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RUSSIA'S ROLE IN ADDRESSING GLOBAL ATMOSPHERIC POLLUTION

By

KIMBERLY HEUCKROTH, B.E.S.

**A thesis submitted to
The Faculty of Graduate Studies and Research
in Partial fulfillment of
the requirements of the degree of**

Master of Arts

Institute of European and Russian Studies

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ABSTRACT

This thesis examines the degree to which environmental issues in general, and global atmospheric pollution in particular, are considered to be a priority by Russia's government, NGOs and citizens. It was found that the Russian government has not been a totally reliable partner in international efforts to combat global atmospheric pollution, explained partly by economic and political instability. ENGOs represent the largest sector in Russian civil society, and while a significant number were found to have a global focus, they are highly dependent on foreign assistance. Even though Russia's citizens have a very low level of knowledge about global warming, they still show a very high degree of concern for environmental issues. Future progress on combating global atmospheric pollution will depend on Russia's commitment to developing sustainable economic and democratic systems, which will ensure that society has the opportunity to become an effective grass-roots force to influence environmental policy.

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GLOSSARY

CDIAC	Carbon Dioxide Information Analysis Center
CEE	Central and East European
CENef	Center for Energy Efficiency
CFC	chlorofluorocarbon
CH₄	methane
CO₂	carbon dioxide
COP	Conference of the Parties
CT	carbon tetrachloride
EC	European Community
ENGO	environmental non-governmental organization
EPA	Environmental Protection Agency
EU	European Union
FCCC	Framework Convention on Climate Change
FSU	Former Soviet Union
GEF	Global Environment Facility
GEMS	Global Environment Monitoring System
GHG	greenhouse gas
GNP	Gross National Product
Goskompriroda	State Committee for Environmental Protection of the RF
Goskomstat	State Committee for Statistics of the RF
GWP	global warming potential
HBFC	hydrobromofluorocarbon
HCFC	hydrochlorofluorocarbon
HFC	hydrofluorocarbon
HOP	Health of the Planet Survey
Hydromet	Federal Service on Hydrometeorology and Environmental Monitoring
IAC	Inter-Agency Commission of the RF on the Protection of the Ozone Layer
ICC	Inter-Agency Commission of the RF on Climate Change Problems
ICPSR	Inter-university Consortium for Political and Social Research
IEM	International Environmental Monitor
IPCC	Intergovernmental Panel on Climate Change
ISAR	Initiative for Social Action and Renewal in Eurasia
ISC	Institute for Sustainable Communities
ISSP	International Social Survey Program
JI	Joint Implementation
MB	methyl bromide
MC	methyl chloroform
Minpriroda	Ministry of Environmental Protection of the RF
MIT	Massachusetts Institute of Technology
MLF	Multilateral Fund for the Implementation of the Montreal Protocol

MOP	Meeting of the Parties
N₂O	nitrous oxide
NGO	non-governmental organization
ODP	ozone depleting potential
ODS	ozone depleting substance
ppbv	parts per billion by volume
RF	Russian Federation
UK	United Kingdom
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNCHE	United Nations Conference on the Human Environment
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
USA	United States of America
USAID	United States Agency for International Development
USSR	Union of Soviet Socialist Republics
UV	ultraviolet radiation
WB	World Bank
WMO	World Meteorological Organization

CHAPTER 1

INTRODUCTION

Since the 1970's, countries have become increasingly concerned about the potential, negative consequences of global environmental pollution for life on earth. The greater connectedness between states, the sense of a world community and the integration of the world economy that have occurred as a result of the process of globalization, has led to greater concern among nations for the importance of protecting the earth's fragile ecosystem. Countries have come to realize that pollution does not respect state, human-made boundaries, but instead can have negative implications for the environment in other nations, as well as for the natural balance of the earth as a whole. As globalization has made travel and communications between countries easier, awareness about threats to the global environment has increased worldwide, as has greater interest in promoting cooperation between nations in finding solutions to the world's shared environmental problems.

The first major attempt at international environmental cooperation occurred in 1972 in Stockholm at the United Nations Conference on the Human Environment (UNCHE). The Stockholm Conference represented a recognition on the part of many nations of the importance and seriousness of transboundary and international environmental problems, and of the need for combined international cooperation. Greater cooperation since the conference is evidenced by the close to 200 multilateral environmental agreements and amendments that have come into existence (Economy and Schreurs, 1997). By the time the United Nations Conference on Environment and Development (UNCED) was held in Rio de Janeiro in 1992, environmental problems had moved from the international realm of bilateral and multilateral agreements to take on an even more complex global character. Today many countries are working together to solve a wide range of environmental problems, from species loss, nuclear safety,

pollution of oceans and seas, and acid rain to even more global issues such as global warming and the depletion of the earth's ozone layer.

The growth in concern since the early 1970's for global environmental problems and interest in international cooperation has not only occurred among Western countries. The Soviet Union, one of the world's largest consumers of natural resources and generators of pollution, has also played a major role in international efforts to address a range of global issues. During the Brezhnev period, attention was given to environmental problems, as both East and West searched for areas in which they could cooperate with one another to promote détente. Brezhnev admitted that a need existed for countries to cooperate on addressing world problems, since all nations are faced with "global problems - problems so vast and complex that they cannot be resolved by any one country no matter how large or powerful" (Clemens, 1990, p.122). It was hoped that cooperation in areas of "low politics" (trade, environment, science, culture) would lead to less confrontation over issues of "high politics", that is military security and conflict with the capitalist West. However, it was not until Gorbachev came to power in the mid-1980's that the Soviet Union fully acknowledged and emphasized, as the West had done all along, the interconnectedness of all countries of the world (Clemens, 1990, chap.5).

The Brezhnev period, despite greater cooperation on global problems, could not break through the dominant ideology that socialism held the answers to all problems, including global ones, and thus that only the Soviet Union was capable of leading all countries of the world in finding solutions to global environmental problems. According to Clemens, the strong pro-socialist ideological orientation of the USSR during the 1970's is evidenced by the regime's attempt to undermine the validity of Western studies on global environmental problems, which tried to suggest that regardless of whether industrialization occurred under a capitalist or socialist system, environmental degradation still occurred and contributed to the deterioration of the world environment. Many Western studies, such as The Club of Rome's "The Limits to Growth" report and

Garrett Hardin's tale of the "Tragedy of the Commons", were condemned by the Brezhnev regime for being indicative of a bourgeois, capitalist, and imperialist worldview, despite the fact that a number of Soviet scientists had come to similar conclusions. The root of the problem as stated by the Party was the system of private property that existed in the West (Clemens, 1990, chap.5). According to the USSR, the capitalist system had only partial solutions to global problems with its use of technology, ignoring the more fundamental problems inherent in capitalism that were really responsible for environmental deterioration. Of course, the scientific-technological revolution (STR) in the USSR, with its increasing abilities to address environmental problems in the socialist system, was not considered to create the severe problems that existed under capitalism (Ziegler, 1987, chap.6). The Soviet Union officially viewed environmental problems as solvable only under socialism, with solutions requiring the use of science and technology (DeBardeleben, 1985, chap.1, chap.9).

To counter the Western 'imperialist' studies on the threat to the global environment, the Soviet Union developed its own study of global problems during the 1970's called *globalistika*, based on Marxist-Leninist theory and stressing the necessity of world socialism if global problems were to be solved. Despite the polemical viewpoint of *globalistika*, some scientists in the USSR managed to continue cooperating on an international level by focusing their attention on global modelling or systems analysis (Clemens, 1990, chap.5). While the USSR participated in many international environmental organizations, many Soviet writers felt that these same supranational institutions would not be necessary if the capitalist system was capable of addressing global environmental issues. Soviet participation in international organizations was not entirely meaningful because such institutions posed a threat to the USSR's sovereignty since it required sharing of information with the West that could potentially reveal state military secrets. The Soviet Union primarily focused on general information exchange,

scientific research and technology, virtually ignoring political issues connected to global environmental problems (Ziegler, 1987, chap.6).

Barbara Welling Hall, in her 1987 study of Soviet perceptions of global ecological problems, identified three major viewpoints that existed in the USSR on global environmental issues during the 1970's and 1980's. The first, or polemical perspective, refers to those scientists and officials who viewed global environmental problems as being caused by capitalism and imperialism, and who believed that the solution lay in socialism and that cooperation would be the result of Soviet initiatives. The ecological or second perspective saw the problem as limits to growth, with supporters of this viewpoint advocating basic changes in society as the solution and supporting international cooperation through multilateral, scientific ventures. The final perspective, the technocratic, viewed the problem as lying in the earth's diminishing resources, and supported technology and management as solutions, with systems analysis as the main form of international cooperation. The Hall study showed that the technocratic perspective was the most prevalent overall, in addition to being the most represented in exchanges between East and West. While most scientists and officials recognized the importance of international cooperation on global environmental problems, they were unable to suggest ways in which such cooperation could be realized (Hall, 1987, chap.2, chap.9).

Indeed, the willingness of the Soviet Union to participate in international regimes to address global environmental problems during the 1970's and early 1980's was largely for symbolic reasons and to obtain concessions from the West on the important foreign policy issues of national defence and security. Thus, it is not surprising that very few, if any concrete directions for cooperation were offered by the Soviet Union. The USSR responded very quickly to environmental issues of importance to the West, endeavoring to portray an image of cooperativeness, regardless of the substance of the cooperation (Darst, 1997b). Environmental commitments were made with little consideration or

assessment of the possibilities for and costs of compliance at the national level. By 1991, the USSR was party to almost 100 international environmental accords, 70 of which were multilateral (Kotov and Nikitina, 1995). The fact that the Soviet Union signed so many environmental agreements is partly explained by the Soviet government's interest in promoting détente so that the USSR could benefit from economic and technological expertise from the West, which was needed to address the country's severe environmental problems. While the Party would not acknowledge the existence of environmental problems in the USSR, these had been accumulating since the 1960's and were becoming a major barrier to continued economic expansion in the country. The economic situation in the Soviet Union could not support the investment in technology and industrial restructuring needed to address growing environmental problems that were affecting economic production. By referring to environmental problems in the USSR as being 'global', the Brezhnev regime also hoped to prove that it alone was not responsible for the state of the environment in the country (Clemens, 1990, chap.6).

By the time Gorbachev came to power in 1985, the economic situation in the Soviet Union had deteriorated even further. In contrast to the Brezhnev era, the Soviet Union under Gorbachev was morally and technically willing to take measures to address global environmental problems, but as was to be discovered later, was not financially capable of taking action. Similar to the Brezhnev period, cooperation took the form of conferences and joint scientific research. The cooperation, however, was more meaningful owing to Gorbachev's policies of glasnost and perestroika, which allowed greater transparency and openness in discussions regarding, among many other issues, the environment. A major impetus for greater cooperation was the accident at the Chernobyl nuclear power station in 1986, which demonstrated to the Soviet Union, and to the rest of the world, that state boundaries could not stop pollution from one country entering another, and that greater cooperation was essential to ensure the protection of the world environment. In fact, the accident provided support for Gorbachev's new political

thinking, since the nuclear fallout from Chernobyl clearly showed that there were a number of instances in which "the common interests of humanity superseded class divisions and differences in social systems" (Darst, 1997b, p.109).

