the Russian Ecological Committee, Russian Aerospace Agency, and Strategic Rocket Forces of the Russian Defense Ministry, identified 10 territories as the regions where separated parts of rockets and missiles fall with a complex of legal, ecological, economic, and social problems for the inhabitants and administrations. A solution was worked out: free insurance for persons and their property as well as social responsibilities of the government for protection of human health.

The solution accepted at this meeting and the subprogram "Space Monitoring of Siberia" developed by the Siberian Space Monitoring Center were handed to the Temporary Commission of the Russian Federation Council on the Protection of Administrative Units Interests, Legal Persons, and Citizens from Unfavorable Consequences of Space-Rocket Activity. The Commission was created according to a Decree of the Federal Assembly (485-RF, November 12, 1998, Moscow). It includes 11 governors and chairmen of legislative assemblies.

The purpose of regional measures to protect the environment is to protect the population's health and longevity. A major role in life-support in the Siberian region is played by ecologically balanced food as an element of survival. For the first time in Siberia, the exhibitions of the international trade organization Siberian Fair were devoted to food problems. The definition "ecological pure production" sounded as a refrain during all exhibitions. Now there is not a uniform system for monitoring food products in the region, but monitoring is a tool in the solution of ecological and demographic problems. Adequate food is not mentioned in presenting environmental conditions and their influence on the population. The International Siberian Fair became a powerful means of information exchange among food institutions. The conference recommended an increase in multi-science knowledge of manufacture and consumption of food products, including special-purpose food.

Ecological problems are caused of course by socio-economic factors. Consequently, it is impossible to solve them only with technical means. Modern approaches to life-support and radical changes of value scales are necessary. The formation of a new social consciousness that defines a favorable environment as a whole is a priority. It is high time to do away with the arrogance of "creators and nature conquerors" and to transform consciousness to rational use of nature based on personal harmony with the environment and knowledge of the laws of nature.

As continuous ecological education, training, and population knowledge increase, the development of environmental sciences, including ecology, must play a key role. Mankind's future depends on general ecological education.

Ecological education and training has been raised to the level of State policy (Governmental Decree "On the Improvement of Ecological Education," 1994). The Program "Ecological Education of the Russian Population" was accepted in 1996. An Interdepartmental Commission on Ecological Education was formed.

The development of a continuous ecological education and training system at the regional level is based on general principles and approaches ("the biosphere is uniform and indivisible," "knowledge is international and has no boundaries"). They take into account the specific character of the Siberian region: its geopolitical situation; natural resource richness; recognition of some regional territories as the preserves of the planet's natural ecosystems; high scientific and industrial potential; and vulnerability of Siberian nature.

The formation of a regional system of continuous ecological education started in 1995 under the aegis of ECC. Scientific-methodological management was provided by the Department for the Problems of Sustainable Development of Mendeleev University of Chemical Technology (headed by N. P. Tarasova). Today we can say with satisfaction that IASA is an experimental platform for Mendeleev University and the UNESCO Center of Chemical Science and Education. This experimental platform deals with the continuous ecological education and training for sustainable development of the Siberian region. Dozens of regional schools with special courses on ecology and environmental protection use the books and training material received from Mendeleev University free of charge—for example: *Chemistry and Society* from the American Chemical Society, *Chemistry and Life* (Salters Chemistry) by a collective of British scientists and teachers, and *From Competition to Cooperation,* a practical handbook on active methods for ecological education prepared by a group of authors headed by the American scientist D. L. Meadows. Pedagogical collectives that use these books highly evaluate the efficiency of such training and its role in the development of contemporary ecological education. It was the beginning of 1990s when a series of regional training seminars was led by Professor Tarasova in Krasnoyarsk Territory with regional teachers and experts and with the support of the regional

administration. Hundreds of teachers and experts from IASA territories completed the course of training on innovative methods of teaching. Krasnoyarsk Territory plays the leading role among the IASA territories in the development of innovative methods of education to deal with the problems of ecological safety and sustainable development of Siberia, as well as in the interactions with international ecological organizations and funds. The head of the Ecological Laboratory of Krasnoyarsk State University, N. E. Gapanovich, was rewarded with national recognition for a contribution to the development of the regional system of continuous ecological education.

PRINCIPLES OF THE REGIONAL SYSTEM OF CONTINUOUS ECOLOGICAL EDUCATION

The purpose of an educational ecological program is the creation of the necessary conditions for organization, functioning, and development of a system of continuous general ecological education and training for the administrative units of IASA.

Program Principles:

- Variety of forms and methods of ecological education and training
- Continuity of the programs at different levels (vertical integration)
- Integration with other educational programs
- Integration among programs at each level
- Capability of adaptation
- Recognition of local characteristics
- Unification of general, professional, and ecological education
- Connection with practical activity

Problems:

- Coordination of activities in the field of ecological education and training
- Creation of a general methodological base
- Achievement of normative-legal standards
- Creation of a general informational base
- Creation of organizations for generalization of work experience and adaptation of educational methods to local conditions

Realization Conditions:

- Coordination
- Annual financing

- Creation of a general database
- Regular data exchange

A system of regional ecological education has a multi-level structure: from kindergarten to school to college to retraining of personnel for the national economy. The study of ecology is organized both as an independent discipline and as ecological parts of special courses. Special attention is paid to the practical forms of education—expeditions, competitions, reviews, conferences, exhibitions, and working with the people. Ecological solutions are possible only with the participation of interested citizens.

Let us consider some cases from continuous ecological education in the region. On the base of the State Ecological Committee of Tomsk Oblast, the Department of Natural Resources and Environmental Protection was founded. There students directly participate in the solution of nature protection problems. The Regional Youth Center works with a discussion club of pupils "Way To the Twenty-First Century," with the motto "Who, if not We." "Ecological Theatre Poez" has been formed within the regional public organization of the Novosibirsk State Pedagogical University, Ecoclub Avies. The club organizes ecological seminars for the teachers from Novosibirsk Oblast. The magazine *Oikis* is issued. The natural museum of the Berdsk Station of Young Naturalists is a methodological base for teachers and regional population. For children of different ages there is a "dialogue" with the world of plants and animals—Small Motherland. Here children learn to understand the necessity of careful attention to nature and readiness to save every species of life on Earth. Kindergarten children together with their parents plant their own trees. Thus, the museum makes a real contribution to ecological education.

The development of a number of educational ecological structures became possible with the support of Russian and international non-budgetary funds (office equipment, computers, and expeditions). Several approaches for postgraduate education and retraining are used. For example, the Omsk Governor approved the decree "On Professional Ecological Education of Directors, Specialists, and Citizens." The program involves three higher schools and the UNESCO section at the Altai State Technical University.

In Novosibirsk, Siberian Ecofund promotes education, with participation of scientists and industrial specialists in training programs.

According to the multilevel system of continuous ecological education in the region, conferences and seminars devoted to modern approaches to sustainable development are carried out (Omsk, Krasnoyarsk, Kemerovo, Tomsk, and Novosibirsk). The main purposes of the conferences and seminars are exchange of experience, unification of efforts, and further development of the regional system of continuous ecological education.

A regional seminar "The Development of Ecological Education" took place at the Tomsk Municipal Lyceum of Tomsk Polytechnic University (April 1997). Certificates were given to the seminar participants.

The Scientific-Practical Conference "Ecological Education for Sustainable Development of Siberia" (November 1998, Krasnoyarsk) concluded that education based on scientific and engineering achievements plays a leading role in deep understanding of contemporary problems. It should promote positive steps in the people's activities and development of critical thinking habits and solution of problems.

Dozens of seminars under the Soros project "Environment and World Society, Ecology and Culture of Health" have been carried out in various territories of IASA.

Representatives from 40 State and public organizations of Novosibirsk, Novosibirsk Oblast, and other territories of Siberia participated in the International Conference "The Role of Siberia in Global Climate Change" (November 15–16, 1997, Novosibirsk). "The Ecological Train from Europe to Kyoto" involved representatives from England, Germany, Herzegovina, Georgia, Poland, Romania, Ukraine, Finland, and the United States with a total of about 150 persons. It involved 30 reports of leading Russian scientists. The guests learned about Siberia, its potential, and its activities in sustainable development. This conference produced a resolution devoted to stabilization of greenhouse gas emissions (December 1997, Japan). During the public forum, which was held in Japan at the same time as the UN conference in Kyoto, six representatives from Siberia participated.

The International Seminar for State Committees of Environmental Protection of Russian Administrative Units considered foreign experience in environmental protection (Tomsk, December 1999). It was devoted to "The Development of the Monitoring System in Tomsk Oblast." Experts from the Ecological Agency of Great Britain took part. The seminar included the following: introduction of new methods for use of natural resources, development of ecological management systems and ecological audits, and role of public organizations. The territorial representatives received useful information from a two-year team effort between the State Ecological Comittee of Tomsk Oblast and the British Agency.

Participants of the Conference "The Siberian Standard of Life: Ecology, Education, and Health" (Novosibirsk, December 1997) developed a network of demonstration projects for multi-level ecological education in the region. Also they noted the contribution of CCE to special program courses (ecology of food, ecological medicine, culture of health).

The ecological-economic forum "Extremes of Siberia-98" (October 1998) considered the problems of economic reform, the worsening of ecological conditions, and the unfavorable consequences for the population. The participants of a roundtable devoted to the system of continuous ecological

education noted the necessity of a complex program of the national survival. They recommended development of a complex program for fundamental understanding of person-environment interactions and multi-level continuous ecological education: pre-school-school-senior-higher-postgraduate.

Due to its work on ecological education in 1998, IASA became an associate member of the UNESCO Center of Chemical Science and Education. Among the main directions of the Center's work is education and retraining of teachers in the field of sustainable development.

Some examples of IASA's Work in the Center Program are:

- CCE of IASA together with the Problem Commission of Novosibirsk State Medical Academy addressed educational levels in food sciences, from pre-school education to staff education to retraining.
- Qualification courses in hygiene, sanitation, ecological safety, and health science were organized in the production and consumption areas.
- The innovation project "The Siberian Standard of Life" was prepared. The project is awaiting financial support from the British Council.
- Experts of the Center organized the conference "Ecological Education of Children of Pre-school and School Age in the Context of Ecological Safety and Sustainable Development in the Siberian Region" (April 1999, Novosibirsk).
- IASA experts helped revise educational programs in the technical high schools. The first group of engineers-ecologists graduated from Novosibirsk State Academy of Water Transport this year. Twenty-three students devoted their diploma work to water use and water transport problems in the context of ecological safety and sustainable development.
- IASA authors prepared the monograph "Basics of Ecological Medicine" (Novosibirsk, 1999), which can be used in educational programs for addressing problems of life-support in the Siberian region.

The activities of CCE within the IASA territory are regularly reported in the regional press and mass media. This informs the population about IASA measures directed to ecological normalization of the environment and easing of social tension in the region.

The Territorial State Committees of Environmental Protection are full partners in the formation of regional components of educational programs. They frequently render organizational and financial support for trainees.

Databases established by the State Committees (using advanced GIS-technology) and processed data (airborne and space monitoring and computer modeling) in the form of different ecological atlases and maps are available to interested educational institutions in the framework of IASA.

A number of higher schools of the region (Tomsk Polytechnical University, Novosibirsk State Technical University, Novosibirsk State Medical Academy) have displayed initiative in helping school pupils select their professional

careers. They created the opportunity for realization of innovative educational methods through special ecological courses. The professors from these higher schools—experts of high qualification in different spheres—are teachers.

Effective training in ecology is possible only by recognizing the power and culture of the Motherland. We have reason to be proud: rich natural resources, educated and talented people, rich spiritual and cultural treasures. "How light-blue and small is our planet!" exclaimed Yury Gagarin, who opened the way to Space.

But we should remember that only with full knowledge about the world and with the participation of the world's society in sustainable development can we preserve our Earth with favorable living conditions.

PUBLIC DISSEMINATION OF INFORMATION TO SUPPORT SAFE MANAGEMENT OF CHEMICALS

J.S.Young
Hampshire Research Institute

I would like to thank the Russian Academy of Sciences and the U.S. National Academy of Sciences for sponsoring this workshop and inviting me to participate.

My presentation has three main parts.

- First, because the Hampshire Research Institute (HRI) is a somewhat unusual nongovernmental organization, I would like to describe who we are, what we do, and how we support this work.
- The second part is concerned with the history of direct public dissemination of environmental information in the United States. I will briefly note the origins of these efforts, describe some of the progress that we have made, and note some of the continuing challenges.
- The third and most extensive part will focus on international initiatives dealing with the dissemination of environmental information to the public and the use of that information by the public. My belief is that the experiences of a variety of nations are more likely to provide cases that are useful in Russia than would an exclusive focus on the U.S. experience. Equally important, there are a number of international initiatives that will likely influence Russian environmental initiatives, as part of the larger issue of Russian participation in the global economy.

HRI is a different kind of NGO in several ways. Perhaps the most basic is that it began as a for-profit business (government consulting). Many U.S. NGOs

started as small groups of citizens concerned about particular local issues working on a volunteer basis, and they have grown into nationwide organizations with hundreds of thousands of members and professional staffs. Hampshire Research Associates was founded by Warren Muir, formerly the Director of the Office of Toxic Substances in the Environmental Protection Agency, with a focus on the analysis of information systems and methods for assessing the risks posed by exposure to toxic chemicals.

After nearly a decade of operation, a related non-profit institute was created, with the focus of providing information directly to the public (including other NGOs), rather than via reports to the government. In the past decade, the non-profit institution has grown to eclipse the government consulting work, and the consulting firm now operates as a subsidiary of the NGO.

Another difference between HRI and other NGOs is the way we work. If many U.S. NGOs can be viewed as "warriors" defending the environment, HRI is instead an "armorer," providing the public with the information and analytical tools they need to participate in public debate and decision-making concerning the environment.

As might be expected for an organization founded by a chemist, and which hired two toxicologists as its first staff, our focus is quite specific. We are concerned with the potential adverse effects of chemicals, whether via intentional use in commerce and industry or as by-products of modern industrial society.

Our main role has been to take data that are available to the public at least in a hypothetical sense, and to provide data formats, analyses, and tools that ensure that those data are really available to support public participation in environmental deliberations.

Two key issues have been the dissemination of data on the releases of industrial and commercial chemicals to the environment (PRTRs) and the development of user-friendly tools for risk assessment. In the latter area, we have long enjoyed the collaboration of Dr. Tarasova and the Mendeleev University.

While most of our work is no longer on behalf of government agencies, it has received substantial financial support from the government, in the form of grants and cooperative agreements. We have also had significant support from private foundations. Increasingly, our work has been supported by multilateral institutions, including UN agencies (UNEP, UNIDO, UNITAR), OECD, and the North American Commission on Environmental Cooperation (CEC).

In the United States, there is a wealth of environmental data available to the public. The key problem that we have encountered is that government agencies vary widely in the extent to which they provide the data in a form that is usable to any but a small group of experts and the level of effort that they require a citizen to expend to get the data.

Probably our best known data source is the Toxics Release Inventory (TRI). It reports annual data on releases and transfers of some 600 chemicals and chemical classes from a range of U.S. industries.

This success story had its beginnings, however, in failure. Most sources credit the passage of the enabling legislation with the environmental disaster at Bhopal, which was closely followed by a similar, if far better controlled, incident at Institute, West Virginia. Without this disaster and potential disaster, the law (which addresses both ongoing releases and disaster preparedness) might never have been passed. At the time, the Environmental Protection Agency held that it was unnecessary, and unlikely to provide information not obtainable elsewhere.

TRI only requires reporting of data to the public, and yet it is associated with major improvements in environmental performance. Over the ten years for which consistently reported TRI data have been available (1988–1997), there has been a substantial decline in releases of listed chemicals from reporting facilities:

Substantial declines have been seen in on-site releases from 1988 to 1997 (49.2 percent overall): to air, down 55 percent; to surface water, 64.7 percent; to underground injection, 21.9 percent; to land, 26.2 percent. These decreases were not offset by an increase in transfers, but reflect real advances in environmental protection.

Academics still argue over exactly how reporting alone has led to improved performance, but most agree that the annual reporting of data linked to the specific facilities responsible for emissions is a key element. There are many other databases that are less well used (likely because they lack a comparable mandate for public reporting). They are likely targets for further efforts at effective public dissemination. We are beginning to explore the use of new tools, including Geographic Information Systems, to increase the utility and availability of these data.

Despite the benefits of public reporting, there are still challenges to making sure the public obtains the data it needs to participate in environmental protection. Over the past decade, the range of chemicals and industries covered by TRI reporting has expanded significantly. At each turn, there is major resistance from affected industries. More recently, there has been a major challenge to the fundamental concept of public access to data, under the guise of concern about terrorism and security.

A recent law imposed a new “balancing” test on risks and benefits of information dissemination, despite a complete absence of any evidence that these data have been used in terrorism. In consequence, new regulations have severely restricted public access to data on the potential impacts of industrial disasters. These restrictions, among other effects, have precluded any analysis at a national or regional level of the safety of our industrial facilities.

Sadly, some evidence also suggests that government agencies are becoming less willing to work with the NGO community to provide effective access to information for the public. At this point, I hope that this is an accidental consequence of government restructuring efforts.

As I noted in my introduction, it may be that activities in a variety of international forums are of greater relevance to Russia that are the specific experiences that we have had in the United States.

In this regard, I want to briefly describe the recent progress of the international community with regard to PRTRs and discuss some potential political implications for reporting in Russia. The latter will rely on observations regarding possible parallels that have been observed elsewhere. You will have to judge for yourselves whether they have any relevance to the situation in Russia.

Finally, I will provide a brief discussion of technical resources relative to establishing a PRTR. While this has been a massive effort in the United States, the experiences of other countries suggest that effective implementation can be done far less expensively. While perhaps not directly relevant to a vast industrial nation such as Russia, the experiences of small European countries may be particularly relevant in addressing the problem of disseminating information in the face of budgetary constraints.

The TRI and other early PRTRs began as independent national efforts, but over the past decade there has been an accelerating pace of work in the international community.

Available evidence suggests that there will be significant harmonization of PRTR reporting on a global scale among the industrialized nations. This harmonization is occurring within a context of the globalization of trade, and significantly involves international *economic* organizations. It may well be that there will be an economic impetus to instituting such reporting.

While I am not aware of any concrete evidence, it is not hard to imagine that public reporting of facility environmental data could become an important part of marketing products globally. Many multinational corporations have adopted a "triple bottom line" (profits, environment, social accountability) approach to evaluating business success, and they are imposing corresponding conditions on firms that wish to serve as their suppliers. There are several documented cases where multinational companies have discontinued relationships with suppliers on the basis of their environmental performance.

PRTRs first came to general attention on the international scene at the Rio Conference in 1992, albeit in rather general language, as was true of much of the conference resolutions. Chapter 19 directs governments to implement and improve data bases about chemicals including inventories of emissions, with the co-operation of industry and the public, and cites PRTRs as an example.

There has, however, been significant action in multilateral organizations since then, with increasing specificity about an international consensus on public availability of environmental data.

Perhaps the most significant event is the signing of the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters in June 1998 under the auspices of the United Nations Economic Commission for Europe. The European Union is moving to harmonize its member requirements with this convention. The striking contrast of the Aarhus Convention to Chapter 19 of Agenda 21 is that the language is far more specific with regard to what is required of signatories.

The "pillars" of this convention are directly related to the focus of our present meeting, and so the relevance of this convention to Russia is a topic that bears serious examination. It is anticipated that a sufficient number of ratifications will occur to bring the Convention into force in 2001. The signatories have had two subsequent meetings, as well as several meetings of implementation/working groups. Moreover, PRTRs are one of three explicit centers of attention for working groups under the Convention. The PRTR group is being led by the Czech Republic.

The Czech Republic has independently been active in this area for several years. It has developed considerable expertise with regard to PRTR implementation in a transition economy faced with severe budget constraints.

In North America, cross-border comparisons have become a major element in PRTR reporting, both with regard to its public visibility (they are very popular with the mainstream press) and in terms of whether and how PRTRs are implemented. Significant differences in comparable facilities across the U.S.-Canadian border have drawn interest in the popular press, resulting in the widespread dissemination of data and of information on how to access the data. The greater range of chemical coverage in the United States and the wider range of facilities in Canada have driven continuing evaluation of the adequacy and relevance of each nation's reporting. Ongoing reporting of U.S. and Canadian data, in the context of a free-trade zone, have created considerable pressure on Mexico to implement a comparable set of reporting.

In the context of these effects, it is instructive to note that the earliest ratifiers of the Aarhus Convention are, with a single exception, immediate neighbors of Russia to the south and west. Only the Russian NGO community can determine its interest in pursuing PRTRs or comparable reporting systems, in light of its knowledge of the legal, political, and technical conditions that prevail here. Such an effort may or may not be a priority for any Russian NGO.

To the extent that there is interest, however, there are technical resources that can dramatically reduce the effort involved in instituting such a reporting system.

For example, there are several national and international sets of guidance on how to estimate emissions from various industrial processes. Given the range of industrial infrastructure that these diverse sources represent, at least some should be relevant or adaptable to conditions in Russia. Many of these technical documents are directly available on the Internet.

In addition to the resources listed below, which deal primarily with the problem of generating data to report, there is a wealth of available information (with more under development) on how to implement the reporting and dissemination of these data. The international institutions listed below represent a good starting place for any NGO interested in PRTR implementation.

TABLE 1 Technical Resources for PRTR Implementation

National Resources	
www.epa.gov/ttnchiel/	Air CHIEF, AP-42
www.environment.gov.au/epg/npi/handbooks	Australian Guidance
International Resources	
http://themes.eea.eu.int:80/showpage.php//?pg=40530	CORINAIR Atmospheric Emission Inventory Guidebook
United Nations	
www.unitar.org/cwm	UNITAR—Support Materials and Compendium
www.who.int/iomc	IOMC (Inter-Organization Programme for the Sound Management of Chemicals)—1995
OECD	
www.oecd.org/ehs/prtr/projects.htm	Estimation and Dissemination Documents

INTERNET USE BY NONGOVERNMENTAL ORGANIZATIONS: TENDENCIES AND PROSPECTS

L.A.Kokhanova
Moscow State University

A new stage of activity of nongovernmental organizations has appeared. It is characterized by use of the Internet. Public movements cannot do without the Global Network. The Internet forms its own virtual environment where people look for new forms of communication.

The goal of the research carried out at the Faculty of Journalism of Moscow State University is to trace interrelations between the nongovernmental sector and new communication technologies and to discover characteristics and differences of the new electronic information environment in comparison with the conventional one. Other tasks are data collection and analysis of current newspapers, digests, and bulletins—issued by NGOs and aimed at other NGOs.

COMPONENTS OF SUCCESS

Since the UN Conference on Environment and Development (Rio de Janeiro, 1992), NGOs have had key positions in establishing democratic structures with public participation for sustainable development and conservation of the Earth's ecosystem. Their high prestige results from their responsible and constructive role in society. Both official and informal organizations, as well as local movements, are recognized as valuable partners in realization of Agenda 21.

Nowadays, as the world community tries to walk away from impractical development patterns and chooses the way of ecological security and sustainable development, NGOs have the task to increase the membership of their structures for recognition of common goals by people in all layers of society.

NGOs cannot realize their opportunities without modern information technologies. Electronic media, particularly the Internet, play a significant role in data expansion, the search for partners, and creation of positive images of these organizations. The Internet is a powerful channel to solve difficult problems, including:

- Increasing professional competence
- Participation in decision-making
- Access to data
- Broadening scientific opportunities during assessments of ecological and economic aspects of specific problems

In spite of its novelty, the Internet in Russia gives the following opportunities for Russian NGOs:

- Increasing data receipt and access to data for NGOs
- Distributing information on NGOs and NGO projects
- Organizing integrated information databases

The main problem now is providing easier access to the network by both electronic users and by creators of their own sites.

ACCESS TO THE INTERNET

The necessity of new information technology is now evident all over the world. Every day the news industry uses Internet pages with more confidence. For a long time, leading western newspapers and magazines have been creating electronic versions. Many American and European radio stations broadcast not only at conventional radio frequencies but on-line also. Every fifth inhabitant of the planet could have access to the resources concentrated in the global computer networks, including Russian ecological databases. The Internet is gradually turning into a global version of mass media.

As to Russian experience, a new tendency from conventional forms of data to new progressive techniques is taking place, similar to developments in the West. Nevertheless, many Russian researchers consider the Internet not as an independent means of information, but as a channel for conventional mass media. Many Russian papers and magazines have their own sites in the computer network.

On the one hand, Internet-journalism leaps forward, and, on the other hand, different political parties with certain ecological agendas as well as other organizations use the network space successfully. At numerous sites of leading Russian political parties—Union of Right Forces, Yabloko, Fatherland All

Russia, KEDR—one can find answers to many questions, such as appropriate use of natural resources, support of ecological principles, and effectiveness of environmental education.

Such sites increased during the last election for the State Duma when people realized the possibilities of the new technologies reaching large audiences. Russian statistics recorded approximately 350,000 computer units with unique identification numbers that were connected with political informational sites each week. According to *Novaya Gazeta* (May 17–23, 1999), the section *Politics* was in fourth place for average daily entries with more than 300,000 hits. The first place always belongs to the section *Entertainment,* the second one to the section *Business,* and the third one to *Mass Media*. If we unite the thematically similar sections *Politics* and *Mass Media,* we have approximately 800,000 hits. This number corresponds to the level of *Entertainment*.

The number of Russian-language users interested in ecology is nearly equal to that of *Business*. There is an opportunity for NGOs to use the Internet seriously in order to accomplish their tasks. It became possible just recently when many public movements were supported by western funds. As a rule, grants were given for specific projects to certain ecological groups. One of the priorities was purchase of computing equipment for scientific research, databases, newspaper or bulletin publishing, and opening of individual sites. That is why, nowadays, NGOs have rather good opportunities for network access and use.

INTERNET-JOURNALISM

Public organizations and movements began to develop the new information field as users of mass media sites present on the Russian Internet. Moreover, active members of these movements became authors. They expected that a lack of publicity in the society would be one of the most serious problems of the green movement. Publicity can result not only from successful actions but also from their frequent mention in the press. The Internet gave ecologists a real chance to come into contact with an audience as often as necessary. For this purpose, they use the entire media spectrum offered by the Internet. It includes electronic versions of publications, network news agencies, and bulletins.

Of course, electronic versions are used by the general press as well as the ecological news. In order to bolster their image, NGOs can send information on themselves to any periodical. But experience shows that their own green press is preferable. An analysis of electronic issues of *Zelyony Mir (Green World)* proves this. The Russian ecological paper offers internet sections like *Eco-press, Eco-globe, ZM Mailbag,* and others.

This paper is also true to its credo that "pages of the paper are open to nongovernmental, state, and industrial organizations and private persons who are active participants of the Russian ecological movement." Front page information about the Azov-Black Sea region and opposition against an oil port that threatens preserves of the Black Sea coast illustrates this.

The positive aspects of ecological journalism on the Internet are the following:

- There is the possibility of watching ecological topics in progress. As an example, Ecoline deals with the Lagonaki-Dagomys road through the Caucasus State Biosphere Reserve. One can find documents, photos, maps, and a list of broken laws. The actions concerning the project are illustrated in detail at the page "Doroga Lagonaki-Dagomys" (Lagonaki-Dagomys Road) at www.ecolain.ru.
- An electronic newspaper has no volume limits. That is why a problem can be covered completely with many facts necessary for understanding the problem.
- Professionals prepare these publications. According to survey data, representatives of ecological organizations and nongovernmental funds, i.e. journalists-ecologists, prepare them. They are not looking for sensations. They try to show ecological improvement because that is their little victory too.
- Accuracy of the information is important. Journalists and members of ecological organizations know how to find necessary sources of data. Even if a source of information gives incorrect data, an experienced journalist-ecologist will not be misled.
- A regional approach is emphasized. Electronic communication facilities give an advantage to the local press in coverage for a mass audience. Public organizations work better at the regional level. They are well informed about ecological problems of the region, they establish relations with local authorities, and they can watch the problems with their own eyes. Hence, journalists-ecologists of the regional press have easier access to local information. This has resulted in an abundance of regional ecological papers, such as *Tabiat* (Tajikistan), *Ekovesti iz Luganska* (Econews from Lugansk), *Most-Silta* (the Northwestern region), and others.
- There is a wide audience. A mass audience benefits from many regional organs in the network because they help to form a complete ecological picture.
- Accessibility is easy. Subscription to the electronic media is usually free. In order to subscribe one can send a letter to a subscription address. If you subscribe, you will receive informational messages from several paragraphs to dozens of pages, with various frequency from less than a week to a month.
- There is a possibility to vary the information volume. Sometimes only a part of a bulletin may be of interest. This problem can be solved by means of e-mail. Due to a special procedure, every subscriber can receive only a brief

annotation of an issue and then has an opportunity to receive the full report of interest. The service is named "What is new?"

- Databases are preserved. Almost all periodicals provide archives. You can look through any interesting issue of any year since the beginning of publication.
- There are different ways of reading the text—an electronic version and hard copy. Also, one can obtain an electronic newspaper in a printed form, as it is not difficult to print the text from a monitor.

So, as active Internet users, NGOs in many respects stimulated Internet-Journalism. They evaluated the advantages of electronic mass media. That is why many periodicals are located at NGO servers.

SERVERS OF PUBLIC ORGANIZATIONS

At present Internet servers of NGOs are the main ecological information carriers in Russia. Hence, the experience of the Socio-Ecological Union (SEU), the largest public ecological organization within the former USSR, is interesting. Public nonprofit organizations usually have difficulties in establishing continuous connections with the mass media, so this might be the most important task of a press service. For easier access of journalists to data obtained by NGOs, their press services publish bulletins and press releases.

The SEU was the first with its own server on the Internet network: "Internet for ecological movement, www:server Ecoline." In 1996 it began providing information about the public ecological movement.

All the time, information at the server is routinely increased. Ecoline aims to make the server as a specific "open tribune" of the nature protection movement by allowing various ecological organizations to put their information there. A number of public organizations opened their pages on the server. Their task is to help each other work better in the present situation.

Opening of the server appeared to be the next stage in development of this NGO that made ecological data available to the general public and also provided a good image both for itself and nature protection. Since 1993, the press service based at the Center of Coordination and Information of SEU has dealt with information campaigns and press conferences—essential information for the Russian mass media.

Present tasks of the press service are the following:

- Providing information about the activity of SEU and improving the SEU image as an active public organization protecting human and nature rights.
- Assistance in increasing ecologically competent publications in the mass media.

- Assistance in training journalists in problems of protection of the environment and public health.

About once a month the press service organizes press conferences devoted to ecological problems, such as deforestation in Karelia, construction of new nuclear reactors in the country, and budgets for preserves. Press releases and press packages are prepared before the press conferences.

Press service tasks are much wider than only collaboration with mass media. It is a department of public relations. Journalists know it as an original source of fast, reliable, and interesting ecological information, while many members of SEU and other public organizations appreciate the opportunity to publish local ecologically essential information. Journalists who used to consider any NGO representative as incompetent in journalism now regard the press service workers as their colleagues, not rivals. Experts and scientists, who expect journalists to always distort data, unhesitatingly permit the press service to process and prepare results of their research for publishing.

Since January 1997 the SEU's CCI press service has issued the weekly bulletin *Ekosvodka,* intended primarily for journalists. Its electronic addresses are seupress@glasnet.ru and press@ecoline.ru. Bulletin materials give popular information about the most significant ecological problems known to SEU members and to other ecological NGOs. The bulletin announces actions, press conferences, and other events of interest to journalists. *Ekosvodka* is interesting to journalists and is routinely used by approximately fifty Russian central and foreign periodicals. *Ekosvodka* is more of an instrument of SEU than an independent source. Every item is supplied with a contact person for additional information, such as Ecological Watch of Sakhalin, Ecojuris institute, and the ecological fund *Chernomorye*.

SEU also issues *Ekosvodka-obozrenie* (Ekosvodka-Review). Unlike the weekly *Ekosvodka,* this bulletin is issued bimonthly as a record of actions. One can get additional information according to the problem.

Besides *Ekosvodka* and *Ekosvodka-obozrenie,* SEU publishes an ecological electronic newspaper. It differs from the bulletins mainly as being more analytical than news. The newspaper's goal is to create interest of a wide audience.

REGIONAL ECOLOGICAL ELECTRONIC BULLETINS

Review of Internet-materials shows that regional NGOs can use the ecological press to reach a wider audience than earlier when they had only printed media. As a rule, electronic bulletins are devoted to the problems of a certain region. For example, *Transboundary Ecological News* deals with problems of the Northwestern region (information from vika@lake-peipus.net),

Ecostan-news (information from catena@glasnet.ru) informs about events in Central Asia, and *Kislotny Dozhd* (Acid Rain) root@green.lipetsk.su publishes materials about ecological problems of Lipetsk. These bulletins are free.

It is possible to subscribe to open networks. The participants can distribute their messages to each other by means of the network. An example of an active network is Ecological North West Line (ENWL), redproj@sci.mail.iephb.ru. An advantage of such networks is that an addressee receives not only the information itself, but almost immediately responses of other members and sometimes experts. So, there is an opportunity to find a mistake or gather more data.

ENWL, which has two mailing lists, ENWL and ENWL-inf, was organized in 1997. The first list is for message exchange on regional problems. Debates are permitted. At present the list contains 120 addresses of different ecological organizations mainly from the northwest of Russia and the Baltic States: Estonia, Finland, Sweden, and Denmark. Important messages pass through the network on http://spb.org.ru/enwl.

The second teleconference, ENWL-inf, deals with information messages and short digests only. At the same time it is not limited to regional themes, so it unites 250 subscribers all over the world. Most network periodicals of the former Soviet states are routinely distributed by this mailing list.

Both lists publish short reports, conference announcements, and scientific and ecological news. They often distribute information received from international ecological servers.

Besides these mailing lists, the ecological network of northwest Russia has EcoNews at http://solar.rtd.utk.edu/~valery/econews/econews.html. It publishes thematic reports on key problems of ecology. Russian and English are official languages of both. In November 1998, every ENWL subscriber received more than 1300 KB of information in text format, while ENWL-inf subscribers received more than 900 KB. ENWL subscription is free. Send your address to majordomo@spb.org.ru in order to subscribe for ENWL or ENWL-inf.

The total number of subscribers for all the above lists is about 750. One can obtain detailed information from the network moderator Vladimir Levchenko: vflew@lew.spb.org (http://www.iephb.ru/labs/lab38/).

A year was enough for a rather significant ecological network of northwest Russia to appear. There is a great interest in ecological problems of the northwest region.

One more project of interest is *Most-Silta,* a newspaper also devoted to the problems of the northwest region. The server spb.org.ru contains three electronic papers: *Green World Baltic News, Baltic Region—Our Habitat* (analytical bulletin), and *Most-Silta,* the only Russian-language paper. It is the result of collaboration of two Finnish and two Russian public ecological organizations. The project began in St. Petersburg at a Russia-Finland forum “Our Common Environment.”

The newspaper is aimed at cooperation between Russian and Finnish ecological public organizations. It is to become a permanent discussion forum concerning the environment and nature protection. The first issue is devoted to a review of the present state of northwest Russian and Finnish ecological movements.

The newspaper publishes opinions of representatives of the state nature protection departments and public organizations. Community participation in decision-making is also discussed. Cooperation between public organizations and authorities in Finland has been in place for decades, while in Russia this cooperation has taken its first steps.

Interviews have an important place in the newspaper. Although they are rare in electronic periodicals, *Most-Silta* routinely publishes interviews on the first page, introducing representatives of northwest Russian ecological organizations. Let us examine an interview of V.A.Gushchin, a representative of the All-Russian Society of Nature Protection. He talks about a bloc of organizations engaged in wildlife protection and environmental training and education on the base of this old organization.

The interview of E.B.Popov, a leader of the public association Biocenter, is a continuation of the previous article. He speaks not only about his organization, which was established in 1991, but also about the newspaper *Yuny Biolog* (Young Biologist) and the annual Ecological Holiday in Moscow's Park of Victory. The Association of Young Journalists-Ecologists attached to Biocenter is of special interest.

Other items of the newspaper are interesting too, especially those informing about public organizations of the region. For example, Green Cross of the Northwest, established in 1993, unites more than 70 collective members such as industrial factories, firms, scientific groups, and public organizations. In Murmansk Oblast, one can now find about 50 registered organizations connected with nature protection.

To some extent, publication of this newspaper stimulated new sites of public organizations. The Kola Informational Ecological Center ECONORD (econord@ksc.inep.ru.) is among them. It is one of the first ecological organizations, formed in 1991 by a group of scientists from the Institute of Problems of Industrial Ecology of the North of the Russian Academy of Sciences.

The Center's main task is informational and educational activity. Since its foundation, more than 10 issues of a magazine have been published, and annual youth ecological camps and scientific conferences have been organized. The youth scientific ecological society EcoAS within ECONORD gives pupils an opportunity to carry out scientific projects under the leadership of scientists from the Kola Scientific Center.

This site also informs about the main activities and active projects of the coordinating ecological center Geya, which has been operating since 1991. To

contact another ecological movement in Murmansk Oblast is also possible by the addresses gaia@mstu.edu.ru in Murmask and krugl@aprec.ru in Apatity. Geya publishes the almanac *Zhivaya Arktika* (Living Arctic). It gives information about the Karelia Republic Council of the All-Russian Society for Nature Protection, which is celebrating its fortieth anniversary, and about propagation of Agenda 21 ideas among different groups. It is interesting to know about the Green Association of Karelia, which established the first national parks of Karelia Vodlozero and Paanjärvi. One can also be acquainted with the association Priroda (Nature) in Medvezhegorsk, which protects the beautiful place Zaonezhye, known all over the world with its pearl, Kizhi.

The regional eco-bulletin *Dikoye Polye* (Wild Field) is devoted to ecological news of the Donbass. It is distributed by the ecological and cultural center Bakhmat at: berezin@bahmat.donetsk.ua. The two last letters of the address show that it is in Ukraine.

The bulletin *Kislotny Dozhd* (root@green.lipetsk.ru) is a sort of "branch establishment" of the Lipetsk department of SEU. Thus, it publishes materials on environmental problems of Lipetsk. Journalists have enough information because the Lipetsk ecological committee's activity is highly rated. The Lipetsk department of SEU belongs to the top five Russian ecological committees. Lipetsk itself may be characterized as "the cleanest city among the dirtiest ones." This city takes sixth place according to its air pollution, twenty-fifth place according to general pollution, and thirtieth place according to degree of hazardous pollutants. Due to efforts of professional ecologists, Lipetsk is known as the cleanest of the metallurgical cities.

The bulletin deals with ecological education and the pluses and minuses of gold mining in the region. A little item from one of the issues tells about car owners who used to drive from their garages through connecting courtyards of apartment houses right by a kindergarten. This simple item illustrates a state of ecological thinking of ordinary people that is very difficult to change. The author introduces a real person into the text, and it shows that one ought to think globally while acting locally.

The news agency Kislotny Dozhd, which exists along with the bulletin, offers short informational reports. For example, ecologists are outraged with the cutting of supposedly harmful poplars, in the center of Lipetsk. Poplar was once selected as the most resistant tree against pollution with increased foliage coverage and ability of air purification. In spite of this, its total destruction is taking place.

Both the Bulletin and the news agency Kislotny Dozhd publish information on the activity of the local club Ekolog (Ecologist).

Due to new information technologies, ecological problems are discussed without boundaries. The Internet now keeps a united information field of the former USSR. One example is the bulletin *Zelyonoye Spaseniye* ("Green Rescue") (mailserv@cci.glasnet.ru), which has appeared since 1995 registered

in Kazakhstan. One of its issues, for example, is devoted to sustainable development after the UN Conference on Environment and Development. It includes materials concerning resource status, economies based on raw material resources, role of transnational corporations, their influence on different aspects of social development, and a search for indicators of sustainable development. The bulletin is meant for professors and students of the humanities, active green workers, and people engaged in sustainable development.

As far as one can see, electronic bulletins play an intermediate role in NGO activity. They promote people's knowledge on sustainable development, and they disseminate information about NGOs.

SERVERS OF STATE STRUCTURES

NGOs consolidate their positions on the Internet by opening their own servers. They display legislation texts and other governmental information. For example, every Internet user can obtain minutes of U.S. Congressional sessions for recent years. The U.S. EPA server www.epa.gov is also informative.

Recently Russian state bodies began to pay attention to placing their information on the Internet. The server of Goskomekologia (the State Committee on Environmental Protection) (www.fcgs.rssi.ru), for example, contains electronic versions of the *Report of Environmental Status* from 1992 to 1994. Servers of regional state bodies appear to be more interesting such as the one of Komprirody (Nature Committee) of Tomsk, with a review of the environment status of Tomsk Oblast (green.tsu.ru). The server of the authorities of St. Petersburg and Leningrad Oblast, base.dux.ru, contains a review of environmental status and legislation of the region.

The interdepartmental server www.priroda.ru has been opened by the Ministry of Natural Resources with assistance of other departments. Its goal is to support the State's activity in coordination of natural resource management.

Official reports on environmental status and certain types of pollution located on the server are very useful for NGOs. Recently these reports have been difficult to access due to limited editions. Now they are accessible to a greater number of readers on the Internet server. They are important for the official positions on different problems concerning environmental protection.

One can find reports of the national news agency Nature Resources at www.priroda.ru/index.html.

The tasks of the agency are the following:

- Informational and analytical support of the state structures in natural resources management.
- On-line distribution of management information and normative documents of natural resource departments.

- Establishment of an interdepartmental system of information exchange of the natural resource departments.
- Distribution of periodicals for natural resource departments.
- Interconnection of mass media with press services of governmental bodies.
- Informational and publishing support of federal executive authorities.
- Introduction of modern means of collection, storage, analysis, processing and distribution of information on problems of natural resources and development of data bases.
- Complex analysis of natural resource information.
- Preparation of analytical reports and references.

Short information reports of the agency reflect the state interests, first of all. This is very important for NGOs, which often have no guidance for their activity and have difficulty in choosing priorities.

For example, the item "Days of Protection of the Amur-2000" appeared on the routinely updated server. Ecological action on protection of the river was announced by the Far East Public Nature Protection Committee, established nine years ago. It includes ecologists, physicians, lawyers, and representatives of local authorities of Primorye and Khabarovsk territories, Chita Oblast, and the Jewish Autonomous Region. The goal of the action is to attract attention of Chinese authorities to the problem of preservation of the great river.

The second item of the same issue is entitled "Contaminated Waters Reach Ukraine." In Romania, waters poisoned with cyanide entered the Danube, and the level of river water contamination in Ukraine increased also. Similar to the previous report, this an international problem which can be solved only by united efforts both of governments and NGOs of these countries.

Public activity should force the state structures to pay more attention to their image as well as organization of their own news departments.

At the first All-Russian conference "Information Dissemination of Nature Protection Activity in the Russian Federation" (November 1997), with participation of representatives of nature protection bodies of 29 administrative units, a decision was made about a fundamentally new approach to information. For the first time, a serious analysis of the legislation base and state information systems was carried out at the conference. Participants of the conference, including numerous members of public movements, analyzed information support of nature protection activity and determined its priorities.

The conference discussed "Main Statements of a National Strategy of Development of Information Support for Nature Protection Activity." This formed a basis for improvement of the work and development of programs in this sphere.

A permanent topic at the interdepartmental server was the discussion of ways of improvement of information support for state and industrial monitoring.

This information is very important to NGOs, and they use it in their routine practice.

The main achievement is the establishment of both interdepartmental servers and those of NGOs. So, a user has an opportunity to compare information. Then we can make more deliberate choices to support nature preservation.

ECOLOGICAL ELECTRONIC BULLETINS

Electronic mass media analysis shows that only a few organizations can afford to design and support then own servers. In order to make access to information obtained by NGOs easier for journalists, press services of the organizations publish bulletins and press releases and distribute them by electronic mail.

For example, SEU sponsors development of e-mail networks among participants of ecological movements. The greater part of nongovernmental ecological associations publish bulletins and distribute them by e-mail. The advantages of e-mail are evident. They include free subscription, high information rate, and as a result, wider audience coverage.

Electronic mail now is comfortable, relatively cheap, and quick. Many ecological organizations all over the world use it. Many different electronic bulletins are published by ecological organizations, for example, *Anti-atom Press* (Anti-nuclear campaign of SEU), *Problems of Chemical Security* (Movement For Chemical Security of SEU), *Kislotny Dozhd* and *Lesnye Novosti* (Forest News and Forest Clubs)

E-mail is used in large educational projects with many participants in different towns of the country. Program ICLEI, aimed at the improvement of city environmental management, is an example of such a project. It is appreciated by its participants who are representatives of nongovernmental ecological organizations in Russia and Ukraine.

The ecological press can be divided as follows:

- According to coverage: regional (territorial, regional, district) and interregional.
- According to information content: thematic (concerning only one or a few ecological problems, such as biological diversity, chemical security) and general (dealing with all branches of ecology).
- According to informational difficulty: popular and specialized, aimed for experts in a certain branch.
- According to kind of publisher: political parties, governmental structures, international ecological organizations and funds, public ecological organizations, and private persons.

TECHNICAL AND FINANCIAL PROBLEMS

In spite of the foregoing optimism, NGOs do not completely use the advantages of the Internet. The main reasons are technical and financial problems.

Many movements and organizations do not have direct access to the Internet. In big cities they can find Internet providers. If a group of enthusiasts lives in a little town or village, it is rather difficult to find a provider.

Financial problems are difficult, as the quantity of grants from foreign funds has rapidly decreased in recent years. For many public organizations, searching for money to pay for access to computer networks has become a serious obstacle. As a rule, NGOs try either to find allies in research institutes and colleges, which receive special funds for electronic communication facilities, or appeal to businessmen. Some of them try to find grants. In this case they are interested in updated databases of funding sources located at the ecological server Ecoline (http://cci.glasnet.ru).

Let us take some examples of collaboration between NGOs in Russia and other countries of the former Soviet Union. The organization Children of the Baltic offers children's groups without Internet access the opportunity to use its website to publicize their activities. In Crimea, the Institute of Biology of the Southern Seas of the Ukraine Academy of Science provides opportunities for the public to use its Internet server at low cost. According to its director, providing access by the general public, and especially by NGOs, to world informational resources is one of the tasks of the scientists and administration of the institute.

Information should be interesting, systematic, and routinely updated. It is necessary to choose a list of connections and references to other pages devoted to the same topic. In its turn, this step is connected with new expenses.

One more problem is to find proper specialists. As a rule, the majority of public organization participants are not trained to work on the Internet. Many are not experienced in journalism. If nobody is ready to undertake this work on a voluntary basis, the organization needs money for the necessary specialists.

As a result, many organizations do not think about the recipients and include random names into their lists of addresses. While preparing the material, it seems not too difficult to think about the following:

- Whether the information would be interesting to the receiver.
- Whether the facts are reported briefly.
- Whether the report includes contact information and how to subscribe.
- Whether there is an apology for possible duplication.

RESULTS

Only joint efforts of NGOs can solve technical and financial problems. In order to realize the potential impact of NGOs, collaboration is necessary. Public movements can improve their effectiveness in sustainable development activity.

The informational level of every NGO participant can increase due to new possibilities of obtaining information. The Internet already promotes on-line distribution of information concerning public movements, their active workers, and the projects they suggest.

EMERGING TOOLS FOR DEVELOPING, INTEGRATING, AND DISTRIBUTING CONSERVATION INFORMATION

M.E.Schaefer
Association for Biodiversity Information

Both the United States and Russia face a range of challenges related to environmental protection and natural resource conservation. Urban sprawl, loss of biodiversity, air and water pollution, hazardous waste disposal, and global climate change are among the problems our nations are working to address. Science is the foundation upon which effective solutions to these problems must be built, and geospatial data are fundamental components of that foundation. Key geospatial data sets include satellite and aerial imagery of the landscape, critical wildlife habitat and rare species, point sources of pollution, waste disposal sites, and carbon sources and sinks.

The Association for Biodiversity Information (ABI) coordinates a network of organizations dedicated to building knowledge about the diversity of life, primarily in the Western Hemisphere. ABI is comprised of 85 components called natural heritage programs in the United States and conservation data centers in Canada, the Caribbean area, and Latin America. The natural heritage network was built gradually over a 25-year period. A central office in Arlington, Virginia, houses 75 staff that work to advance the network by developing data standards and methodologies, database management software, and tools to support conservation decision-making. We specialize in generating information on the location and status of rare and imperiled species and ecological communities.

This fall, ABI released *NatureServe,* an on-line encyclopedia of life containing information on the location and status of 50,000 plants, animals, and ecological communities in North America. This will be expanded to Latin America early next year. ABI also develops tools that encourage the use of biological information in the decision-making process.

ABI's basic approach to informing conservation decision-making can be applied anywhere in the world. We are happy to share the lessons we have learned in building and operating our organization.

THE POWER OF GEOGRAPHIC INFORMATION SYSTEMS

A geographic information system (GIS) is a powerful tool for organizing, displaying, and analyzing geospatial data. As the technology has advanced, it has become increasingly accessible. Just five years ago GIS software was expensive, ran on high-end computers, and required significant technical training to operate. Today the software is relatively inexpensive, runs on personal computers, and requires little training to use. GIS is now used routinely in the United States at the federal, state, and local government levels and is used by most environmental NGOs that have scientific activities. GIS is a powerful tool because it makes possible the integration of biological, physical, and socioeconomic information, allowing a more comprehensive depiction of data relevant to an issue. It is particularly helpful in land use planning as a tool that facilitates the organization of a wide variety of technical information and its depiction in a useful format.

The utility of GIS is advancing rapidly in parallel with development of related technologies. Inexpensive global positioning systems (GPS) allow one to quickly and accurately link data with a precise geographic location. The Internet makes it possible to readily transfer data around the world. Wireless technologies allow the immediate entry of field data as well as its instant transfer to home research or to other laboratories. Advanced commercial aerial and satellite imagery makes it easy to incorporate high resolution images of the landscape into a GIS. The parallel development of technologies and capabilities such as these makes GIS a more powerful and sophisticated tool while broadening the range of users taking advantage of it.

FROM GIS TO DSS

Decision support systems (DSS) are now evolving. These systems couple GIS with analytical tools, models, and visualizations. The bulk of these systems are in the research and development phase and are being piloted in various locations around the world. Some are emerging for broader application. DSS's are particularly helpful in land use planning. Models and visualizations can be used to help citizens and government officials develop alternative urban growth scenarios. For example, under one scenario an urban center might continue growing unconstrained as it has in the past. Under another, growth might be clustered around existing population centers and transportation systems. A third

scenario might optimize opportunities to preserve ecologically sensitive areas as well as set aside open space for recreation uses. Each scenario can include detailed land use information, depending upon the needs of users. Land use resulting from a particular scenario can be depicted at intervals in the future, say 10, 20, or 50 years depending upon the model. Visualizations of this kind are particularly helpful in engaging citizens in the planning process.

Visualizations can also be useful in describing historical patterns of land use. LandSat imagery dating back to the 1970s can provide a 25-year depiction of landscape change. Aerial imagery sometimes allows visualizations as far back as the 1950s. And old maps make it possible to depict land use going back several hundred years.

When used for conservation purposes, historical visualizations allow descriptions of changes in vegetative cover and loss of habitat, as well as broader ecosystem decline.

BRIDGING THE CANYON BETWEEN MANAGEMENT AND SCIENCE

GIS and DSS are powerful tools for linking science and resource management, or more broadly, science and public policy. As such, they bridge the gap—and at times the canyon—between data and decision-making. They are especially helpful in organizing and integrating physical, biological, and socioeconomic information. Coupled with visualizations these tools catalyze and enable citizen participation in the decision-making process. Since NGO activities often involve promoting public understanding of issues and contributions to their resolution, GIS and DSS are tools that these organizations should take full advantage of. These powerful technologies can significantly improve the effectiveness of NGOs by allowing them to readily make use of science to inform the public policy process.

EXPERIENCE IN COPING WITH EFFECTS OF RADIATION ACCIDENTS: LESSONS FOR SOCIETY

L.A.Bolshov, I.I.Linge, I.L.Abalkina
Nuclear Safety Institute

Coping with the levels and severity of ecological problems on the threshold of the third millennium demands more effective measures. It is obvious that elaboration of such measures is more than a technical or economic task. It is also a problem of an adequate social response to the problems caused by previous development activities of society. Both lack of perception of ecological problems by Russian society and lack of readiness for effective efforts towards their resolution were characteristic less than ten years ago. Certainly, the main reason is the total social upheaval of recent years. However, the fact that ecological problems were often a screen for political and economic decisions is an important factor. Experience in overcoming the effects of the Chernobyl accident proves this point.

This experience also shows the impact of information on public perceptions of ecological problems. A divergence between an artificial information image and the real problem may cause an incorrect base for decision-making. As a result, society appears to be facing new problems. So, it is necessary to emphasize the role of ecological organizations in informing and educating the society.

CHARACTERISTICS OF RADIATION HAZARD AWARENESS

Experience from radiation accidents, and especially the accident at the Chernobyl plant, has shown the impact of information on the population, both for individuals and for society, in comparison with the impact of radiation. On

the one hand, the impact comes from perception of radiation hazard; and on the other, it is a result of a mechanism of social aggravation. Let us consider in brief the reasons and peculiarities of perceptions of radiation hazard.

The starting point of radiation awareness as danger was the creation of nuclear weapons, the bombing of Japan, and large-scale nuclear weapons testing. One of the main reasons for formation and strengthening of extremely tense and unequal perceptions of radiation hazards has been the arms race, which for one-half a century has involved all nuclear countries (from the United States, Great Britain, and the USSR in the late forties to India and Pakistan at the end of the nineties). Still, opposition to nuclear activities in general is a reason too. Ionizing radiation is considered to be not only dangerous for health, but also an inevitable hazard for future generations.

Many factors have affected the perception of ionizing radiation. They are: secrecy, which has surrounded nuclear weapons production everywhere; international campaign drives for elimination of nuclear weapon testing; new types of production (H-bomb, N-bomb) in certain countries; international alarm over the danger of expansion of nuclear weapons; intensive attention to radiation effects on human health and the environment.

Thus, a strong base exists for a special perception of radiation hazards in everyday life. It is seriously aggravated due to peculiarities of man-made accidents and catastrophes. Society more easily withstands natural disasters even if they have huge effects. This has been proven with quick revival of regions suffering from earthquakes, floods, hurricanes, and tornadoes, even if the danger of repeated disasters remains very high.

In case of a man-made disaster, the first social reaction is to search for a reason and for culprits. The higher the level of responsibility, the harsher the social perception of the catastrophe. Thus, accidents and disasters at state-controlled factories appear to be the most serious for their social effects. Also, radiation accidents are certainly characterized with harsher social effects because it is the State which controls the use of radiation activities and especially nuclear energy activities.

We can see great differences in social attitudes to accidents and disasters. One is characterized by an adequate response including the following stages: defining the scope of a catastrophe and precise classification of victims; searching for reasons and culprits; paying compensatory damage, mainly, by insurance systems; punishing the responsible bodies (a producer, an operating organization); and identifying reasons (construction, organization, human factors) in order to prevent repetition of the accident. Such accidents include fires and traffic incidents.

Society has adapted to traffic accidents in spite of the number of victims. Loss of life of dozens, hundreds, and thousands of people in train wrecks, car crashes, and shipwrecks does not cast doubt on their necessity. It means the society regards such hazards as socially acceptable.

The other extreme is rare man-made accidents. Social attitudes toward them are much more intricate and sharp. These include radiation and chemical accidents. The initial reaction of populations to information about such accidents, and first of all, those involving radiation, is concern about their own health and the health of their progeny. The circle of victims is uncertain. Soon the State is blamed for giving permission for the activity that caused the catastrophe. A mechanism of social aggravation starts to work. With the help of the mass media and organizations interested in public attention or recognition, the situation is dramatized. In its turn, the mass-media dramatization intensifies concern of the community and extends the circle of "victims." It can cause different social effects up to radical changes of public attitudes toward science and certain activities.

Let us briefly outline those people and organizations that can take an active part in this aggravation scheme. First are local authorities and political figures. They seem to be quite sincere and have different reasons (from a desire to increase state compensation to an interest in receiving public attention). Nevertheless, a lack of comprehension, a reluctance in obtaining official data from specialists, and a logic of opposition inevitably make them dramatize the post-accident situation. In conditions of high information capabilities of local authorities and greater public confidence in them in comparison with the State as a whole, their influence on the population is very profound.

For example, in 1991 after adoption of both republic (Ukraine, Belarus, and Russia) and all-union laws, areas eligible for benefits and compensation increased. Authorities asked for their regions to be added to the list of radiation pollution areas. The only exception was Krasnodar Territory, where some resorts were polluted. The local authorities preferred to decontaminate polluted areas on their own rather than lose the image of the resorts.

The second group that is able and ready to take part in the social aggravation process includes ecological and anti-war organizations. The orientation of their reaction inevitably results from their usual stance because dramatization of accidents proves the correctness and significance of their previous activity.

The movements of victims of radiation accidents play a certain role too. The members are inclined, on the one hand, to preserve their victim status and collect corresponding compensation and benefits and on the other hand, to mythologize about their participation in radiation accidents.

The third group of people that can play a very dramatic role in the aggravation of consequences includes cultural workers, artists, and intellectuals. A custom of identifying oneself as the nation's conscience together with the stereotype of the radiation impact can often increase the psychological after-effects. For example, after the Chernobyl accident cultural workers offered to discuss not only the danger of the burial of Chernobyl victims, but also the impossibility of burying them in "contaminated" land. Both problems (except in

a few unique cases) had no sense at all, but they strongly influenced the community. The same problems with burial of radioactive accident victims took place in Goiania (Brazil, 1988) as the local population sharply protested. Cultural workers also try to change professional terms. For example, radiation pollution, which means appearance of harmful (in this case radioactive) substances in the soil, is changed to radioactive contamination (saturation with pathogens) or even more dramatically to health damage of the area.

In the case when a radiation accident takes place under conditions of economically successful activity, organizations and groups using alternative technologies can also participate in dramatizing the situation. It would be mistake to exaggerate the role of these factors after atomic plant accidents, but a number of cogent arguments are raised in arguing against atomic and for thermal power.

The role and activity of the above mentioned groups can change at different stages after a radiation accident. Thus, cultural workers always deal with the problem for a short period. Ecological organizations usually act for a longer time, independent of any positive results of their activity. For example, campaigns conducted to collect money to send children for rest from the moderate climate conditions of central Russia to the south in the Crimea or Cuba give doubtful results. The reason for money collection is to support children who were exposed to radiation, but often healthy children benefit.

So, information after the Chernobyl accident resulted in the following characteristics of radiation hazard awareness:

- Radiation hazard is associated only with industrial business (power plant, defense industry), with all other sources of radiation hazard (natural sources, medicine) posing little hazard.
- Radiation hazard is excessively high in comparison with other hazards.
- Only the State is responsible for measures to decrease risk.
- The current policy of risk reduction is insufficient.

None of these statements is true. Natural sources and medicine are the main part of radiation hazard (see Table 1). The share of radiation accidents and man-made sources in overall radioactivity is negligibly small even on territories with nuclear plants. But in dealing with problems of radiation hazard, the mass media say nothing or little about the facts. Proven ways to reduce risks, such as staying out of the sun or avoiding radon impacts, do not receive attention. As a result, the greater part of the population is not only ignorant of radiation hazard, but they also do not want to take even simple prevention measures. One can even state that the present Russian community is like a “zombie” on the whole problem of radiation hazard and the Chernobyl consequences. Most people repeat the mass media stereotype and equate radiation hazard to Chernobyl.

TABLE 1 Irradiation of Population in Some Regions (1998)

Regions of Russian Federation	Irradiation from Natural Sources, %	Medical Irradiation, %	Irradiation from Global Fall-out and Radiation Accidents, %	Industrial Irradiation, %
Chernobyl area				
Bryansk Oblast	51.9	37.3	10.8	0.01
Kaluga Oblast	74.9	24	0.9	0.18
Oryol Oblast	64	32.7	3.3	0.03
"Mayak" area				
Sverdlovsk Oblast	58.7	39.5	1.7	0.14
Chelyabinsk Oblast	74.5	24.7	0.6	0.24
Active power plants				
Voronezh Oblast	62.4	36.9	0.6	0.11

Source: Analytical memorandum "State of Radiation Safety of the Russian Federation in 1998," Ministry of Health of the Russian Federation.

SCIENTIFIC VALIDITY OF DECISION-MAKING

Every large ecological problem, especially a radiation accident, is a unique event with a number of particular features. Therefore, scientific research and necessary scientific support take on special significance in the decision-making process that concerns safety measures and elimination of after-effects. Nevertheless, as shown later, many decisions have been made without scientific support or contrary to scientific recommendations.

Let us consider a number of examples showing the role of science in reduction of the Chernobyl consequences. Table 2 deals with dates of decisions (by the government or authorized ministry) on safety measures for the first five years after the accident and some characteristics of these measures, including their scientific validity.

They are divided into five groups according to the type of decision:

1. Sanitary code and regulations (S) approved by the Chief Sanitary Doctor of the Soviet Union or a republic
2. Executive decrees concerning certain settlements (ED), usually decrees of supreme public authorities
3. Government decrees and orders concerning recommendations and instructions on working procedures, departmental guides, and instructions (DG), usually dealing with regulations and instructions according to the characteristics of the radiation environment
4. Conceptual (C) decisions of Soviet National Committee on Radiation Protection (NCRP), later Russian NCRP, for the main intervention levels and their need in corresponding legislation and administrative decrees
5. Legislative decrees (L) on execution of certain measures by executive organs or determination of intervention levels

TABLE 2 Scientific and Technical Reasons (STR) for Safety Measures and for Informing Population after Chernobyl Accident

Item	Date	Type of Decision	Decision on Safety Measures	STR Yes/ No	Affected Population (Thousand People)
1.	04/26/86	ED	Reactor A-plant access restriction	Yes	
2.	04/26/86	ED	Iodine prophylaxis for population of the town of Pripyat	Yes	32
3.	04/27/86	ED/S	Evacuation of Pripyat population	Yes	46
4.	05/01/86	ED	Evacuation of population from 30 km zone	Yes	115
5.	05/02/86	ED	Decree on Iodine prophylaxis	No	0
6.	05/05/86	ED	Decree on Iodine prophylaxis	No	400
7.	05/06/86	S	Restriction on I^{131} content in foodstuffs	Yes	3,000
8.	05/10/86	ED	Decree on evacuation of children from Kiev	No	1,000
9.	05/12/86	S-ADL	Definition of annual dose limit (100mSv)	Yes	270

Item	Date	Type of Decision	Decision on Safety Measures	STR Yes/ No	Affected Population (Thousand People)
10.	05/15/86	S	Territory zoning according to dose limit (1, 3, 5, 20 mR per hour)	Yes	<100
11.	05/16/86	S	Restriction on radioactivity in foodstuffs	Yes	
12.	05/29/86	ED	Central Committee of CPSU and Council of Ministers decree about decontamination efforts in Ukraine and Belarus territories affected by radiation pollution	No	250
13.	05/30/86	S	Dose rate and radiation content in foodstuffs	Yes	200
14.	05/30/86	DG	Recommendations for safety measures in agricultural sector	Yes	
15.	08/22/86	ED	Definition of so called zone of stringent control (ZSC) according to Cs^{137} content in soil (15 Ci per sq. km)	Yes	240
16.	04/23/87	S	Definition of annual dose limit for the second year after the accident as 30 mSv	Yes	<100
17.	08/12/87	ED	Expanding ZSC, taking also into account social factors	No	240+40
18.	12/15/87	S	Restrictions on Cs^{134} and Cs^{137} content in foodstuffs	Yes	
19.	05/23/88	DG	Restrictions on Cs^{134} and Cs^{137} in soil and products	Yes	
20.	07/18/88	S	Definition of annual dose limit for the third year after the accident 25 mSv	Yes	<100
21.	09/13/88	ED	Expanding ZSC	No	280+6.0
22.	10/06/88	S	Restrictions on Cs^{134} and Cs^{137} content in foodstuffs	Yes	

Item	Date	Type of Decision	Decision on Safety Measures	STR Yes/ No	Affected Population (Thousand People)
23.	11/22/88	K	Acceptance of NCRP concept of total lifetime extra dose limit equal to 350 mSv	Yes	
24.	05/24/89 and 10/05/89	ED	Resettlement according to radiation dose per life criterion	Yes	5.8
25.	12/30/89	ED	Expanding ZSC	No	
26.	01/26/90	ED	Benefits for increased Cs content in milk	No	200
27.	03/16/90	ED	Resettlement according to radiation dose per life criterion	Yes	2.3
28.	09/28/90	ED	Zoning according to Cs^{137} content in soil 1, 5, 10, 15, 30 Ci per sq. km	No	260
29.	03/11/91	ED	Enhancement of list of settlements with benefits for increased Cs content in milk	No	
30.	02/19/91	DG	Recommendations for safety measures in agricultural sector	Yes	
31.	04/08/91	K	Restriction for extra exposure dose to 1 to 5 mSv per year	No	
32.	05/15/91	L	Zoning criteria (Cs in soil and ADL) and benefits	No	
33.	12/28/91	ED	Zoning of polluted territories of Russia according to the Law	No	2.3 million

As Table 2 shows, many decisions concerning the safety of hundreds of thousands of people (items 5 and 12) or intervention in the lives of millions of people (items 28, 29, 32, and 33) were adopted contrary to the results of scientific analysis and assessment. Document analysis concerning these decisions allows us to find many other circumstances essentially distorting the purpose of the realized safety measures. Derived intervention levels were often used for making decisions on expanding the area of appropriating counter-measures. A so-called “social factor” was often taken into account in decision-making, forcing the expansion of an area of appropriate counter-measures.

The scientific and technical validity of the decisions is based on conclusions made by radiation safety specialists, which engender society's confidence. A number of actions inconsistent with the real danger made by political groups, the mass media, and others proved that a biased distrust of specialists appeared during the first month after the accident. The situation improved a little by the middle of summer 1986. Then the crucial decision-making process was completed, based on scientific and technical validity, while a number of incorrect decisions were revised.

By the end of 1988, a large amount of data was collected for long-term radiation prognosis of polluted areas. Moreover, real opportunities for all safety measures were realized, as well as limiting negative consequences for the population that resulted in restrictions. The environment became better in some polluted areas. In these circumstances the Soviet NCRP suggested its 35-rem concept of total lifetime extra dose limit equal to 350 mSv (hereinafter, the concept of safe habitation). Practical realization of the concept provided for very limited resettlement of the most polluted settlements and significant lessening of restrictions in other areas.

Nevertheless it did not work due to a number of social reasons.