Since the collapse of the Soviet Union, Russia has continued to acknowledge the important role that it must play, considering its large land area and rich reserves of mineral and natural resources, in protecting its environment so as not to disrupt the global ecosystem. However, rather than making environmental protection at both the domestic and global levels more fruitful, the transition to a democratic system and market economy in Russia have limited the opportunities available to give greater attention to international environmental cooperation. Competing economic and political priorities in Russia today have challenged the country's capacity to meet its international environmental commitments. While Russia has continued to participate in international cooperative efforts to protect the global environment, the substance and quality of this participation has been undermined by the need to address the more immediate, volatile and important financial and social problems brought on by the transition towards a democratic and market-oriented society.

In the context of the severe economic and political instabilities experienced by Russia over the past decade, the major goal of this thesis is to determine to what degree the environment is considered to be a priority by Russia's government, non-governmental organizations (NGOs) and citizens. Specifically, the objective of this thesis will be to analyze the level of concern and awareness that exists in Russia with regard to the two most extensive global atmospheric pollution problems, namely global warming and the depletion of the ozone layer. Literature on Russian environmental issues to date has shown that substantial concern exists about environmental degradation on a national scale, but do Russia's government, NGOs and citizens understand the significance of global environmental change both to themselves as well as to all countries of the world? Are they concerned about how Russia's activities are contributing to environmental

problems on a global scale? What role do they believe Russia, as a member of the world community, should be playing in addressing and ultimately finding solutions to global environmental problems?

While a large number of international environmental problems, such as marine pollution, acid rain, desertification, deforestation and loss of biological diversity, could be selected to examine Russia's participation in international cooperation to protect the world environment, the problems of global warming and ozone depletion are the only issues with potential consequences on a global scale. As such, these problems require the greatest level of international cooperation between all governments to find appropriate, effective and sustainable solutions.

Another reason for selecting global warming and ozone depletion is the fact that these global problems are less tangible than other international environmental problems, which has made cooperation more difficult. It is the abstract nature of global atmospheric pollution that is most interesting since cooperation in the face of scientific uncertainty is a true measure of meaningful interest in addressing global environmental problems. Thus, analyzing Russia's willingness to adopt a precautionary principle and involvement in international efforts to combat global warming and ozone depletion serves as an excellent measure of genuine concern for protecting the world environment.

The reason for selecting both global warming and ozone depletion to study Russian involvement in international environmental agreements is the very different circumstances surrounding these two global atmospheric issues. International efforts to protect the ozone layer have met with far greater success than attempts to combat global warming. The major reason for the greater success in the case of ozone depletion has been the much higher level of scientific certainty surrounding this global problem. The location of large ozone holes over certain regions of the Earth has provided policy makers with the clear evidence needed to take action on an international scale. Another reason for successful cooperation on ozone loss has been the availability of friendly substitutes

for ozone depleting substances (ODSs). The problem of global warming (or the greenhouse effect), on the other hand, continues to be challenged by scientific uncertainty and strong opposing economic interests, and as yet there are no economically viable alternatives to human activities that result in the production of greenhouse house gas (GHG) emissions (Rowlands, 1995, chap.4; Soroos, 1997, chap.6, chap.7). Comparing the role that Russia has played as a partner in international efforts to combat ozone depletion, an issue characterized by compelling factors, versus its role in efforts to address global warming, a highly abstract and uncertain issue, should provide insight into the integrity of Russian international environmental policies, commitments and attitudes.

In order to undertake an analysis of Russian perspectives on global warming and ozone depletion, it is necessary to analyze the views of all parties both directly or indirectly involved in or affected by these important global atmospheric problems. Prior to the collapse of the Soviet Union, the major actor was the government and its agencies. While informal groups made up of scientists, scholars and experts existed, their views were not for the most part included in the larger decision-making process (DeBardeleben, 1985, chap.4). Furthermore, the views of citizens on environmental issues were not incorporated into the formation of policies. With the new political pluralism in Russia, however, it has become possible for NGOs and citizens to voice their opinions and to begin to play a role in policy and decision-making. Thus, the thesis will focus on these three major actors, that is the government, environmental non-governmental organizations (ENGOS) and the Russian public, in an effort to analyze the role that these groups have played, independently and interactively, in shaping Russia's approach and views towards international cooperation on global warming and ozone depletion.

The views and actions of the Russian government towards ozone depletion and global warming are examined in the first two chapters using a variety of English and Russian language primary and secondary sources. Russia's contribution to the problem of global atmospheric pollution in terms of its production of ODSs and GHGs, its

involvement in international scientific research into the causes of ozone depletion and global warming, its commitments under the ozone and climate change agreements, and the policies and measures adopted by the government to prevent an increase in ODS and GHG emissions are analyzed. Given the economic and political problems that Russia has been experiencing during the transition period, the government has increasingly relied on international financial and technical assistance to meet its global warming and ozone depletion commitments. Thus, another major focus of Chapters 2 and 3 is to examine the degree to which the international community has been involved in helping Russia meet its commitments under the ozone and global warming conventions by establishing appropriate policies and implementing programs to address global atmospheric change.

The policies of glasnost and perestroika introduced by Gorbachev set the stage for the formation of ENGOs, representing Russia's environmental movement, just before and following the collapse of the Soviet Union. Chapter 4 attempts to examine the role that these relatively new ENGOs are playing in promoting greater awareness and concern about environmental problems in general, and global warming and ozone depletion in particular. Using both English and Russian primary and secondary sources, a brief, historical review of the evolution of the environmental movement in Russia is presented first. An extensive analysis then follows of the extent, distribution and focus of Russian ENGOs, based on a current listing of active NGOs provided in "The Post-Soviet Handbook: A Guide to Grassroots Organizations and Internet Resources" (Ruffin, Deutschler, Logan, and Upjohn, 1999). Chapter 4 concludes with a discussion of the numerous problems which face ENGOs today, preventing them from playing a more active role in promoting the importance of such environmental problems as ozone depletion and global warming within political circles and within Russian society at large.

The formation of ENGOs in the past decade has been accompanied by increased environmental concern on the part of the Russian public. Chapter 5 examines in detail the degree to which citizens in Russia are aware and concerned about environmental

problems in general, and global warming and ozone depletion in particular. This detailed investigation is based on public opinion data taken from existing and available nationwide surveys, including the 1992 George H. Gallup survey entitled *Health of the Planet*, the 1993 International Social Survey Program's environment survey, and the 1997 International Environmental Monitor survey. In addition, the analysis in Chapter 5 identifies the profile of those Russians who are the most knowledgeable and concerned about environmental problems in general, and about global atmospheric pollution in particular. An effort is made to examine the validity of a number of hypotheses presented at the beginning of Chapter 5 to assess the relationship between socio-demographic characteristics and Russian attitudes on and sensitivities for environmental issues.

Chapter 6 synthesizes and highlights the information and findings from Chapters 2 through 5 in order to better assess the attitudes of Russia's government, ENGOs and citizens with respect to global warming and ozone depletion, and thereby to establish the insight needed to answer a number of questions relating to the thesis statement. Specifically, Chapter 6 attempts to determine whether the Russian government is or will be a responsible and reliable partner in finding solutions to global warming and the depletion of the ozone layer given the economic hardship and setbacks with which it is faced. Is Russia participating in international environmental cooperation on global warming and ozone depletion because it is genuinely concerned about protecting the Earth's atmosphere? Or is the Russian government involved in international efforts to combat global atmospheric pollution for symbolic reasons alone?

Chapter 6 will also attempt to establish how much of Russia's cooperation on global warming and ozone depletion can be explained by Russian policies as opposed to international pressure? Has Russia been purposely inactive on the problem of global atmospheric pollution, knowing full well that the West would eventually fund programs to address the problem and to help Russia meet its commitments? Or has the Russian government played an active role in finding solutions to global warming and ozone

depletion in order to obtain economic aid and concessions in other policy areas from the West? Would the Russian government have progressed as far in addressing global atmospheric pollution had funding from foreign donors not been available?

With respect to ENGOs, the analysis in Chapter 6 provides the basis to come to conclusions about whether the problem of global atmospheric pollution is of importance to the Russian environmental movement and whether ENGOs can be effective in mobilizing support for environmental issues. The collapse of the Soviet Union opened up new opportunities for cooperation between the Russian environmental movement and international organizations and epistemic communities, made up of NGOs, scientists and policy makers. How much influence have international environmental organizations exerted on Russian ENGOs to lobby for greater action on global warming and ozone depletion, and to educate the public?

Chapter 6 also provides a summary analysis of Russian public opinion in an effort to determine whether Russians, considering the economic and political challenges they face daily, are capable of thinking about environmental problems in their own country, let alone in the world? Do they realize the threat that global atmospheric pollution poses to all countries of the world? Also, how willing are Russian citizens to participate in measures at the societal level to protect the global atmosphere?

The final and concluding analysis in Chapter 6 assesses the future prospects for Russia's participation in and contribution to world efforts aimed at combating global warming and ozone depletion, and thus at protecting the Earth's atmosphere.

CHAPTER 2

OZONE DEPLETION: A SERIOUS ISSUE FOR THE RUSSIAN GOVERNMENT?

The Russian government has been involved in international efforts to protect the ozone layer since the first evidence connecting human activities to ozone depletion became available in the 1970's. This chapter attempts to analyze how seriously the Russian government has regarded the problem of ozone loss in the context of the economic and political instabilities that Russia has experienced over the past decade. As such, this chapter will examine Russia's production of ODSs, its involvement in international scientific research on ozone depletion, and its commitments under ozone agreements. The policies and measures adopted by the government to prevent an increase in ODSs, and the degree to which Russia has relied on foreign assistance to meet its obligations will also be explored. First, however, a brief overview of the history, discovery and the causes and effects of ozone depletion will be undertaken.

Background on Ozone layer Depletion

It was not until the end of the nineteenth century that scientists first discovered the presence of ozone in the Earth's atmosphere, and until 1930 that the British chemist Sydney Chapman theorized that ozone could be generated and destroyed. Data collected for the International Geophysical Year in 1957-58, almost 30 years later, led to theories throughout the 1960's and 1970's that the level of ozone in the atmosphere was not only affected by the presence of atomic oxygen, molecular oxygen, and ozone as Chapman had suggested, but also by hydrogen and nitrogen levels. In fact, it was Professor Paul Crutzen in 1970 who suggested that nitrogen oxides from fertilizers, and hydrogen and nitrogen compounds emitted by supersonic aircraft could cause ozone layer depletion. While numerous research efforts were initiated to determine whether large fleets of supersonic aircraft would contribute to ozone depletion, different studies and scientific viewpoints continued to clash. In the end, the development of supersonic transport (SST)

was cancelled by the USA and the Soviet Union because of high economic costs and limited commercial opportunities for the use of such aircraft, leaving only the British/French development of the Concorde. Hence, the SST threat to the ozone layer became less politicized, and was again only debated among scientists (Rowlands, 1995, chap.2; United Nations Environment Program [UNEP], 1999).