Beginning in 1988, a great number of articles on the Chernobyl problem were published simultaneously with the development of "glasnost" policies. The mass media adopted strictures on the concept of safe habitation. In 1989, taking into account the complex political situation in the country and in fact impeaching the credibility of its own specialists, the Government of the Soviet Union made an official request to the International Atomic Energy Agency (IAEA) for coordination of an "international examination of the concept of safe habitation in the areas contaminated with radioactivity after the Chernobyl accident developed in the USSR and an assessment of effectiveness of measures for public health protection within these areas."

As a result, the International Chernobyl Project (ICP) started in the spring of 1990. An independent international advisory commission of 19 members was organized under the chairmanship of the outstanding scientist Dr. I.Shigematsu, Director of the Radiation Effects Research Foundation in Hiroshima. Two hundred independent experts from 23 countries and seven international organizations took part in the project. Fifty scientific groups visited the USSR. Laboratories from several countries including Austria, France, and the USA helped to analyze and assess the data.

Initial information on the ICP was favorably reported. However, after the news that ICP members considered the measures in progress as quite adequate, the mass media changed their opinion on the project. Dozens of publications blamed the ICP members for trying to hide the radiological consequences of the accident for the sake of the international "nuclear Mafia."

The resulting documents of ICP contained sharp criticism of both implemented and planned safety measures. They were formulated as follows:

"The International Advisory Commission noted that the adopted and planned long-term measures, though guided by good intentions, exceeded the strict requirements of radiation protection. Resettlement and foodstuff restriction measures are unsuitable from the standpoint of radiation safety. Nevertheless, any relaxation of the current policy almost certainly would give a negative effect due to the high level of stress and alarm of residents in contaminated areas and their current expectations. It is agreed, however, that social and political factors should be taken into account, so responsible and competent authorities should make the final decisions. In any case, future changes should not lead to stricter restriction criteria.

"More specific criteria reducing foodstuff restrictions would be preferable to resettlement, taking into account all the social and economic factors connected with public health. Further application of the restrictions for use of local foodstuff products in the polluted areas means a significant worsening of quality of life for some people. The only way to avoid it is to resettle them to such regions where they could live in their previous manner if it is possible. Comparatively high criteria for foodstuff restrictions might have aggravated these problems…"

One could think the ICP results might close a debate concerning the possibility of habitation of polluted areas. In fact, the USSR Government planned a number of actions in June-August 1991, including meetings of socially active citizens with executive and legislative authorities. Large sections of the public should have been acquainted with the ICP results. However, the situation in the country became worse; events of August 1991 resulted in the USSR's collapse and prevented both practical realization and the acquaintance of the general public with the ICP advice. As a result, the governments of Belarus, Russia, and Ukraine in fact rejected both points: the NCRP suggestion of limited resettlement and the ICP view that rejected any resettlement.

Thus, neither the opinions of national specialists nor the views of leading international experts were taken into account. On the contrary, populist decisions resulted in significant economic and social waste.

ROLE OF POLITICAL FACTORS AND THEIR EFFECTS

Public discontent was stirred up by some persons who made a political, administrative, and public career based on the Chernobyl accident and incited the authorities to change their previous decisions. Since specialists did not support this revision, they were just excluded from the decision-making process. Subsequent measures were realized according to soil pollution criteria instead of dose criteria, which are the only correct criteria for radiation safety. Just after the accident, soil pollution might be justified by lack of radiation data. Further, "territory pollution density" criteria should be used only for agriculture

purposes. However, the adoption of dose principles is an important component of radiation accident reduction. This component was lost in the Chernobyl accident reduction effort.

By 1990 more than 500,000 people received different benefits because of the Chernobyl accident. By 1991 it turned out that many people were interested in further expanding the so-called radioactive contaminated zones. These circumstances caused problems in realizing rational ideas of developing a Unified Program of radiation accident reduction (as well as adopting the law on social protection of victims).

The following persons insisted on using radiological principles in determination of radioactive contaminated zones:

- A few specialists in the radiation protection sphere, including those who had encountered public opposition.
- A number of outstanding scientists recognizing the role of radiation and other hazards in life.
- Some economists versed in the necessary costs.

Active supporters of maximum expansion of the radioactive contaminated zones were:

- Republic authorities of Ukraine and Belarus and Russian regional administrative elites interested in financial and material support from government funds.
- Numerous mistaken public figures who did not anticipate negative results of their activity, though they connected their political fortunes with the consequences of the accident.

Due to unclear positions of the politically weak Moscow Government, almost all demands of the Republics were completely fulfilled. They resulted in the broadest interpretation of radioactive contaminated zones. The so-called zone with privileged social-economic status with lower pollution density border at 1 Ci per sq. km. was of fundamental importance. This zone with its numerous benefits did not correspond to any radiological criteria. It should be mentioned that the authors of the decision concerning this zone did not know that more than 30 percent of the territory where the pollution density exceeded 1 Ci per sq. km. was situated outside the USSR (Table 3). It is necessary to stress that there were no claims for damage nor indemnities for health injuries in the majority of foreign countries impacted by the Chernobyl accident.

TABLE 3 Cs137 Radioactive Pollution of European Countries Caused by the Chernobyl Accident

Country	Country Size 10^3 sq. km	Territory with Pollution Exceeding 1 Ci per sq. km, %	Total Sum of Fall-out		
			PBq	kCi	Fall-out in Europe, %
Austria	84	11.08	0.6	42.0	2.5
Belarus	210	43.50	15.0	400.0	23.4
Great Britain	240	0.16	0.53	14.0	0.8
Germany	350	0.32	1.2	32.0	1.9
Greece	130	1.24	0.69	19.0	1.1
Italy	280	1.35	0.57	15.0	0.9
Norway	320	7.18	2.0	53.0	3.1
Poland	310	0.52	0.4	11.0	0.6
Russia (European part)	3,800	59.30	19.0	520.0	29.7
Romania	240	1.20	1.5	41.0	2.3
Slovakia	49	0.02	0.18	4.7	0.3
Slovenia	20	0.61	0.33	8.9	0.5
Ukraine	600	37.63	12.0	310.0	18.8
Finland	340	19.00	3.1	83.0	4.8
Czech	79	0.21	0.34	9.3	0.5
Switzerland	41	0.73	0.27	7.3	0.4
Sweden	450	23.44	2.9	79.0	4.5
Whole Europe	9,700	20.75	64.0	1,700.0	100.0
The whole world			77.0	2,100.0	

According to estimates of that period, 1.3 million people lived within the zones of radioactive contamination. By the middle of the 1990s, territories with a population of about seven million people were included in radioactive contaminated zones after numerous enlargements. The greater part of resources was spent for the largest zone by size and population that had privileged social-economic status. So, consistent with the law, zones based on Cs^{137} soil pollution density isolines of 1, 5, 15, and 40 Ci per sq. km. contributed to a tremendous dissipation of resources and took resources from some regions really needing help.

Unfortunately, the price of incorrect decisions included more than money for benefits and compensations. The psychological health of many people was damaged because they were officially considered as accident victims. Strange as it may seem, health control based on the law played a significant role here. Humane but abstract ideas gave negative results in specific circumstances during the last phase of the Chernobyl accident. Large resources were spent on health control using a list of possible health effects. First of all, it included thyroid gland cancers that were discovered during total screening. The law, in fact, required searches for any evidence of public health decline. This surely was found in situations of decreasing living standards and unfavorable demographic trends. But inhabitants of polluted regions linked in their mind health problems due to many reasons with radioactive effects. Some of the health workers who dealt with increased death rates and other effects as the living standard declined were especially sure of this relationship. It is necessary in this regard to stress that the polluted areas and regions did not differ from other regions of Russia according to the main demographic criteria.

Standards for participating in programs for eliminating accident after-effects were established in too simplified a manner. They caused an unjustified increase in the number of participants. By spring 1989, when the most extensive work was fulfilled, the number of participants was estimated as 250,000 people. It was a large but realistic number; but several years later it increased more than three times to 800,000 people.

A fundamental change of the basic structure of the Chernobyl law might be the only rational way out. But a serious change of public opinion toward radiation hazard and an increased ecological culture of the whole society is needed. It is possible only when there is societal confidence in scientists and specialists. One should stress the role of ecology organizations, which should base their activity on scientific arguments instead of propaganda stereotypes.

ROLE OF GREENPEACE OF RUSSIA AND OTHER PUBLIC ORGANIZATIONS IN THE CONSERVATION OF RUSSIAN FORESTS

O. V. Smirnova
Center for Ecological Problems and Forest Bioproductivity

EVOLUTION OF ECOLOGICAL PROBLEMS

An extensive pattern of forest use exists in Russia dating back to the 1930s. It is characterized by exploiting more and more ancient forests instead of intensive forestry in developed regions. The best wood according to quality, supply, and accessibility is taken in the first cutting, with an absence of efficient reforestation. As a result, timber resources are disappearing quickly. Deforestation of the remaining ancient forestlands is inevitable. For example, only 6 percent of the taiga zone in European Russia has natural forests. Greenpeace of Russia made a map, "Last Remaining Forestlands of the European Taiga," based on space imagery and special nature studies.

Most of the forestlands may be destroyed in five to ten years. Gas and oil producing industries, gold mining, and other extractive industries are also responsible for deforestation. Enterprises and exploration activities of these industries are the main causes of fires. Forestland destroyed by fire is comparable with that destroyed as a result of felling.

The present pattern leads to the total destruction of natural forest ecological systems in a great part of the forest zone of Russia as well as to depletion of timber resources. It causes an avalanche of social problems. In the 1970s, the timber industry decline began in most taiga regions. It became especially evident in the end of the 1980s and in the 1990s. The main reason for the decrease is the depletion of woods in the vicinity of enterprises founded in the 1940s, 1950s, and earlier. Since the beginning of the 1990s, about one million employees here lost their jobs in the timber industry or will soon be unemployed. Several

thousand "wood settlements" mainly in remote districts of the European North, Siberia, and Far East with four million residents are left without a livelihood.

The pattern of depletion is stimulated by extremely low payments for forest exploration rights (forest tax). For example, standing wood has a token price of not more than one dollar for one cubic meter. That is about 2 to 5 percent of the commercial value of round lumber. As a result, the State has a lack of money for an efficient forest service. In 1999 the payment for forest exploration rights was about 15 percent of the total costs of the Federal Service of Forestry.

The present pattern of forestry leads both to the total destruction of the last remaining ancient forests and to ecological disturbance of the forest zone (water balance, swamping, soil decay, biodiversity decrease).

The whole state timber industry is unprofitable. Also, life in timber settlements is socially unstable due to a decrease of earnings and unemployment.

THE IMPACT OF GOVERNMENT DECREES

For the last decade, no government decrees for radical change of the situation and for stable forest exploitation have been adopted. The Forest Code of the Russian Federation requires timber owners to carry on multiple-purpose and sustainable forestry while promoting biological diversity. This requirement is not fulfilled because of the absence of appropriate laws. Even the existing nature protection legislation on forestry and forest exploration is not observed. For example, the Law "On Ecological Assessment" adopted in 1995 requires an ecological assessment of "schemes of protection and use of water, forest, land, and other nature resources," including organization and management projects for forestry and felling. Nevertheless, most projects are realized without any ecological assessment. Conservation of species under special protection is usually not addressed because these species are not identified within the scope of forest husbandry and planning. Forest husbandry, the base for forestry planning and management, is aimed entirely at accounting for timber resources.

"The Principles of Determination of Woodcutting Areas…" adopted in 1987 are still in force. They provide "a level of major harvest and regeneration felling for 20 to 30 years." Economically inaccessible woods are included into production reserves. As a result, forests located near roads in populated regions are subject to more intense cutting.

The full use of woodcutting areas is impossible in the majority of regions due to a lack of economically accessible forest resources. Enterprises often try to solve this problem by disregarding ecological limits including those provided by legislation.

"Criteria and Indicators of Sustainable Management of Russian Forests" adopted in 1998 does not have parameters of sustainable forest management and does not provide for any change in the present forest management system.

Moreover, the majority of forestry employees know nothing about this document. The general type of felling is final harvesting on a large area (up to 50 hectares). This causes heavy soil erosion, swamping, and catastrophic changes of the forest environment, with an absence of reforestation and disappearance of many species of forest flora and fauna. The current Forest Legislation disregards international conventions for biodiversity conservation and does not include up-to-date scientific achievements for sustainable forest husbandry.

ROLE OF NONGOVERNMENTAL ORGANIZATIONS

A number of public organizations are involved in forest conservation. The most active ones have joined the Forest Club of Russian NGOs. It is an informal working group consisting of representatives of NGOs.

Forest Club members are:

- Greenpeace Russia
- Socio-Ecological Union Forest Campaign
- Conservation Center for Wild Resources
- Druzhinas (Student Corps) for Nature Conservation Movement
- Information Center of Taiga Rescue Network-Russia
- Save Pechora Committee
- Individual activists

The main task of the Forest Club is to coordinate NGOs for forest conservation. The Club's major activities are:

- Improvement of Russian forest legislation, forestry regulations, and technical standards
- Inventory of natural old growth forests and other valuable forest areas
- Monitoring of protected territories for illegal logging and poaching
- Promotion of ecologically and socially responsible forestry and independent forest certification
- Publication of the *Forest Bulletin*

The current state forest management system does not ensure participation of NGOs in forest management and development of forest policy. The overwhelming majority of Forest Service employees regard NGOs as hostile entities that should not interfere in forest affairs. Usually, the state bodies do not consider suggestions of residents and NGOs on changing felling practices, excluding some sites from exploitation, or changing the management system.

Consideration of public suggestions is not provided in the current forest legislation.

Standard acts and forest legislation are usually developed in secret, excluding not only the general public, but also specialists outside the Forest Service. The scientific and nature protection communities learn about a certain bill or project when it is introduced to the State Duma, registered at the Ministry of Justice, or confirmed with a department decree. As a rule, it is almost impossible to introduce any changes into the document at this stage. In those isolated instances when a project was open for discussion, specialist opinions outside the Forest Service were not taken into account. Since 1993, no representative from scientific or public organizations outside the Forest Service and other ministries and departments has managed to include any innovations in the documents.

Efficient collaboration between the government and the public at the federal level is almost impossible. The only effective participation of the general public is open protest against certain state activities and projects.

RESULTS OF ACTIVITIES OF NONGOVERNMENT ORGANIZATIONS

NGO activities are diverse. The Forest Club has the following activities:

1. Improvement of Russian forest legislation; promotion of ecologically and socially responsible forestry; and independent forest certification.

   Detailed analysis of illegal felling shows the weakness of the current Forest Code, with 20 percent of timber being felled illegally.

   Greenpeace proposed a forest program of sustainable forest management that would provide timber settlements with regular work. In a clear manner, a reference book describes the current forestry structure, as well as felling standards and rules. It suggests possibilities of public participation in forest management in Russia.

   Greenpeace prepared standards for assessment of the less disturbed forest areas. These standards were published in a number of issues of the *Forest Bulletin* and were repeatedly discussed at conferences of environmental activists and forestry workers, including two conferences in 1998, devoted to problems of forest management and protection in Karelia and Sakhalin.
2. Inventory of natural old growth forests and other valuable forest areas.

   Since 1996, Greenpeace in cooperation with the Biodiversity Conservation Center, the Socio-Ecological Union, and other NGOs carried out an inventory of ancient taiga areas in the European and Ural areas of Russia. The work was based on 1999–2000 space images of middle and high resolution. The work

included more than one hundred expeditions of NGOs; specialists of Moscow, Pushkin, Tambov, and other state universities; and reserve workers.

The NGOs use updated sources of information on the condition of forestlands and more up-to-date technologies in comparison with the state nature resource departments. The inventory of ancient taiga areas all over Russia is now carried out within the project "The Forest Watch of Russia." Russian research and production institutions, the technical center Skaneks, the International Institute of Forestry, and regional organizations, such as Altai-21 Century Foundation, Friends of Siberian Forests (Krasnoyarsk), and the Bureau of Regional Public Campaigns (Vladivostok) participate in the project. Undisturbed forest assessment criteria are used, research techniques are improved at model sites (usually they are reserves), and the basis for new reserves and national parks are developed. *Identification Atlas of Taiga Plants of European Russia* was published to assist field investigations.

3. Monitoring protected territories to detect illegal logging and poaching.

Since 1997, Greenpeace workers have actively participated in revisions of forest management and forest husbandry in several regions, such as Moscow Oblast, Leningrad Oblast, Sakhalin Oblast, Republic of Buryatia, and Primorye Territory. In a few regions, the revisions were informal without participation of state bodies. In Moscow and Leningrad Oblasts the revisions resulted in improvement of forest management and observance of current legislation.

In Primorye Territory, a protest was carried out against the export to Japan of illegally cut timber, bought and "legalized" by official wood exporters. As a result, the business activity of some companies was suspended for some time. Unfortunately, the situation has now returned to the original pattern.

Demonstrations to attract public attention are important for NGOs. For example, in Moscow Oblast illegal felling took place in the immediate vicinity of a forestry office, but forest guards never reacted to these acts. This action was described in the press and shown on TV. As a result, the Board of the Moscow Forest Department organized the Public Council of Forest Management to solve such problems.

As a result of protests of NGOs, Scandinavian companies and Russian wood importers declared a moratorium on purchase of timber from forestlands in Karelia in 1997. Due to this moratorium, the most valuable remaining timber stands were saved in Kalevala Forestland, which is as an official reserve. At present, an advisory panel is discussing the future of these forestlands.

4. Public participation in forest management.

Opportunities for teamwork with local authorities in a few regions are wider than opportunities at the federal level. For example, for the last five years in Moscow Oblast reviews of environmental legislation compliance were carried out with participation of NGOs (in fact, the reviews were completed thanks to the efforts of the NGOs themselves). One such example is the "Summary of the

Results of the Interagency Commission on Assessing the Status of Forestry in Vyborg, Priozersk, and Vsevolozhsk Regions of Leningrad Oblast."

According to the results of the revisions, rather strong sanctions were often applied to law violations. For example, commercial "clear cutting" in strictly protected nature reserves practically stopped in Moscow Oblast. State ecological examinations are now carried out for projects of forest management and felling plans. "Hot" problems may be discussed with forest department officials. Nevertheless some problems remain. In August 2000, the state reserve Atleka in Vologda Oblast was established as a result of a discussion among representatives of local authorities, forest industry companies, NGOs, and the scientific community. It is the first case of a strictly protected national reserve established by a logging enterprise. The Vostochny Reserve in Sakhalin Oblast is one more example of constructive collaboration between public and State structures. Unfortunately, examples of similar understanding by the authorities of the actions and demands of the "greens" are still very rare and in the majority of regions completely absent.

5. Educational activity, including education of members of environmental organizations and education of the general public.

   To improve professional qualifications of environmental organization members and forest officers, the Forest Club publishes the periodical *Forest Bulletin* as well as other materials, for example the book *European Taiga on the Verge of the Millennium* by A.Yu Yaroshenko. Booklets, calendars, and posters are published for the general public, such as the calendar for 1999 and a booklet devoted to Lake Baikal.

6. Lobbying of nature protection initiatives and attraction of public attention to regional and federal ecological problems.

   Organizing support for an environmental referendum was a main activity in 2000. The current legislation requires two million signatures. More than 2.5 million signatures were collected, so the referendum depends on the Russian Government. It may avoid the referendum by declaring signatures to be "faulty" or "inaccurate."

RECOMMENDATIONS FOR PARTICIPATION OF NGOS IN ECOLOGICAL DECISION-MAKING

It is necessary to develop a legislative mechanism providing for participation of NGOs in ecological decision-making. A way for information about government decrees and actions to reach NGOs and the general public is needed along with a way for ensuring responsiveness to suggestions from NGOs. Up to now, important decrees are usually prepared, unknown to the general public. Even if NGOs learn about a decree and put forward proposals, they are disregarded without discussion.

To solve these problems it is necessary:

- To distribute information for the general public about the substance of new draft laws and departmental and interdepartmental regulations if they are not connected with state secrets. The simplest way could be publishing the texts on the Internet and in the central mass media. The information should be published not less than a month before the date of their official consideration or, in the case of a federal law or interdepartmental standard, not less than three months before the date.
- To develop a way to ensure responsiveness to suggestions from the public on the substance of new laws and standards, natural resource policies, and other problems concerning interests of different population groups. An obligation of a reasonable answer on such proposals from the state bodies within a limited time period is important.
- To have a mechanism for monitoring ministries and departments that are active in environmental protection and natural resource use. In particular, regular restructuring of the departments in the regions with participation of public organizations in this restructuring is important. Public councils with participation of NGOs should be established and linked to federal ministries and departments and their regional divisions. Participation of fictitious "public" organizations should be avoided.
- To make obligatory the participation of interested NGOs in commissions of experts conducting federal and regional ecological examinations. It is necessary to publish information on projects and territories that have already undergone ecological examinations.
- To require public monitoring of large investment projects, including those with foreign investments. The easiest means of doing this appears to be the establishment of a public council for every project with participation of NGOs. The council must have access to non-commercial data concerning the projects and all information about the current legislation.
- To provide free access for the general public and NGOs to data concerning implementation of projects for use of natural resources and for environmental protection. It is necessary to remove unreasonable obstacles for access to ecological data, including costs, particularly if they are already paid from budgetary funds.

PROBLEMS OF WASTE MANAGEMENT IN THE MOSCOW REGION

A.G.Ishkov
Department of Natural Resources of the Central Region of Russia

The scientific and technological revolution of the twentieth century has turned the world over, transformed it, and presented humankind with new knowledge and innovative technologies that previously seemed to be fantasies. Man, made in the Creator's own image, has indeed become in many respects similar to the Creator. Primitive thinking and consumerism as to nature and natural resources seem to be in contrast to this background. Drastic deterioration of the environment has become the other side of the coin that gave the possibility, so pleasant for the average person, to buy practically everything that is needed.

A vivid example of man's impact as "a geological force" (as Academician V. I. Vernadsky described contemporary mankind) is poisoning of the soil, surface and underground waters, and atmosphere with floods of waste that threaten to sweep over the Earth. Ecosystems of our planet are no longer capable of "digesting" ever-increasing volumes of waste and new synthetic chemicals alien to nature.

One of the most important principles in achieving sustainable development is to limit the appetite of public consumption. A logical corollary of this principle suggests that the notion "waste" or "refuse" should be excluded not only from professional terminology, but also from the minds of people, with "secondary material resources" as a substitute concept for them. In my presentation I would like to dwell on a number of aspects of waste disposal. It is an ecological, economic, and social problem for the Moscow megalopolis in present-day conditions.

PRESENT SITUATION WITH WASTE IN MOSCOW

Tens of thousand of enterprises and research organizations of practically all branches of the economy are amassed over the territory of 100,000 hectares: facilities of energy, chemistry and petrochemistry; metallurgical and machine-building works; and light industrial and food processing plants. Moscow is occupying one of the leading places in the Russian Federation for the level of industrial production. The city is the greatest traffic center and bears a heavy load in a broad spectrum of responsibilities as capital of the State. The burden of technogenesis on the environment of the city of Moscow and the Moscow region is very considerable, and it is caused by all those factors mentioned above. One of the most acute problems is the adverse effect of the huge volumes of industrial and consumer wastes. Industrial waste has a great variety of chemical components.

For the last ten years we witnessed mainly negative trends in industrial production in Moscow due to the economic crisis in the country. In Moscow the largest industrial works came practically to a standstill, and production of manufactured goods declined sharply. At the same time, a comparative analysis in 1998–99 of the indexes of goods and services output and of resource potential showed that the coefficient of the practical use of natural resources per unit of product, which had been by all means rather low in previous years, proceeded gradually to decrease further. At present we have only 25 percent of the industrial output that we had in 1990, but the volume of water intake remains at the same level. Fuel consumption has come down only by 18 percent, and the amassed production waste diminished by only 50 percent. These figures indicate the growing indexes of resource consumption and increases in wastes from industrial production.

Every year about 13 million tons of different kinds of waste are accumulated in Moscow: 42 percent from water preparation and sewage treatment, 25 percent from industry, 13 percent from the construction sector, and 20 percent from the municipal economy.

The main problem of waste management in Moscow city comes from the existing situation whereby a number of sites for recycling and disposal of certain types of industrial waste and facilities for storage of inert industrial and building wastes are situated outside the city in Moscow Region, which is subject to other laws of the Russian Federation. Management of inert industrial and building wastes, which make up the largest part of the general volume of wastes and of solid domestic wastes (SDW), simply means in everyday practice their disposal at 46 sites (polygons) in Moscow Region and at 200 disposal locations that are completely unsuitable from the ecological point of view.

The volume of recycled waste is less than 10–15 percent of the volume that is needed. Only 8 percent of solid domestic refuse is destroyed (by incineration). If we group industrial waste according to risk factor classes, refuse that is not

dangerous makes up 80 percent of the total volume, 4th class low-hazard wastes 14 percent, and 1st-3rd classes of dangerous wastes amount to 3.5 percent. The largest part of the waste is not dangerous—up to 32 percent. Construction refuse, iron and steel scrap, and non-ferrous metal scrap are 15 percent. Paper is 12 percent, and scrap lumber is 4 percent. Metal scrap under the 4th class of risk factor makes up 37 percent; wood, paper, and polymers more than 8 percent; and all-rubber scrap 15 percent. So, most refuse can be successfully recycled and brought back into manufacturing.

This is related to SDW too. The morphological composition of SDW in Moscow is characterized by a high proportion of utilizable waste: 37.6 percent in paper refuse, 35.2 percent in food waste, 10 percent in polymeric materials, 7 percent in glass scrap, and about 5 percent in iron, steel, and non-ferrous metal scrap. The paper portion in commercial wastes amounts to 70 percent of the SDW volume.

A number of programs initiated by the Government of Moscow are underway for the collection and utilization of refuse and for neutralization of industrial and domestic waste. A waste-recycling industry is being developed in the city of Moscow, mostly for manufacturing recycled products and goods. One of the most important ecological problems is the establishment in the region of ecologically safe facilities for the disposal of dangerous wastes of 1st and 2nd class risk factors.

Pre-planned industrial capacities for thermal neutralization of SDW will be able to take 30 percent of domestic waste and dangerous industrial waste. Construction of rubbish-burning works according to the old traditional approach is not worthwhile and should come to an end. Waste-handling stations have been under construction in the city for the last five years. In two years there will be six such stations which will make it possible to reduce the number of garbage trucks from 1,156 to 379 and to reduce the amount of atmospheric pollution they produce. In addition the switch to building stations with capacity of briquetting one ton of waste into a cubic meter will decrease the burden on waste disposal sites and prolong their life span by 4–5 fold. Trash hauling enterprises will also make profit because of lower transportation costs.

Putting into operation waste-segregation complexes (10–12 sites) would reduce volumes of refuse to disposal sites by 40 percent—that is 1,200,000 tons per year. The total volume of burned or recycled SDW would reach 2,770,000 tons a year. A total of 210,000 tons of waste per year would be buried. So, in the course of a five year period, full industrial recycling of SDW could be achieved in practice.

Collection of segregated waste is one of the important elements in effective disposal and utilization of SDW. It facilitates recycling of waste and return of secondary material into the manufacturing process. Future trends in segregation and collection of SDW will demand wide popularization and improvement of the ecological culture and everyday behavior of people.

In recent years the high increase in the number of cars in Moscow has brought about not only higher pollution of the atmosphere, but also an avalanche-like accumulation of refuse from vehicles. Besides littering residential and recreation areas, cars represent a source for toxic pollution of land and reservoirs. At the same time, automobile wastes are a good source for recycled products. In the short-term outlook, Moscow has to resolve the problem of collection and utilization of decommissioned vehicles and automobile wastes with particular emphasis on activities of the private sector. Setting up a system for collection and utilization of bulky domestic waste and electronic equipment refuse is also on the priority list.

In 1999 in Moscow the following volumes of secondary raw materials were produced or used in the city or were recycled: 300,000 tons of construction waste, 296,000 tons of metal scrap, 265 tons of car battery lead, 21,000 tons of glass, 62,500 tons of paper waste, 4,328 tons of oil-bearing waste, and 306 tons of refuse from galvanizing plants.

Such traditional secondary materials as metal scrap and paper waste are not recycled in Moscow but are shipped to other regions of Russia.

The worldwide practice of sorting and recycling industrial and domestic wastes demands the establishment of an industry for secondary recycling. Otherwise segregation of waste becomes ineffective.

There are restraining factors for the development of an effective system of assorted selection, segregation, and use of secondary raw resources, namely lack of sufficient manufacturing capacities and of suitable technologies for secondary recycling.

The problem of utilization of wastes is closely linked with the problem of modernization and sometimes even demands fundamental restructuring of industries. The practical use of equipment for less energy consumption and a smaller volume of wastes and a transition to the use of alternative raw materials are needed. Large enterprises—the main producers of dangerous wastes—are in a difficult financial situation now, which is an impediment for proceeding along these lines.

Private and medium-size enterprises are becoming gradually aware of the economic profitability in rational use of waste. For example, the firm Satory started as a transportation organization specialized in removal of scrap from demolished buildings and those undergoing reconstruction. It now benefits from recycling of waste, having developed an appropriate technology for the dismantling of buildings with segregation of building waste. So, as it has been already mentioned above, the first task for Moscow is to establish a basis for waste recycling.

HOW TO CHANGE THE SITUATION WITH WASTE

Transition to modern technologies in the utilization of wastes requires either sufficient investments or a considerable increase in repayment for waste on the part of the population. Obviously, these two approaches are not likely to be realized in the near future.

The recovery of one ton of SDW with the use of ecologically acceptable technology requires not less than $70–100.

Given the average per capita income in 1999 and the likely increase up to the year of 2005, in 2005 it will be possible to receive from a citizen not more than $14 per year. This means that the cost of technology should not exceed $40 per ton of recycled waste. Unfortunately, this requirement can fit only unsegregated waste disposal at the polygons (taking into account an increase in transportation costs by the year 2005).

Such being the case, it looks like there is only one acceptable solution for Russia to solve the problem of waste in an up-to-date manner: to introduce trade-in value on packaging and on some manufactured articles.

In recent years domestic waste includes more and more beverage containers. Plastic and glass bottles, aluminium cans, and packs like Tetrapak stockpiled at disposal sites will soon reach the same volumes as in western countries. In Canada, for example, this kind of waste amounts to one-third of all domestic waste.

A characteristic feature of this kind of waste is that the packaging for beverages is extremely durable and expensive. Manufactured from polyethylene terephthalate (PTA) and aluminum, it is sometimes more expensive than the beverage it contains.

What are the ways for solving the problem? Practically all of them are well-known, but most will not work in Russia in present conditions. The first problem relates to collection of segregated waste in the urban sector and in the services sector. A number of reasons make this system unrealistic, specifically in large cities. Sorting of waste at waste-briquetting sites and at polygons is possible. But if we take into account the present cost of secondary resources, this system turns out to be economically unprofitable and cannot be widely introduced.

The introduction of deposits on containers for beverages is at present the most acceptable option for Russia. This system turned out to be most effective in a number of countries that have much in common with Russia. In fact this option is not at all new for us. Surely, all people remember the price of beer or kefir bottles. A system of deposit for glass bottles was in operation in the USSR, and waste sites were free from hundreds of millions of glass bottles and jars. We simply need to reinstate this system at present in the new economic conditions according to new types and modes of packaging. Deposits could be introduced also on glass bottles and jars, PTA and other plastic bottles, aluminium cans, and Tetrapak packing.

Let us investigate several non-ecological aspects of this problem, because the ecological impact of secondary recycling of billions of bottles, cans, and packs is quite obvious.

Most of the population in Russia lives below the poverty line. When people buy bottles of vodka, beer, or soft drinks, they will have to pay a deposit value (10–20 kopeks for a bottle). The poorest people will carry the bottles to receiving points. A system of collection of packaging will function by itself. Only receiving points are needed. Millions of rubles that are collected will be redistributed among the poorest people for their benefit, and a social problem of the poor will be solved to a certain extent not by charity, but with normal economic means.

A second point is also well-known. In a market economy one of the most important problems is that of employment. What happens when the trade-in value is introduced?

Thousands of new jobs are created at receiving points and at enterprises that recycle glass, plastics, etc. And we don't need a single penny from the state budget. More than that, these enterprises will pay taxes and consume products of other branches of industry, thus yielding a return to the budget, not to mention income tax from new jobs.

There is another aspect of the matter. Considerable funding is needed from budgets of local governments, including communal repayments for waste collection and disposal at polygons and incinerators. Reduction of expenses for utilization of waste can be significant support for housing and communal reform in general.

It is practically impossible to evaluate in general an ecological effect when thousands of tons of waste will cease to occupy plots of land near cities as long-term disposal sites. Operation costs of receiving points and transportation costs could be covered by funds obtained from manufacturers and from returned packaging. Besides, when a waste recycling industry develops and becomes profitable, recycling factories will be able to render partial support to receiving points.

Trade-in value can be introduced on all types of packaging except milk products and products for children. It could amount to 15 or 30 kopecks per container, depending on its size. If all plastic bottles with water and beer are sold with trade-in value only in Moscow, the total sum will reach 450 million rubles a year. If we include glass bottles, aluminum cans, and packets, the sum will be one billion rubles. This sum will be redistributed at receiving points among people with scanty means when they receive the money for used packaging and jobs at receiving points and at recycling factories.

The bottleneck of the problem now is the absence in Russia of high technology industries for waste recycling. It can be resolved rather easily. At the first stage, used packaging can be sold as raw material for enterprises, including those overseas. There is unrestricted demand for PTA and aluminum on the part

of foreign firms. When waste collection mechanisms are established, there will be limited investments in this branch of industry.

With regard to the inexhaustible source of free raw material, this recycling industry will become one of the most reliable from the point of view of recoupment of investments. The Government, regional authorities, the population, and of course ecologists should all be interested in having such a law.