During the mid-1970's, scientists began to examine potential sources of ozone depletion on Earth instead of in the atmosphere itself. The first theory connecting human activities on the Earth to ozone depletion in the atmosphere was advanced by Sherwood Rowland at the University of California and Mario Molina at the Massachusetts Institute of Technology in 1974. Rowland and Molina made the breakthrough discovery that when chlorofluorocarbons (CFCs) break down in the atmosphere they release chlorine atoms, which cause ozone loss. Bromine atoms released from halons were also found to be responsible for the depletion of the ozone layer. At first, the Rowland/Molina CFC theory was not widely accepted, creating intense scientific and political debate throughout the late 1970's and early 1980's. With the discovery of an enormous ozone hole over Antarctica in 1985 by the British Antarctic Survey, however, concern at both the national and international levels began to grow. US satellite data confirmed that ozone levels had dropped over 30% during the Antarctic Spring (Rowlands, 1995, chap.2; Soroos, 1997, chap.6; UNEP, 1999).

Regardless of continued scientific debate, the 'ozone crater' over Antarctica led to increased global concern about the negative consequences of ozone depletion for humans. The ozone layer is vital to life on Earth, shielding it from the sun's harmful ultraviolet-C and ultraviolet-B radiation. The depletion of the ozone layer allows more UV-B radiation to reach the earth, resulting in an increase in the incidence of melanoma and non-melanoma cancers, eye cataracts, weakened immune systems, damage to human-made materials (paint, plastic, rubber), reduced plant yields, reduced fishing yields, damage to ocean and forest ecosystems, and adverse effects on animals. In addition, scientists have

found that ozone layer depletion could accelerate global warming by exposing phytoplankton in the oceans to damaging UV-B radiation. At present it is estimated that the phytoplankton in the oceans have the capacity to absorb 50% of the Earth's CO₂ production. Thus, any serious damage to phytoplankton as a result of ozone layer depletion could significantly accelerate global warming (UNEP, 1992, pp.14-23; UNEP, 1999).

Prior to industrialization, the level of chlorine in the atmosphere was only 0.6 parts per billion by volume (ppbv). With the discovery of CFCs in 1928, however, chlorine levels in the atmosphere increased significantly. CFCs were regarded to be 'wonder gases' since they had a long lifetime, were non-toxic, non-corrosive and non-flammable. From 1931 to 1945, CFC production increased 35-fold. As of the early 1990's, chlorine levels in the atmosphere had reached 3.0-3.5 ppbv and were continuing to rise. Scientists believe that the ozone hole over Antarctica will continue to form and increase every spring until ozone depleting substances (ODSs) in the atmosphere are reduced to less than 2 ppbv. Even with a drastic reduction, however, CFCs and halons already emitted will remain in the atmosphere for more than 100 years, resulting in further ozone depletion well into the 21st century (UNEP, 1992, p.5; UNEP, 1999).

Despite continued scientific uncertainty in the early 1980's surrounding the causes of ozone loss, many governments decided in 1985 to adopt a precautionary principle and sign the Vienna Convention on the Protection of the Ozone Layer. Further scientific research in the late 1980's revealed continued ozone loss over Antarctica and in the northern hemisphere. Shortly thereafter, governments agreed to the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer, setting binding targets for the reduction of CFC and halon production. While rapid cooperation on the ozone issue in the late 1980's is connected to the greater scientific certainty that existed on the impact of human activities on the ozone layer, progress was also quick because of the availability of suitable and economically viable substitutes for ODSs.

Since the Montreal Protocol came into force in 1989, a number of subsequent amendments were signed to speed the phase out of controlled ODSs and to add additional ODSs, including more CFCs, carbon tetrachloride, methyl chloroform, hydrochlorofluorocarbons (HCFCs), and methyl bromide (Rowlands, 1995, chap.2; Soroos, 1997, chap.6; UNEP, 1992, pp.4-7). Table 2.1 (page 16) provides a breakdown of the most common ODSs in terms of their uses, ozone depletion potential (ODP), global warming potential (GWP), contribution to ozone loss and lifetime in the atmosphere. As can be seen, while halons have a relatively high ODP, they do not stay in the atmosphere as long as some CFCs or contribute as much to ozone loss. HCFCs, with a lower ODP and shorter lifetime in the atmosphere, have been used as substitutes for CFCs but will also eventually be phased out in favor of hydrofluorocarbons (HFCs), which do not contribute at all to ozone depletion. While HFCs do have a GWP potential, it is considerably less than that of CFCs and halons.

International cooperation to combat ozone depletion has been extremely successful. In 1986 worldwide consumption of CFCs was 1.1 million tonnes, falling to 146,000 tonnes by 1997 as a result of strong phase out efforts on the part of industrialized countries. It has been estimated that without the Montreal Protocol, CFC consumption would have reached 3 million tonnes by 2010 and 8 million tonnes by 2060, resulting in a 50% increase in ozone loss by 2035 (UNEP, 1999).

Russia's Production and Consumption of Ozone Depleting Substances

In 1990, before the collapse of the Soviet Union, Russia was one of the largest producers and consumers of ODSs in the world, representing 15% to 20% of all global ODS production. As can be seen from Table 2.2 (page 17), production and domestic consumption of ODSs in Russia reached their peak in 1990 and since have steadily decreased. The greater than 80% drop in both production and domestic consumption from 1990 to 1997 can be attributed to both the economic and industrial decline in the country.

Table 2.1
Characteristics of Ozone Depleting Substances

Ozone Depleting Substance	Uses ^a	ODP ^b	GWP ^b	% Contribution to Ozone Loss	Lifetime (range in years) ^c
CFCs					
CFC 11	A F R S	1	1	26%	50-74
CFC 12	A A C F R	1	3	45%	74-120
CFC 113	A R S (electronics)	0.8	1.4	12%	90
CFC 114	A F R	1	4	--	200
CFC 115	A R	0.6	7.5	--	400-1,700
Halons					
Halon 1211	FE	3	na	--	25
Halon 1301	FE	10	na	4%	65-110
Halon 2402	FE	6	na	--	na
Carbon Tetrachloride	CF, P, S (synthetic rubber, dyes, metal degreaser, dry-cleaning)	1.1	0.3	8%	42-67
Methyl Chloroform	A, Ad, P, S (textile repellent, inks, semi-conductor cleaner)	0.15	0.02	5%	5.4-8
Methyl Bromide	P (fumigant for crops)	--	--	--	0.7
HCFCs^d					
HCFC 22	A A C F R	0.05	0.4	--	15
HCFC 123	A F R S	0.02	0.02	--	2
HCFC 124	A A C F R	0.02	0.1	--	7
HCFC 141b	A F R S	0.1	0.1	--	10
HCFC 142b	A A C F R S	0.06	0.4	--	20
HFCs^d					
HFC 125	R	0	0.6	--	28
HFC 134a	A A C F R	0	0.3	--	16
HFC 143a	R	0	0.7	--	41
HFC 152a	A C R	0	0.03	--	2

Adapted from: (Benedick, 1998, pp.16-17), (UNEP, 1992, p.27), and (UNEP, 1999).

-- Data not available. na - not applicable

^a A Aerosols AC Air Conditioning Ad Adhesives CF Chemical Feedstock
 F Foams FE Fire Extinguishers P Pesticides R Refrigeration
 S Solvents

^b Ozone Depleting Potential and Global Warming Potential index expressed in relation to CFC 11 (arbitrarily given a value of 1). The higher the value, the greater the chemical's ability to deplete the ozone layer.

^c Based on all three sources noted above.

^d Substitutes for CFCs and halons.

Table 2.2
Russia's Estimated Production, Domestic Consumption and Exports of ODSs
(metric tons/year)^a

Year	Production	Domestic Consumption	Exports	% of Production Exported
1990	117,930	70,000	47,930	47%
1992	66,515	36,665	29,850	45%
1995	44,865	--	--	--
1996	18,150	15,945	2205	12%
1997	15,900	11,780	4120	27%
1998	--	9,000 ^b	--	--
1999	--	6,000 ^b	--	--
After 2000	--	2,000-4,000 ^c	--	--

Adapted from: (Goskompriroda/IBRD, 1999, p.5) and (World Bank, 1998, pp.11-12).

^a Excluding carbon tetrachloride (not counted since it is used as a feedstock for ODS production).

^b Forecasts (Goskompriroda/IBRD, 1999) based on continued success of GEF ODS Consumption Phase Out Project in Russia. (see section in this chapter on external and financial technical assistance, page 41)

^c Forecast (Goskompriroda/IBRD, 1999) of residual demand in the solvent, refrigeration and fire protection sectors after GEF phase out initiatives complete.

-- Data not available.

Figure 2.1
Estimated CFC Production Capacity in 1997 Outside Compliant Industrialized Nations
 (Estimated Total: 290-300 thousand tons)

Source: (Goskompriroda/IBRD, 1999, p.3)

Figure 2.2
Sectoral Breakdown of ODS Consumption in the Russian Federation in 1992

Source: (Tselikov, 1997, p.8)

Despite Russia's ODS production decline, it was still producing 11% of the global production of regulated ODSs in 1997. This, however, represented a significant improvement over the Soviet Union's 1990 world share of 15% to 20%. This would indicate that Russia was succeeding in reducing its ODS production capacity relative to the rest of the world. On the other hand, if the comparison between 1990 and 1997 is made on the basis of CFC production capacity levels, Russia's ODS reduction results are far less positive. The reason for this is that in 1997 Russia still accounted for nearly 50% of the world's existing CFC production capacity outside of compliant industrialized nations (Figure 2.1, page 17). As can be seen from Table 2.1 (page 16), CFCs are the most destructive ODSs and account for nearly 85% of ozone losses. Consequently, in 1997, Russia still had a CFC production capacity that potentially could account for over 40% ($50\% \times 85\%$) of the Earth's ozone losses.

Remaining ODS production in Russia today supplies both a declining domestic market and a number of former Soviet states and developing countries. Although estimates vary from report to report, the latest data, given in Table 2.2 (page 17), show that exports accounted for 47% of Russia's total production of ODSs in 1990, falling to 27% in 1997. Of 1997 exports, 42% went to other CIS countries (mainly Ukraine) and 13% to developing or Article 5 countries in the Montreal Protocol who have been given a 10 year grace period before they have to start phasing out ODSs. The remaining exports were sent to OECD countries where they were re-exported to Article 5 countries (State Committee for Environmental Protection [Goskompriroda]/International Bank for Reconstruction and Development [IBRD], 1999, pp.5-6).

A breakdown of total consumption of ODSs (excluding HCFCs) in Russia in 1992 by sector (Figure 2.2, page 17) shows that the aerosol sector was by far the largest, accounting for 46% of consumption. The refrigeration, solvent, foam and fire protection sectors accounted for 27%, 14%, 11% and 2% of total ODS consumption respectively in 1992 (Tselikov, 1997).

Consumption of ODSs (CFC 11 and CFC 12) in the aerosol sector in 1992 was estimated at 18,200 MT/year, 98% of which was concentrated among eight companies in the consumer and industrial sectors of the Russian economy. Refrigeration, the second largest sector (10,700 MT), can be broken down into four sub-sectors: the domestic, commercial, industrial and refrigeration servicing sectors. In 1993, nearly 30 factories across Russia were producing refrigeration units. The servicing of domestic, commercial and industrial equipment accounted for the largest share of the refrigeration sector in 1992. The main ODSs used in Russia's refrigeration sector include CFC 11, CFC 12, CFC 113, HCFC 22, and HCFC 141b (Solov'ianov, 1997; World Bank, 1998, pp.7-10).