The same should be done with sales of cars, tires, and car batteries. Prices of every tire or battery should be higher by 30–50 rubles. These sums of money should be returned back to a buyer or credited when he buys a new tire or a new battery. For sure, such being the case we will not find used batteries thrown about the city dumps. In this case the task is even simpler because there are already a number of facilities for the recycling of tires and batteries.

In fact, a law of trade-in value can change the situation with waste in Russia in a fundamental way. Russian legislation has already been prepared, and the concept of an ecological tax has been introduced in the new Internal Revenue Code. Now it needs to be competently introduced. The outlay for waste recycling has to become a type of ecological tax. To realize this task much work has to be done among the deputies and with the Government. Public ecological organizations, including international ones, should play a leading role.

ACTIVITY OF PUBLIC ORGANIZATIONS IN THE SPHERE OF WASTE MANAGEMENT IN THE MOSCOW REGION

We know examples of the ever increasing role of the general public in the solution of the problem of waste utilization, first of all in those countries that have well-developed democratic institutions. “Fight Against Waste” is one of the popular slogans of public organizations abroad. Public opinion has brought about measures of sanitary cleaning in cities, secured better work by municipal services, shut down hazardous industries, and restricted and prohibited incineration facilities. Nevertheless, the struggle against wastes in the economically developed countries, being a manifestation of an advanced attitude towards the environment, has in the long run brought about a paradoxical result. Transfer of hazardous industries to countries with lower environmental standards and inadequate public support—Russia, as an example—has made the world even more dangerous from the ecological point of view.

Russia has just embarked on the path of formation of environmental public movements by the establishment of nongovernmental organizations. Representatives of nongovernmental organizations from Russia took part in the international gathering in Bonn in March 2000 of nongovernmental organizations that are members of the International Persistent Organic Pollutants (POPs) Elimination Network. A declaration against incineration was adopted in

Bonn by nongovernmental organizations, which called for elaboration of effective alternative technologies for utilization of waste and safe technologies for elimination of existing stockpiles of POP.

Quite a number of environmental organizations are operating now in Moscow. First to be mentioned is the All-Russia Society for the Conservation of Nature, which was established in Soviet times. There are other nongovernmental organizations: Ecosoglasiye, Ecolain, Ecological Union, and the Russian branches of Green Cross and Greenpeace. All these organizations collect and popularize environmental information and organize protest actions against policies of the Government or local administrations on ecological matters. A new political party—Russia's Movement of the Greens—is being formed.

Laws currently in force in the Russian Federation ("On Protection of the Environment," "On State Ecological Examination by Experts," "On Production and Consumption of Waste") declare the right of the public to participate in environmental examination of projects that are to be implemented, including those on the establishment of facilities for elimination and disposition of waste. Public examinations can be organized by the initiative of citizens and public associations. For example, under the law of Moscow "On Protection of the Rights of Citizens while Implementing Decisions on Construction Projects in Moscow," public hearings are organized by the city's boards. Decisions taken by local authorities, at referenda and public meetings, may be the very reason for carrying out public examinations. Such examinations are conducted mainly by commissions, collectives, or ad hoc groups of experts. Members of public examination panels are responsible for the accuracy and validity of their expert evaluations in accordance with the legislation of the Russian Federation. A decision of a public environmental panel has an informative nature as a recommendation, but it becomes legally mandatory after its approval by the appropriate body of the State. Besides, the opinion of the public is taken into account when a project submitted for state environmental review has undergone public examinations and there are supporting materials.

Public environmental examination is supposed to draw the attention of state bodies to a definite site or facility and to disseminate well-grounded information about potential ecological risks. This important facet of public environmental organizations in Moscow and in Russia is very weak. To a large extent, it can be explained by an insufficient level of specific and general knowledge of ecology even on the part of the environmentalists themselves. Lack of knowledge on the part of ordinary citizens and public groups and inadequate information (for various reasons) produce alarm-motivated behavior by those who harm the organization of environmental activity in general and waste management in particular.

There are nevertheless positive examples of public participation in designing policies of local authorities in the waste management sphere.

Speaking about the Moscow region we can point to the very productive work of the Public Ecological Commission attached to the Council of Deputies in Pushchino, in Moscow Oblast.

The population of Pushchino is 21,000. The polygon for solid biological wastes (SBW) has practically exhausted its capacities. In 1996, in order to find a way out, the Administration of the town showed an interest in a proposal made by the Austrian firm FMW to support financially the construction of an electric power station in the vicinity of the town that would operate using both fuel briquettes and SBW of the town. The briquettes would be manufactured in Turkey and would contain 70 percent Austrian industrial waste with added oil sludge. It was also envisaged that during the construction period of the electric power station, 300,000 tons of briquettes would be shipped and stockpiled. The original positive decision was annulled due to an independent evaluation of the project organized by the Public Ecological Commission.

The general public of Puschino put forward a counter proposal before the Administration in order to reduce volumes of SBW disposal at the polygon and to prolong its operation—segregation of SBW (food waste, paper refuse, fabrics, metal, glass, used car batteries). As a result, a new scheme for sanitary measures in the town was worked out in 1998, which on the basis of segregation of waste provided for a considerable decrease in refuse flow to the polygon. Unfortunately, for lack of finances in the town budget, the scheme has not been introduced to the full extent. But in spite of severe shortages of special containers for segregated wastes, a network of receiving points for secondary materials was set up.

One of the pressing tasks for greater public activity is wide popularization of environmental knowledge on waste management, especially among the young generation. There is a very important role for public organizations to play in this domain when enlightenment and education are becoming a primary concern of nongovernmental organizations. Referring again to the example of the Public Ecological Commission in Pushchino, I have to underline that this organization is taking an active part in the enlightenment of the population through organizing exhibitions, placing publications in the press, and spurring school children into action to encourage cleaning of the town by means of environmental contests, seminars, and conferences. Children help the Commission organize mobile receiving points for secondary material. They even prepare announcements and post them around the town calling on the citizens to take valuable amounts of domestic wastes and car batteries to receiving points.

There are other examples of a growing influence of public organizations on the policy of administration in the sphere of waste management in the Moscow region. The Moscow Children's Ecological Center has worked out the Program "You, He, She and I—All Together Make Moscow Clean," which is being introduced with the support of the Moscow Government. In the framework of this program, children collect waste paper at schools, and they are taught how to

be careful about the environment and material resources. The storage facilities agreed to support the initiative. They buy waste paper at a special price for school children. Then, the schools spend the earned money for excursions, laboratory equipment, books, and plant greenery.

Another example of an enlightened activity is a project realized in 1999 by the firm Ecoconcord on producing video-clips for TV about the adverse effects of waste incineration and the illegality of unauthorized storage of waste.

The name Ecoconcord speaks for the main purpose of this organization—to achieve mutual understanding between the general public and governmental organizations, to encourage public involvement in decision-making, and to promote the formation of policy bodies that would not let public opinion be ignored.

Proceeding from the global task of integrating the activities of interested parties in lessening adverse waste pollution, public organizations have to cooperate with authorities and not stand against them. Cooperation and consensus between governmental and nongovernmental organizations in working out strategies and tactics in waste management should become a prerequisite in successful realization of state policy in this sphere in the Russian Federation.

EMISSIONS OF POLLUTANTS INTO THE ATMOSPHERE AND HYDROSPHERE OF THE KUZNETSK COAL BASIN

G.I.Gritsko
Kemerovo Scientific Center

The Kuznetsk coal basin (Kuzbass) is located largely on the left bank of the Tom River, the most urbanized part of Kemerovo Oblast. The main industries in this part of the Kuzbass territory are ferrous and nonferrous metallurgy, power engineering, machine building, construction, and chemical enterprises. Therefore, the general ecological condition of the Kuznetsk coal basin is determined not by the coal industry alone, with restructuring calling for liquidation of 35 coal mines by flooding, but also by other industries.

Given the geographical variance in environmental conditions and industrial impacts, several ecological-geographic districts can be distinguished. These are first of all the territories that have undergone the most intense industry-induced impacts: destruction and degradation of soil cover, disturbance of hydrogeologic conditions, pollution of surface and subsurface waters, atmospheric pollution from industrial emissions, and degradation of natural flora and fauna. These territories are in the Kemerovo and South Kuzbass ecological-geographic districts. Boundaries of the maximum industry-induced pressure on the biosphere coincide with the boundaries of these districts. This pressure is present in about 30 percent of the territory within the limits of Kemerovo Oblast, where about 70 percent of the population lives and practically the entire coal industry of the Kuzbass is concentrated. The second group of districts (about 40 percent of the territory, 20–25 percent of the population) is subjected to a rather heavy industry-induced load from enterprises and from pollutant transport from adjacent territories, but the abundance of forests stabilizes to a large measure the ecological environment. And, finally, the third group of ecological-geographic districts (about 30 percent of the regional territory with 5–10 percent of the population) may be regarded as ecologically satisfactory.

The atmospheric condition is an important ecological characteristic of the region. Air pollution still remains one of the most pressing ecological problems because the bulk of people live in districts where pollutant concentrations are often in excess of maximum permissible levels. The most polluted cities are Kemerovo and Novokuznetsk.

Air pollution in Kemerovo Oblast results from an extremely high concentration of various industries. Of 1,472 enterprises with pollutant emissions under the control of Goskomekologiya (State Committee on Ecology) of Kemerovo Oblast, the following are located on a small territory of 95,700 square kilometers: 21 enterprises of ferrous and nonferrous metallurgy, 126 coal-mining and coal-processing enterprises, 18 thermal-power engineering facilities, 10 chemical enterprises, 83 machine-building and metal-working plants, 184 construction-industry enterprises, and 308 enterprises of rail and motor transport and road services, as well as agricultural, food, light industry, and furniture enterprises and numerous steam heating plants.

The total pollutant emissions into the atmosphere in the populated areas of the region in 1999, including stationary and mobile (motor, rail, and air transport) sources, were 1,358,573 tons, including solid substances-235,899, sulfur dioxide-138,875, carbon dioxide-610,018, nitrogen oxides-143,282, hydrocarbons-211,916, other gases-18,486. Most of the total emissions are from pollutants from combustion of various fuels.

Emissions from mobile sources are 260,032 tons (19.14 percent), including the following: motor transport-239,595 tons, railroad transport-19,867 tons, and air transport-570 tons. The majority of emissions from mobile sources are exhaust emissions from motor transport amounting to 92.14 percent. The motor transport contribution to pollution is 19.14 percent in the region as a whole, while it is much higher in some towns, such as Anzhero-Sudzhensk-38.4 percent, Mezhdurechensk-40.1 percent, Kemerovo-44.1 percent. The exhaust emissions from motor transport have increased by 6.0 percent (or by 14,479 tons) as compared with 1998.

The stationary sources accounted for 1,098,541 tons of pollutants emitted into the atmosphere (the emission limit being 1,127,547 tons). Incomplete data indicate that around 200 substances enter the atmosphere. The majority are highly toxic and carcinogenic (3,4-benz(a)pyrene, various metal and silicon compounds, cyanides, fluorides, and a broad spectrum of hydrocarbons, including volatile organic compounds that enter into photochemical reactions in the atmosphere to produce ozone and other oxidants).

Enterprises of the following sectors are the main contributors to air pollution: metallurgy-421,706 tons, power engineering-206,170 tons, fuel-233,459 tons, chemical industry-5,209 tons, and other sectors-231,708 tons. The volume of recorded emissions into the atmosphere in comparison with 1998 has increased as follows: in the fuel industry-by 60,275 tons due to the more accurate accounting of methane emission sources; in electric power

engineering-by 6,911 tons due to increased amount of burned fuel; in the chemical industry-by 1,952 tons due to a production increase; in metallurgy-by 29,346 tons due to a production increase. In 1999, 80 new enterprises were registered, while 115 enterprises were either liquidated or merged. The increase of emissions into the atmosphere throughout the region has totaled 98,309 tons.

During the last five years (1995–1999), pollutant emissions from stationary sources have decreased by 7,004 tons, or by 6 percent, as a result of recession in the main sectors of the economy. Four million tons (79.4 percent) of pollutants were removed at the enterprises of the region in 1999. The highest level of removal was in the power engineering (92.3 percent) and chemical (87.4 percent) industries. A low level of pollutant removal was in housing-communal services-33.9 percent, at transport and road-service enterprises-30.5 percent, at trading enterprises-24.4 percent, and in public health services-6.6 percent. Noxious substances from the communication, educational, material, and technical supply enterprises go to the atmosphere without cleaning. The greatest volume of emissions is registered in the towns of Novokuznetsk, Kemerovo, Belovo, Leninsk-Kuznetsky, Myski, Prokopyevsk, Kiselevsk, Kaltan, and Mezhdurechensk.

A great number of industrial enterprises are situated near residential districts. Recurrent weather conditions unfavorable for dissipation of emissions cause the high level of air pollution. This is confirmed by observations at the hydrometeorology and environment monitoring centers located in Kemerovo, Novokuznetsk, and Prokopyevsk. The pollution level in Kemerovo and Novokuznetsk, according to a generalized index developed by Rosgidromet (Russian Hydrometeorological Service), is estimated to be high.

Pollutant emissions into the city atmosphere in 1999, including stationary and mobile (motor, railroad, and air transport) sources, amounted to 117,777 tons.

The main contributors to emissions from stationary sources are the enterprises of: power engineering-71.26 percent, ferrous metallurgy-7.15 percent, chemical processing-7.65 percent, housing-communal services-4.06 percent, and fuel industry-3.69 percent.

Pollutants removed at city enterprises amount to 588,245 tons, which comprise 90 percent. The level of removal is the highest in the power engineering industry-91.7 percent, in chemical industry-87.7 percent. It is low at the enterprises of housing-communal services-29.1 percent, machine building and metal plants-26.6 percent, transport and road services-4.3 percent. Emissions from trading and from material and technical supply enterprises go to the atmosphere without cleaning.

As compared to 1998, emissions from stationary sources have increased by 2,004 tons due to the production increase at city enterprises (Azot, Khimprom, Kemerovo State Regional Power Plant). Statistical accounts have been

submitted by 140 enterprises for which MPE (maximum permissible emission) standards are established.

In Kemerovo, regular observations of air pollution are performed using a network of eight stationary points of the state hydrometeorology and environmental monitoring committee.

Staff members of the Kemerovo scientific center have carried out work on the ecological zoning of the city territory based on investigations of sulfur accumulation by leaves of plants. Based on inventory data and the distribution of weather conditions (wind velocity, wind direction, and atmosphere stability), the average annual near-ground concentrations of the sum of sulfur-containing impurities have been calculated.

Industrial processes associated with coal mining are sources of man-induced impacts on the environment. These sources are power plants, coal transportation, storage and loading, degassing and ventilating, burning spoil banks, maintenance-technological services, and motor transport. All possible sources of emissions and an assessment of their impact on the atmospheric pollution should be described in the design of a newly opened mine.

Mine methane at operating enterprises goes to the atmosphere mainly from degassing and ventilating units. According to the presently accepted documents, methane is one of the least harmful pollutants (maximum permissible concentration=50 milligrams per cubic meter). Today, the payment for one ton of methane emission is approximately 1,000 times less than for one ton of sulfurous anhydride. Therefore, the economic and administrative sanctions on methane emissions on the part of Russian territorial nature-preservation authorities are quite insignificant. However, the worldwide tendencies of recent years toward the limitation of greenhouse gases lead to greater attention to methane emissions. It is not unlikely, therefore, that the standards of payment for atmospheric pollution with methane will significantly increase in the near future, which, in view of the large emissions of this gas in the Kuzbass coal mines, may result in a substantial increase of nature-preservation payments and in a decrease of coal mining profitability.

A generalization of inventory data on the sources of harmful substance emissions into the atmosphere at the Kuzbass mines provides the ranges of total emissions per mine. Under the most unfavorable conditions, the payment of fines for methane emissions into the atmosphere does not exceed 6,450 rubles per year.

A review of inventory data also shows that at Kuzbass mines, ventilation unit emissions at a height of 5–6 meters typically have a relatively high vertical velocity of gas-air mixture discharge (8–19 meters/second). This condition substantially increases the effective flare height and leads to a decrease in the near-ground concentrations at short distances from the source. With the indicated source parameters and the emissions at the upper boundary level, the maximum near-ground concentration is achieved at wind velocities of 3–5

meters/second at a distance of 50–300 meters and may be equal to 3–4 MPC (maximum permissible concentration).

When a coal-mining enterprise closes, most sources providing loads on the atmosphere disappear. At the same time, state environmental control over the sources of pollutant emissions is terminated. But this does not mean that the closed mine completely ceases its negative influence on the atmosphere. Products of incomplete burning of spontaneously ignited coals and of mine equipment in the fire zone may be emitted. Spreading of dust from poorly controlled spoil banks also persists.

As to methane, after a mine is closed its ventilation ceases, and emissions of methane-air mixture are significantly reduced. But, as pumping of water also ceases, the water table rises, with the result that pressure in the mine grows and methane begins to escape to the surface and into the atmosphere.

The rivers of the Kuzbass are polluted with waste waters disposed from numerous enterprises of different branches of industry. The quality of water bodies continues to be below standard specifications. The most widespread pollutants of surface waters in the region are petroleum products, phenols, metal compounds, ammonium, and nitrites. The principal source is waste waters of industrial enterprises and housing-communal services.

Four main water basins are in the region: the Tom, Inya, Chulym, and Chumysh Rivers basins. More than 32,000 rivers with a combined length exceeding 76,478 kilometers flow over the territory.

Depending on local characteristics and relief, the rivers of the region are subdivided into plain- and mountain-type rivers. All of the rivers flowing over the territory of the region link to the Ob River basin and are tributaries of its upper reaches.

The main reasons for the increase in water consumption were an increase in output at some enterprises (West-Siberian Metallurgical Complex and Kuznetsk Metallurgical Complex in Novokuznetsk, Azot and Khimprom in Kemerovo, Yurga Machine-building Plant in Yurga) and an increased use of water at coal-mining enterprises.

The shrinkage of the irrigated land areas and the reduction of livestock populations have resulted in a decrease of water consumption for irrigation and agricultural needs.

Rivers of the Tom basin, where the main industrial potential of the Kuzbass is concentrated, are the most used and most subject to industry-induced impacts. According to the pH value, the Tom's waters are usually neutral or weakly alkaline. The contents of biogenic substances (Si, Fe, and compounds of N and P) show enhanced amounts of iron and ammonium ions, occasionally also of NO_2. The concentrations of trace elements vary over quite a wide range, but the average level of their contents is not high. An examination of data has shown that the Tom's waters are polluted most with organic substances, with enhanced concentrations of petroleum products and phenols being most often registered

throughout the length of the river. Identified in the Tom's waters (in the framework of experimental investigations) is an extensive list of various organic substances falling into the following classes of compounds: saturated and aromatic hydrocarbons (including those of petroleum origin), alkyl phenols, fatty organic acids and their ethers, alcohols, organic phosphates, and chlorine-organic compounds. Thus, based on the results of investigations in 1990–1993 along the Tom River on the Kuzbass territory, the three most heavily polluted areas have been delineated: in the zones of influence of Novokuznetsk, Kemerovo, and Yurga. Among the most characteristic pollutants in surface waters of the Tom River, for which values exceeding MPC have been continuously or occasionally registered, are suspended solids, ammonium nitrate, heavy metals (Pb, Zn, Ni, Fe, Mn, Cr, Cd), petroleum products, highly volatile phenols, and other organic substances of different classes of hazard. The mode of distribution of hydrocarbons suggests their man-induced origin. The presence of SAH (surface-active hydrocarbons) in nanogram quantities of lighter aromatic hydrocarbons (naphthalene and its derivatives anthracene, fluorene, fluorenthene, and pyrene) suggests that the enhanced concentrations of SAH in the Tom River are caused by the discharge of mine and subsurface waters contacting with coal rocks enriched in these compounds.

The Inya River basin is second in importance and ecological loading. Sixteen million cubic meters of water were taken from water bodies of the basin in 1999, mainly for the needs of production (10 million cubic meters). Discharged into the basin's surface water bodies were 116 million cubic meters of waste waters from the towns of Belovo, Leninsk-Kuznetsky, and Guryevsk and from the Promyshlennov, Leninsk-Kuznetsky, Guryevsk, and Belovo districts. Of 115 million cubic meters of waste waters needing purification, 104 million cubic meters (89.8 percent) have been treated, of which .01 million cubic meters have been purified to meet specified standards. Together with waste waters, 125,000 tons of pollutants are discharged into the rivers of the basin, including 249 tons of toxics and 20,562 tons of pollutants with reduced toxicity.

The source of the Inya River is located on the Taradanov ridge. The Inya is the right tributary of the Ob and flows through industrial and agricultural areas in the central part of Kemerovo Oblast. The river is 663 kilometers long, extending for 433 kilometers over the Kemerovo Oblast territory. The drainage basin area is 17,600 square kilometers. Within the region, the river is regulated by means of the Belovo Reservoir.

The Inya is polluted mainly with waste waters from coal-mining enterprises and communal services, which is reflected in the chemical composition of water. A total of 66 million cubic meters of waste waters have been discharged into the river, including 3,800 cubic meters without treatment. Together with waste waters, 81,000 tons of pollutants have been discharged. The main pollutants of the Inya River and its tributaries are petroleum products, phenols, nitrogen-

containing substances, and ions of heavy metals. Phenol pollution of the river averages 6–9 MPC. The one-time maximum concentration was registered in 1999:18 MPC in the summer low-water period. Average concentrations of petroleum products varied within a 3–6 MPC range. While the concentrations of petroleum products in the monitored section downstream from Leninsk-Kuznetsky remain within a 4.5–5.5 MPC range, in the section upstream from the town a decrease from 6 MPC in 1997 to 3 MPC in 1999 has been registered. In 1999, as compared with two previous years, the average concentrations of ammonium nitrates and nitrites decreased both upstream and downstream from the town. Pollution of the Inya with organic substances, as judged from BOD5 (biochemical oxygen demand) and COD (chemical oxygen demand) indicators, is stable within a 1.5–2 MPC range, while average concentrations of total iron and zinc increased a little in 1999 (to 1–1.5 MPC) as compared with two previous years (0.5–1.0 MPC).

The Chulym River basin includes the Yaya River and its tributaries, the Kiya and its tributaries, the Itatka, and others. About 33 million cubic meters of water were taken from water bodies of the basin in 1999, mainly for the needs of production. Discharged into the surface water bodies of the basin were 61 million cubic meters. Of 55 million cubic meters of waste waters requiring purification, 49 million cubic meters (81.3 percent) were treated. Twelve million cubic meters (19.7 percent) were treated in accord with specified standards. Together with waste waters, 28,000 tons of pollutants were discharged into the rivers of the basin, including 87 tons of toxic substances and 4,400 tons of toxic sewage wastes.

The Chumysh River basin includes the Chumysh and its tributaries: Kara-Chumysh, Yegos, and others. Some 95 million cubic meters of water were taken from bodies of water in the basin, largely for the needs of production. Discharged into the rivers of the basin are waste waters from enterprises of Novokuznetsk Region and Prokopyevsk. A total of 23 million cubic meters of waste waters were discharged, including nine million cubic meters (40 percent) without treatment. Together with waste waters, 9,050 tons of pollutants were discharged, of which 21 tons were toxic and 1,600 tons were toxic sewage wastes.

Mining exerts an adverse effect on the water regime of Kemerovo Oblast. Dehydration of mining areas occurs and cones of depression form, with sizes depending on the geologic and hydrogeologic conditions and on the length of the mining period. An area of depression cones in the Kuzbass exceeds two thousand square kilometers.

The effect of mining on the river discharge is reflected in a decrease in the subsurface water discharge into the river due to drainage pumping in mines or quarries, by an increase in the river sedimentation caused by the same factors, and by a decrease in the subsurface water reserves. The daily flow from Kuzbass mines and open pits exceeds one million cubic meters. Drainage of deposits

results in a decrease of water reserves in surface water bodies, drying up of wells and water supply wells, and exhausting of springs, streams, and small rivers. In the zone of mining, more than 200 rivers have disappeared or diminished, and a general degradation of the territories continues, which results in the destruction of habitat conditions and degradation of vegetation.

The coal industry is the second in importance for pollution of Kuzbass water bodies after power engineering, which discharges into the rivers 58.9 percent (1,515 million cubic meters/year) of untreated waters. The coal industry accounts for 14.6 percent (384 million cubic meters/year) of untreated waters. Coal enterprises discharge 34.4 percent of all suspended solids and 10 percent of petroleum products. Mines, per unit of output, discharge into water bodies 3.6 times more suspended solids, 5.2 times more chlorides, 2.6 times more easily oxidized organic substances, and 3.72 times more petroleum products than open pits. Suspended substances are the main pollutant of mine waters. Waste waters of some mines contain phenol, which forms as a result of pyrogenic decomposition of coal. Mine waters show strong bacterial pollution.

Closure of coal mines by means of flooding will lead to the contraction of their depression cones and to a change in the discharge directions of mine-polluted subsurface waters. The result may be that the subsurface waters previously discharged into mines will begin to discharge into surface water streams with pollutants from dumping grounds of various waste products (including dangerous chemical waste). The influence of waste waters on the surface water quality can be observed near the following mines: Pionerka-the Big Bachat River, Bungurskaya-the Bungurska River, Dimitrova-the Aba River, Shevyakov-the Olzheras River, Shushtalepskaya-the Kondoma River, Baidaevskaya-the Garshina River, Vakhrushev-the Aba River. An analysis of mine waters after they have passed treatment plants shows that the majority of solids analyzed exceed MPC. Thus, suspended substances in all of the mines analyzed exceed MPC from 2 to 34 times, BOD from 1.6 to 20.8 times, ammonia from 1.3 to 18 times, and so on. The discharges of waste waters from mines being closed have resulted in an increase of MPC in surface waters by a factor of 2 to 7 for a number of components.

The subsurface waters of the Kuzbass are of the infiltration type, with reserves formed due to atmospheric precipitation. The infiltration in the upper part of the geologic section varies, according to G.M.Rogov, from 200 mm (25 percent of precipitation) in the mountain-taiga zone to 85 mm (14 percent) in the low-mountain-taiga zone and to 35 mm per year (7–8 percent of precipitation) in the steppe zone.

According to Zapsibgeologiya (West-Siberian Production-Geological Association), traces of industry-induced pollution of subsurface waters have been recognized west of Myski and in the vicinity of Novokuznetsk. Pollution by a number of components (phenols, formaldehyde, COD, BOD) ranges up to 150 MPC. Much of the explored reserves in the Myski and Kiyzak areas are not

exploited now because of the pollution with waste saline waters from a district steam heating plant over an area of four sq. km. and the liquidation of reservoir gravel by the Kiyzak building material quarry. On the territories of large livestock complexes and poultry plants the contamination of soil has resulted in the pollution of subsurface waters with nitrogen compounds and heavy metals. In some cases the subsurface waters under farming lands were found to have enhanced contents of pesticides (Kemerovo Region), nitrates-from 2 to 30 MPC (swine-breeding complexes in Chistogor and Tal), and organic compounds-phenols up to 3000 MPC (Kemerovo: Azot, Tokem).

Observations of the subsurface water regime under natural conditions conducted for many years show that the mode of ground and subsurface water table fluctuations depends most of all on the amount of precipitation and on the regime type. The wells under the riverside and terrace regime conditions clearly show a spring and autumn rise of the water table and its smooth recession in the course of winter. The minimum levels of summer-autumn low-water periods differ from those of winter low-water periods in both directions, but are most often lower or close to them. The annual amplitude of water table fluctuations varies from 0.2 to 4 meters. Only the spring water table rise is registered (lagging in time, as a rule, in comparison with the riverside regime) followed by a smooth recession. Minimal levels in the summer-autumn low-water period are close to those in the winter low-water period. Annual amplitudes are insignificant, rarely exceeding one meter.

The effect of the coal-mining complex on the hydrosphere causes a change of water regime of the territory—pollution of ground and waste waters with products of physical and chemical weathering of subsurface rocks. In every case, the zone of mining and the territories adjacent to it are drained by means of tunnels, pumping, and disposal of subsurface waters into the hydrological network beyond the mining area. The natural regime of subsurface waters becomes disturbed and their reserves diminish. In the process of both subsurface and open-pit mining, the lowering of the ground water table forms a cone of depression whose size depends on the geologic and hydrogeologic conditions of the mining area and on the duration of mining.

One of the most adverse aspects of mine flooding is the possibility of polluting the subsurface waters, which are a source of drinking water. This will necessitate an urgent solution of the water supply problem for the populations of Novokuznetsk, Belovo, Kemerovo, and Anzhero-Sudzhensk.

Pollution of mine waters with metals is registered for zinc (up to 14 times background levels), copper (up to 270 times), lead (up to two times), manganese (up to 325 times), molybdenum (up to four times), arsenic (up to 100 times), vanadium (up to five times), fluorine (up to 5.9 times), and aluminum (up to 2.3 times).

As is evident from an analysis of mine water pollution dynamics, the contents of nitrogen group compounds and petroleum products increase in

spring, summer, and autumn and sharply decrease in the winter period. This means that an important role in the pollution of mine waters with these substances, particularly when water levels are extremely high, is played by snow-melt and storm waters bringing to the mines pollutants from petroleum products and household refuse accumulated on the territory allocated for mining. To help solve the large-scale problems of natural resource monitoring and environment protection in Kemerovo Oblast, an integrated information system based on the use of geoinformation technologies has been developed. *Ecological Atlas of Kemerovo Oblast* (ATLAS) is designed for the collection and storage of graphical and semantic information on the state of the environment and natural resources in Kemerovo Oblast, as well as for processing this information. The system provides support for the solution of a wide range of problems concerning monitoring, accounting, planning, distribution, and financial regulation in the field of natural resources usage and payment for environment disturbances and pollution. Besides, ATLAS can be used in higher and post-graduate ecological education. The system based on GIS-technologies is used as follows:

- To form electronic maps of localities using a base of graphic layers with a summary map of all semantic descriptions of objects available in each layer.
- To establish relationships between individual objects with semantic information stored in databases of the dBASE and PARADOX format.
- To create and/or attach cartographic-mathematical models of technical-natural phenomena with the visualization and saving of their results in a separate graphic base layer.
- To process and edit semantic and graphical data (in compliance with information security).
- To form, browse, and print out normative-reference information.

The aggravation of the ecological situation in Kemerovo Oblast in recent years is connected not only with the activation of production in heavy industry sectors, but also with the lack of ecological culture among the great majority of managers of all levels.

At present, 12 public ecological organizations work in the Kuzbass. Among the most active of them are the following: Kemerovo Department of the All-Russian Society for Nature Preservation, Information Ecological Agency, Ecological Parliament of Children and Young People, Kemerovo Regional Society Social Health, Kemerovo Regional Department of the Russian National Organization Green Cross, and Ecological Movement Kuzbass. Scientists of the Kemerovo Scientific Center of the Siberian Branch of the Russian Academy of Sciences take an active part in the work of the majority of these organizations. The principal lines of activity of public ecological organizations are the following:

- Publication of *Information Ecological Bulletin*
- Ecological audit and consulting
- Public ecological expert examination
- Informational support and service in the environmental field

The regional Ecological Parliament of Children and Young People has adopted its own ecological code for children and young people in February 2000 on the basis of the recommendations of the UN Conference on the Environment and Development (Rio de Janeiro, 1992). Its fundamental principles are as follows:

- Destruction of the environment is a consequence of the destruction of personality, of a person's inner life, of his values.
- There is but one step from ecological ignorance to a crime against humanity.
- We have no right to enrich ourselves at the expense of nature; we must live in harmony with it.
- To preserve man as a species, we should preserve the natural environment; in order to preserve the environment, man should change himself, his attitude to it.

The Ecological Parliament of Children and Young people has concluded an agreement on cooperation to participate in the solution of regionally significant ecological problems with the Kemerovo Oblast administration in an effort to strengthen the interaction between the authorities and the ecological movement

The Information Ecological Agency (IEA) may now be called a professional public organization. The agency collects and systematizes ecological information with special attention to regional ecological problems. The main emphasis is on involving the general public in the process of significant decisions and regulations in the field of environmental protection in the Kuzbass.

Information Ecological Bulletin is a monthly 24-page monthly publication with a circulation of 950 copies. The bulletin is intended for specialists, industry personnel, teachers, and representatives of public organizations. It covers the following issues: regional problems, projects, and public actions in the field of environment; ecological legislation, ecological audit, and ecological management; the environment, public health conditions, and the ecological rights of citizens; technologies in the field of environment; and ecological education.

The IEA provides services for ecological audits, environmental impact assessments, ecological substantiation of business activity, valuation of maximum permissible pollutant emissions, waste disposition, permissible levels of environmental impact, and confirmation of limits on the use of natural

resources. The IEA has appropriate licenses for all of the above-listed types of activity.

To realize these activities, the Agency forms temporary groups of specialists in different fields from IEA members. Since February 1998, the IEA has been affiliated with the Russian Network of Regional Centers of public ecological expertise in the context of a program realized by the Moscow public organization Ecoline and supported by the Institute for Sustainable Communities (USA). The Agency supports development of information and exchange of information.

The scientists of the Kemerovo Scientific Center of the Russian Academy of Sciences take an active part in the popularization of ecological knowledge and of the problems of stable regional development by publishing popular scientific papers in the mass media and in the *Information Ecological Bulletin*. They participate in expert appraisals of regional legislative acts aimed at nature preservation and of regionally significant business projects.

Currently special attention is paid to the problems of ecological education and training. An analysis of the present situation shows an absence of multilevel ecological education as a system. The number of ecological schools in the region is far from sufficient. This is connected with the absence of ecological education programs, the lack of personnel, the complexity of curricula, and the lack of textbooks and training aids.