The non-insulating foam sector in Russia uses mainly CFC 11 and CFC 12 for bedding, carpet underlay, shoe soles, automotive components and construction materials. In 1992, the estimated ODS consumption in this sector was 4,300 MT. A total of 5,400 MT of ODSs (CFC-113, carbon tetrachloride, methyl chloroform) were used in the solvent sector in Russia in 1992 for electronics and metal parts cleaning. The smallest sector, fire protection, accounted for the consumption of 900 MT of ODSs in 1992. Halon 1211 (50 MT), Halon 1301 (50 MT) and Halon 2402 (800 MT) are the ODSs used for extinguishing fires (World Bank, 1998, pp.10-11).

Given that Russia represents almost half of the world's remaining CFC production capacity, the Russian government's involvement in international efforts to combat the depletion of the ozone layer has been crucial. The following analysis aims to examine the role that Russia, both prior to and after the collapse of the Soviet Union, has played in international negotiations aimed at protecting the ozone layer.

International Agreements to Protect the Ozone Layer

The first international conference to discuss the possibility of developing an agreement to protect the ozone layer was held in Washington, D.C., in 1977. It was not until 1982 however, that the United Nations Environment Program (UNEP) assembled a working group of experts in response to the Washington conference to draft the

framework convention that would be signed in Vienna three years later. Negotiations on the ozone treaty became polarized around two groups of countries, one known as the Toronto Group, including Austria, Canada, Finland, Norway, Sweden, Switzerland, and the United States, and the other, a bloc of countries including the EC, Japan and the USSR. The Toronto group had placed bans in the late 1970's on the non-essential use of CFCs and were proposing that other industrial countries do the same in the form of an ozone treaty. They did not want to further jeopardize the competitiveness of their own ODS industries in highly profitable export markets by taking further measures to reduce ODS production unless other countries started the process of eliminating non-essential CFCs. The European Community (EC), Japan and the USSR however, continued to argue that scientific uncertainty still remained surrounding the connection between CFCs and the destruction of the ozone layer and that no treaty should be developed until further evidence had been gathered. All three were using the scientific uncertainty argument as a means to protect their CFC export markets (Soroos, 1997, chap.6).

Ultimately the Soviet Union did agree to the Vienna Convention for the Protection of the Ozone Layer in 1985, despite the fact that scientific proof, in their view, was still lacking and that there was still a threat to the profitability of the USSR's CFC exports. One reason that explains the Soviet government's final decision to accept the convention was its highly politicized nature, and thus the international pressure applied on the USSR as one of the largest producers of ODSs in the world to comply with the prevailing views of many other industrialized nations. Another reason for the USSR agreeing to the Vienna Convention could be, as Kotov and Nikitina argue, that it entered into many international environmental agreements to preserve a good image for the Soviet Union in world affairs and to get foreign policy concessions from the West in other, more important areas (Kotov and Nikitina, 1995).

Whether or not the protection of the ozone layer was one of the Soviet Union's primary objectives in accepting the Vienna Convention, it must be given credit for being

one of the first countries to ratify the Convention in 1986. Having ratified the Convention, the USSR was required to adopt legislative and administrative measures to reduce its production of ODSs, but only if scientific proof became available that human activities were indeed resulting in the depletion of the ozone layer (see Table 2.3, page 22). Considering that the Soviet government was still skeptical about the negative impact of human activities on the ozone layer, it probably thought that it would never have to develop legal or administrative mechanisms to reduce ODS production, perhaps explaining its quick ratification of the Convention. Nevertheless, it at least took the important step of ratification ahead of both the EC and Japan.

The second provision of the Vienna Convention required the Soviet Union to participate in international scientific efforts to monitor the impact of human activities on the ozone layer, to research the implications for life on earth of ozone depletion and to exchange scientific information with other countries (Table 2.3, page 22). Given that the Soviet Government had a strong belief that science and technology could solve any problem, and that it was in support of gathering further scientific evidence on the connection between human activities and ozone depletion, it made a large contribution to international research activities and thus met the second major provision of the Vienna Convention. In fact scientific research was the Soviet Union's primary means of cooperating with other countries to address ozone layer depletion. Joint scientific cooperation was viewed by the USSR as a non-confrontational means of complying with international environmental agreements, allowing it to be less involved in highly politicized negotiations. What was important for the Soviet government was to portray an image of cooperativeness, regardless of the substance of the cooperation (Darst, 1997b).

With the discovery of the ozone hole over Antarctica in May 1985, two months after the signing of the Vienna Convention, and the report on the thinning of the ozone layer issued by the World Meteorological Organization (WMO) and the United Nations

Table 2.3
Summary of Russia's Obligations
Under International Agreements to Protect the Ozone Layer

Agreement and Date Opened for Signature	Date Russia Ratified	Entry Into Force	Main Obligations
Vienna Convention for the Protection of the Ozone Layer (Mar 1985)	June 1986	Sept 1988	<ul style="list-style-type: none"> - adoption of legislative and administrative measures to reduce ODS if human activities found to be responsible for the depletion of the ozone layer - international cooperation in monitoring, scientific research and exchange of information on the impact of human activities on the ozone layer and the consequences for life on earth of ozone depletion
Montreal Protocol on Substances that Deplete the Ozone Layer (Sept 1987)	Nov 1988	Jan 1989	<ul style="list-style-type: none"> - freeze of 5 common CFCs (11, 12, 113, 114, 115) 1986 levels by 1989; 50% reduction from 1986 level by 1998 - freeze of 3 most common halons (1211, 1301, 2402) at 1986 levels after 1992 - list of products containing controlled ODS by 1992 and ban on their import from non-parties in 1993 - introduction of import control measures for goods produced with but not containing controlled ODSs
London Amendment (June 1990)	Jan 1992	Aug 1992	<ul style="list-style-type: none"> - phase out of expanded list of 15 CFCs (CFC 13, 111, 211 to 217 added) and 3 most common halons by 2000 - addition and phase out of solvents: carbon tetrachloride by 2000, methyl chloroform by 2005 - addition and phase out of HCFCs by 2040 - Multilateral Fund (MLF) created to help developing countries phase out ODSs
Copenhagen Amendment (Nov 1992)	Not Ratified	June 1994	<ul style="list-style-type: none"> - date advanced for phase out of CFCs, carbon tetrachloride and methyl chloroform to Jan 1996* - advanced phase out of halons by Jan 1994* - addition of methyl bromide - addition of HBFCs and phase out by 1996 - advanced phase out of HCFCs by 2030 - MLF accepted as financial mechanism for aiding developing countries to phase out ODSs
Montreal Amendment (Sept 1997)	Not Ratified	Nov. 1999	<ul style="list-style-type: none"> - finalization of schedule for phase out of methyl bromide - advanced to 2005

Adapted from: (Benedick, 1998, pp.335-340), (Soroos, 1997, chap.6), (UNEP, 1992, pp.4-7), and (UNEP, 1999).

* Mandatory adjustments for parties who have ratified the Montreal Protocol. Adjustments to the Montreal Protocol do not have to be ratified. They come into force 6 months after the circulation of the adjustments to the Parties by the Depository. Thus, adjustments contained within the Copenhagen Amendment would have come into force in May 1993 (Graber, 2000).

Environmental Program (UNEP) in 1986, compelling scientific evidence was finally available connecting the depletion of the ozone layer to human activities. The greater scientific certainty around ozone depletion resulted in increased attention at both the national and international levels to the need to reduce the world's production and consumption of ODSs. Even though the Vienna Convention would not come into effect

until 1988, the shocking effect of the Antarctic ozone hole discovery pushed the international community to speed up plans to develop targets and deadlines for the reduction of ODSs. The international consensus and willingness to cooperate was so great that, just two years after the Vienna Convention, the Montreal Protocol on Substances that Deplete the Ozone Layer was adopted (Soroos, 1997, chap.6).

Getting all countries on board to accept the Montreal Protocol, however, was not an easy task. In the months leading up to the adoption of the Protocol, the United States undertook a huge international campaign to promote the need for governments to cooperate on addressing the depletion of the ozone layer. The US government, aided by Canada, Finland, New Zealand, Norway, Sweden and Switzerland, focused particular attention on the EC, Japan, the Soviet Union, and some developing countries who did not attach a lot of importance to ozone depletion and who were far from being committed to accepting binding emissions targets. The US diplomatic strategy depended to a large degree on concrete science as opposed to discussions pertaining to potential future catastrophes and to the Antarctic ozone hole, which was not 100% confirmed to be related to human actions (Benedick, 1998, chap.5).

Sensing that the USSR was not fully up to date on the latest scientific research on ozone depletion, the US government made an offer to the Soviet Union of bilateral scientific cooperation on research related to ozone depletion and climate change in December 1986, which the Soviet government was quick to accept. A 1987 US scientific mission to Moscow proved successful in promoting greater understanding among Soviet officials and scientists about the most current findings on ozone depletion and in weakening their opposition to adopting strong measures to reduce global ODS production (Benedick, 1998, chap.5, chap.7). American-Soviet joint scientific research continued under Reagan and Gorbachev. In fact, in 1991 the Soviet Union aided the USA greatly when it was unable, due to budget constraints, to launch a new satellite to replace Nimbus-7, which had carried ozone measuring equipment but had reached the end of its

space life. The USSR agreed to carry new ozone measuring equipment on a weather satellite that it was launching in 1991 (Benedick, 1998, chap.8).

The USA's scientific mission to Moscow appeared to have had an effect on the Soviet government, since it adopted the Montreal Protocol at the end of 1987, and was quick to ratify it a year later. Besides the US government's efforts to persuade the USSR to cooperate on ozone depletion, early ratification was no doubt connected to Mikhail Gorbachev's new policies of perestroika and glasnost that were resulting in greater debate and openness in Soviet society at the time of the signing of the Montreal Protocol in 1987. Public concern about the deplorable state of the environment in the Soviet Union reached its height in the late 1980's and early 1990's. Furthermore, the Chernobyl accident in 1986 was a watershed in terms of bringing environmental concerns to the forefront in the Soviet Union (Peterson, 1993, chap.1). A direct example of how Gorbachev's policy of glasnost helped ozone negotiations was the Soviet Union's release of CFC production figures for the first time in 1986 (Benedick, 1998, chap.8; Litfin, 1994, chap.4; Rowlands, 1995, chap.4).

The Soviet government's adoption of the Montreal Protocol was not only connected to scientific cooperation with the USA and Gorbachev's policies of glasnost and perestroika. Getting the USSR to agree to the Montreal Protocol also required intense negotiations and large compromises. In fact, had a number of problems raised by the Soviet Union not been addressed, it probably would not have agreed to the protocol. Firstly, the Soviet government was one of the most opposed to including halons on the list of controlled substances within the Montreal Protocol. Used as fire extinguishers to protect important national treasures such as the Hermitage Museum, and in the defence and space industries, the USSR did not feel that adequate substitutes were available for this important ODS. Fortunately, the US scientific mission in 1987 succeeded in convincing the Soviet Union of the importance of controlling a number of different ODSs, including halons (Benedick, 1998, chap.7, chap.11).