In schools of the region (mainly in the innovative educational institutions), attention is given to the scientific-research work of students in ecology. Their work is presented at scientific conferences, in the ecology sections. The Kuznetsk department of the Geographical Society together with the tourist station of Novokuznetsk has organized training on practical ecology for groups of students. Students become acquainted with methods for the observation and study of birds, with determination of water quality, and with the world of plants. They carry out ecological games and walking tours.

Additional ecological-biological education in Kemerovo Oblast involves the regional station of young naturalists as a coordination center of uninterrupted ecological education and ecological culture formation among pre-school children and among elementary and middle school students.

There are 15 scientific associations of pupils and students in the region established on the basis of young naturalist stations, ecological-biological centers, and children's and young people's centers. They include "Genetics of Animals," "Ecology of Plants," and "Biochemistry and Cytology" in Novokuznetsk; "Microbiology," "Young Forester," and "Fauna" in Kemerovo; and "Young Ecologist and Biologist" in Anzhero-Sudzhensk, and Myski.

Stations of young naturalists in Mezhdurechensk, Novokuznetsk, Anzhero-Sudzhensk, Topki, Kiselevsk, Prokopyevsk, Kemerovo, Yurga, and other towns, together with schools, are engaged in an integrated study of the ecological conditions of their towns, in the examination of large and small rivers, and in the

investigation of flora and fauna of their native land. Various methods used in this study include ecological monitoring; bioindication of water bodies and air basins; and hydrobiological, zoological, and botanical investigations.

It has become a tradition that the regional station of young naturalists, together with the regional Goskomekologiya and Kemerovo State University, conducts rallies/competitions of young ecologists, including defense of research works by the rally participants, and their demonstrations of ability to use the main methods of field ecology.

With active support from the regional Committee of Young Naturalists, the groups of young ecologists of the Kemerovo region participate in the realization of several Federal educational-research projects: "Phenology of Birds," "Life to Russian Waters," "Crane, the Bird of Peace," "Water on the Earth," and others. Ecological shifts at the stations of young naturalists continue in Kemerovo, Novokuznetsk, Mezhdurechensk, Yurga, Anzhero-Sudzhensk, and Myski. Pupils of School No. 62 in Kemerovo are engaged in the problem of potable water under the program "Clean Water of the Taydon—to the Kuzbass Towns." They report the results of their expeditions at Russian conferences and receive well-deserved diplomas and certificates.

The Kemerovo Scientific Center, with the participation of institutes of higher education and public ecological organizations, has conducted a number of international, all-Russian, and regional scientific-practical conferences and seminars. The most significant were the All-Russian scientific-practical conference "Ecology and Economy: Regional Problems of Transition to Stable Development. A Look into the Twenty-First Century," the international scientific-practical conference "Ecological Problems of the Regional Coal-mining Sector Under the Transition to Stable Development," the second international conference "Reduction of Methane Emission," and the scientific-practical seminar "Regional Problems in the Economical Education on the Eve of the Twenty-First Century."

The aforementioned seminar discussed methodological approaches, standards, and training aids for a system of multi-level ecological education and training. The discussion demonstrated experience in the ecological education and training of the people. In the system of general secondary education, ecology is being introduced as an independent subject. In the higher schools, special courses of ecology, nature preservation, engineering ecology, and rational use of natural resources are being introduced. Several centers of ecological education work within the system of post-graduate professional development.

At the same time, the process of ecological education and training has not become continuous and obligatory, as is required by the Environmental Protection Law. A scientifically based system of ecological education and training is absent in the region, and the legal and normative foundation has not been formed. There are great difficulties in providing the material-technical and

educational-pedagogical basis for carrying out practical expeditions. The difficulties in the dissemination of ideas and experience of Russian and foreign ecological education are aggravated by the absence of available information systems and periodicals.

To raise the level of ecological education, the following should be done:

- It is necessary to pass the law "On the Ecological Education and Training of Population in Kemerovo Oblast."
- A regional target program should be developed "Perfection of Ecological Education and Training in Kemerovo Oblast for the Years 2001–2005," with the specification of financial resources from the regional budget (via the Education Department and the Science and Higher School Department) and the regional ecological fund budget.
- A system of centers of ecological education and training should be established. They should have the following tasks: development of regional standards of different-level ecological education; assessment of the effectiveness of ecological education, expert appraisal, and certification of training aids; development of retraining and professional development programs for teachers in the ecological education system of the Kemerovo region; and assistance in the preparation and publication of training and methodology aids, including tutorial computer programs.
- The role of public organizations and the mass media in the process of ecological education should be increased. A standing seminar (school) for journalists and public activists is needed, together with a cycle of broadcasts and telecasts.
- Ethical and aesthetic education at each educational level should be improved and extended.

The report has been prepared on the basis of the following materials and published works:

Bykov, A.A., E.L.Schastlivtsev. 2000. Calculations Assessing the Local Atmospheric Pollution with Methane at the Working and Closed Kuzbass Mines. Proceedings of the 2nd International Conference Reduction of Methane Emission. Novosibirsk, Siberian Branch of the Russian Academy of Sciences (in Russian) pp. 629–632.

Data on the pollution of Tom River water by sections, 1981–1996; water discharge by sections of Tomsk, Kemerovo, Novokuznetsk, Mezhdurechensk, 1986–1996; radioactive pollution of surface waters in the vicinity of CXT, 1991–1996; toxicity of the Tom River, 1993–1997. West-Siberian Center of natural environment pollution monitoring, January, 1998 (in Russian).

Ecological Map of Kemerovo Oblast, Scale 1:500000, 1995 (in Russian).

Elaboration Materials of the Federal Target Program. 1998. Radical Improvement of the Hydroeconomical and Ecological Situation in the Tom River Basin. Kemerovo Scientific Center, Siberian Branch of the Russian Academy of Sciences (in Russian).

Malakhov, S.M. and L.A.Novoselova, eds. Report, 2000: Natural Environment Condition in the Kemerovo Oblast in 1999. State Committee on Environmental Protection of Kemerovo Oblast. Kemerovo, Russian., 288 pp.

Malakhov, S.M. and L.A.Novoselova, eds. Report, 1999: Natural Environment Condition in the Kemerovo Oblast in 1998. State Committee on Environmental Protection of Kemerovo Oblast. Kemerovo, (in Russian), 182pp.

Neverova, O.A., A.A.Bykov, S.A.Morozova, 2000. Phytomonitoring and Its Comparison with the Results of Long-term Modeling of Atmospheric Diffusion, Kemerovo, Manuscript deposited in the All-Russian Institute of Scientific and Technical Information on October 17, 2000, No. 2636-VOO (in Russian), 17 pp.

Schastlivtsev, E.L., A.A.Bykov, et al., 1997. The Basic Principles of Compilation of the Distributed Territory Natural Resource Registry of Kemerovo Oblast. Papers of the All-Russian Scientific-Practical Conference Ecology and Economy: Regional Problems of Transition to Stable Development: A Look into the Twenty-First Century, Kemerovo, Kuzbassvuzizdat, pp. 65–74 (in Russian).

Schastlivtsev, E.L., L.P.Barannik, V.I.Ovdenko, and A.A.Bykov. 2000. Evaluation of Ecological Consequences of Coal Mine Closure in Kuzbass Coal Region. Proceedings of the Sixth International Conference Environmental Issues and Management of Waste in Energy and Mineral Production, SWEMP-2000, Calgary, Alberta, Canada, May 30–June 2, 2000. Balkema, Rotterdam, pp. 661–665.

State Water Resources Registry. Annual data on the quality of surface waters and land in the river basins of Altai Territory, Kemerovo, Novosibirsk, and Tomsk Oblasts, and the Republic of Altai, 1981–1996. Novosibirsk, West Siberian Hydrometeorological Service Administration (in Russian).

Surface Water Quality and Effectiveness of Water Protection Measures over the Territory of the West Siberian Hydrometreorological Service Administration. Activity: a Yearbook, 1990–1996. Novosibirsk, West Siberian Hydrometeorological Service Administration (in Russian).

RUSSIAN FAR EAST ENVIRONMENTAL PROBLEMS

V.M.Buznik
Khabarovsk Research Center

The Far East Region includes ten eastern entities of the Russian Republic: the Republic of Sakha; Primorye and Khabarovsk Territories; Amur, Kamchatka, Magadan, and Sakhalin Oblasts; the Jewish Autonomous Region; and Koryak and Chukot Autonomous Districts. It occupies a sizable territory of 6.215 million square kilometers or 36.4 percent of Russia. As of January 1, 1997, the region was inhabited by 7.421 million people or only 5.03 percent of the nation's population. The average density of the population is 1.19 persons per square kilometers or one-seventh the national average. A recent downward trend in the population has developed as migration to other regions increases.

Strangely enough, development of the region began from the north. Russian expeditions initially explored Chukotka and Kamchatka in the first half of the eighteenth century. Exploration of the southern part of the region began only in the second half of the nineteenth century. Slow development of the region was related to its remoteness and unfavorable climatic conditions. Yet the region enjoys an important geopolitical location, for it provides access to the Pacific Ocean and to the frontiers with Japan, Korea, China, and the United States. Industrial, economic, and cultural development of the region was carried out by military forces, by newly arrived workers, and by prisoners—all perceived as temporary residents. Historically, genealogically, and culturally, most of the region has been linked to Central Russia and Siberia. The region is rich in natural resources—fish, timber, oil, gas, and minerals such as gold, diamonds, coal, and non-ferrous metals. With 5.03 percent of the population, the region produces 9.0 percent of the nation's timber and 67.1 percent of the fish catch. Industrial output reached 4.7 percent in 1990 and 4.6 percent in 1996, while farming was 3.2 percent and 2.9 percent, respectively. During the period of

reforms, the share of these industries was on the rise, although the share declined considerably in other sectors. Consequently, recent trends are toward increased resource-extraction industries with growing pressure on the environment.

The main environmental problems in the region relate to preservation of biodiversity, use of marine resources, pollution of rivers and lakes, preservation of forests, and urban development.

PRESERVATION OF BIODIVERSITY

The huge region spreads over several climatic zones from the polar area in the north to the subtropical areas of Primorye Territory, including continental, coastal, and island areas. It has unique biological diversity—vegetation, animal, and marine. The southern areas of the region were not exposed to ice formation during the glacial period, which resulted in preservation of ancient biospecies. The southern area of Primorye and Khabarovsk Territories exemplifies a unique coexistence of both northern (e.g., larch, stone birch) and southern (e.g. liana, lotus) plants. Such a unique mix is also typical for the animal world. There are more than 5,000 vascular plant species and more than 1,500 types of mushrooms. In the south of Primorye territory there are more than 1,200 types of plants, 120 mammal species, 50,000 insects, and 550 birds. There are 104 types of fish in the Amur River alone. Diversity was preserved to a great extent due to the low level of development of the region as compared with other regions of Central Russia. There are many ancient plants in the area. For example, in the Sikhot Alin mountains, among the 800 plants 200 fall into the class of ancient relics. Three groups stand out among the relics of vegetative and possibly animal origin: relics well adapted to current conditions and renewable by nature, mobile relics, and relics that are being reduced by natural and anthropogenic forces.

A distinguishing feature of the region is the availability of unique endemic plants and animals. Many of the over 250 endemic plants are on the verge of disappearance and are now in the Rare Species Book. The principal challenges to biodiversity are:

- Natural and anthropogenic disasters.
- Reduction of growth areas due to impacts such as deforestation and industrial development.
- Predatory and poaching extermination of tigers, musk deer, ginseng, lemon trees, and the Amur sturgeon.
- Lack of proper resource management.

Reduction of biodiversity in the Far East is inevitable due to a weakening of governmental control over resource-related activities, curtailment of funds for nature protection, poaching, and a sharp growth of smuggled exports.

Different measures could counter biodiversity reduction. Among such steps are an increase in the size and number of protected areas, environmental education—particularly for school children—control of poaching and smuggling, and better resource management.

PROBLEMS IN THE USE OF THE PACIFIC SEAS

Problems arising from man's marine activities include loss of biodiversity, impacts of shipping, pollution from the Navy's activities, wastes from off-shore oil and gas production, and industrial and household dump sites.

Ocean problems are often of an international character. Loss of biodiversity is often associated with fishing on the high seas as well as in coastal waters. Problems arise with international quotas and harvesting methods. It is not easy to implement an agreement when on frequent occasions each party tries to attain an excessive share of the resources and to hide its catch. Even though there is recognition of the importance of observing the agreement by the government, it is hard to persuade businessmen, sailors, and fishermen to comply. In recent years, poaching for illegal export has reach an industrial scale. The process from fishing to payment involves many activities on the sea. Government control is complicated, although the state is trying to use fishing inspectors and Coast Guard capabilities. The poaching of mollusks and trepangs (sea cucumbers) is taking on a massive scale in coastal waters. Trepangs are widely used in Chinese medicine and are therefore bought and smuggled out of the country in volumes that threaten the disappearance of the species. Artificial cultivation of seafood could be an alternative to reduce poaching. But this activity has not been developed due to a lack of investment funds and the mentality of the population, which prefers to rely on nature rather than cultivation.

The negative environmental impact of marine industries is associated with the fact that the Russian fleet is aging. In the past 15 years there have been practically no new ships. Privatization and creation of joint-stock companies have resulted in small shipping companies that violate all the rules and regulations concerning marine ecology and navigation safety. The sinking of the Russian tanker *Nadezhda* with a resulting oil spill not far from Japanese islands is an example of the problems. Many ships are even banned from entering foreign ports.

The Navy's activities, including cruises of nuclear-powered vessels, also damage the marine ecology. Apart from technical problems connected with the Navy's operations that impact the coastal areas, the military mentality is in principle unfriendly toward the environment. This is true in any country, not

only Russia. Graveyards of decommissioned warships are a threat to coastal waters, although recently some problems were solved by the dismantling of vessels.

Off-shore oil and gas production has begun near Sakhalin Island under a Russian-American-Japanese project. But due to the novel character of the program, there is a serious risk of negative environmental consequences.

There is a problem associated with industrial and domestic waste disposal in the seas. Vladivostok provides a typical negative example. Poorly processed wastes have been discharged for over one hundred years into Amur Bay. As a result, the bay is polluted and swimming is unsafe. To solve this problem there is a need to build wastewater treatment facilities and to control their operations. Unfortunately, economic and political chaos has slowed down such activity. The environmentally oriented world community is greatly concerned about the dumping of liquid radioactive waste from nuclear power plants into the seas. A new facility should be built to clean up such waste. One inadequate facility exists in Bolshoi Kamen.

AMUR RIVER CHARACTERISTICS AND CHALLENGES

The Amur River is among the ten largest in the world, with the following characteristics: length of 4,444 kilometers, annual runoff of 350 cubic kilometers, delta runoff of 10,900 cubic meters per second, and a runoff area of 10,900 square kilometers. A 10,000-kilometer stretch serves as the border between China and Russia, with the source of the Amur River lying in Mongolia.

A main characteristic of the Amur River is biodiversity. In the northern hemisphere it is second to only the Mississippi River in this respect. The Amur has over 100 fish species, with two-thirds of them being food fish. There are relic species in the river, since its watershed was formed in ancient times. The watershed was not affected by ice during the glacial period, which led to the preservation of species. With respect to the ichthyological diversity in Russia, the Amur is comparable to Lake Baikal. The Amur sturgeon is well known for its large size and weight of over one ton. It is similar to white sturgeon in the Volga River and American white sturgeon in the Columbia River.

There are specific features of the Amur River, particularly the international aspects involving a number of disputes over the border despite treaties that date back one and one-half centuries. Problems also arise concerning engineering structures, fish catches, environmental monitoring, and industrial and municipal waste discharges.

In the judgment of specialists, poaching has been the main problem with regard to disappearing fish resources. Poaching now exceeds legal fishing, with 1,500 tons of Siberian fall salmon taken legally in 1997 but 10,000 tons taken

illegally. In Khabarovsk, endangered species are sold openly while enforcement measures are ineffective. Poaching is growing due to unemployment, and the situation cannot be returned to normal without solving the social problems.

Legislation seems incomplete and even ridiculous. For example, selling of all types of fish nets is authorized despite a ban on the use of certain types of nets. In practice the poachers are allowed to sell their catch. At the same time sport fishing is growing, and it too is not controlled. The public needs to take a more active stand on poaching. In the United States an organization in Oregon, the Wild Salmon Center, provides an example of effective activity to protect rare fish species. They are involved not only in the United States, but also in the Russian Far East.

The Amur River also faces the "phenol" smell problem. This permeates the fish and prevents the sale of fish. It is similar to the smell of the chemical phenol. The first response of the public was that it was linked to industrial spills. However, tests and investigations showed that the problem was more complex. Most of the course of the river is fed by marsh runoff saturated with organic substances of vegetative origin. As a result of the biochemical interactions with the flora and fauna of the river, xenobiotics are released and penetrate the fish through respiratory and trophic channels. Although the origin of this problem is mainly nature, anthropogenic discharges, particularly waste dumps, can trigger the process. Also, man-caused discharges into the river may create additional toxic xenobiotics, and efforts to reduce discharges should not slacken. At present the problem cannot be immediately solved, but investigations can provide information about the timing and places of the problem. Specialists of the Khabarovsk Research Center have been of considerable assistance in addressing this problem. As for public environmental organizations, they have not been helpful. Initially they simply cast blame on those directly involved in industrial production and on the authorities. Then they relied on scientists who were not competent to investigate the problem.

FOREST FIRES

The Far East region has considerable timber resources. They are of great importance in the formation of the planet's atmosphere. Woods are concentrated primarily in the southern areas, i.e., in Khabarovsk and Primorye Territories and in Amur and Sakhalin Oblasts. Severe fires occur there on the average of once every 22 years, with the last spate of large fires in 1998. The periodicity is apparently related to cyclic arid conditions and to the build-up of combustible material during the periods between fires. Also, in the eastern areas of the region there are frequent fires. Overall, probably 85 percent of the fires of the region are triggered by human activities.

The 1998 fires occurred in the spring and lasted six months. Over 2.5 million hectares burned completely, although the fire area was much larger. Each burned hectare released 100 tons of particulate containing 55 percent tar and water, 25 percent soot, and 20 percent ash. These particles are harmful when inhaled by humans or animals. In addition, 10 to 12 tons of nitrogen, sulfur, and carbon oxides were discharged, including oxides with toxic effects. In sum, the fires resulted in the discharge of 250 million tons of particulates and 25 million tons of harmful gases with widespread impacts. For example, in Khabarovsk, located 200 kilometers from the fires, cars used headlights during the day. Pollution lasted for a few months and increased death rates. The impact on newborn children was particularly harmful. The UN Council on Humanitarian Issues reported that the fires had caused a large-scale problem of international concern.

Fires have many negative impacts. They destroy animal habitats. They change the flora composition of the forests. They change the insect population and may cause sudden outbreaks of some species. Runoff may pollute reservoir. And of course fires hamper reforestation efforts.

Prevention and elimination of forest fires should be of a comprehensive character including legislative, administrative, environmental protection, educational, and social programs. One factor responsible for the extent of the fires is the lack of agreement between the federal government and entities in the territories with regard to forests. Forests are federal property with regard to timber exploitation areas and timber sales. However, forest protection, fire fighting, and reduction of the consequences of fires are under the authority of the region. Unfortunately, lengthy discussions on these topics between the federal and Khabarovsk authorities in 1998 were largely a waste of time as the fires ignited.

RADIATION SITUATION

In the region there are a few sources of possible radioactive contamination—natural, household, industrial, military, energy supply facilities, and radioactive waste storage facilities.

Natural sources are associated with specific geological structures that give off radon that results in the background levels. In Khabarovsk, the background from radon is 20 percent higher than the average for Russia. Particularly high background is associated with rocks containing uranium and thorium, with the levels dependent on porosity. Surveys indicate that 15 percent of city apartments using local building materials are moderately hazardous, 10 percent are hazardous, and 2 percent are particularly hazardous.

Other sources include radioisotopes used for research, production, and medical purposes and for standard measurements. Fifteen years ago, such

sources in the Far East were in the tens of thousands, with 13,000 in Khabarovsk alone. The number has declined greatly due to curtailment of production and related activities. For example, in Khabarovsk the number has decreased by a factor of 22. Therefore, associated risks of contamination have also declined. In the meantime, however, there has been an increase in problems associated with waste disposal of radioactive sources. Quite often the sources are simply thrown out with ordinary waste rather than being delivered to appropriate waste storage sites.

Industrial sources include manufacturing and maintenance activities for nuclear submarines at Komsomolsk-on-Amur and Bolshoi Kamen. At present, production facilities at the former are closed, and decommissioned submarines are being dismantled at the latter. Also, at Bolshoi Kamen a plant for liquid radioactive waste processing is under construction.

The state enterprise Radon has a storage facility for solid radioactive waste not far from Khabarovsk. It stores mainly household radiation sources from the entire Far East region. Neither the authorities nor environmentalists are concerned with the condition at the facility.

The Bilibino nuclear power plant in Chukotka operates normally, according to the press.

Additional military sources of radiation relate both to nuclear weapons and to the nuclear power units of submarines, but little information is available on relevant activities.

ENVIRONMENTALLY ORIENTED NGOS

There are many environmentally oriented NGOs, totaling a few hundred in the Far East region and over 50 in Khabarovsk alone. However, it is difficult to describe their activities as effective, meaningful, or discernible. NGOs may be divided into four groups: (1) opponents of the policies of the government, (2) “prisoners of conscience,” (3) educational organizations, and (4) promoters of new technologies.

The first group uses existing environmental problems as a basis for opposing the government. They appeared in large numbers in the mid-1980s, when environment was considered an area in which citizens could openly disagree with the state authorities. Many opponents intent on resolving political problems became involved in environmental activities. The opposition was of a radical character. Subsequently, when they had other opportunities to become involved openly in political activities, they left the environmental movement. Also, as soon as some of them gained power, they changed their stand toward environmental problems. Thus, in the early 1990s deputies of the Primorye Territory Duma, who were members of NGOs, and other environmentalists opposed even conducting a feasibility study for the proposed construction of a

nuclear power plant in the region, yet today they support such a project in view of the power crisis. Those who continue to join NGOs rely on the NGOs primarily as a channel for obtaining grants and fluids from other sources.

The second group of NGOs, the "prisoners of conscience," represent organizations that unite people who are concerned over a safe environment and work for its improvement. The public Committee on the Protection of the Amur in Khabarovsk is such an NGO. However, despite their noble objectives and motivations, they lack the persistence and assertiveness characteristic of the first group. Often their activities are simply complaints in the press or emotional statements to limited audiences. These organizations need assistance from the local authorities and from the community.

The third group includes organizations oriented to educational activities and advocacy of environmental protection and preservation, particularly among high school students and other young people. This is the most important trend, since it involves the education of a new generation of people and the future communities. The activities of these NGOs should be linked to work in youth and children's organizations including both the universities and the schools. But they also need the support of the authorities at all levels.

The fourth group of NGOs unites efforts of workers involved in production activities who try to promote the integration of "soft" or environmentally friendly technologies into existing production processes. Though the first three groups actually exist, the fourth group is still largely a dream that is urgently needed in reality.

The solution of environmental problems should be considered within the framework of sustainable development of entire communities and the whole nation. Sustainable development implies the integration of social and environmental problems. Indeed, over the past ten years social conditions of the population, particularly indigenous populations, have become worse. It is difficult to convince people not to set fires in the taiga area or to stop poaching rare fish. In a society there should be moral and psychological relationships between individuals and the environment. Unfortunately in Russia, during the period of economic reform—a period of wild capitalism—different approaches were in vogue aimed at generating material goods for individuals. Those shifty and energetic people who made a great deal of money felt indifferent to the needs of society and the environment. A substantial disparity in property status has made Russian society very unstable. Over the past decade, a young generation has grown up focused on solving their own financial problems with no glances at the surrounding world. To improve the situation the scientific community, first of all the Academy of Sciences and environmental NGOs, should be actively involved.

DYNAMICS OF RADIOACTIVE POLLUTION OF PRIMORYE TERRITORY AND THE NORTHERN SHELF OF THE SEA OF JAPAN

V.N.Soifer, V.A.Goryachev, A.F.Sergeev
Pacific Oceanology Institute

Investigations of the radioecological conditions in Primorye Territory and the Far-East region as a whole show that these conditions are closely connected to the radiation in the northern part of the Sea of Japan. Radiation contamination seems to be an acute problem in the Asia-Pacific region for three main reasons:

- From almost the first years of the Soviet Union, this region has been completely closed to civilian organizations and individual researchers, inasmuch as intensive construction and development of military bases continued there for decades both before and after the Second World War.
- The regional problem has caused public concern in the Russian Federation, Japan, Korea, the United States, and other states that have vital interests (fishery, aquaculture, recreation) that are potentially threatened by radioecological accidents and radioactive waste from Russia's Pacific Fleet.
- The program of fleet reduction should have been completed in the region by 2000. During the last 10 years, 54 nuclear submarines have been taken out of commission, but only 10 were adequately salvaged with attention to wastes.

Governmental data and our own data were obtained and analyzed during long-term investigations of radiation conditions of the territories adjacent to submarine repair facilities and bases. Also, a study of radionuclide distribution in Peter the Great Bay was carried out. On the basis of these studies, we reached conclusions about the relatively insignificant contribution of anthropogenic sources of radionuclides to radiation background levels of our region as a whole.

Such sources average less than one percent of the total. Besides local pollution sources from the fleet, we also investigated global sources.

A comparison of the effect of the last Chinese atmospheric nuclear test in 1980 with the consequences of the Chernobyl accident showed that the nuclear test effects were longer (more than one year) and had a higher level of total beta-activity of the lower atmosphere in Primorye Territory. However, total beta-activity levels of the two releases were comparable.

Concerning probable radioactive environmental pollution of the south of Primorye Territory (in the opinion of experts of the Fleet's chemical service), the coastal facilities along the bays of Bolshoi Kamen, Sysoyeva, and Chazhma are sources. These facilities deal with recharging nuclear reactors; replacement of filters; collection, temporary storage, and processing of radioactive waste; temporary storage of used nuclear assemblages; and repair and deactivation of contaminated equipment. Also potentially dangerous are the places where oil tankers with radioactive waste facilities were operating. The main components of radioactive waste are ^{137}Cs, ^{90}Sr, ^{60}Co, and ^{144}Ce.

Until 1993, burial of liquid and solid radioactive waste had been carried out in deep-water regions of the northwestern part of the Sea of Japan, 200–300 kilometers from the coastline.

The spontaneous chain reaction on a submarine in Bolshaya Chazhma in August 1985 has remained the most severe nuclear incident. It preceded the accident at Chernobyl and belongs to the following class of incidents:

- Uncontrolled reactor regime involving destruction of the active zone.
- Release of fission products into the environment—the atmosphere and the seawater in the bay.
- Wind transportation of aerosols of small dispersed particles through the industrial zone (the Navy ship repair works) and further, through the coastal part of the Dunai Peninsula with residential settlements.

The difference between this nuclear incident and Chernobyl is that it took place with a reactor of a distinctly different design and with ten times less power. Its fuel assembly did not contain radioactive products accumulated during previous operation. Just before the accident, the reactor had been loaded with new fuel elements.

We have carried out the following studies as an independent expert examination of government activity in 1991–1994. We obtained the following data about the probable damage of the environment by the accident:

1. The amount of radioactivity, its radionuclide composition, and its explosion potential were developed.
2. Models of atmospheric transport and gradual redirection of radioactivity in Ussurisk Bay were developed.

3. Numerical estimates of turbulent transportation of radionuclides in water and their release into the atmosphere were carried out.
4. The dynamic processes of redeposition of high-level radioactive pollution in the upper layer of seafloor deposits directly in the zone of the accident were studied experimentally.
5. Estimates were made of future conditions of the bodies of water with attention to long-lived radionuclides. Investigations of Ussurisk Bay in 1990– 1992, using tritium tracers and numerical modeling, were evaluated.
6. Evaluations of doses received by the population of Dunai as a result of the accident in Chazhma Bay were carried out. The population received the heaviest radioactive doses during inhalation of iodine radioactive isotopes—^{131}I, ^{132}I, ^{133}I, ^{134}I, and ^{135}I.
7. The coefficients of risk for the population of Dunai were evaluated. The population of Dunai is 20,000. Twenty-two additional deaths caused by all forms of cancer and the same number of non-lethal cancer cases were predicted in Dunai.

The inhabitants who were up to 150 meters distant from the explosion along the trace axis received significant doses of external gamma-irradiation and external beta-irradiation of the skin.

The analysis of bottom samples from Chazhma Bay has shown that the distribution of radioactivity, which depends more than 95 percent on ^{60}Co, is non-uniform over the area and along the vertical. A large part of activity in the epicenter zone is situated at a depth of 15–20 centimeters from the bottom. Some solid grains were extruded from the bottom samples with the help of magnetic separation of highly-active samples. These “hot” particles from the fuel assembly contribute 50 percent to the total radioactivity of the sample.

The main processes influencing the space-time variations of radionuclides in bottom deposits in the region of the accident are radionuclide transport in water and radioactive decay. The flushing of radioactivity from the bay into Strelok Gulf reduces levels by about one percent annually. Radioactive decay of ^{60}Co reduces levels each year by about 12 percent. This ratio is explained by the limited water dynamics, intensive sedimentation, concentration of most activity in larger “hot” particles with higher density, and low solubility of “hot” particles in seawater.

SOCIETY SHOULD BE PROTECTED FROM THE METAL THREAT

S.L.Davydova
Institute of Petrochemical Synthesis

The Ecological Women's Assembly has been active since 1944, uniting within its membership women and youth of Russia and other former Soviet states. Among the many aspects of environmental protection of concern is the problem of chemical toxicants, including metals (see Table 1).

Listed in order of degree of human sensitivity to toxic metals, the metals are ranked as follows: Hg > Cu > Zn > Ni > Pb > Cd > Cr > Sn > Fe > Mn > Al. The sensitivity variations are not uniform.

Living organisms have special mechanisms of heavy metal detoxification. In response to the toxic action of Pb^{2+}, Cd^{2+}, and Hg^{2+}, for example, the liver and kidneys increase the synthesis of low-molecular beta proteins, which contain cysteine in their structure. The high content of sulfhydryl groups in cysteine promotes the combination of metal ions into strong complexes, resulting in some level of detoxification.

But it is clear that we must protect ourselves from this "metal" threat.

At one time the main anthropogenic sources of lead releases into the environment were lead-based paints, lead-containing pesticides (now forbidden), and lead in soils around some industrial enterprises. Now the main source of lead pollution is automobile fuel. Vehicle exhausts account for up to 80 percent of the total lead content in the atmosphere. Using ethylized gasoline with a high lead content results in widespread heavy metal pollution of the atmosphere.

In cities overloaded by motor transport, lead concentration in the atmosphere exceeds background values by 20 to 30 times. Street dust sometimes contains up to 1,000 milligrams of lead per kilogram. Oxides and heavy metal salts are almost indestructible, and they gradually accumulate in the environment in areas where people live.

TABLE 1 Metal Properties

Properties	Cd	Co	Cu	Hg	Ni	Pb	Zn
Biochemical activity	H	H	H	H	H	H	H
Toxicity	H	M	M	H	M	H	M
Carcinogenicity		H			H		
Concentration in aerosols	H	L	H	H	L	H	H
Ease of spreading	H	H	L	H	L	H	L
Mobility	H	H	H	H	H	H	H
Tendency to bioconcentration	H	H	M	H	H	H	M
Ability to accumulate	H	M	H	H	M	H	H
Complex formation	M	L	H	M	L	L	H
Tendency to hydrolysis	M	L	H	M	M	M	H
Solubility	H	L	H	H	L	H	H
Persistence	L	H	H	L	H	L	H
H—high M—moderate L—low activity							

Entering the atmosphere from exhaust gases of automobiles and then accumulating in the top layers of the soil, lead enters the human body through the gastro-intestinal path, as well as by inhalation. Lead is delivered by the blood and accumulates in bones, the liver, the kidneys, and the brain. Lead irreversibly affects the nervous system, impedes functioning of the reproductive system, affects the kidneys, and causes mental and physical retardation in children. Especially dangerous is the effect of lead on children, who, when inhaling dust, receive approximately five times more lead for their body weight than adults. Also, lead assimilates in children at a level several times higher than in adults.

According to the World Bank, lead pollution of the air from motor transport has become one of the three main risk factors for health in Central and Eastern Europe. The UN Committee on Sustainable Development considers a general prohibition of ethylized gasoline a primary health protection task for the global population. The plan for complete cessation of leaded gasoline production was discussed at the Conference of the European Environmental Ministers in 1998 in Denmark. The parallel reduction of lead levels in human blood in the United States and the decreased use of leaded gasoline since the middle of the 1980s is clear.

Also, it is interesting that in 1997, The Alliance to End Childhood Lead Poisoning (U.S.) issued a brochure entitled *Myths and Realities of Phasing Out Lead Gasoline* (see Table 2). The necessity and possibility of a complete change to unleaded gasoline are obvious.

TABLE 2 Myths and Realities of Phasing Out Lead Gasoline

Myth	Reality
Lead poisoning is not a problem worthy of attention.	Lead's effect on people's health is extremely dangerous and is certain.
Use of leaded gasoline is not the cause of lead poisoning.	The direct relationship between the level of use of leaded gasoline and lead content in man's blood is well known.
Old automobiles cannot use unleaded gasoline.	Intensive investigations and experiments confirm that all automobiles can operate on unleaded gasoline.
The only known substitute for lead—benzene—is a well known carcinogen.	Most well-known replacement additives make tetra-ethylized gasoline safer than leaded gasoline.
The change to unleaded gasoline requires large material expenditures.	The change to unleaded gasoline is economically effective for vehicle owners, oil refining enterprises, and society as a whole.
The change to unleaded gasoline is practically an unsolvable problem for developing countries.	The change to unleaded gasoline has real advantages, especially for developing countries.