A second problem that the Soviet government had with regard to the Montreal Protocol was again connected to halons. Towards the end of negotiations on the Protocol, it was discovered that the USSR was using a halon that had never been used in any other country. In order to get the Soviet government to agree to including this rare halon on the list of controlled ODSs, other countries had to compromise in a third area that was a problem for the USSR, that is the base year at which ODSs would have to be frozen. Instead of 1986, the USSR wanted 1990 to be the base year, making other countries afraid that it wanted in fact to maximize its ODS production from 1986 to 1990. However, in the end it was ascertained that the problem was that the Soviet Union had an existing five year plan (1986-1990) that called for a small increase in CFCs and which could not be changed under Soviet law. To accommodate the Soviet Union a clause was added to the Protocol allowing a country (except Article 5, that is developing countries) to add to its 1986 production base output from facilities legislated or under construction before 1987, completed by 1990, and which did not raise per capita CFC consumption in a country above 0.5 kg. Thus, the Soviet Union agreed to include its rare halon among the Montreal Protocol's controlled ODSs in return for being allowed to include two CFC plants already under construction into its 1986 production base (Benedick, 1998, chap.7; Litfin, 1994, chap.4; Rowlands, 1995, chap.5).

As can be seen from Table 2.3 (page 22), by ratifying the Montreal Protocol the Soviet Union, together with other countries, was obligated to freeze its 'production' of the five most common CFCs at 1986 levels by 1989. It was also required to limit its 'production' of the three most widely used halons at 1986 levels after 1992. In the protocol, 'production' actually refers to production plus imports minus exports. During negotiations the EC argued against controlling consumption within each country because of the difficulties of monitoring numerous consumption points and also because as consumption declined the US would have excess domestic capacity and would thus enter export markets, jeopardizing the profitability of CFC industries in the EC. Other

countries were against controlling production because they felt that it would result in existing producers having too much power, especially the EC, which could in the end have a monopoly over CFC production. Adding imports and subtracting exports from production would ensure that a monopoly did not form in CFC export markets (Benedick, 1998, chap.7).

The Montreal Protocol also obligated the Soviet Union, as a ratifier, to compile a list of all the goods that it produced containing controlled substances by 1992. A final provision of the protocol pertained to trade, requiring that ratifiers ban their imports of controlled ODSs from other industrialized countries not party to the protocol and that they introduce import control measures against goods produced with, but not containing controlled substances.

It was only two months after the adoption of the Montreal Protocol that even greater scientific evidence with regard to the connection between human-made ODSs and ozone depletion became available. In March 1988, the Ozone Trends Panel released a report compiled by over 100 scientists from 10 countries. The report concluded that CFCs and halons were causing the depletion of the ozone layer beyond a reasonable doubt. In addition to confirming the ozone hole over Antarctica, the report discovered ozone losses of 1.7% to 3.0% over the northern hemisphere, including North America, Europe, the Soviet Union, China and Japan. During winter months ozone loss was even higher, ranging from 2.3% to 6.2%. Furthermore, the Ozone Trends Panel determined that the ozone loss of 2% predicted by the Montreal Protocol had in fact already occurred and that the rate of ozone loss was accelerating (Benedick, 1998, chap.9).

In light of the new information about ozone losses in the northern hemisphere and the fact the Montreal Protocol would do nothing to slow down ozone loss if implemented, governments became even more concerned about the ozone problem. Given the Soviet Union's geographic dominance in the north, it would be logical to assume that it would have been one of the most concerned countries in the world. However, at the Save the

Ozone Layer Conference in London in March 1989, the Soviet delegation challenged scientific findings by saying that "Arctic ozone depletion was primarily caused by weather and climate, and not by man's emission of gases" (Rowlands, 1995, p.58). The Head of the Soviet delegation also stated that stronger measures could only be undertaken when more scientific evidence became available, implying that international scientific findings to date had not proven anything. However, two months later the Soviet Union appeared to have changed its position (Rowlands, 1995, chap.2). Why the USSR suddenly changed its viewpoint is unclear, but it could be that it only did this to preserve its international image, while still doubting the growing scientific evidence.

In 1990, only one year after the Montreal Protocol had come into force, reports and further scientific evidence showing that the ozone layer was thinning more rapidly than had been expected, resulted in the creation of the London Amendment. As can be seen from Table 2.3 (page 22), the most progressive provision of the London Amendment to the Montreal Protocol required countries to completely phase out an expanded list of the fifteen most common CFCs, in addition to the three most common halons, by 2000. In addition to expanding the list of CFCs to be controlled, the London Amendment also added carbon tetrachloride, methyl chloroform and HCFCs to the list of controlled ODSs. Carbon tetrachloride was to be phased out by 2000, methyl chloroform by 2005, and HCFCs, leading substitutes for CFCs, by 2040. A new provision introduced by the London Amendment was the decision to create a Multilateral Fund for the Implementation of the Montreal Protocol (MLF) to help developing countries phase out ODSs. As an industrialized country, the Soviet Union was required to contribute to the MLF.

Negotiations on the London Amendment proved to be just as intense as those that had taken place in the creation of the Montreal Protocol. Countries with their own vested interests brought their problems to meetings and compromises had to be made. During negotiations, the Soviet Union was one of the countries most opposed to adding

carbon tetrachloride to the list of controlled ODSs. Had scientists known earlier that carbon tetrachloride use accounted for half of all 1986 CFC and halon use combined, it would have been included in the original Montreal Protocol. Many Western countries had banned the use of carbon tetrachloride because of its toxicity, while Eastern European countries, and particularly the Soviet Union, had made wide use of the chemical since it was cheap and simple to produce. The Soviet delegation, however, was unable in the end to prevent the addition of carbon tetrachloride to the list of controlled ODSs (Benedick, 1998, chap.10; Litfin, 1994, chap.5).

While the USSR tried to salvage carbon tetrachloride, the reverse was true for methyl chloroform, which was used to a far greater extent in other countries, particularly Japan. While methyl chloroform has a low ozone depletion potential (ODP), its consumption in 1986 exceeded that for the two most widely used CFCs (11 and 12) (Benedick, 1998, chap.10). It turned out that the Soviet Union made very little use of methyl chloroform and so strongly advocated that it be banned by 1992. The USSR subsequently changed its proposal to an 85% reduction in methyl chloroform by 2000. Eventually 2005 was agreed upon for the phase out date, quite far into the future from the 1992 date originally proposed by the Soviet Union (Litfin, 1994, chap.5).

The issues with halons that had concerned the Soviet government during the Montreal Protocol also arose again in negotiations over the London Amendment. Considerable debate occurred over the phase out date for halons, with the Toronto Group proposing that they be phased out by 2000, and the Soviet Union suggesting a reduction of between 10% and 50% by 2000 since no other substitutes existed for some of the USSR's halon uses. A 1990 US mission to Moscow, however, was able to persuade the Soviet government to accept the 2000 date, on the condition that the USSR would be allowed to continue using halons, but only for special, essential purposes. By the time the Soviet Union agreed to the 2000 deadline for phasing out halons, however, substitutes for these ODSs were already becoming more readily available (Benedick, 1998, chap.11).

In October 1991, scientific research that UNEP and the World Meteorological Organization (WMO) had been undertaking on ozone depletion became public. UNEP/WMO found, similar to the study undertaken by the Ozone Trends Panel in 1988, that ozone losses were greater than had originally been predicted. A further assessment in January 1992 confirmed even higher ozone losses totalling more than 20% in the northern hemisphere, and between 40% and 45% for a few days over Russia. Although the eruption of Mount Pinatubu in the Philippines in June 1991 would have added to natural chlorine emissions in the atmosphere, humans were still contributing a great deal to ozone loss and many governments expressed concern about the rapid deterioration of the ozone layer that had occurred (Rowlands, 1995, chap.2).

In addition to UNEP/WMO ozone loss assessments in 1991, NASA had also detected that ozone depletion over the US was occurring at twice the predicted rate, with losses between fall 1990 and spring 1991 reaching as far south as Florida. The Soviet Union was very skeptical about NASA's findings (Benedick, 1998, chap.14), echoing the disregard it expressed in London in March 1989 for potential future ozone holes over the Arctic (see page 27). Considering that UNEP/WMO found maximum depletion of 40-45% over Russia for a few days, it is surprising that the Soviet government would not have taken the scientific findings of these respected international organizations more seriously. Whether or not the position of the Soviet government was based on the scientific assessments of its own scientists is unclear.

With new scientific evidence showing ozone depletion progressing at a faster pace than ever predicted, governments once again undertook negotiations to create even stronger phase out schedules for ODSs in the form of the Copenhagen Amendment. As can be seen from Table 2.3 (page 22), the Copenhagen Amendment of 1992 contained a number of adjustments that were mandatory for parties who had ratified the Montreal Protocol. Thus, even if a country did not ratify the Copenhagen Amendment, it was required to phase out CFCs, carbon tetrachloride and methyl chloroform by 1996 as

opposed to the year 2000, and halons by 1994. Adjustments come into force six months after the circulation by the Depository of the changes to all parties of the Montreal Protocol (Graber, 2000). Therefore, the Copenhagen adjustments would have come into force in May 1993. The Copenhagen agreement also added methyl bromide and hydrobromofluorocarbons (HBFCs) to the list of controlled substances and advanced the phase out date for HCFCs to 2030. These final provisions, however, only applied to countries who ratified the Copenhagen Amendment.

Following the Copenhagen Amendment, even greater efforts were made by governments to speed up phase out in the light of more scientific information showing increased ozone loss over Antarctica. At a Meeting of the Parties (MOP) to the Montreal Protocol in Vienna in 1995 a number of adjustments, mandatory for all ratifiers of the Montreal Protocol were adopted, but not in the form of an official agreement. Countries were notified of several adjustments, which would come into force in six months. The adjustments included phasing out HCFCs even sooner, by 2020, eliminating the use of methyl bromide by 2010, and banning trade in methyl bromide between parties to the Copenhagen Amendment. The most recent amendment took place in Montreal in 1997, advancing the deadline for phasing out methyl bromide to 2005.

The London Amendment was the last international agreement on the protection of the ozone layer that Russia ratified. With the collapse of the Soviet Union at the end of 1991, Russia accepted the provisions laid out in the Vienna Convention, Montreal Protocol and London Amendment, but due to economic, social and political problems has not been able and/or willing to ratify the Copenhagen and Montreal Amendments. Since Russia did ratify the Montreal Protocol however, it is required to comply with any mandatory adjustments specified in amendments to the Protocol. As will be seen in the following section, despite a dramatic fall in ODS production and consumption in Russia owing to the sharp decline in industrial production, it has still faced many difficulties,

both financial and institutional, in meeting the mandatory adjustments specified in the Copenhagen Amendment relating to the accelerated phase out of CFCs and halons.

Measures and Policies Adopted by the Russian Government

While Russia, and the Soviet Union before it, have been highly involved and successful in international scientific research and cooperation on studying the depletion of the ozone layer, they have not been as successful in reducing their production and consumption of ODSs as required by international environmental agreements on the protection of the ozone layer. One reason for Russia's noncompliance is clearly the economic and political instability that faced the country during the perestroika period and after the collapse of the Soviet Union. Institutional weakness among government agencies and financing problems have been huge barriers to compliance. Despite funding problems, however, a truly committed government would still make efforts to be in compliance and to cooperate with other countries. The following review of Russia's attempts to comply with its ozone obligations will provide some indication of just how committed the Russian government has been to protecting the ozone layer.