When humans take in a combination of metals from the environment (during inhalation of polluted air, consumption of chemically contaminated food and water, and through the skin and mucous membranes), they are subjected to severe impacts of these toxicants. The combined effect of these toxicants is complicated because a living organism reacts to each toxicant differently: in some cases with adaptation (frequently temporary) and sometimes with sharp negative reactions. Frequently during medical examinations of people living in ecologically unfavorable regions, changes in the characteristics of blood are discovered. Also, the attributes of chemical intoxication are found (sometimes even exclusively) among children and older persons. Varying responses to the impact of chemical toxicants depending on sex differentiation have also been noted.

INFLUENCE OF AMERICAN NGOs ON ENVIRONMENTAL DECISIONS AND POLICIES: EVOLUTION OVER THREE DECADES

M.E.Kraft
University of Wisconsin-Green Bay

The influence of American environmental NGOs has evolved significantly over the past three decades as the larger scientific, economic, institutional, and political contexts of environmental policy have changed. This paper places the role of environmental NGOs within these contexts. It reviews their strategies and influence as U.S. environmental policy has moved from federally-dominant regulation to concern for efficiency-based reform efforts and flexibility, and finally to a concentration on how best to pursue the goal of sustainable development through a diversity of policy tools such as market-based incentives and public-private partnerships. Particular emphasis is given to the use of technical information and scientific expertise by environmental NGOs and to a shift from adversarial to collaborative and participatory strategies at all levels of government. Specific case studies from the United States are used to highlight successful efforts over the past decade to integrate environmental, economic, and social concerns within the framework of sustainable development.

I was asked to speak on the evolution and influence of U.S. environmental NGOs. I do so in terms of some fundamental changes in U.S. environmental policy and politics over the past three decades. While I can offer only a sketch of the patterns and issues, I provide references to more extended treatments of the topic.

In a new book, *Toward Sustainable Communities: Transition and Transformations in Environmental Policy,* Daniel Mazmanian and I trace this policy evolution.[1] We develop a framework for understanding important changes in environmental problem solving from the 1970s through the 1990s, and into the twenty-first century. We discuss these changes in terms of three overlapping epochs in environmental policy: regulating for environmental

protection (1970 to 1990), efficiency-based regulatory reform and flexibility (1980 to 1990s), and steps toward sustainable communities (1990 and onward).

Within each of these epochs we highlight the way environmental problems are defined and policy objectives set, dominant implementation philosophies, points of intervention, policy approaches and tools that are used, information and data management needs, and the predominant political and institutional context. Part of our purpose is also to understand the role of public opinion and environmental NGOs in helping to identify and define environmental problems, to bring scientific information to bear on the policy process, to press for certain kinds of policy action, and to affect the political context—primarily through mobilization of public opinion.

I use this framework here to highlight some of the most important features of U.S. environmental policy and politics over the past three decade. I will also suggest how this history, particularly recent developments, might apply to Russia. See Table 1, which is taken from *Toward Sustainable Communities*.

Put simply, the role of NGOs in the United States has changed significantly over the past thirty years as environmental advocacy groups moved from a posture of confrontation and adversarial relations with government and industry to one characterized by professionalism and cooperation. This shift, which occurred gradually between the early 1970s and early 1990s, bodes well for the future of environmental policy in the United States.

The new philosophies and strategies of NGOs give greater emphasis to comprehensive analysis of environmental problems, the use of scientific studies and economic analyses, and participation of key stakeholders. Taken together, the approaches appear to be far more effective in identifying and resolving the major issues. In terms of drawing lessons for Russia, it is important to **ask why** environmental NGOs have been able to influence environmental decisions and policies as much as they have. It is also of interest to ask **what factors** account for the difference between the most successful and less successful cases of collaboration and cooperation in the late 1990s and early twenty-first century. The answers may suggest what other nations might do to achieve comparable results.

ACTIONS DURING THE 1970S

Environmental issues rose to prominence on governmental agendas only in the late 1960s, but that shift in public and policymaker attention to the problems, along with rapid improvement in scientific knowledge, led to dramatic changes in U.S. environmental policies. Most of the key policies were approved within a ten-year period: 1970 to 1980. These include the Clean Air Act amendments of 1990, the Clean Water Act of 1972, the Endangered Species Act of 1973, the Safe Drinking Water Act of 1974, and significant actions in 1976 to control

toxic chemicals and hazardous wastes through the Resource Conservation and Recovery Act and the Toxic Substances Control Act, among many other legislative actions. These policy actions of the 1970s set the overall character of U.S. environmental policy for the rest of the twentieth century. The emphasis was to be on federally-dominant "command-and-control" policy, with the newly created Environmental Protection Agency (EPA) in charge of pollution control policy and the Interior Department given chief responsibility for natural resources management. Table 2 lists the most important of these acts.

These policies were approved overwhelmingly by the U.S. Congress and signed by the President in large part because of an abundance of new scientific data, the pressure of public opinion, and the efforts by environmental NGOs. Those NGOs tried to educate the public; mobilize citizens to action in their communities, states, and nation; and urge policymakers at all levels of government to adopt and implement strong environmental protection policies. They were quite successful in those efforts. Their actions in turn were heavily dependent on access to scientific information, such as health risk assessments, which have improved substantially over the past 30 years. Scientific information of this kind was reported prominently in the nation's print and electronic media. The availability and credibility of such scientific knowledge played a pivotal role in persuading the public and policymakers to take action. It created a greater sense of legitimacy than would otherwise have been the case.

Environmental NGOs helped to achieve these notable impacts through a variety of strategies that are commonly used by U.S. interest groups.[2] These include public education (historically through printed material and television, and increasingly through the Internet), direct lobbying of public officials to convey information to them, and indirect lobbying or mobilization of grassroots supporters across the country who in turn attempt to influence public officials. In addition, many of the groups often engaged in litigation to help monitor and enforce environmental laws, which some see as a way to keep government honest and responsive to public concerns. They also participated in the often complex administrative processes of executive agencies such as standard setting, rulemaking, and other implementation actions.[3]

A smaller number of groups have engaged in electioneering, or use of campaign contributions, political endorsements, and support for officials during election campaigns, to achieve their goals. The logic here is to help ensure that policymakers sympathetic to environmental concerns are elected to office.[4] Many other environmental NGOs, such as Resources for the Future, the Union of Concerned Scientists, the Worldwatch Institute, and the World Resources Institute, have focused more on education, policy analysis, and scientific research rather than policy advocacy.

As this brief review illustrates, the diversity of these groups and their activities is as impressive as their collective success. While we speak of environmentalists or environmental NGOs as if they were a single social group

or phenomenon, they are in fact a highly disparate set of individuals and organizations with widely varying purposes and strategies.

Some of the characteristics of environmental NGOs during the decade of the 1970s were distinctive to that time period, and other attributes continue to the present day. Among the former was an understandable tendency among advocacy groups to play an "outsider" role that often became confrontational and adversarial. Environmental groups frequently challenged corporate decision-making and labeled polluters as callous and unthinking. They pressed government at all levels to enact and enforce tough new regulatory laws on clean air, clean water, toxic chemicals, endangered species, and a host of other issues. The assumption was that only such "command-and-control" policies, particularly at the federal level of government, could change corporate behavior (and actions by state and local governments) and thereby control pollution and abuse of natural resources. Given those purposes and the political climate at the time, little thought was given to the costs of environmental policy or to the difficulties of implementation.

These groups were also adept at translating and promoting new scientific research. For many reasons, scientists themselves are often reluctant to get involved in public controversies and the policymaking process, leaving the public and policymakers to deal as best they can with complex technical issues. Environmental NGOs helped to fill this void by bringing scientific discoveries to public and policymaker attention, and by clarifying both the technical and policy issues. They did so in part through release of their own reports that summarized scientific studies and often gained significant and positive media coverage. Sometime those studies were used to challenge government positions based on conflicting data and interpretations. At a minimum, they highlighted important issues that might otherwise have been ignored.

Survey data from the period indicated a rising level of public concern about environmental problems, particularly threats to public health from pollution and toxic chemicals. The existence of such public concern greatly facilitated the success of environmental and health groups in their quest for policy action.[5] Thus building public knowledge and support for governmental action was one of the most important ways in which environmental groups successfully pursued their goals.

The ability of U.S. environmental groups to engage in these strategies during the 1970s was helped by their surging membership from the 1960s to the late 1990s. Table 3 lists seven of the most visible and active of the national environmental organizations that scholars refer to as "mainstream" groups—to distinguish them from thousands of smaller and less visible grassroots or community groups and the more radical groups such as Greenpeace. The astonishing rate of growth in membership from 1960 to 1970 helps to explain the success of these NGOs in influencing government decisions and policies in the early 1970s. Some of the groups saw their membership rolls triple or

quadruple over the decade. In a democracy, elected officials are likely to pay keen attention to public opinion and to the preferences of large membership NGOs. This is especially so when the issues are highly salient and the values they reflect are widely held.

A strong membership growth rate for environmental groups continued during the 1970s, and it accelerated during the 1980s in response to perceived threats to environmental policy from a conservation administration (see Table 3). The larger memberships and budgets aided the groups in their many legislative and legal challenges to the conservative administration of President Ronald Reagan. For most of the major groups, the growth rate stabilized during the 1990s, but some continued to exhibit strong growth. The Nature Conservancy, for instance, reached new membership heights as public support for land conservation efforts grew across the nation. It had a membership of 800,000 by 1995, and rose further to 1.2 million members by 1998. It enjoyed a comparable increase in its revenues, and thus in its capacity to purchase additional land for conservation purposes.[6] One recent estimate put the total membership of U.S. environmental groups at over 14 million people and their combined budget at over $600 million per year.

The fundamental policy changes listed in Table 2 occurred quickly during the 1970s, and they were consolidated and in many respects strengthened over the next 20 years. The result was that environmental policy became strongly institutionalized, giving it a permanent and broadly supported position in government and in the private sector.[7]

CONSOLIDATION AND REBUILDING DURING THE 1980S

Not all the news was good. By 1980, there was much concern over the economic impacts of environmental policies, or at least the imagined economic impacts. By 1981, early in the Reagan presidency, there began a period of concerted efforts to pull back from the environmental policy commitments of the 1970s.

On the whole, these efforts failed. Yet environmental agencies suffered from sharp cuts in their budgets and personnel, and environmental research was adversely affected as government support for research was cut. A lasting legacy of this era was the need to justify environmental policy actions through analysis of economic impacts and through provision of strong scientific analysis such as quantitative risk assessments. Both concerns continue to this day.[8]

In this sense, this second era or epoch could be called a searching for efficiency-based regulatory reform and greater flexibility in environmental regulations. Policymakers sought to find ways to minimize those economic impacts. This was also a time when environmental responsibilities increasingly were decentralized or shifted to state and local governments, and when market

mechanisms or economic incentives were given serious consideration as a supplement to regulation by the national government.

In this period, environmental NGOs continued many of the same strategies and activities they used during the 1970s, but their additional resources allowed them to hire a diversity of professionals, from water quality and toxic chemical specialists to economists and lawyers. Some, such as Environmental Defense, assumed a leading role in advocating the use of market-based incentives. In general, the credibility of the NGOs' work increased substantially during the 1980s as they gained experience and expertise. The result was that they became even more adept at public education and mobilization, and gained significantly in political influence. This was particularly so by the early 1990s as a new administration that was more receptive to their arguments took office at the federal level.

In addition, this second period saw much activity by business organizations and government agencies directed at pollution prevention, additional gains in environmental information and databases, and the beginnings of a more collaborative approach to environmental policy. These activities and developments have been widely discussed, generally in a very favorable light.[9] Examples abound. For instance, studies of ecosystem functioning assist in the development of Habitat Conservation Plans under the U.S. Endangered Species Act. Modeling of contaminated sediments and river flows allows state and federal agencies to make better informed and more efficient decisions on cleanup strategies. Ecological risk assessment methodologies are improving and will become critical to many natural resource management decisions. Environmental NGOs often play a major role in encouraging such research and in overseeing its use in decision-making.

PURSUING SUSTAINABLE DEVELOPMENT IN THE 1990S AND TWENTY-FIRST CENTURY

As these comments suggest, in the third epoch beginning around 1990—toward sustainable communities—much more sophisticated research in environmental science and sustainable development strategies becomes a necessity. In this current epoch, stimulated by the 1992 UN Conference on Environment and Development (UNCED), emphasis has been placed on reconciliation of economic development and environmental protection. In particular, human needs and the needs of natural systems have to be brought into harmony on a long-term basis. Doing so requires a different kind of decision-making within both government and industry.

As a result, emphasis increasingly has been placed on comprehensive analysis of environmental problems, use of systems design and management, computer modeling of human-natural systems interactions, life-cycle product

analysis, and much greater attention to product design and materials use. Moving toward sustainable development as a goal also requires (a) new mechanisms and institutions that can assist in balancing human and ecosystem needs, and (b) new policy strategies and tools. These tools include use of market incentives, public-private partnerships, and extensive public involvement in environmental decision-making.

These new policy approaches and tools highlight a special role to be played by environmental NGOs. In addition to the activities noted above such as public education, collection and dissemination of scientific information, lobbying of public officials, and litigation, environmental NGOs increasingly have been active participants in governmental decision-making. This has been particularly the case at the local, regional, and state levels where the groups have shifted, as noted above, from an earlier adversarial style to one characterized much more by cooperation, collaboration, and professionalism. Many environmental NGOs have become key stakeholders in these local exercises in collaborative decision-making. They sit at the table with industry, government officials, and scientists, and they bring a distinctive perspective to these proceedings.

Table 4 lists five cases that illustrate these new roles for environmental NGOs. No single case tells the full story, and these new strategies continue to evolve. Some cases of collaboration at the local and regional level are remarkably successful while other are not. Among the former is the approval of a Habitat Conservation Plan adopted in the San Diego, California, area. Developers, citizen groups, environmentalists, and government officials reached agreement on a plan designed both to conserve the habitat of endangered and threatened species and to offer a reasonable level of economic development in the region.

Development of a comprehensive plan to help restore the Florida Everglades similarly illustrates the potential of these new policy strategies. This was the most complex, extensive, and costly U.S. effort to date to restore a damaged ecosystem. Development of the plan was characterized by extensive stakeholder involvement and collaboration and negotiation among multiple levels of government. Environmental NGOs and the business community were heavily involved in these processes which took years to complete. Restoration itself will take place over the next three decades or more.[10]

Examination of these and other cases suggests that certain factors help to account for successful collaboration and movement toward sustainable development. Table 5 summarizes these factors. Among the most important is community leadership, particularly by “policy entrepreneurs.” These are well-informed and respected leaders who can articulate the issues, help to design appropriate solutions, and bring the various stakeholders together. In addition, support by the community and especially by business leaders is critical to success. Such support appears to be gained in part by providing full access to scientific and other key information, and use of an open decision-making

process that allows for and encourages extensive citizen involvement. Finally, communities must be able to establish clear goals for sustainable development, and this too requires the availability and widespread discussion of how economic, social, and environmental goals interrelate to form a basis for sustainable development. Scientific expertise and modeling or simulation exercises can help build such goals and public understanding.

Clearly, environmental NGOs play a crucial role in this third epoch of sustainability, and they do so at all levels of government. They continue to play the same roles in policymaking as they did in the 1970s and 1980s, but in the 1990s and the early twenty-first century they have the additional advantage of greater resources and access to new information technologies. Perusal of their Web pages indicates the enormous capabilities they bring to their roles of public education, lobbying, and involvement in the newer forms of collaborative decision-making. Table 6 lists selected Web sites for a wide range of both governmental agencies and environmental NGOs.

It is unclear how easily these roles and activities of environmental NGOs can be duplicated in Russia. There is a long American tradition of encouraging citizen involvement in governmental decision-making, and multiple points of access are provided in the U.S. political system at all levels of government. The U.S. public is highly concerned about environmental problems and is generally sympathetic toward the agendas of environmental NGOs. Those NGOs are often quite capable of participating in decision-making from the local to the national level and increasingly they are expected to participate and to balance the perspectives found in industry and government.

As Russia develops economically, there will be many opportunities to further build an emerging civil society and to create decision-making processes that can facilitate contributions by environmental NGOs. Scientific NGOs are likely to play a central role for years to come as citizen groups themselves begin to develop. Such a role would be enhanced to the extent that scientists are willing and able to assist the public and policymakers in understanding environmental problems, their causes, and possible solutions. Such a role has been underscored in recent years by many prominent scientists.[11]

Yet science alone is almost never sufficient to design, adopt, and implement environmental policy. Policy decisions inevitably involve social, economic, and political judgments about levels of acceptable risk, which policy strategies will work best, political feasibility, and administrative feasibility. Hence the role of science is to inform those judgments, not necessarily to make them. At the same time, public officials must be receptive to concerns voiced by the public and scientists.

If the experience of the United States is pertinent, the concept of sustainable development may provide a vehicle for bringing policymakers, scientists, and citizens together to discuss environmental problems of concern and their relationship to social and economic issues. People disagree about what

sustainability means, and this is why it should be considered to be a process as much as it is an end state of environmental conditions. Environmental NGOs can help to create a public dialogue about long-term needs and how best to reconcile conflicting values and goals. These processes can take place at all levels of government and within many different institutions. The U.S. experience suggests that they are particularly promising at local and regional levels where environmental problems are most visible and citizens may be more strongly motivated to take interest and participate actively in discussions and decision-making.

TABLE 1 From Environmental Protection to Sustainable Communities

	Regulating for Environmental Protection 1970–1990	**Efficiency-Based Regulatory Reform and Flexibility 1980–1990s**	**Toward Sustainable Communities 1990-onward**
Problem identification and policy objectives	• pollution caused primarily by callous and unthinking business and industry • establish as national priority the curtailment of air, water, and land pollution caused by industry and other human activity	• managing pollution through market-based and collaborative mechanisms • subject environmental regulations to cost-effectiveness test • internalize pollution costs • pursue economically optimal use of resources and energy • introduce pollution prevention • add policies on toxic waste and chemicals as national priorities	• bringing into harmony human and natural systems on a Sustainable basis • balance long-term societal and natural system needs through system design and management • rediscover/ emphasis on resource conservation • halt diminution of biodiversity • embrace an eco-centric ethic
Implementation philosophy	• develop the administrative and regulatory legal infrastructure to ensure compliance with federal and state regulations	• shift to state and local level for initiative in compliance and enforcement • create market mechanisms for protection of the environment	• develop new mechanisms and institutions that balance the needs of human and natural systems, both within the U.S. and around the globe

	Regulating for Environmental Protection 1970-1990	Efficiency-Based Regulatory Reform and Flexibility 1980-1990s	Toward Sustainable Communities 1990-onward
Points of intervention	• end of the production pipeline • end of the waste stream • at the point of local, state, and federal governmental activity	• the market-place, which serves as the arbiter of product viability • provide education and training at several points along the cradle-to-grave path of materials and resource use	• societal level needs assessment and goal prioritization • industry-level attention to product design, materials selection, and environmental strategic planning • individual behavior and life-style choices
Policy approaches and "tools"	• policy managed by Washington, DC • command-and-control regulation • substantial federal technology R&D • generous federal funding of health and pollution prevention projects	• policy managed more by states and affected communities • federal role shifts to facilitation and oversight • introduction of incentive-based approaches (taxes, fees, emissions trading) for business and industry • creation of emissions- trading markets	• comprehensive future visioning • regional planning based on sustainability guidelines • Total Quality Environmental Management (TQEM) and life-cycle-design practice in industry • various experiments with new approaches
Information and data management needs	• firm-level emissions • waste stream contents and tracking • human health effects • environmental compliance accounting in industry	• costing out environmental harms and benefits of reduced pollution • provision of readily accessible emissions data, e.g., through Toxics Release Inventory and right-to-know programs • professional protocols for environmental accounting in industry • ecosystem mapping	• sustainability criteria and indicators • eco-human support system thresholds • region/community-global interaction effects (e.g., regarding CO_2 emissions and depletion of ozone layer) • utilization of ecological footprint analysis • use of material and energy "flow-through" inventories and accounting • computer modeling of human-natural systems interactions

	Regulating for Environmental Protection 1970–1990	**Efficiency-Based Regulatory Reform and Flexibility 1980–1990s**	**Toward Sustainable Communities 1990-onward**
Predominant political/ institutional context	• rule of law • adversarial relations • zero-sum politics • focus on national regulatory agencies and enforcement mechanisms	• alternative dispute resolution techniques • greater stakeholder and public participation, especially, at the state and local level • reliance on the market place	• public/private partnerships • local/regional collaborations • community capacity building and consensus building • mechanisms created to enforce "collective" decisions
Key events and public actions	• Santa Barbara oil spill • Earth Day • passage of the 1970 CAA and 1972 CWA • passage of National Environmental Policy Act (NEPA) • creation of the Environmental Protection Agency	•Carter administration/ focus on cost of environmental regulation, •election of President Ronald Reagan • Love Canal, Bhopal • RCRA and SARA • growth in state and local environmental policy capacity	• attention to global issues of sustainability • Brundtland report, Our Common Future • Earth Summit (UNCED) • collective international action-Montreal Protocol on CFCs, international accords on global warming

Source: Mazmanian, Daniel A. and Michael E.Kraft, eds. 1999. Toward Sustainable Communities: Transition and Transformations in Environmental Policy. Cambridge, MA: MIT Press.

TABLE 2 Major Federal Environmental Laws: 1964 to 1990

1964	Wilderness Act, PL 88–577
1968	Wild and Scenic Rivers Act, PL 90–542
1969	National Environmental Policy Act, PL 91–190
1970	Clean Air Act Amendments, PL 91–604
1972	Federal Water Pollution Control Act Amendments (Clean Water Act), PL 92–500
	Federal Environmental Pesticides Control Act of 1972 (amended the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) of 1947, PL 92–516
	Marine Protection, Research, and Sanctuaries Act of 1972, PL 92–532
	Marine Mammal Protection Act, PL 92–522
	Coastal Zone Management Act, PL 92–583
	Noise Control Act, PL 92–574
1973	Endangered Species Act, PL 93–205
1974	Safe Drinking Water Act, PL 93–523
1976	Resource Conservation and Recovery Act (RCRA), PL 94–580
	Toxic Substances Control Act, PL 94–469
	Federal Land Policy and Management Act, PL 94–579
	National Forest Management Act, PL 94–588
1977	Clean Air Act Amendments, PL 95–95
	Clean Water Act (CWA), PL 95–217
	Surface Mining Control and Reclamation Act, PL 95–87
1980	Comprehensive Environmental Response, Compensation, and Liability Act (Superfund), PL 96–510
1982	Nuclear Waste Policy Act of 1982, PL 97–425 (amended in 1987 by the Nuclear Waste Policy Amendments Act of 1987, PL 100–203)
1984	Hazardous and Solid Waste Amendments (RCRA amendments), PL 98–616
1986	Safe Drinking Water Act Amendments, PL 99–339
	Superfund Amendments and Reauthorization Act, PL 99–499
1987	Water Quality Act (CWA amendments), PL 100–4
1988	Ocean Dumping Act of 1988, PL 100–688
1990	Clean Air Act Amendments of 1990, PL 101–549

Source: Kraft, Michael E. 2001. Environmental Policy and Politics, 2nd ed. New York: Addison Wesley Longman. A fuller list with a description of the key features of each act can be found in Vig and Kraft, eds., Environmental Policy, Appendix 1. Natural resource policies are discussed in Chapter 6 in Kraft, and summarized in Table 6.1 in that chapter (pp. 162–63).

TABLE 3 Membership and Budgets of Selected National Environmental Organizations, 1960–1998

Organization	Year Founded	Membership 1960	1970	1980	1990	1998	1998 Budget ($ million)
Sierra Club	1892	15,000	113,000	181,000	630,000	555,000	47.0
National Audubon Society	1905	32,000	148,000	400,000	600,000	575,000	47.4
National Parks and Conservation Association	1919	15,000	45,000	31,000	100,000	500,000	14.0
Wilderness Society	1935	10,000	54,000	45,000	350,000	350,000	15.0
National Wildlife Federation	1936	NA	540,000	818,000	997,000	4 million [a]	100.0
Environmental Defense	1967	*	11,000	46,000	200,000	300,000	23.4
Natural Resources Defense Council	1970	*	*	40,000	150,000	400,000	27.0

Sources:

Bosso, Christopher J. 2000. Environmental Groups and the New Political Landscape, in Environmental Policy, 4th ed., Norman J. Vig and Michael E. Kraft, eds.Washington, DC: CQ Press, pp. 64, 69.

Bosso, Christopher J., 1994. After the Movement: Environmental Activism in the 1990s. in Environmental Policy in the 1990s, 2nd ed. Norman J. Vig and Michael E. Kraft, eds. Washington, DC: CQ Press. Membership figures are notoriously hard to pin down. All figures reported here should be considered estimates and used only to illustrate change over time.

[a] NWF membership figures before 1998 include full members only, not the much larger number of affiliated members who have membership in other environmental organizations. The figure for 1998 is much larger because the NWF no longer releases data on regular versus affiliate members; thus, it reflects the combined number of members.

*In 1960, neither Environmental Defense nor the Natural Resources Defense Council existed, and in 1970, NRDC was not a membership organization.

TABLE 4 Selected Cases in Environmental and Natural Resource Protection

1. San Diego, California: Development of a Comprehensive and Broadly Supported Habitat Conservation Plan Under Endangered Species Act.

2. Northeast Wisconsin and the Great Lakes: Use of Collaborative Decision-making to Address Problems of Contaminated River and Harbor Sediments. Work of Remedial Action Plan, Science and Technical Advisory Committee, Fox River PCB Cleanup, and the Natural Resource Damage Assessment Process.

3. Pacific Northwest: Use of Watershed Management Councils to Foster Environmental Planning and Ecosystem Restoration.

4. Florida Everglades: The Most Complex, Extensive, and Costly U.S. Effort at Ecosystem Restoration, with Extensive Stakeholder Involvement, Collaboration, and Negotiation Among Multiple Levels of Government, Environmental NGOs, and the Business Community. Restoration will take place over the next three decades or more.

5. Local Land Conservation Initiatives: Large Number of Measures Approved Through Direct Voter Endorsement in Initiatives and Referenda in Late 1990s to Deal with Urban Sprawl and Loss of Open Space.

TABLE 5 Factors that Foster Community and Regional Sustainable Development

1. Community leadership. Especially prominent and well-respected "policy entrepreneurs" who can articulate the issues, formulate solutions, and bring together diverse stakeholders from the community, environmental NGOs, government, and business.
2. Business and community support. Public support and citizen and NGO involvement are particularly important. To build such support, communities must provide full access to scientific and other key information, and make decisions in an open process that allows for and encourages citizen involvement.
3. Clear sustainability goals for the community or region. This also means an ability to understand how economic, social, and environmental goals interrelate to form a basis for sustainable development. Scientific expertise and modeling exercises can help build such goals and public understanding.
4. The availability of pertinent scientific knowledge and scientists. Do citizens and public officials have access to scientific expertise? And are scientists willing and able to spend time helping citizens, NGOs, and policymakers understand the technical issues and thus to inform policy judgments. Too often scientists have little interest in playing this vital role.

TABLE 6 Selected Environmental Internet Sites

General Sites on Public Policy or the Environment	
www.policy.com	Policy institutes, advocacy groups, media, businesses, and government agencies, policy news, issue briefings. Links to major environmental organizations.
http://thomas.loc.gov	Library of Congress's Thomas search engines for locating congressional documents.
www.gao.gov	U.S. General Accounting Office. Evaluation studies and reports on government agencies and programs.
www.epa.gov	U.S. Environmental Protection Agency
www.epa.gov/epahome/rules.html	EPA site for laws, rules, and regulations, including the full text of the dozen key laws administered by the EPA.
www.epa.gov/epahome/Programs.html	EPA programs and projects.
www.whitehouse.gov/CEQ	Council on Environmental Quality.
Research and Data Collections	
www.cnie.org	National Council for Science and the Environment, formerly Committee for the National Institute for the Environment. Includes issue library, environmental journals, and links to Congressional Research Service.
www.rff.org	Resources for the Future—economic policy analyses and information.
www.worldwatch.org	Worldwatch Institute, with list of Worldwatch papers and other publications.
www.wri.org/wri/index.html	World Resources Institute, with links to international environmental and governmental organizations.
www.scorecard.org	Environmental Defense Fund site for extensive environmental data by city or zip code.
www.epa.gov/epahome/Data.html	EPA databases and software. Good entry point to locating environmental information.
www.epa.gov/ceisweb1/ceishome	Center for Environmental Information and Statistics at EPA.
www.unfpa.org	United Nations Population Fund.
www.census.gov	Census Bureau population data.
www.prb.org	Population Reference Bureau
www.doi.gov	Department of Interior—Fish and Wildlife Service, Bureau of Land Management, Park Service, U.S. Geological Survey.
www.usda.gov	Department of Agriculture, Forest Service.
www.doe.gov	Energy Department.
Environmental Organizations and Advocacy Groups	
www.gwu.edu/~greenu/index2.html	Environmental organization Web sites.
www.webdirectory.com	Environmental organization Web directory and search engine for diverse environmental topics.
www.zpg.org	Zero Population Growth, population news and resources.
www.lcv.org	League of Conservation Voters—environmental voting records and information on congressional actions.

www.nrdc.org/nrdc	Natural Resources Defense Council—news and information on public policy issues.
www.nwf.org	National Wildlife Federation
www.2nature.org	Second Nature. Devoted to education for sustainability.
www.sierraclub.org	Sierra Club
www.defenders.org	Defenders of Wildlife
www.edf.org	Environmental Defense (formerly Environmental Defense Fund)
www.foe.org	Friends of the Earth
www.greenpeace.org	Greenpeace International
www.iwla.org	Izaak Walton League of America
www.audubon.org	National Audubon Society
www.npca.org	National Parks and Conservation Association
www.tnc.org	The Nature Conservancy
www.nrdc.org	Natural Resources Defense Council
www.tws.org	Wilderness Society
www.panda.org	World Wildlife Federation
www.enviroweb.org/ef	Earth First!
www.ran.org	Rainforest Action Network
www.farmland.org	American Farmland Trust
Environmental News Sites	
www.envirolink.org	Environmental library search.
www.enn.com	Environmental News Network, current news and links.
www.igc.org/igc/econet	Econet, diversified news and links.
http//cnn.com/NATURE	CNN environmental news.
Environmental Education/Careers	
http://conbio.rice.edu/cnie/dep	Directory of over 200 environmental programs in higher education.
www.starfish.org	Sustainability and environmental education resources, bibliographies, courses.
www.eco.org	Environmental Careers Organization, internships and jobs in environmental field.
www.webdirectory.com/Employment	comprehensive site for environmental employment information and posting of resumes.
Sustainability Sites	
www.naturalstep.org	The Natural Step, with principles of sustainability for corporations and others.
www.sustainable.doe.gov	A key site for information on sustainability actions, with extensive links.
www.sustainable.org	Sustainable Communities Network, extensive sustainability and smart growth tools and references.
www.geonetwork.org/links	Geolink Library. Over 400 sustainable development links on urban sprawl, green design , green living, news.
www.rprogress.org	Redefining Progress, offering new measures for redefine the meaning of human progress.
www.whitehouse.gov/PCSD	President's Council on Sustainable Development.
www.gn.apc.org	GreenNet, computer network for environment, peace, human rights.

REFERENCES

[1]Mazmanian, Daniel A. and Michael E.Kraft, eds. 1999. Toward Sustainable Communities: Transition and Transformations in Environmental Policy: Cambridge, MA.: MIT Press.

[2]In this paper environmental NGOs are assumed to be those nongovernmental organizations that are supportive of environmental protection policies. These include environmental groups such as the Sierra Club, Natural Resources Defense Council, Environmental Defense, and the National Wildlife Federation as well as many public health groups such as the American Lung Association. There are other NGOs that typically oppose such policies or seek to limit their impact, such as those associated with the Wise Use Movement (largely in the West), property rights groups, and some state and local governments. Industry and trade associations also tend to be skeptical of governmental intervention. For a description of the "environmental opposition" in the United States, see Switzer, Jacqueline Vaughn . 1997. Green Backlash: The History and Politics of Environmental Opposition in the U.S. Boulder, CO: Lynne Rienner.

[3]Wenner, Lettie M. 1982. The Environmental Decade in Court. Bloomington, IN: Indiana University Press and O'Leary, Rosemary. 1993. Environmental Change: Federal Courts and the EPA Philadelphia: Temple University Press.

[4]For a thoughtful overview of environmental groups and their organizational and political challenges, see Shaiko, Ronald G. 1999. Voices and Echoes for the Environment: Public Interest Representation in the 1990s and Beyond. New York: Columbia University Press. Group strategies and tactics, particularly regarding communication, are addressed in Kraft, Michael E. and Dianna Wuertz. 1996. Environmental Advocacy in the Corridors of Government, in The Symbolic Earth, James G.Cantrill and Christine L.Oravec, eds. Lexington, KY: University Press of Kentucky.

[5]See Dunlap, Riley E. and Angela G.Mertig, eds. 1992. American Environmentalism: The U.S. Environmental Movement, 1970–1990. Philadelphia: Taylor and Francis.

[6]See Bosso, Christopher J. Environmental Groups and the New Political Landscape, in Environmental Policy. Vig and Kraft, eds.

[7]This history can be found in much greater detail in Vig, Norman J. and Michael E.Kraft, eds. 2000. Environmental Policy from the 1970s to 2000: An Overview, in Environmental Policy, 4th ed., Washington, DC: CQ Press. See also Kraft, Michael E. 2001. Environmental Policy and Politics, 2nd ed. New York: Addison Wesley Longman. A slightly different version of this history can be found in Kraft, Michael E. 2000. U.S. Environmental Policy and Politics: From the 1960s to the 1990s, Journal of Policy History 12, 1: pp. 17–42. For two detailed historical accounts of the last five decades of environmental policy and the role of environmental science and environmental groups, see Hays, Samuel P. 2000. A History of Environmental Politics Since 1945. Pittsburgh: University of Pittsburgh Press, and Lacey, Michael J. ed. 1989. Government and Environmental Politics: Essays on Historical Developments Since World War II. Baltimore: Johns Hopkins University Press.

[8]See Freeman III, A.Myrick Economics, Incentives, and Environmental Regulation. And Andrews, Richard N.L. Risk-Based Decisionmaking, in Environmental Policy, 4th ed., Vig and Kraft, eds.

[9]See, for example, Sexton, Ken, Alfred A.Marcus, K.William Easter, and Timothy D. Burkhardt, eds. 1999. Better Environmental Decisions: Strategies for Governments, Businesses, and Communities . Washington, DC: Island Press, and Daniel Press. And Mazmanian, Daniel A.

Understanding the Transition to a Sustainable Economy, in Environmental Policy. Vig and Kraft, eds.

[10]For one assessment of how environmental NGOs worked closely with industry and government officials in a local case involving water quality in a river basin and remediation of PCB-contaminated sediments, see Kraft, Michael E. Clean Water and the Promise of Collaborative Decision Making: The Case of the Fox-Wolf Basin in Wisconsin, in Toward Sustainable Communities, Mazmanian and Kraft, eds. A broad review of cases that illustrate collaboration in natural resource protection can be found in Wondolleck, Julia M. and Steven L.Yaffee. 2000. Making Collaboration Work: Lessons from Innovation in Natural Resource Management. Washington, DC: Island Press.

[11]See, for example, Lubchenco, Jane. January 23. Entering the Century of the Environment: A New Social Contract for Science. Science 279: pp. 491–97.

COLLABORATION OF REGIONAL GOVERNMENT BODIES WITH ENVIRONMENTAL PUBLIC ORGANIZATIONS: THE EXAMPLE OF TOMSK OBLAST

V.V.Galtsova
Committee of Natural Resources for Tomsk Oblast
R.T.Tukhvatulin
Department of Natural Resources and Oil-and-Gas Complex of Tomsk Oblast

Article 32 of this country's fundamental law—the Constitution of the Russian Federation—establishes that citizens of the Russian Federation shall have the right to participate in managing state affairs both directly by means of referenda and through their representatives.

The article creates a legal basis for public participation in the process of environmentally sound decision-making carried out by state bodies. Under Article 58 of the Constitution and Article 12 Part 1 of the Russian Federation law "On Protection of the Natural Environment" citizens shall not only enjoy the right to a favorable environment, but shall also bear equal responsibility for its protection. The duty to protect nature is at the level of the Constitution, much like the responsibility to defend the Fatherland and to pay legally established taxes (M.I.Vasilyeva, 1999, p.34).

However, the government's obligations to take public opinion into account during decision-making are not written in all laws currently in force.

Cooperation between the State and citizens in solving environmental problems and protecting environmental rights is more the responsibility of state bodies and officials than the public. The problems of the environment and the health of people are social problems. Yet the solution of the problem is being carried out by so-called "residual financing."

From 1995 to 2000, payments into Tomsk Oblast's budget for the use of the region's natural resources comprised 4.3 to 5.2 percent of total income. At the same time, budget expenditures for environmental protection and restoration of natural resources ranged from 0 to 0.3 percent only. In 1995–1999, the environmental fund was from 0.2 to 0.8 percent. The raw mineral resources fund

was from 1.7 to 4.5 percent. In 1999, the environmental fund was 1 percent, and the territorial raw mineral resources restoration fund 10 percent.

On the one hand, low payments have been coupled with wasteful and irrational utilization of natural resources as well as with environmental pollution. On the other, financial assets for protection and restoration of natural resources are not available.

A hard look at the legislation currently in force shows that citizen and NGO rights are limited to participation in discussions only by invitation from officials. Decisions are made by government bodies alone. It is extremely difficult for citizens and small-scale NGOs to gain recognition from the officials responsible for decision-making and to derive benefit from the discussions.

Thus, two key issues to be addressed by NGOs as well as by government are:

1. Access to information
2. Possibility of participating in decision-making process.

How are the issues solved in Tomsk Oblast?

PUBLIC ENVIRONMENTAL INFORMATION SYSTEM OF TOMSK OBLAST

The law "On Protection of the Environment" (Articles 6–10) prescribes that bodies responsible for environmental protection should provide citizens and the general public with necessary environmental information as well as render assistance to citizens and public organizations in understanding such information.

Goskomekologia (now the Ministry of Natural Resources) is responsible for coordination and protection of the natural environment, as well as for notification of the public of its condition. To meet these responsibilities, Goskomekologia of Tomsk Oblast had developed its own regional Public Environmental Information System.

Outcomes of sociological polls carried out in Russia and in the oblast from 1995–1998 were used as a basis for setting up the system. We have managed to clarify environmental problems that concern the local population and sources of environmental information about them. We have promoted a monthly regional radio broadcasting program and set up a newspaper, *The Green Meridian*. Also, regional TV, information bulletins, round tables, and briefings are being used. A public environmental inquiry office has been established.

Such activity as "Department Days" (in our case, the Department of Natural Resources and Oil-and-Gas Complex of Tomsk Oblast) is also used. During these days, representatives of the local administration visit different districts and

organize meetings with the local population to discuss the environmental situation.

Of prime interest is the creation of a server to provide official and reliable environmental information for the community.

One more innovation is the server's discussion page. Everyone can visit the page and post any question. There is a special subdivision on the page, "A question to Mr. A.M.Adam, Chair of the Committee."

There are many possibilities to provide the public with environmental information. But the task is not only to give information, for example, if the benzopyrene level reaches 15, the permissible value, in some town. Environmental education is of more importance. Information that is distributed should create interest for further information. It should provoke public concern over the environment as well as a desire to protect the right to a healthy and favorable environment.

FORMATION OF AN ENVIRONMENTAL MANAGEMENT AND CONSERVATION SYSTEM

A compromise between nature and society and the right to a healthy and favorable natural environment is the key principle of environmental management.

Another basic principle has been included in the Declaration on the Natural Environment, adopted at the UN Conference in Rio de Janeiro. It states, "Environmental matters should be solved in an efficient way and with participation of all citizens concerned."

We have tried to determine how to coordinate activity of citizens at the appropriate level. For this reason we have developed a scheme of interplay between all structures concerned with environmental problems in Tomsk Oblast.

A coordinating environmental council was set up on April 13, 1995. Representatives of federal and regional services, industrial enterprises, the scientific community, and the public at large are among the council members. The body is responsible for forming a regional environmental strategy as well as for elaboration of plans for actions and urgent measures to be submitted for public discussion. Having permitted representatives of two NGOs to participate in the council, we made it possible for the public at large to participate officially in the decision-making process.

OUTCOMES OF NGO ACTIVITY: POSITIVE AND NEGATIVE ASPECTS

Environmentally sound decisions are reflected in legal actions adopted by state and local government bodies and constituent entities. Their execution has to do with individual sites and with the natural environment as a whole. The decisions must have an ecological basis and pass the environmental examination and public hearing process.

The following decisions on large-scale projects have been made by the Tomsk Oblast agencies taking into account public opinion:

- Stoppage of gravel extraction from the Tom River bed. (A public organization, the Committee for Conservation of the Tom)
- Ban on construction of a nutritional supplement biotechnology plant. (A public organization, the Ecological Initiative)
- Removal from service three of five reactors of the Siberian Chemical Complex. (A public organization, the Ecological Initiative)
- Ban on containers for storing fissile materials received from military units under the governmental decision on sharp reduction of nuclear warheads in Russia. (A public organization, the Ecological Initiative)

The activity of NGOs made it possible to deepen public understanding of environmental problems and to exert pressure upon Tomsk Oblast agencies. One example is the public hearing held in September 2000 on the premises of the Tomsk Oblast Administration.

The public hearing or, to be more precise, a discussion on construction of the Seversk Nuclear Power Station (NHS-500), took place due to inquiries of public organizations and citizens under the federal law “On Using Atomic Energy” (Articles 11 and 14). Effective actions that had been carried out by public organizations of Tomsk, Moscow, and other towns forced the Tomsk Oblast government to conclude that the designers of the NHS-500 project must eliminate all shortcomings and violations of environmental legislation related to the project. The local authorities also decided that the NHS-500 project must be revised drastically in view of comments expressed at the public discussion.

The public discussion on construction of the Seversk Nuclear Power Station was the first large-scale public action in the region. All interested persons could take part. Those who were not able to make personal presentations could send their written proposals to the Tomsk Oblast government for consideration. Under the law, decisions of the government agencies must be officially published for the information of the general public, although this has not yet been done.

A large number of Tomsk city and oblast public organizations and movements are involved in environmental problems. In 1999 there were more than ten public organizations working in the following areas:

- Free expression of opinion
- Participation in development of normative acts
- Referenda on problems of environmental protection
- Environmental examinations
- Construction projects and selection of sites
- Public environmental monitoring
- Ecological education

Let us briefly summarize achievements of the main local public organizations.

The Tomsk Environmental Student Inspection (TESI) is a public organization created in October 1999. It has more than 200 members, primarily students of Tomsk. Much attention was given to TESI by the local mass media in 1999. Forty-seven articles were published in the regional newspapers; the town and regional radio stations broadcast 51 reports; and four local TV channels devoted 11 reports to its work. TESI is a major organizer of environmental demonstrations.

The Tomsk Oblast Council of the All-Russian Nature Protection Society was founded in 1992. One of the main tasks of the Council is a TV program, "The Ecology Club," devoted to the environmental problems of Tomsk Oblast.

A distinctive feature of TESI is its corps of inspectors. Members have the status of non-staff inspectors of the State Committee for Protection of the Natural Environment. Under the law "On Non-Staff Environmental Inspection," TESI has the right to conduct inspections of different enterprises and plants and to make claims against inappropriate use of the natural environment. In 1999, TESI members carried out 165 inspections in the industrial zones of Tomsk and the oblast. In the course of inspections they prepared 81 claims, and they imposed 73 fines totaling 7,130 rubles.

In 1999, complex explorations of the Ob, the Tom, and the Ushaika rivers were conducted under the TESI environmental program "Clean Rivers."

The Environmental Legal Center is a public organization founded in 1996 with the objectives of protecting citizens' rights to a safe environment and monitoring environmental legislation. Its members are intellectuals, students of the Tomsk colleges, and farmers. The Center keeps in touch with prominent scientists.

The Center deals with bans on environmentally hazardous activity and compensation for damage caused by abusing the right to a safe environment. The Center supports appeals against actions (or inactions) of state bodies violating citizens' non-property rights.

Recently the Supreme Court Judiciary Board overturned the Tomsk local court decision on a license for disposal of liquid radioactive wastes in the ground water areas of Seversk. The license was issued by the local administration to the Siberian Chemical Complex in 1996.

The Environmental Initiative movement (EI) was founded in 1989 with the primary goal of providing a public focus for anti-nuclear activity. The main achievements are the following:

- A 1989 ban on construction of a nutrition supplement biotechnology plant.
- Support of the Krapivinsky water reservoir construction (1989–90).
- Obtaining about 100,000 signatures to ban storage containers for fissile materials received from military units.

EI's primary goal is to counteract the plans of the Ministry of Atomic Energy to start construction of a nuclear-powered heating plant (AST-500) attached to the Siberian Chemical Complex. The goal is to be achieved by dissemination of reliable information about the hazardous impact of the complex on the environment and on the health of the population. EI also tries to expose "the nuclear myths" about the illusory low-price, ecological safety, and harmlessness of nuclear energy.

A Tomsk Oblast public organization, the Wind Rose, was founded in 1992 with the purpose of attracting local attention to environmental problems, to ecologically safe commercial activity, and to ecological education. It has 10 members.

The organization has developed the following actions and publications: a training program of continuous ecological education for schoolchildren, a textbook, *Education in Nature Protection: Elementary Course,* and a textbook on ecology, *Changing the World.* It set up an ecological club, *The Road to the Twenty-First Century,* for pupils and students. It held an Internet conference, Environmental Security, and published materials of the conference.

A roundtable, The Tomsk Oblast's Pupils' and Students' Participation in Solving Regional Environment Problems, was held in November 1999. Teachers, lecturers, and local public organization representatives were among the participants. The subject was methods for informal ecological education such as tourism, clubs of ecologists, teenage environmental projects, Internet and e-mail, and cooperation with the mass media.

An ecological and ethnographical excursion called Elan was organized in September 1999. Twenty-four pupils and three teachers took part. A textbook on ecological-ethnographical excursions and games was developed. An information bulletin *EKObanderol* [ECO Mailbag] is being published. If necessary it can include urgent information, such as developments in Yugoslavia (NATO strikes and the environmental consequences).

A youth organization, Siberian House, was created in 1974 on the base of the Explorer tourist brigade. The team includes 20 youngsters and five tutors. The main activities are regional ethnography studies, summer camps, and sporting contests. One goal is exploration of rare sites of nature with visits to 19 sites. To clarify the formal status and legal base of the sites, appropriate documentation has been submitted to the Oblast Administration.

The Nature House is a children's ecological and tourist organization and has created reasonable attitudes to nature protection.

The Aliom Club is an environmental educational society created to popularize ecologically safe technologies. Scientists, managers, engineers, and technologists are among its members.

The Tomsk Oblast Scout Center is an organization related to tourism and ecological education. Its activity stretches over seven regions. The number of scouts is about 500. In Chainsk district a school scout team cooperates with the local forest management authorities in the village of Podgornoye.

The tourist club Odyssey is a public organization created to organize tourism and ecological education.

The Strezhevoi Ecological-Biological Center (the township of Strezhevoi) is a public organization dealing with ecological education and fostering.

Summing up, the above public organizations are of great benefit to the community as well as to the region as a whole.

In conclusion, let us make some recommendations on increasing the role of nongovernmental organizations in the environmental decision-making process.

Is it difficult for state bodies to coordinate the activity of the public environmental organizations? Among the different laws currently in force, there are inconsistencies in regulations relating to public participation in managing state affairs. However, public environmental organizations must be able to make their own contributions. Adoption of appropriate normative acts is the only way out of the situation. It is these acts that provide for comprehensive and adequate public participation in environmentally sound decision-making

Also, it is necessary to carry out training courses on management and sustainable development for nongovernmental organizations.

Problems of preventing environmental harm and compensation are of extreme concern for the population. However, the solution is being implemented by "residual financing." Financial sources and the measures to prevent and compensate environmental harm should be determined by law. Nowadays it may be worthwhile to combine all financial payments to the local budget for utilization of natural resources in a joint natural resources restoration fund. The fund could allow for local government bodies to focus financial means on strategic directions. Payments for utilization of subsurface resources could form the principal part of the fund. Use of the funds for improvement and restoration of water resources, biological resources, and wild nature sites is necessary and

quite reasonable. This is especially the case with regard to the activity of the oil-and-gas complex, which destroys these resources.

INTERACTION OF NONGOVERNMENTAL ORGANIZATIONS AND REGIONAL AUTHORITIES IN SOLVING PROBLEMS OF THE LAKE BAIKAL REGION

V.V.Dryukker
Limnological Institute, Irkutsk

The UN Conference on Environment and Development (Rio de Janeiro, 1992) has proclaimed the concept of sustainable development as a basis for a new paradigm of future development of our civilization and has adopted a program of actions when entering the twenty-first century (The Agenda for the Twenty-First Century). Principle 4 of the adopted Declaration states: “In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.”

The Lake Baikal region is an example of a territory that has not only national, but also international importance. It has an eternal value not only for Russians, but also for the whole of mankind. Lake Baikal is the most ancient lake on the planet. Its age is about 25–30 million years. It is the deepest lake, with a depth of 1,637 meters. It contains a tremendous volume of water—23,000 cubic kilometers or 23 percent of the world’s resources of pure fresh water. It is also one of the largest in areal expanse.

According to present-day data, the genetic diversity of Baikal includes 2,565 species and subspecies of aquatic fauna and 1,000 species and subspecies of aquatic plants, of which two-thirds are endemic, meaning they are found nowhere else. To this number one should add many hundreds of species of water and bottom micro-organisms as well as viruses and microbes that have been little investigated. Thus, the diversity of Baikal has no equal in the world, and Lake Baikal is included in the UNESCO World Nature Heritage List of 1996.

What is the Baikal region? This is a region directly connected with the internationally known Lake Baikal and located in the center of Asia on the

territory of two states, Russia and Mongolia. The territory of the Baikal region stretches from south to north for 1300 km, and from west to east for 1,000 km. Its total area is 800,000 sq. km. The unique combination of various landscapes in the center of Asia—from mountain-tundra and mountain-taiga to steppe and semi-desert along with the largest and most ancient freshwater reservoir—is of special significance and value in the biosphere structure of the planet as a whole.

The Baikal watershed occupies territory in the southeast of Siberia and the northern part of Mongolia. The largest part is located in Russia, where it has been divided without taking into account the lake's area over several administrative and territorial entities of the Russian Federation: Republic of Buryatia-73 percent, Chita Oblast-21 percent, Irkutsk Oblast-6 percent. The Baikal ecosystem has become better known just as its protection and rational use have become more complicated. New territories located outside the bounds of the lake's watershed have been included in the Baikal region, including that part of Irkutsk Oblast that adjoins the northwest boundary of the Baikal watershed. It is up to 200 km. wide and regarded as a zone from which atmospheric emissions of industrial installations may reach the watershed.

At present in accordance with the Law of the Russian Federation "On Protection of Lake Baikal," the Baikal region is divided into three zones:

- Central ecological zone ("the core")—territory that includes Lake Baikal and islands, a water protection zone adjacent to Lake Baikal, and protected natural territories adjacent to Lake Baikal;
- Buffer ecological zone—territory outside the central ecological zone that includes the watershed of Lake Baikal within the bounds of the Russian Federation;
- Ecological zone of atmospheric effect—territory outside the watershed of Lake Baikal within the bounds of the Russian Federation up to 200 km. wide to the north and northwest of the watershed where there are economic units with activity that has a negative influence on Lake Baikal.

Such a division of the Baikal region is an important condition for preservation of Baikal as a part of the World Nature Heritage.

At the same time, the Baikal region is characterized by considerable development of industry and agriculture, which cannot avoid affecting the condition of the lake. Therefore, the question of a balanced solution of ecological and socio-economic problems is especially acute here.

The following ecological problems of the Baikal region are priority issues:

- The natural conditions of the geosystem components
- Preservation of a large amount of biological diversity
- Consequences of industrial and agricultural development
- Use of reliable ecological information

The natural conditions of the Baikal region require accurate methods of investigations for measuring the parameters of water and ground ecosystems and the air basin. For the most part the region is still not polluted.

While solving the questions of environmental protection in the Baikal region, particular attention must be paid to preservation of biological diversity which means, according to the Convention on Biological Diversity, variability of living organisms from all sources including soil, sea, and other water ecosystems as well as ecological complexes including these components.

For addressing the questions of preservation of the Baikal region, the normative-legal basis includes both international documents and the laws of the Russian Federation:

- Convention on Biological Diversity, Rio de Janeiro, 1992.
- Convention on Protection of the World Cultural and Natural Heritage, 1972.
- All-European Strategy of Preservation of Biological and Landscape Biodiversity, Sofia, 1995.
- Convention on Assessment of Environmental Effects in a Transboundary Context, 1991.
- Federal law "On Natural Environment Preservation," 1991.
- Federal law "On Ecological Examination," 1995.
- Federal law "On Especially Protected Territories," 1990.
- Federal law "On Protection of Lake Baikal," 1999.
- Water Code of the Russian Federation.
- Forest Code of the Russian Federation.
- "On State Strategy of the Russian Federation Regarding Environmental Protection and Ensuring Sustainable Development," the Edict of the President of the Russian Federation of February 4, 1994, # 236.
- "Conception of Transition of the Russian Federation to Sustainable Development," the Edict of the President of the Russian Federation of April 1, 1996, #440.
- "National Plan of Action for Environmental Protection of the Russian Federation in 1999–2001." Approved at the meeting of the Government of the Russian Federation on November 12, 1998.
- "Strategy of Sustainable Development of the Russian Federation." Approved at the meeting of the Government of the Russian Federation in December 1997.

Thus, in the Russian Federation there are a number of strategic planning documents in the field of environmental protection and Sustainable development that have not yet been put in a strict hierarchical order due to the fact that the legislation in this field is relatively new. However these documents can already be used as a legislative basis.

In the Baikal region a number of attempts have been made by state structures and public organizations to implement programs aimed at preservation. The state documents on Baikal preservation are as follows:

- Resolution of the Central Committee of the Communist Party of the Soviet Union and the USSR Council of Ministers of April 13, 1987, # 434, "On Arrangements to Ensure Protection and Rational Use of Natural Resources of the Lake Baikal Basin in 1987–1995."
- "Territorial Integrated Scheme of Protection of Nature in the Lake Baikal Basin," approved on April 14, 1990, by the Resolution of the Presidium of the Russian Federation Council of Ministers.
- "Integrated Federal Program of Ensuring Lake Baikal Preservation and Rational Use of Natural Resources of Its Basin," 1994.

The role of nongovernmental public organizations in implementing the above decisions is difficult to overestimate. The destiny of "the sacred sea," as people living on the banks of Baikal call the lake, has worried both children and old people. This is evident from signatures for preservation of the unique Baikal, demonstrations, appearances on television, and unauthorized signs reading "Let us preserve Baikal" on the chimneys of the Baikal Pulp and Paper Plant. The most active supporters of environmental protection in the Baikal region are the following public organizations:

- Baikal Ecological Wave, which has organized regular publication of the ecological magazine *Wave*.
- Baikal Ecological Parliament, with prominent scientists from Irkutsk as its members.
- Revival of the Land of Siberia.
- Greenpeace.

The above public organizations are in continuous contact with local government institutions. They participate in all ecological decisions without exception. In particular, they put forward the idea of instituting Baikal Day, which since 1999 has been routinely conducted at the end of August-beginning of September in the form of various actions for the protection of the lake, thereby joining the efforts of local governing institutions and various ecological movements.

In March 1998, the Limnological Institute in Irkutsk and the Baikal Institute of Nature Management in Ulan-Ude, with the support of ecological organizations of Irkutsk Oblast and the Republic of Buryatia, started implementation of a TACIS project "Assistance in Gaining Ecological Information and Its Dissemination among the Population of the Baikal Region." The financial support was provided by the European Union and the technical

support by the Society of Technical Assistance (Germany). The aim of the project is to distribute information among the population and organizations responsible for decision-making in the field of environmental protection. As a result of the joint work conducted by a large number of state and public ecological organization as well as institutions of basic and additional education, the Baikal Ecological Information Network has been established. Its participants are located in 12 towns of Irkutsk Oblast alone.

The inhabitants of the Baikal region realize that they are responsible to the whole of mankind and future generations for preservation of the world pearl, Lake Baikal. The ecological conditions in our region are very tense and complicated. Thus, realizing their personal responsibility, more and more people are standing up for environmental protection.

People also realize that nothing will change if the way of thinking remains unchanged. But it can be changed only if there is reliable information. Ecological workers understand the importance and necessity of ecological education; but very often they have no possibility to obtain the information they need, even though such information is available at research institutes situated in the Baikal region. In Irkutsk alone there are nine institutes of the Russian Academy of Sciences conducting research on nature management. The organizers and those implementing the above mentioned project have identified the following problems:

- To collect and process ecological information and make it accessible to all those who need it.
- To establish a standing network of ecological organizations of Irkutsk Oblast and the Republic of Buryatia, including consumers and distributors of this information.

The project participants have defined the concept of providing the population of the Baikal region with information as a strategy of collecting, processing, and presenting data about natural resources of the territory based on the principles of integration and legal responsibility, using up-to-date information technologies to make well-grounded decisions regarding nature management in the region. Now the important tasks for teachers, ecologists, and progressive groups of the population are not only the ecological orientation of the public and providing the population with information, but also the task of promoting civic positions and stimulating social activities for democratization of ecological knowledge.

The implementation of this large-scale TACIS project has resulted in:

- Establishing the Baikal Ecological Information Network.
- Obtaining a large number of computers.

- Establishing contacts with ecological organizations from other countries and regions (ISAR, Social Information Agency, the American organization Sacred Earth Network, and others).
- Participating in preparation of the state report "On the Status of Environmental Conditions of Irkutsk Oblast," which says, "In arranging ecological education of the population there must be coordinated efforts of the government organs; environmental, educational, scientific, and public organizations; and the mass media."

The importance of continuous ecological education is clear to all the participants in the Baikal Ecological Information Network. Most of them have been closely cooperating with each other and with other organizations in this important task.

Another example of cooperation between local autonomous bodies and public organizations is the Russian-Canadian project on cooperation in decision-making in the field of environmental protection and, in particular, the Irkutsk component, "Water Resources Management in the Angara River Basin." During the 1998–2000 period, the project organizers combined the efforts of state authorities and public organizations of Irkutsk Oblast in arriving at a "consensus" in decision-making in the field of environmental protection. Some of the project participants are:

- State Committee on Environmental Protection
- Committee on Natural Resources
- Department of Nature Management, Irkutsk Oblast Administration
- Angara-Baikal Basin Water Department
- Irkutsk Territory Department of Hydrology, Meteorology, and Environmental Monitoring
- Irkutsk Hydro-Electric Station Administration
- Irkutskenergo Joint-Stock Company
- Baikal-Angara Department of Waterways and Navigation
- Committee on Nature Management Legislation and Ecology of the Irkutsk Oblast Legislative Assembly
- Limnological Institute, Russian Academy of Sciences (RAS)
- Institute of Geography, RAS
- Energy Systems Institute, RAS
- Institute of Geochemistry, RAS
- Institute of the Earth's Crust, RAS
- Institute of Plant Physiology and Biochemistry, RAS
- Institute of Biological Research at Irkustk State University
- Irkutsk Refrigeration Industrial Complex (state-owned enterprise)
- Irkutsk Housing Design and Construction Administration
- *Science in Siberia* (publication)

- Academy of Water Industry
- Children's Ecological Organization of the city of Angarsk
- Baikal Ecological Education (public organization)
- Regional Ecological Forecasting (research and production firm)
- Baikal Ecological Wave (public organization)
- Civic Informational Initiative (public organization)
- Irkutsk Branch of the All-Russian Nature Protection Society
- Mayor of the Usolye Administrative Region
- Mayor of the town of Shelekhov.

In spite of the fact that the programs and governmental decisions regarding the Baikal region were only partially realized, progress has been made:

- The Selenga Pulp and Paperboard Plant has converted to a closed-loop water consumption system.
- Wood drift floating along Baikal's tributaries has been stopped.
- Collection of waste water from boats in Lake Baikal has been put into practice.
- Pollutant emissions to the atmosphere from the Baikal Pulp and Paper Plant have been reduced.
- Hazardous substance discharges into Lake Baikal have been reduced.
- Lake Baikal was put on the World Nature Heritage List by UNESCO.
- The Law of the Russian Federation "On Lake Baikal Protection" was passed.
- The Baikal state information system has been established.
- Norms for permissible pollutant impact on the Baikal ecological system have been worked out, and a new ecological approach is under preparation.
- Integrated ecological monitoring of the Baikal ecosystem is being conducted.
- A new way of obtaining drinking water from the depths of Lake Bakial has been developed and patented, and production of bottled water has been organized as an alternative type of profitable production.

At the same time, experience makes it possible to identify the reasons why environmental programs being realized by local government bodies in cooperation with public organizations and population are not completely effective. They include:

- Lack of a coordinated system of objectives and tasks being realized under various projects and programs.
- Lack of an ecological basis in some programs.
- Lack of economic, financial, and legal mechanisms due to budget constraints.

- Methodological miscalculations, in particular, not taking into account the integrated ecological approach.
- Unreasonable "centralization" and lack of orientation towards priorities of the concerned parties and users of the results of activities under the programs.

With regard to resource potential, this region has all the necessary qualities to be chosen as a "model" when elaborating the concept of sustainable development from the position of the Agenda for the Twenty-First Century. A rather well-preserved environment of the region, a huge resource potential, and a unique natural object—Lake Baikal with the surrounding landscapes—form a natural basis for the sustainable development process.

On the other hand, the ecological fragility of the natural landscape system of the region, especially the ecosystem of Lake Baikal, will determine the high requirements for social and economic development processes, including the ethics and aesthetics of nature management oriented toward the future. Lake Baikal and the whole Baikal region should become an area for international cooperation of intellectual, financial, material, and human efforts aimed at solving the integrated problems of the survival of mankind and the preservation of the biosphere.

PROJECT OF BIODIVERSITY PRESERVATION IN THE RUSSIAN FEDERATION

TABLE 1 Fauna of the Most Ancient Lakes

Lake	Number of animal species and subspecies	Reference
Baikal	2565	Timoshkin and others, 1997
Tanganyika (Africa)	1248	Coulter, 1991
Biwa (Japan)	595	Mori, Miura, 1990
Caspian Sea	542	Kosarev, Yablonskaya, 1990
Ohrid (Macedonia)	430	Stancovic, 1960; Salemmaa, 1985; Kenk, 1978
Hubsugul (Mongolia)	285	Varikhanova, 1989; Kozhova and others, 1997
Titicaca (South America)	200	Dejoux, 1992

TABLE 2 Drinking Water Standards

Components	EEC	Russia, All-Union State Standard Drinking Water	WHO (94)	US EPA, Bottled Water	Switzerland, High quality Water	"Baikal Water"
Chlorides mg/l	200	250	250	250	20	0.5
Sulphates mg/l	200	250	250	250	10	5.4
Calcium mg/l	270				40	17
Magnesium mg/l	50				5	3.4
Sodium mg/l	150	200	200		20	3.4
Potassium mg/l	12				10	0.9
Aluminium mg/l	0.2				0.05	0.003
Solid residual mg/l	1500		1000		100	96
Fluorine mg/l			1.5	2.4		0.2
Nitrates mg/l	50	45	50	10	25	0.4
Nitrites mg/l	0.1	3	3		0.01	0.005
Ammonium mg/l	0.5	0.2			0.05	<0.02
Oil product mkg/l	10				0.1	
Phenols mkg/l	5	1			0.5	<0.1
Natural iron mkg/l	3000	300	300	300	50	0.005
Manganese mkg/l	50	100	500	50	20	0.6
Copper mkg/l	1500	1000	2000	1000	50	0.3
Zinc mkg/l	5000	300	3000	5000	100	0.5
Arsenic mkg/l	50	10	10	50	2	<1
Cadmium mkg/l	5	1.0	3	10	0.5	0.02
Chromium mkg/l	50	50	50	50	1	<0.2
Mercury mkg/l	1	0.5	1	2	0.1	<0.1
Lead mkg/l	50	10	10	50	0	0.05
Selenium mrg/l	10	10	10	10	1	0.5
Barium mkg/l		100	700	100		10.1
Boron mkg/l		500	300			8.8
Nickel mkg/l		100	20			<2
Strontium mkg/l		700				110
Antimony mkg/l			5			<1

LIMNOLOGICAL INSTITUTE, SIBERIAN BRANCH, RUSSIAN ACADEMY OF SCIENCES

1. The Baikal International Center for Ecological Research has been created. It allows increased scientific investigations of different integrated problems.
2. Ecological passports for different enterprises and institutions functioning in the Baikal region have been developed.
3. Norms of the allowed pollutant impact on the Lake Baikal ecosystem have been developed.
4. A draft of the Law on Lake Baikal has been worked out and submitted to the State Council.
5. The technical conditions for Baikal bottled drinking water have been developed, and a patent for its production has been obtained.
6. A draft of the Federal Target Program of the Baikal Pulp and Paper Plant that solves social problems of the town of Baikalsk has been developed.
7. Microbiological and hydrobiological monitoring of the Lake Baikal ecosystem and its main tributaries is being conducted.
8. Integrated research of biodiversity in the Lake Baikal ecosystem and in the water bodies of its basin has been considerably expanded.

PUBLIC PARTICIPATION IN ENVIRONMENTALLY SOUND DECISION-MAKING: LEGAL ASPECTS

V.L.Mishchenko
Ecojuris Institute of Environmental Law

CONSTITUTIONAL AND LEGAL GUARANTEES

While speaking about guaranteeing the rights of citizens to participate in environmentally sound decision-making, one normally refers to Article 32 of the Constitution of the Russian Federation as the basic document. The article states, "Citizens of the Russian Federation have the right to participate in managing state affairs both directly and through their representatives." Moreover, Article 33 of the Constitution ensures the right of citizens "to appeal in person and make individual and collective appeals to state bodies and bodies of local government." Appropriate federal legislation has not been developed. It is uncertain whether it will ever be adopted, but existing legal provisions are insufficient.

Yet, the priority of human and civil rights as well as numerous guarantees of exercising these rights has already been guaranteed in the Russian Constitution and in some laws currently in force. To be sure, we should abandon a narrow academic approach to civil rights and start protecting them in practice.