ODS Phase Out Schedules

Russia expressed concern as early as 1992, during negotiations on the Copenhagen Amendment, that it would not be able to meet the mandatory advanced phase out schedules being proposed by other industrialized countries. Thus, faced with being out of compliance for not meeting the 1994 deadline for halon phase out and the 1996 deadline for CFC phase out, the Russian government requested in 1993, to the irritation of developing countries, that a special category for "parties with problems similar to those of developing countries" be created (Benedick, 1998, p.279). By August 1994, having already failed to meet the halon phase out deadline, the Russian Federation was arguing that other international environmental agreements, such as the climate change and biological diversity conventions, had created a special category for countries

in transition, and that the ozone convention should do the same (Benedick, 1998, chap.17).

In May 1995, the Russian government, and other transition countries, requested that they be granted an extension of 4 years (from 1996 to 2000) to phase out their production and consumption of ODSs because of economic difficulties (see Table 2.4, page 33), that they be temporarily exempt from having to make financial contributions to the MLF, and that they be provided with financial assistance (Benedick, 1998, chap.17; Emel'ianenkov, 1997). In addition to these three requests, Prime Minister Viktor Chernomyrdin delivered a speech stating Russia's commitment to protecting the ozone layer and reviewing Russia's plans and programs, but stating that it would be unable, for economic reasons to meet the Copenhagen Amendment's 1996 CFC deadline (Benedick, 1998, chap.17). However, the co-chair of the Montreal Protocol's Halon Technical Options Committee has suggested that it is not only because of financing problems that Russia failed to undertake measures to phase out its production of ODSs. Apparently, the Russian government was still concerned about the effect that the phase out would have on both the country's export earnings in this area and on many Russian towns still reliant on the ODS industry for economic survival (Metchis, 1995).

By 1995, Russia and other transition countries had attempted to discuss their problems with all the Montreal Protocol's institutions, and even with the UNEP executive director. Although the protocol had a process for noncompliance it appeared that Russia was instead "seeking a high-level political settlement without formally submitting to the data-reporting and other requirements that were part of the noncompliance process" (Benedick, 1998, p.281). Russian Environment Minister Viktor Danilov-Danilyan defended Russia against accusations at negotiations in Vienna in 1995 that it was not doing enough to force its ODS industry to comply with ozone commitments, saying that the Montreal Protocol was signed in the Soviet era and that Russia today was "poorer than those who it was supposed to be helping" ("Russia Seeks More", 1995). The United

Table 2.4
Summary of Major Regulatory Enactments and Official Communiqués
Approved by the Russian Government and Related to Compliance with Ozone Commitments

Enactments/Communiqués	Date	Required Actions
Resolution No. 378 Measures to Ensure Compliance with the VC* and the MP*	Jun 3 1992	<ul style="list-style-type: none"> - created the Inter-Agency Commission for Ozone Layer Protection (IAC) - required government agencies to develop a program, with a finance plan, to ensure Russia's compliance - ordered the Ministry of Finance to allocate funds annually to the MLF
Resolution No. 875 Functioning of IAC	Aug 30 1993	<ul style="list-style-type: none"> - placed the IAC under Minpriroda - ordered the IAC to coordinate ODS activities of government departments
Resolution No. 526 Priority measures to ensure compliance with the VC and MP	May 24 1995	<ul style="list-style-type: none"> - approved actions to ensure compliance with ozone commitments - appointed Minpriroda to coordinate activities and submit timetable for ODS phase out - ordered the Ministry of Finance to fund ODS activities and approve 1996 budget allocations - required special licenses as of Jan 1996 for ODS exports/imports to/from countries party to the MP and prohibited exports/imports to/from other countries - ordered Minpriroda, the Ministry of Foreign Economic Relations and the State Customs Committee to create a list of controlled ODSs - ordered Goskomstat to submit annual ODS consumption and production reports to Minpriroda and to the State Committee on Standards to manage ODS standards and certification - required government agencies to submit annual applications to Minpriroda for ODS production
Letter to Parties of the VC and MP	May 26 1995	<ul style="list-style-type: none"> - confirmed commitment of Russian government to the MP - provided update on actions to meet commitments and requested a 4 year extension for ODS phase out
Minpriroda** Letter to the Parties of the VC and MP	Feb 26 1996	<ul style="list-style-type: none"> - confirmed commitment to VC and MP and announced IAC as main coordinating body for ozone activities - announced the introduction of a diminishing quota and licensing system as of Jan 1996 for ODS consumption and production - announced that as of Jan 1996, the State Committee on Standards would issue ODS standards/certification - announced that ministries and government agencies were undertaking ODS inventories and ordered estimate of ODS needs until 2005 to be completed by April 1996 - advised that ODS exports as of Jan 1996 would be controlled: limited export to CIS countries with no re-export and control over export of used ODSs and those set aside for destruction - informed that ODS controls and regulations would be operational by the end of 1997

Source: (Goskompriroda/IBRD, 1999, pp.12-14)

* VC=Vienna Convention MC=Montreal Protocol

**Minpriroda was lowered from a ministry to a state committee, Goskompriroda, in August 1996.

States urged the Ozone Secretariat to accept Russia's statement that it would be out of compliance by 1995 as a reason to put the protocol's noncompliance mechanism into operation for the first time. The Implementation Committee, in charge of control measures for countries out of compliance, granted Russia an extension to 2000 to phase out CFCs and halons after it submitted detailed phase out programs and agreed to regular reporting. The Committee also recommended that financial assistance be provided to Russia and other countries in economic transition (Benedick, 1998, chap.17).

Multilateral Fund Contributions

In addition to not meeting phase out deadlines, Russia has also not met the provision requiring it to make yearly contributions to the MLF despite a 1992 government resolution requiring the Ministry of Finance to allocate funds on an annual basis to the MLF (see Table 2.4, page 33). While Russia's lack of contributions to the fund is regarded poorly by other parties, it is not an indication of noncompliance since the original agreement on the MLF was worded in such a way that contributions were meant to be voluntary. Nevertheless, Russia has continuously been behind in its voluntary payments. Its arrears for 1991 and 1992 totalled US \$15 million, while arrears over the 1991-1995 period totalled US \$47 million, or 72% of total MLF arrears over the same period. Interestingly, by late 1995, Bulgaria, the Czech Republic and Hungary had fully or almost paid their 1991-1995 voluntary obligations to the MLF while Poland, Slovakia and Ukraine had made some contributions (Benedick, 1998, chap.16, chap.17). It is difficult to understand why Russia would have ratified the London Amendment in 1992, thereby undertaking to make contributions to the MLF when it was already in arrears and economic conditions in the country were rapidly deteriorating. It could be that the Russian government did not foresee economic problems being so intense in the future. A more likely explanation, however, and one that seems to be consistent with the USSR's general approach to all international environmental agreements as suggested by Kotov

and Nikitina, is that commitments were adopted in many cases without an evaluation of the Soviet Union's ability to comply (Kotov and Nikitina, 1995).

In addition to not making its voluntary MLF contributions, Russia has even tried to benefit from the MLF. Russia promised to meet the new 2000 CFC and halon phase out target, provided however, that it receives adequate financial assistance from other countries. In fact, a dispute occurred between Article 5 (developing countries) and transition countries over the MLF. Transition countries felt that they were temporarily worse off than developing countries and thus should be eligible to obtain money and assistance from the MLF, when in fact they were required to make voluntary contributions to the fund. Article 5 countries were enraged by the efforts of transition countries to obtain funds from the MLF, which were intended for countries with serious financial difficulties, namely developing countries. Russia does not qualify for financial assistance from the MLF for the implementation of the Montreal Protocol since its annual per capita consumption of CFCs is greater than 0.3 kg. Thus a number of developed countries have contributed to a grant administered by the World Bank Global Environmental Facility (GEF) (discussed on page 41) to help transition countries, particularly Russia which accounts for around half of existing global CFC production capacity, to phase out CFCs and halons by their new 2000 deadline (Benedick, 1998, chap.17; UNEP, 1999).

Illegal ODS Exports

Another noncompliance issue, requiring special mention, has been Russia's illegal ODS exports. Besides not being able or willing to meet the required deadlines for the phase out of ODSs or to make MLF contributions, Russia has also been accused of allowing the illegal export of CFCs to countries, which have banned or imposed controls on the import of such substances. As a result of the Vienna Convention and Montreal Protocol, the supply of CFCs has declined dramatically while world demand has

remained high resulting in a black market for recycled CFCs. The black market for CFCs has originated primarily in Russia and other transition countries where there is a high demand for hard currency and a CFC surplus given the decline that has occurred in domestic consumption. The US Environmental Protection Agency (EPA) reported that at least 900 tons of CFCs were imported into the United States from Russia during the first half of 1995. The Russian government responded by stating that they were CFCs from decommissioned missile silos. However, chemical analyses undertaken on the illegally exported substances revealed that they had a purity level of 99.7%, which is very difficult to achieve through recycling (Metchis, 1995).

Russian CFC surpluses have not only entered the United States, but have also been discovered in black markets in Western Europe and Latin America. Smugglers have falsified import documents by either specifying the US as a country through which a shipment is merely passing to the import country or by stating a fictitious country of origin, and have labelled containers as recycled rather than as virgin CFCs. The MLF has been an important tool for preventing black markets from forming in most developing countries by providing CFC alternatives. Developing countries have been very resistant to efforts by Russian and Indian firms to market or dump their CFCs. The international black market for CFCs, blamed primarily on Russia, but also on India and China, threatened the Montreal Protocol since it lowered the price of CFCs relative to alternatives (Lyle, 1997) and reduced incentives for recycling used CFCs and replacing old equipment used to produce ODSs. Industries, particularly in the US, which had invested large amounts of money in developing CFC substitutes were particularly concerned, forcing US Vice President Gore to discuss the black market in CFCs with Russian Prime Minister Viktor Chernomyrdin and to request that efforts be taken by Russia to control illegal exports (Benedick, 1998, chap.17).

At the 7th MOP held in Vienna in 1995, the Ozone Secretariat passed a resolution discussing the need for strict control over Russia's production, consumption, exports, and

imports of ODSs. The questions of using economic sanctions against Russia and of banning its ODS exports to developing countries (excluding the CIS since these ex-Soviet Republics had no other access to these products) were also discussed. At a subsequent MOP to the Montreal Protocol, another resolution was passed reminding Russia that it had to provide the implementation committee with information on its ODS production and consumption. Russia was also requested in this resolution to use its capacity to recycle ODSs to the maximum in order to meet domestic consumption, and thus to meet the provisions of the Montreal Protocol (Solov'ianov, 1998).

In order to address the problem of illegal exports of ODSs to countries with bans and import controls on such substances, the Russian government passed a decree in May 1995 requiring that licences be obtained for the export and import of ODS shipments (see Table 2.4, page 33). As of 1996, Russian licensed ODS exports were only allowed to developing countries and other CIS countries. Furthermore, to obtain a license, importing countries had to agree not to re-export ODS shipments arriving from Russia (Barabanov, 1998). In 1997, the State Committee for Environmental Protection received more than 5,000 requests for the export and import of ODSs and goods containing these substances (Solov'ianov, 1998). However, there is no information available to confirm whether authorities enforced the licensing requirements as set out in the government's May 1995 decree.

Action Plans and Programs

Since the adoption of the Montreal Protocol in 1987, the Russian government has initiated three national programs to address ozone depletion. The first program involved research on the ozone layer and began in 1990, while the second dealing with technologies for the production of ozone friendly halons was implemented in 1992. The Russian government was also in the process in 1992 of developing the third program entitled "Production of ozone friendly refrigerants and Russia's compliance with international obligations to protect the ozone layer". This program included plans to

introduce ozone friendly substitutes and technology into enterprises and measures aimed at collecting and recycling ODSs. Despite the Russian government's efforts at trying to phase out the production of ODSs, the institutional and financial barriers that it has faced have been a major impediment to the successful realization of ODS reduction programs (Kotov and Nikitina, 1995).

In an effort to coordinate actions on ODS phase out among different government departments, scientific institutions and industrial groups, the Russian government issued a decree in 1992 ordering the creation of the Inter-Agency Commission on the Protection of the Ozone Layer (IAC) (see Table 2.4, page 33) to ensure that Russia met its obligations under the Vienna Convention and Montreal Protocol. The institutional authority of the IAC was elevated in a second decree in 1997, which appointed Danilov-Danilyan, the Head of the State Committee for Environmental Protection (Goskompriroda), as the Chairman of the IAC. Among the many tasks which were assigned to the new commission were the following: to implement a program on ozone layer protection and the production of ozone friendly substances to ensure Russia's compliance with international obligations; to develop recommendations to limit the negative impact of human activities on the ozone layer; to hold national and international meetings, symposiums and conferences on ozone depletion; to enhance the effectiveness of Russia's international efforts at cooperation on the protection of the ozone layer; and to establish working groups consisting of federal authorities and highly qualified specialists and scientists in order to develop a number of ODS target programs to focus on, among other areas, refrigeration, halons, medical uses and solvents ("Decree of the Government", 1997; "Postanovlenie o mezhvedomstvennoi", 1997). While the creation of the IAC was a step forward in addressing the problem of Russia's weak institutional capacity, it is unclear what activities the agency was able to achieve in the first five years of its existence and whether since 1997 it has been adequately provided with funds to carry out its tasks.

The Russian government, in 1996, also introduced a new system of production quotas, designed to be lowered each year until ODS production is completely phased out in 2000 (see Table 2.4, page 33). While Russia received many suggestions from parties to the Montreal Protocol at meetings throughout 1995-97 to create a system for the collection and recycling of used ODSs, such a system has not yet been implemented. Russia has, however, been able to identify two facilities that could potentially undertake the recycling of used ODSs: the Russia Scientific Center for Applied Chemistry and the Joint Stock Company (JSC) "Halogen" (Solov'ianov, 1998). Furthermore, the Russian government recently finalized a Federal Task Program entitled "ODS Production and Consumption Phase Out in the Russia Federation 1998-2000." Among many measures to ensure Russia's future compliance with its international obligations, the new federal program addresses the issue of collecting and recycling used ODSs and phasing out residual demand for ODSs after the closure of the World Bank GEF project (discussed on page 41) (Goskompriroda/IBRD, 1999, p.4).

In 1996, the government also introduced a managed banking system for its halons, a widely used and important ODS for fire protection in the country. Managed banking allows countries to set aside a portion of their ODS stocks for future use. Banking lowers the cost of phase out since ODS production equipment does not have to be retired as soon and encourages recycling, recovery and measures to reduce ODS leakage and venting. Also, banking has prevented developing countries from increasing their ODS production capacity, since their needs during their ten year grace period could largely be met from industrialized country stockpiles (Benedick, 1998, chap.14). Russian halon banks, if operated effectively, would help to gradually phase out this important ODS by 2000.

Scientific Cooperation

International scientific cooperation has been one of the only areas in which the Soviet Union, and subsequently Russia, have been successful and consistent in meeting their ozone obligations. One of Russia's most impressive scientific contributions to

international efforts to protect the ozone layer is its network of 29 monitoring stations across the country which provide daily reports on the state of the ozone layer, information which is shared internationally (Kotov and Nikitina, 1995). The Russian Hydrometeorological Service (Roshydromet), in charge of this monitoring network, pays particular attention to two ozone holes over Russia that appear temporarily each year during the winter months of February and March. One hole is located over Yakutia in Eastern Siberia and the other over the European part of Russia. The latter's epicentre is located directly over the north-western region, that is over the Pskov, Novgorod and Leningrad Oblasts (Anastas'ev, 1997). Ozone levels in 1997 over Yakutia were 35% below normal, while ozone levels over the Pskov, Novgorod and Leningrad Oblasts were 20% to 30% below normal ("Two Ozone Holes", 1997).

Russia has also been a participant in a number projects together with the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP). Another cooperative effort underway between Russia and Germany started in 1987 and aims to monitor the ozone layer over Antarctica using four stations. More recently, Canada, Finland and Russia have agreed to exchange information on ozone levels over the Arctic (Kotov and Nikitina, 1995).

In 1994, the Commission on Scientific and Technical Cooperation between Russia and Italy approved an international project to create a mobile laboratory using a Russian M-55 high-altitude spy plane to monitor the state of the ozone layer. Other countries, including Germany, the United Kingdom, Sweden, Finland, and Switzerland, took part in converting the plane into the "Geophysica" laboratory. By 1996, the airplane had been modified for the first experimental flights ever in the Arctic to measure the chemical composition of the stratosphere at heights of 21 km above the earth. Russia's scientific and technological contributions through this project have been outstanding. The information gathered from many future experimental flights will be invaluable to

better understanding the chemical processes that are leading to the depletion of the ozone layer (Smolentsev, 1997; Solov'ianov, 1998).

External Financial and Technical Assistance

As can be seen from the preceding analysis of the measures and policies that the Russian government has adopted to date, most of the programs that have been developed to address ozone depletion have lacked the financing, institutional strength and political will to bring about significant changes. It is only through a grant from the World Bank, as will be discussed, that major progress in last five years has been made in phasing out a large portion of Russia's ODS consumption and production.

The major financial and technical assistance that Russia has received to phase out ODS consumption and production has been from a project entitled "Ozone Depleting Substance Consumption Phase Out Project for the RF" funded from the World Bank's GEF program. After two years of preparatory work with Moskompriroda, the World Bank approved the ODS phase out project in April 1996 for a grant of US \$60 million. These funds were to be disbursed in three tranches for phasing out ODS consumption in the aerosol and refrigeration sectors and for providing institutional and technical support for the development of a national regulatory framework (World Bank, 1998, p.1).

The first tranche of the ODS consumption phase out project (US \$8.6 million) was aimed at one of Russia's largest consumer aerosol producers, JSC "Arnest", to convert its use of ODSs to hydrocarbon aerosol propellant (Table 2.5, page 42). Another component of the project, which was part of all the phases, involved strengthening regulatory control at both the national and regional levels through training. By the time the second tranche (US \$25.4 million) began, which was directed at commercial refrigeration, as well aerosol producers, several of the companies that had been identified originally for conversion to non-ODSs were no longer financially viable and thus could not meet the enterprise contribution requirements of the project. Two other companies that had been selected also had to be discarded before the second tranche; one producer

Table 2.5
Estimated ODS Consumption Phase Out in First,
Second and Third Tranches of the World Bank GEF Project

Tranche/Sector	Number of Projects	Estimated ODS Phase Out (MT)
FIRST TRANCHE		
Aerosol	1	3,050
SECOND TRANCHE		
Aerosol	3	6,766
Commercial Refrigeration	1	35
PROPOSED THIRD TRANCHE		
Residual Aerosol/Refrigeration	3	1,800
Refrigeration Servicing	1	4,150
Halon Banking	1	100
Non-Insulating Foam	5	332
Fire Protection Equipment	2	20
Medical Aerosols	3	75
Solvents	4	50
Production Phase Out Support	1	
TOTAL	25	16,378

Adapted from: (World Bank, 1998, Table 1-5).

expressed an unwillingness to be re-evaluated for financial viability, while the other had already proceeded independently to contract the required equipment necessary for conversion to non-ODSs. As can be seen from Table 2.5 (above), in the end three aerosol producers and one manufacturer of commercial refrigeration equipment were selected for the second tranche (World Bank, 1998, pp.4-7).

The third and final tranche of the project (US \$27 million) is still under preparation but it would appear that it will involve both the conversion of further enterprises to ODS substitutes and/or the phasing out of production altogether. This last tranche will assist Russia in managing a gradual phase out of ODSs in those sectors, such as refrigeration servicing and fire protection, where demand for significant quantities of ODSs will still exist in the medium term. A gradual phase out is needed in these sectors to avoid social hardship and public risk (World Bank, 1998, p.12).

In addition to summarizing the number of projects that were undertaken in tranches one and two, and those that are proposed for tranche three, Table 2.5 (page 42) shows the estimated quantities of ODS consumption that have been or will be phased out in each tranche. By the end of the third tranche, the project should have phased out over 16,000 metric tons of ODS consumption in Russia, leaving a conservative estimate of 2,000 to 4,000 metric tons remaining after the project is over in the year 2000. The forecast for domestic consumption after the year 2000 is based on any residual demand that may continue in the solvent, refrigeration and fire protection sectors (Goskompriroda/IBRD, 1999, p.5; World Bank, 1998, p.14). It should be noted, however, that even though the GEF project should considerably reduce ODS consumption, Russia will still continue to contribute to ozone layer depletion in the future given the time lag that exists between when ODSs are produced and when they are emitted, either during (e.g. aerosol cans, freon leakages from refrigerators/air conditioners) or following (e.g. disposal of old refrigerators/air conditioners and aerosol cans) consumption.

A potential extension of the third tranche, which is currently being proposed, is a project for the permanent closure of ODS production capacity at a number of enterprises. The project, entitled "Special Initiative for ODS Production Closure in the RF", is being proposed by the Russian government and will be financed by the World Bank GEF and bilateral donors (US, UK, Sweden, Norway, Japan, Italy, Germany, Finland, Denmark and Austria) through the creation of a US \$27 million trust fund (US \$17 million from bilateral donors and US \$10 million reallocated from the third tranche of the GEF ODS Consumption Phase Out Project (Goskompriroda/IBRD, 1999, p.2). As shown in Table 2.6 (page 44), seven enterprises have been chosen for the Special Initiative, representing a combined production capacity of 139,000 metric tons. These enterprises will receive compensation for permanently eliminating their ODS production capacity. The project to

Table 2.6
Enterprises Selected for Proposed Special
Initiative to Terminate ODS Production in Russia

Enterprise	Location	CFCs Produced	Total Production Capacity (MT)	Total Production 1997 (MT)	Production Quota 1997 (MT)^a
JSC Altaichimprom	Slavgorod	CFC 11 CFC 12	30,000	384	1,000
JSC Chimprom	Volgograd	CFC 11 CFC 12 CFC 113	24,000 18,000	7,023 243	5,000 1,000
JSC Halogen	Perm	CFC 11 CFC 12 Halon 2402	30,000 300	2,945 161.5	1,000 300
JSC Kaustic	Volgograd	CFC 11 CFC 12	30,000	4,300	4,000
JSC Kirovo Chepetsk Chemical Kombinat	NE European Russia	CFC 113 Halon 2402	5,800 1,030	415 --	1,000 --
JSC Redkino Test Factory	Redkino	CFC 13	200	75	90
Russian Scientific Center for Applied Chemistry	St. Petersburg	CFC 115 Halon 1301 ^b Halon 1211 ^b	30 80 20	-- -- --	-- -- --

Adapted from: (Goskompriroda/IBRD, 1999, p.10)

^a Annual, diminishing quotas set by the government in order to ensure the phase out of CFCs and halons by 2000.