The Institute of Environmental Law, hereinafter called Ecojuris, is a professional human rights organization. Ecojuris was the first in our country to start protecting environmental rights of citizens and nongovernmental organizations in practice, including the right to participate in the decision-making process. It seeks to accomplish this role on the basis of the following basic principles:

1. The Constitution of the Russian Federation shall be used directly.

   Part 1 of Article 15 of the Constitution states that the Constitution "shall have supreme legal force and direct effect and shall be applicable on the entire territory of the Russian Federation."
2. Gaps, contradictions, and common and controversial points in the laws shall be interpreted in favor of the citizens.

   The heart of this principle is Article 2 and Article 18 of the Constitution. The first one proclaims: "Man and his rights and freedom shall be the supreme value." The second one says: "Human and civil rights and freedoms shall have direct force. They shall determine the meaning, content, and implementation of laws, they shall determine the functioning of legislative and executive authority and of local government, and they shall be guaranteed by law."
3. Environmental rights (like any other human and civil rights) shall be fundamental and of high priority. State and local government bodies shall only be able to establish procedural norms for their execution and protection. This principle is based on the following articles of the Constitution:

- Part 1 of Article 3: "The bearer of sovereignty and the sole source of power in the Russian Federation shall be its people of many nationalities."
- Part 2 of Article 17: "Basic human rights and freedoms shall be inalienable and shall be enjoyed by everyone from birth."
- The above cited Article 18.

4. The following principle is based on the very same articles of the Constitution: Opinions of the citizens on any activity to be carried out or on any object to be located on the territory where they live shall prevail and shall be disputed only in accordance with legal procedures.
5. The right to participate in decision-making shall be a part of the human right to a favorable environment, that, in turn, shall be an inalienable element of the right to life. This principle emerges from the following complex of articles of the Constitution and other laws:

- Article 42: "Everyone shall have the right to a favorable environment…"
- Part 1 of Article 20: "Everyone shall have the right to life."
- Part 1 of Article 9: "Land and other natural resources shall be utilized and protected in the Russian Federation as the basis of life and activity of the people living on the concerned territory."
- Article 92 of the Law "On Protection of the Natural Environment": "Everyone shall have the right to life in the most favorable environmental conditions."

- Articles 12 and 13 of the above law, guaranteeing environmental rights of the public.

6. Information necessary for the exercise of citizens' environmental rights, including the right to participate in decision-making, shall be of public interest. Classifying this information as limited access information (that is, state secrets or confidential information) shall be prohibited (Article 10 of the Federal Law "On Information and Protection of Information," based on Part 4 of Article 29 and Article 42 of the Constitution).
7. Environmental rights of citizens and nongovernmental organizations shall be ensured and protected by the whole body of laws currently in force—civil, civil-procedural, investment, information, nuclear, environmental, natural resources, and so on.

We are successfully using these principles to protect the environmental rights of citizens and nongovernment organizations as well as to protect rights in related fields, such as the right to information, to participation in managing state affairs, and to legal protection.

Ecojuris, in close cooperation with an organization it created, the Network of Russian Public Interest Environmental Lawyers, protects public interests, using the possibilities provided by the environmental legislation. These laws are rather progressive and, to some extent, pioneering in our country. Environmental lawyers-practitioners have made a substantial breakthrough in human and civil rights protection, adding environmental legislation with creative approaches to civil and civil-procedural law.

In addition to the above general principles, when protecting environmental rights we use more specific fundamental approaches and provisions of Russian legislation:

1. At the stage of obtaining preliminary agreement on location of a facility, bodies of local government shall be obliged to clarify the opinion of the population by means of local referenda and citizen meetings. Citizens, public associations, and bodies of local government shall have the right to participate in considering issues pertaining to exemptions and allotments of land plots of interest to the population (Article 28 of the Russian Federation Land Code).
2. A scheduled economic or other activity that could be environmentally dangerous in the future shall be subject to mandatory state environmental examination (Article 3 of the Federal Law "On Environmental Examination").
3. As to an activity (regardless of the territory where it is carried out) that causes harm to the health or property of citizens, their households, or the

environment, citizens or organizations may turn to the courts to stop environmentally harmful activity (Article 91 of the Law "On Protection of the Natural Environment").

4. The danger of causing harm in the future may be grounds for filing a lawsuit to prohibit an activity creating such danger (Article 1065 of the Civil Code of the Russian Federation).
5. Interests of citizens, nongovernmental organizations, and other persons may be represented in a court as well as in extra-juridical examinations of disputes by lawyers and other persons acting with a power of attorney in the traditional way (Chapter 5 of the Civil Procedural Code and Article 185 of the Russian Federation Civil Code). Besides, their interests may be represented in the above mentioned bodies on the basis of Chapter 50 of the Civil Code, "Actions without authority in the interest of another person."

   Conditions of actions in the interest of another person are determined by Part 1 of Article 980 of the Civil Code: "Actions without agency, other instructions, or the prior consent of the interested person for the purpose of preventing harm to his person…or in his lawful interests shall be carried out based on their benefit or usefulness…"

   Part 1 of Article 981 establishes an obligation to notify the interested person of action in his interest:

   "A person acting in the interest of another person is obligated at the first opportunity to inform the interested person of such action and wait for a reasonable period of time for his ratification or non-ratification of the action undertaken…"
6. Inasmuch as nature and its resources shall be the national property of the people of Russia as the natural basis of their social and economic development and well-being (Preamble of the Law "On Protection of the Natural Environment"), Article 980 of the Civil Code provides for the possibility of protecting interests not only of living people, but also of future generations.

   This innovative approach is being successfully used by Ecojuris. It has found support among the representatives of the Office of the Prosecutor General and has not met opposition among judges of the Supreme Court of the Russian Federation.

   The Civil Code does not establish definite forms of ratification of the actions undertaken in the interest of another person. So we have developed an application form (Table 1) for a person to implement the requirements of Article 981. This form can be used in case of representation of the interests of private citizens or groups of citizens. (Legal persons and nongovernmental organizations, in particular, fill out a similar application form, except the column on descendants.)

TABLE 1 An Application Form

On Approval of Actions Undertaken by Ecojuris

In accordance with the procedure established by Articles 980 and 981 of the Civil Code on protecting the lawful interest of another person (in case of appeal against the Government relating to transfer of the first group of forest lands into non-forest group lands for managing forests and using the forest fund, adopted in 1994–1998).

Name, Christian name, Patronymic (in full)	Post address	Agreed that my interests to be represented by	Agreed that interests of my descendants to be represented by	Date

7. The right to participate in environmental decision-making along with other environmental rights pertains to personal non-property rights, that is to non-material values (Article 150 of the Civil Code). Therefore, in accordance with Article 208 of the above Code, legal limitations shall not be placed on the requirements of protecting these rights.
8. In 2000, a possibility of actions in the lawful interest of another person was secured in the procedural legislation, namely in new wording of Article 42 of the Civil Code.

Thus, in summary, rather vast legislation is currently in force in our country to be used in protecting public rights to participate in environmentally sound decision-making. Of course, one would like to have good special legislation concerning regulations under review. However, due to the poor quality of many new laws (issued by the "fluent pen" of the State Duma), serious anxiety exists that public rights would not be secured and extended but substantially limited.

A relatively fresh example from the environmental sphere can be presented. The new Federal Law "On Sanitary and Epidemiological Well-being" was adopted in 1999, replacing the previous one with the same title (1991). (The Code of Laws of the Russian Federation, No. 14, 1999, Art. 1650). The latter had been adopted at the height of perestroika and became the first Russian normative act to secure the citizen's right to a favorable environment as well as the right to participate in decision-making.

Part 4 of Article 5 of the law stipulated that citizens "shall have the right to participate both directly or through their representative or public associations in developing, discussing, and making decisions by state government and

administrative bodies that aim at providing the population with sanitary and epidemiological well-being."

The public waited for the State Duma to update the wording of this provision and advance it in the spirit of the times. Instead, the provision was excluded in full from the law, and as a result the public received the toothless pre-perestroika right "to submit proposals."

It should be noted that for the last two or three years, attempts have been made by some groups of deputies and officials to submit new wording of the Federal Law "On Environmental Examination" to the State Duma for consideration, which has limited human and civil rights.

My long-standing human rights activity is evidence that our country has unfortunately remained a state not governed by laws. "Under-regulation" of some relations and incoherence of some legal norms sometimes are better from the human rights standpoint than excessive "over-regulation" undertaken by incompetent and dishonest lawmakers.

In spite of the absence of general unified mechanisms of participation in making decisions that can affect the environment and natural resources, citizens, nongovernmental organizations, and other strata of our society have "compensatory mechanisms" for such participation. This is public participation in evaluating the effect on the environment (EEE) in the environmental examination.

An EEE is a stage of environmentally sound decision-making to be carried out before the environmental examination. A new regulation on evaluation of the effect of economic and other activity on the environment was adopted in 2000 with direct participation of the author of this article (approved by the order of the State Committee on the Environment on May 16, 2000, No. 372, registered in the Ministry of Justice on July 4, 2000, No. 2302).

A pioneering attempt was made in this document to regulate more carefully the procedure of public participation in decision-making. The document considers public participation to be not only the basic principle of EEE, but also an "inalienable part" of this procedure. Notification and participation of the public as well as due consideration of its opinion shall be binding at all stages of EEE, beginning with preparation of the EEE technical design (paragraphs 2.5, 4.1, and others).

In decision-making, public preferences must be revealed and taken into account. This shall be one of the results of EEE (paragraph 1.6).

Part IV of the regulation is fully devoted to notification and participation of the public in the EEE procedure. It fixes the terms and order of notification, information content, and rules of collection and analysis of comments and proposals. Preliminary consultations, public discussions, and submissions of written comments shall be the main forms of citizen participation. All these procedures are regulated in the document.

For example, paragraph 4.9 stipulates that public hearings are to be arranged by local governments. All decisions related to public participation shall be documented.

The advocate of an action shall arrange public hearings on a planned activity and keep the record. The main issues of discussion as well as disputes between the public and the advocate (if any) shall be clearly fixed in the record. The record shall be signed by representatives of local government, citizens, public organizations (associations), and the advocate. The record of public hearings shall be included in the final set of documents on evaluating planned economic activity and the effect on the environment.

The new regulation, unlike the previous ones clearly stipulates the obligation to take into account information on comments and proposals of the public. A supplement of the regulation contains a list of documents to be included in the final set of EEE materials to prove the actual participation of the public in the decision-making process. All these materials shall be submitted for environmental examination (paragraphs 12.1–12.7). The following information shall be included in the materials of public hearings:

- Means of notification of the public on the place, time, and form of the public discussion.
- A list of public discussion participants, including names, and the names of organizations (if any), with their addresses and telephone numbers.
- A list of issues under consideration and abstracts of presentations, and records of public hearings (if any).
- All comments and proposals raised in the course of the public discussions, names of their authors, and materials of possible disputes between the public, local government, and advocate.
- Conclusions of the public discussion on the environmental aspects of a planned activity.
- A summary of public comments and proposals with the indication of those which have been or have not been taken into consideration and grounds for refusal.
- A mailing list of appropriate information to be sent out to the public at all stages of EEE.

The principle of public participation in the environmental examination has been secured in Article 3 of the Federal Law “On the Environmental Examination” mentioned above. According to this article, any project can be a subject of state environmental examination beginning with drafts and ending with documentation justifying the license, agreement on division of production, and so on, depending on the nature and importance of a project (Articles 11 and 12 of the above law).

The state environmental examination is an obligatory measure to protect the natural environment. It should prevent economic decisions which can cause harm to the natural environment. A positive conclusion of the state environmental examination is necessary to finance and implement any project and programm (Parts 1 and 2 of Article 36 of the Russian Federation Law "On Protection of the Natural Environment"). The legal consequences of a negative result of the examination shall be a prohibition on implementing the project (Part 5 of Article 18 of the Law "On the State Environment Examination").

The right of public associations to carry out a public environmental examination of the same project before or at the time of the state environment examination is provided by Chapter 4 of the above law. Public examination findings shall reflect public opinion and shall be obligatory for consideration during the State decision on realization of the project.

Of great importance for public rights is Article 14 of the Law "On the Environmental Examination" providing an obligatory submission of (1) EEE results and (2) results of citizen and public organization discussions organized by local government concerning the subject of the state environmental examination. In this case, the law considers the power of local government to organize public discussions, polls, and referenda among the population on economic activity as a power in the sphere of the environmental examination (Part 2 of Article 9).

Thus, the above analysis of the federal law "On the Environmental Examination" and EEE Regulations clearly demonstrates (analysis of law and regulations) that a duplication, or "overdose," of public discussions takes place in these documents. But given the great number of human rights violations in our country, this is not bad. To exercise one's constitutional right to participate in managing state affairs (Part 1 of Article 32 of the Constitution), one must participate in decision-making at all stages of the process. If it doesn't work at one stage, it may at another.

Consequently, Russian land and environmental legislation gives the public some possibilities to express views in favor of or against placing a facility or carrying out an activity on territory of their residence as follows:

- By means of a local referendum or meeting to be held by local government at a stage of preliminary planning.
- By means of public hearings/discussions at the EEE stage organized by joint actions of local government and an investor on a federal, regional or local level according to the importance of the project.
- By means of a public discussion, as an integral part of the environmental examination, organized by local government.

Thus, in accordance with the Constitution's provisions, public opinion shall be decisive. State decisions that are inconsistent with residents' opinions or

impede expressions of such opinions are violations of a number of constitutional rights that can be appealed to interstate bodies for the protection of human rights and freedoms, if all available internal means of legal protection have been exhausted (Article 46 of the Constitution).

EXPERIENCE IN DEFENDING THE ENVIRONMENTAL INTERESTS OF SOCIETY

Ecojuris is a nongovernmental organization seeking to execute public interest environmental law. The term "public interest environmental law" had not even existed in our country when we started our activity although some decades ago this term became popular in the United States, Canada, and other countries. Nevertheless, we succeeded in opening and introducing this direction in Russia. We began our work at the end of 1989 on the base of the Academy of Sciences' Institute of State and Law. At that time, illegal construction of the North Thermal Power Station was underway in Moscow, organized without appropriate environmental examination. Later a similar problem arose in Southern Butovo (a district of Moscow). Having realized that it was impossible to continue our work without pooling efforts of many people, we set up Ecojuris; and in 1991 it was registered as a nongovernmental organization. Since that time it has re-registered more than once because of changes in legislation and in membership.

As of now the name of our public organization is "The Institute of Environmental Law—Ecojuris." Our experts carry out consultative-judicial practice as well as research, legal drafting, education, seminars, and training not only in Moscow, but also in the regions. We hold training courses for environmental lawyers. We are currently carrying out a lawyers' training program on protecting national minorities' rights for traditional uses of natural resources.

For the first few years, Ecojuris had been the only nongovernmental organization in the USSR and Russia to protect public environmental interests and civil environmental rights. But now, about ten such organizations exist in our country. Most have been created with our direct involvement. Lawyers work for environmental organizations, such as Karelia's Association of the Greens and Kamchatka's League of Independent Experts. In 1994, it occurred to us that we should informally pool our efforts. Since that time we have been holding annual conferences of our organizations. To exchange experience and information, the informal Network of Russian Public Interest Environmental Lawyers was set up in 1997. It currently has more than forty members.

In 2000, representatives from five countries of the former Soviet Union took part in our Seventh Annual Public Interest Environmental Law Conference for the first time. In addition to the Russian network, we have established the

Eurasian Public Interest Environmental Law Network to protect public environmental interests. Our colleagues from Azerbaijan, Moldova, Ukraine, Kazakhstan, Kyrgyzstan, and Uzbekistan have joined us. In each of these countries, there are one or two persons engaged in consulting, pleading cases, and other legal activities. Human rights lawyers from Belarus, Georgia, and Armenia have also expressed their wish to join the Network. Most of these countries have similar legislation and problems: the oil mafia, the fishing mafia, the timber mafia, and corruption, particularly among the highest and middle rank officials responsible for granting licenses and permissions to carry out different projects and use different kinds of resources. Conduct of rank-and-file officials is not immaculate, yet they have a long way to go to reach the standards set by "the highest echelons."

During all these years, we have been involved with law on behalf of the public. In the early 1990s, courts did not take environmental cases for examination at all. Judges did not know the environmental legislation. We brought them copies of appropriate normative acts. In such a manner, they learned about this information for the first time. To ensure that an original jurisdiction would take such a case for examination, we would sometimes have to appeal to the Supreme Court. We were the first who acquainted judges and other officials with the Constitutional right to a favorable environment and unlimited guarantee of protecting this right in court. What is more, they learned that a European Human Rights Court existed, and we could appeal to it. It was a revelation for them. Since the middle of the 1990s the judicial system has begun stirring. Judges and public prosecutors are displaying interest in our activity. They have started taking part in our seminars and delivering lectures for our trainees. Bodies dedicated to guaranteeing human rights have arisen. We won cases in Moscow and in the regions. To illustrate, in Chelyabinsk, a member of our Network in cooperation with Ecojuris has managed to gain psychological damage compensation for a child who is a third-generation radiation victim.

At present, Ecojuris has a rather complex structure. It includes a consultative center for citizens and public organizations. Muscovites and Moscow Oblast residents are able to consult the Center. People from other parts of the country can send us written inquiries. Verbal inquiries center largely around citizens' environmental rights in populated areas, including unlawful building, destruction of trees, infringement of sanitary and epidemiological norms, and neglect of environmental assessment and examination. Deforestation and unlawful construction in protected wetlands are common. It is these violations that upset people. In general, the inquiries show considerable variation, ranging from protection of domestic animals to complaints against housing quality to noise pollution.

Apart from consultative assistance, Ecojuris continues dealing with public interest environmental law. In Moscow, Moscow Oblast, and adjoining oblasts, the consultative center pleads different cases, including sanitary and

epidemiological infringement, unlawful construction, and neglect of environmental impact examination on various projects. As a rule, about ten such small cases are under consideration by Ecojuris at any one time.

More complicated cases of interregional and even All-Russian interest are also being handled by Ecojuris. Considerable advances have been made on these levels. In 1998–1999, Ecojuris won two cases against the Government on the illegitimate reclassification of pristine forest lands as non-forest lands. In September 1999, we won a case against the Government on its unlawful granting of permits for the discharge of drilling wastes into the Far East seas. These cases have been won at the level of the Supreme Court.

To be sure, failures also occur. We try to see that a lost case does not turn into a conspicuous failure. Each case, even a small one, is normally accompanied by a public campaign and mass media support. Letters and requests are sent to the state bodies, including the office of the Prosecutor General. Here are some concrete examples.

We actually lost the case on the St. Peterburg-Moscow high-speed railway project. The Supreme Court rejected our claim. But a large-scale mass media campaign was launched. More than three thousand supporters of our position were involved from different regions of the country. A great number of publications were issued. All TV channels broadcast reports on the matter, including on our lawsuit. We believe that this case made its contribution to stopping construction of this line. In our view, President B.N.Yeltsin reversed a substantial number of his decrees due to the threat presented by this very case. Though this case may have been lost in court, it should not be considered a failure.

Ecojuris opposes President Putin's edict of May 17, 2000, on abolishment of the State Committee on Ecology and Ministry of Forest Management. A great number of laws, from the Constitution to the environmental legislation, have been violated by this edict. The Presidential edict is a very important decision related to citizens' environmental and human rights to a favorable environment, to information, and to participation in managing State affairs. We believe the edict to be undeniably unlawful. There is not a general unified procedure for public participation in environmental decision-making in our country. Consequently, so-called "compensatory" mechanisms should have been put into operation. This would imply, that in accordance with the federal Law "On the Environmental Examination," the draft of this edict as well as the draft of the corresponding government decree adopted on the base of this edict should have undergone state examination with participation of the public. This procedure has not been observed. Therefore, we consider it to be a serious abuse of citizens' rights.

Nevertheless, the Supreme Court has ignored our claim, so we are now at the stage of appeal. We are currently developing a strategy of future actions, as we cannot let this case end without legal consequences.

HIGHLIGHTS OF PRESENTATIONS

G.E.Schweitzer
National Research Council

The list of organizations represented at this workshop provides a good overview of the types of environmental NGOs that are active in Russia and the United States. There are of course hundreds of others with special interests and unique approaches—at both the national and local levels. But in general, advocacy, analytical, and educational NGOs have been well represented.

At the same time, the concept of NGOs is somewhat different in the two countries. An American environmental NGO is usually perceived as an organization established specifically to contribute to environmental improvement at the national or local level, or both. Professional societies (e.g., the American Chemical Society), nongovernmental laboratories supported by the federal government (e.g., Oak Ridge National Laboratory), and departments of universities, for example, are not usually considered to be environmental NGOs, even though Russian specialists might consider them to be an important form of NGOs.

In Russia there is a long history of many types of organizations outside the formal governmental structure participating in environmental protection activities that today are considered to be environmental NGOs. They include, for example, coordinating councils established by regional governments with common environmental interests, institutes of the Russian Academy of Sciences, government-sponsored citizen organizations, museums with environmental outreach programs, and societies that promote ecology programs for students.

During the past decade, hundreds of western-style environmental NGOs have been established in Russia, many with strong international ties to western NGOs. Greenpeace is probably the leading example of this trend. Several speakers have noted, however, that some of the new Russian NGOs, with far

less stature than Greenpeace, are primarily interested not in championing environmental causes, but rather in serving as a vehicle for expressing dissent with broader governmental policies and in becoming conduits for western grants. Still, many new Russian NGOs are very vigorous advocates of greater attention to environmental concerns amidst the economic collapse in the country, and they certainly have carved out a permanent niche on the Russian landscape.

Some environmental NGOs in both countries are devoted to ensuring that decisions and policies taken by government, including the enforcement of environmental regulations, are in the best interests of the public. They use direct communications with governments, the power of the mass media, and the judicial system to achieve this goal. Others have assumed responsibilities not adequately handled by government agencies, such as packaging government information and data in a form that is understandable to both specialists and the public and in developing additional data relevant to governmental decisions. Others serve as rallying points for voices of the people or provide meeting grounds for polluters, the public, and government. Others direct their energies to education and training of both professionals and the public—offering courses, preparing educational literature, and generally supplementing activities of educational institutions by sharing experiences, developing new analytical techniques, and applying new methodological approaches. Still others serve as coordinating centers for governmental authorities and specialists from different regions of the country with common interests. Then there are hybrid organizations that assume several of these tasks and additional responsibilities as well.

The workshop addressed many environmental issues, with heavy reliance on case studies; and the discussions of immediate environmental problems placed the consideration of NGOs into a meaningful perspective. In the aggregate, NGOs are interested in all aspects of environmental protection. At the same time, several differences in the agendas of NGOs in Russia and the United States seemed apparent. Of course, the differences expressed at the workshop were somewhat influenced by the individual interests of the participants.

The Russian emphasis on protection of forests and on the impacts of large-area radioactive contamination was understandable. The economic crisis has led to a deterioration of the technical and administrative capabilities to control pollution with the result that particulate and other common pollutants are of greater concern in Russia than in the United States. Also, solid waste disposal is a serious problem in Russia, where segregation of wastes, recycling of wastes, and establishment of adequate landfills lag behind efforts in the United States.

The U.S. effort, on the other hand, has increasingly focused on human health impacts of pollution. Control of toxic effluents and emissions is a high priority with risk assessment being an area of intensive development. Also, the

United States is able to devote more resources to investigation and protection of biodiversity; and global environmental issues also receive increasing priority.

In both countries, scientific research plays an important role in the work of NGOs. Many Russian presentations were by specialists of the institutes and centers of the Russian Academy of Sciences, clearly an important resource for NGOs. In the United States, many NGOs now have internal scientific capabilities, which enhances their credibility in dealing with government agencies. In both countries, solid scientific data are important in convincing the government agencies, the legislative bodies, and the public to give greater priority to environmental concerns.

Turning to education and training, Russia has an impressive array of programs at both the high school and university levels. However, a recent law rescinds the long-standing requirement that an ecology component must be included in the mandatory-core high school curricula, leaving the decision on this matter up to local authorities when they prescribe the optional aspects of the curricula. Several universities have adopted "sustainable development" as a theme, and a number of NGOs work with the universities in this field. It is important that "sustainable" development not become "no" development, and the importance of economics in the work of the NGOs was recognized. One example of the tight linkage between NGOs and students is in the city of Tomsk, where students provide much of the core of the NGO movement.

The internet was repeatedly cited as an important tool for the NGOs. U.S. government agencies increasingly use the internet to disseminate important information related to their decisions; and this trend has been of considerable importance for NGOs. The role of e-mail in tightening the linkages among NGOs with common agendas is clear; but there are many uncertainties as to the environmental data that are disseminated on the internet, given the absence of good quality control mechanisms. Nevertheless, in the years ahead, internet communications and data transfer will be central to the activities of many NGOs.

Several questions were not completely answered during the workshop, and they should help provide a framework for more focused workshops on the role of environmental NGOs that could be organized in the future.

- What additional steps can the Russian Government take to facilitate the work of NGOs? The pending legislation to update the basic environment protection law addresses the role of NGOs, but will additional amendments be necessary? As the Ministry of Natural Resources absorbs its new responsibilities for protection of the environment and protection of forests, how will it ensure that NGOs continue to have access to governmental decision-making, how will it disseminate information to NGOs, and how will it support NGO activities at the local level?

- Given the economic crisis, should Russian NGOs emphasize cooperation or confrontation with government agencies and with the polluters? Is the judicial system sufficiently responsive to environmental concerns encapsulated in law suits to warrant greater efforts in the field of litigation—at the national and local levels? Are the councils supported by regional governments in the Urals and in Siberia useful models for replication in other areas? How can the Ministry of Defense and Ministry of Atomic Energy be encouraged to pay more attention to NGOs?
- What are the characteristics of successful NGOs? Is support by western grants an asset or a liability? Can the Russian Academy of Sciences' new committee on cooperation with environmental NGOs facilitate cooperation among the scientific community and environmental organizations in a manner that enhances the credibility and the impact of these organizations?

CLOSING REMARKS

N.P.Tarasova
Russian Academy of Science

This workshop was characterized by active participation of the attendees and proved of importance in further improving cooperation between ecological scientists and nongovernmental organizations. Reports of the Russian side showed that nongovernmental organizations have become real participants in dialogues during the decision-making process at local and regional levels all over the country from the Pacific Ocean to the Baltic and Barents Seas. The experience of the "Siberian Agreement" demonstrates the possibility of involving significant scientific centers for realization of large international projects. The Kemerovo and Khabarovsk research centers of the Russian Academy of Sciences strongly contribute to establishing problem priorities, and they actively collaborate with social organizations in educational endeavors. The workshop agenda coincides with a priority set by Agenda 21, by other UN documents concerning sustainable development, and by instruction documents of UNESCO. All speakers and discussants especially stressed the importance of scientific education and help in interpretation of complex new interdisciplinary problems. We are very interested in the experience of the Hampshire Institute, a nongovernmental organization developing software for assessment of hazards due to different chemical pollutants in food and environment. Joint projects adapting this software for Russia can meet with support in our regions. Without doubt the experience of our American colleagues in database technologies would be very useful for us in making information available to everyone.

Reports devoted to interaction with the mass media, social organizations, and decision-makers were of significant mutual interest. Undoubtedly, the reports by Professors Kraft and Kokhanova and by Ms. O'Connell gave food for thought.

These themes can serve also as research areas for joint projects. All the participants came out in favor of continuation of such workshops. I expect the Cooperation Section of the Russian Academy of Sciences Scientific Council on Ecological Problems and Emergency Events will take into account these wishes in their planning for 2001.

In conclusion, I would like to turn to comments by Dr. Gibbons. He expressed his thought that the scientist's duty is to explain to the society outward phenomena, being based on the most advanced scientific concepts. It is a challenging task to help people make proper decisions in a condition of global indeterminacy and continuously changing environments. The coming millennium will be characterized by the increasing importance of quality of life, human health, and education. Natural resources are finite, but knowledge and development of human intelligence are infinite. Let me wish all colleagues every success in this important field.

APPENDIX A

SCIENTIFIC COUNCIL ON ECOLOGICAL PROBLEMS AND EMERGENCY EVENTS

A.P.Belousova

The Scientific Council on Ecological Problems and Emergency Events (hereinafter called the Council) was established for general coordination and further development of basic and applied research activities of the Russian Academy of Sciences in ecology, environmental protection, and emergency events (natural and man-made catastrophic processes). The Council is a coordination and consultative unit working on a voluntary basis and attached to the Presidium of the Russian Academy of Sciences.

The Council works in cooperation with the government and with other institutions of Russia, foreign countries, and international organizations dealing with scientific research in ecology, environmental protection, and emergency events.

The main purposes of the Council are the following:

1. The general coordination of research carried out by the Russian Academy of Sciences on ecology, environmental protection, and emergency events.
2. Development of an electronic library based on research materials of the institutes of the Russian Academy of Sciences on ecology, environmental protection, and emergency events. The library should be of interest to users of Russian information networks and for connection to the Internet.
3. Analysis and synthesis of research results obtained by institutions of the Russian Academy of Sciences on environmental protection and natural and man-made catastrophic events.
4. Preparation of proposals and recommendations for the Presidium of the Russian Academy of Sciences concerning problems of ecology, environmental protection, and emergency events.

5. Preparation of materials concerning problems of ecology, environmental protection, and emergency events according to the needs of state agencies addressed to the Russian Academy of Sciences.
6. Promotion of ecological research including interdisciplinary research in the institutions of the Russian Academy of Sciences.
7. Promotion of ecological examination of projects and facilities of the state involving scientific institutions of the Russian Academy of Sciences.
8. Promotion of links of the scientific institutions of the Russian Academy of Sciences with governmental bodies, Russian ecological organizations, including public ones, and foreign organizations dealing with problems of ecology, environmental protection, and emergency events.
9. Promotion of links of the scientific institutions of the Russian Academy of Sciences, dealing with problems of ecology, environmental protection, and emergency events with the Russian and foreign mass media.
10. Participation in the organization of scientific meetings on the problems of ecology, environmental protection, and emergency events.
11. Cooperation with international scientific organizations, foreign scientific institutions, and individual foreign scientists on problems of the Council.
12. Promotion of joint activity of scientists from different departments by establishing interdepartmental and international research groups in ecology, environmental protection, and emergency events.

STAFF AND STRUCTURE OF THE COUNCIL

The main structural units of the Council are:

- The Bureau of the Council.
- Regional divisions of the Council on the problems of ecology, environmental protection, and emergency events in the Far East, Siberia, the Urals, and the European part of Russia.
- Sections on the following problems: catastrophic processes, ecological problems of the atmosphere, ecology and wildlife conservation, ecology of continental waters of Russia, ecology of the world ocean, ecology of the lithosphere and underground waters, information support for ecological research, ecological problems of education, interaction with nongovernmental and international ecological organizations, social and economic problems of ecology, and methods and technologies of ecological research.

The Chairman of the Council is Academician N. P. Laverov, vice president of the Russian Academy of Sciences. The Chief Scientific Secretary of the Council on Ecological Problems and Emergency Events is Dr. A. P. Belousova.

Contact address:
Room 95–96, Building 2, Vavilov Street, 44, Moscow, Russia, 117333
Tel. (095) 135 40 00. Fax: (095) 134 75 68
E-mail: anabel@aqua.laser.ru

APPENDIX B

PRESENTATIONS

U.S.-BASED PRESENTERS

Thomas J.Graff
Regional Director
Environmental Defense
Oakland, California
Michael E.Kraft
Professor of Public and Environmental Affairs
University of Wisconsin, Green Bay
Green Bay, Wisconsin
Lars Laestadius
Senior Associate, Biological Resources Program
World Resources Institute
Washington, DC
Maureen E.O'Connell
Director
Save Our Cumberland Mountains (SOCM)
Lake City, Tennessee
Mark E.Schaefer
President
Association for Biodiversity Information
Arlington, Virginia

Glenn E.Schweitzer
Project Director
National Research Council
Washington, DC
John S.Young
President
Hampshire Research Institute
Alexandria, Virginia

RUSSIAN PRESENTERS

Sergey I.Baranovsky
President
Russian Green Cross
Moscow
Leonid A.Bolshov
Director
Nuclear Safety Institute
Russian Academy of Sciences
Moscow
Vyacheslav M.Buznik
Chairman
Khabarovsk Research Center
Russian Academy of Sciences
Khabarovsk
A.P.Belousova
Chief Scientific Secretary
Council on Ecological Problems and Emergency Events
Russian Academy of Sciences
Moscow
S.L.Davydova
Institute of Petrochemical Synthesis
Russian Academy of Sciences
Moscow
Valentin V.Dryukker
Deputy Director
Institute of Limnology
Russian Academy of Sciences
Irkutsk

Valentina V.Galtsova
Head, Department of Science Information Resources,
Ecological Education, and Public Relations
Tomsk Oblast Committee on Natural Resources
Tomsk
Gennady I.Gritsko
Chairman
Kemerovo Research Center
Russian Academy of Sciences
Kemerovo
I.A.Haliy
Institute of Sociology
Russian Academy of Sciences
Moscow
Alexander G.Ishkov
Deputy Head
Department of Natural Resources for the Central Region of Russia
Moscow
Ludmila A.Kokhanova
Department of Journalism
Moscow State University
Moscow
Maria N.Korotkevich
Director, Ecological Programs
Siberian Accord—Interregional Association
Novosibirsk
Vera L.Mishchenko
President
Ecojuris
Moscow
Olga V.Smirnova
Center for Ecological Problems and Forest Bioproductivity
Russian Academy of Sciences
Moscow
Nataliya P.Tarasova
Chair, Committee on Liaison with NGOs
Russian Academy of Sciences
Moscow