^b Recycled 1 MT Halon 1301 and 0.5 MT Halon 1211, in addition to 30 MT of Halon 2402 and 182 MT of CFC-12 at pilot production facility in 1997.

-- Data not available.

close CFC plants in Russia is one of the most cost effective ODS phase out opportunities in the world, since only US \$37 million has to be spent to phase out half of the world's remaining CFC production capacity outside compliant industrialized nations (Figure 2.1, page 17). Furthermore, if the project is fully implemented, it will significantly curb illegal CFC exports estimated in 1997 at \$300 million/year (Lyle, 1997; UNEP, 1995).

Summary Remarks

While it appears that Russia has been committed to protecting the ozone layer through such actions as attending international conferences, ratifying agreements, participating in scientific cooperation, establishing the IAC, issuing decrees to ensure Russia's compliance, and introducing measures to control illegal ODS exports and imports, the effectiveness of these measures has been compromised by a lack of financing, political will and institutional strength. Furthermore, it is very questionable as to whether Russia would have succeeded to the same degree if other countries committed to the protection of the ozone layer had not pressured Russia to meet its ozone obligations and offered financial and technical assistance. The most effective action has taken place in the past 5 years through World Bank GEF initiatives to reduce ODS consumption and production.

Russia's inability on its own to take the required, concrete action to reduce consumption and production of ODSs can be attributed in part to the limited government revenues that have persisted over the past decade of economic transition. Limited finances aside, however, the level of the Russian government's ongoing commitment and interest in protecting the ozone layer remains unclear. The government's past skepticism about the role of human activities in causing ozone depletion raises questions about the real reasons behind its participation in international ozone protection efforts. Russia's motivation, decisions and actions in responding to the international effort to combat ozone depletion will be examined in greater detail in Chapter 6, along with a similar and comparative analysis of its role in addressing the second major world atmospheric pollution issue - global warming.

CHAPTER 3

GLOBAL WARMING: A SERIOUS ISSUE FOR THE RUSSIAN GOVERNMENT?

The analysis undertaken in Chapter 2 of Russia's participation in international efforts to protect the ozone layer revealed that the government has not been entirely committed to meeting its ozone obligations. A similar and comparative analysis will be undertaken in this chapter to assess the Russian government's performance on global warming. In order to determine to what degree the government has regarded global warming to be a serious issue, this chapter will examine Russia's generation of GHGs, its involvement in international scientific research on global warming, and its participation in and commitments under climate change agreements. The policies and measures adopted by the government, and its reliance on foreign assistance to reduce GHG emissions will also be explored. As background, a brief overview of the history, discovery and the causes and effects of global warming will be presented first.

Background on Global Warming

The problem of global warming was first brought to the world's attention in 1896 by the Swedish chemist Svante Arrhenius who postulated that carbon dioxide from coal burning would gradually lead to a rise in the Earth's temperature. Arrhenius understood that carbon dioxide was a greenhouse gas, that is while it would let sunlight penetrate through the Earth's atmosphere it would also act as a blanket in the atmosphere, trapping heat near the Earth's surface and thus causing the world's temperature to rise slowly. Although Arrhenius was a highly respected scientist, it was not until the 1980's that his global warming theory was accorded the attention that it deserved. A number of scientists throughout the early twentieth century had continued Arrhenius' work, but a lack of scientific acceptance and political will existed to support more in depth research on long-term global climate change. As more governments have recognized the potential threats posed by global warming however, millions of dollars have been invested in

research to compile records of the Earth's weather trends, to analyze ice cores, tree rings and geological deposits, and to construct computer models in an attempt to configure the Earth's complex climate system (Flavin and Tunali, 1996, p.10; Rowlands, 1995, chap.3)

As of 1996, a century since Arrhenius first predicted global warming, the concentration of carbon dioxide (CO₂) in the atmosphere had risen to 361 parts per million (ppm), the highest level in 150,000 years and 30% above levels that existed at the time of the industrial revolution when fossil fuels first began to be used. This high level of CO₂ in the atmosphere as of 1996 greatly exceeds the earth's natural ability via oceans and forests to remove carbon from the air. In fact, scientists have found that two-thirds of the increase in CO₂ levels in the atmosphere occurred after World War II as humans became increasingly more dependent on fossil fuels for energy, industrial production and transport, and as the pace of global deforestation accelerated (Flavin and Tunali, 1996, p.11). The warmest years since climate records were first kept in the mid-1800's have occurred since 1980, with each consecutive month from May 1997 to September 1998 breaking the previous monthly world average temperature record (Karl, Knight, and Baker, 2000), suggesting that significant global warming may have already started and could be progressing rapidly. In 1995, the UN's Inter-governmental Panel on Climate Change (IPCC), consisting of 2,500 scientists who monitor the climate to support negotiations on global warming, estimated that if current levels of carbon dioxide emissions continued, global temperatures would increase from 1 to 3.5 degrees Celsius by the end of the twenty-first century (Flavin and Dunn, 1998). The IPCC has also admitted that a connection exists between global warming and human activities, stating that, "a pattern of climatic response to human activities is identifiable in the climatological record" (Flavin and Tunali, 1996, p.10).

While the most abundant greenhouse gas (GHG) is carbon dioxide, scientific research during the 1980's also identified methane (CH₄), nitrous oxide (N₂O) and some types of chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) and

hydrofluorocarbons (HFCs) as GHGs, which although present in smaller quantities than CO₂, are 50% more powerful at trapping heat. Atmospheric concentrations of methane from rice paddies, livestock, landfills and fossil fuel extraction and processing have increased 145% since the pre-industrial era. While man-made CFCs and HCFCs are being successfully phased-out in many countries under the ozone regime as noted in Chapter 2, these chemicals will remain in the atmosphere for many years, contributing further to a rise in global temperatures (Flavin and Tunali, 1996, p.12).

Compared to the well-established case of ozone depletion, greater scientific uncertainty surrounds global warming, explaining to a large extent the relative inaction that has occurred from many governments around the world to address this problem. Many scientific studies have concluded that global warming is human induced as opposed to being caused by natural variations in the Earth's climate system. Other scientists and skeptics have tried to dismiss the phenomenon. They claim that fluctuations in climate cycles have occurred throughout the Earth's history, that conclusive evidence in support of global warming cannot be obtained by a mere 200 years of climate records, and that computer models, no matter how sophisticated, cannot prove that warming is occurring (Flavin and Tunali, 1996, p.12). Scientists cannot even agree on the precise nature and magnitude of impacts that global warming could have on the Earth's ecosystem. Possible environmental effects include the reduction in polar ice caps with a resulting increase in sea levels, the melting of permafrost zones, an increase in the number and severity of tropical storms, a change in precipitation and soil moisture, shifts in vegetation zones, and a reduction in biodiversity. Potential impacts on society include an increase in flooding and droughts, changes in growing seasons, coastal inundations, the higher economic costs associated with energy restructuring, an increase in environmental refugees, and a rise in the number and range of diseases (United Nations Environment Program [UNEP], 1993, pp.13-36).

Given the great uncertainty that exists with regard to the causes, effects and onset of global warming, governments in many countries agreed by signing the 1992 United Nations Convention on Climate Change (UNFCCC) to adopt a precautionary principle, that is not to use the lack of scientific uncertainty as a justification for inaction. According to this logic, a wait-and-see approach would bring action only when it was too late for humans to reverse possible catastrophic effects. While governments have officially adopted the precautionary principle, they have been slow to take measures to reduce GHG emissions. The analysis which follows aims to determine to what degree Russia may be contributing to global warming and what measures it has taken to implement the precautionary principle which it adopted along with many other nations in 1992.

Russia's Greenhouse Gas Emissions and Sinks

Russia has been a major contributor to increasing the level of carbon dioxide in the Earth's atmosphere, and thus to the problem of global warming. In the mid-1980's and early 1990's just before its collapse, the Soviet Union ranked second in the world after the United States in terms of total carbon dioxide emissions (Nikitina, 1990). Russia represented approximately 55% of the Soviet Union's emissions, making it the third largest source of total CO₂ emissions in the world in 1990 after China and the USA (Figure 3.1, page 50). As of 1996, Russia was still the third largest emitter, representing 7% of the world total of 6.2 billion tons of carbon dioxide. The USA alone represented 23.3% of total CO₂ emissions in 1996, while China was responsible for 14.8%. Together, the other, remaining 203 countries produced only 29% of the world's CO₂ emissions (Figure 3.2, page 50).

It is interesting to note that Russia has continued to be the third largest emitter of carbon dioxide in the world even though emissions fell 28% from 1990 to 1996 (Table 3.1, page 51 and Figure 3.1, page 50). A significant fall in emissions has also occurred in Germany because of the industrial restructuring that has been undertaken in Eastern

Figure 3.1
Total Emissions of Carbon Dioxide in Selected Countries (1990-96)

Note: China: Data for Mainland China only. Germany: Federal Republic of Germany and German Democratic Republic combined for 1990. Russia 1990 data for Russia from (Flavin and Tunali, 1996, p. 34). 1991 data calculated based on 1990 ratio of USSR (source CDIAC) to Russian emissions.

Adapted from: (Carbon Dioxide Information Analysis Center, 1999)

Figure 3.2
Total Carbon Dioxide Emissions
by Country as a Percentage of Total
World Emissions in 1996

* Canada 1.8% and Poland 1.6% Adapted from: (CDIAC, 1999)

Table 3.1
Total and Per Capita Carbon Dioxide Emissions in 1996 for Selected Countries

Country	World Ranking Total Emissions	Total Emissions (million tons)	% Change Total Emissions (1990-96)	World Ranking Per Capita Emissions*	Per Capita Emissions (tons/person)	% Change Per Capita Emissions (1990-96)
USA	1	1,447	9.9	11	5.37	3.5
China	2	918	40.1	104	0.76	31.0
Russia	3	431	-28.0	29	2.91	-27.1
Japan	4	319	9.2	38	2.54	7.2
Germany	6	235	-12.3	30	2.87	-16.6
Canada	8	112	0	20	3.76	-6.5
Poland	13	97	2.1	39	2.52	1.2

Adapted from: (Carbon Dioxide Information and Analysis Centre, 1999).

* Top ten countries with the highest per capita emissions (highest to lowest): U.S. Virgin Islands, Aruba, Falkland Islands, Kuwait and part of neutral zone, Guam, Netherland Antilles, United Arab Emirates, Qatar, Wake Island, Luxembourg.

Germany since the early 1990's. While one would expect Poland to have experienced a fall in emissions, there has actually been a slight growth because of the quicker economic recovery that the country has experienced relative to other Eastern European nations. Canada, surprisingly, experienced no change in emissions while the USA underwent a 10% increase. As of 1996, China had experienced a phenomenal 40% increase in carbon dioxide emissions since 1990.

Russia and many other countries, when compared with China and the USA on a total emissions basis, appear to be contributing much less to the problem of global warming. However, and as some environmentalists, scientists and policy makers have argued, comparisons should be based on per capita emissions. As Table 3.1 (above) and Figure 3.3 (page 52) show, this approach produces quite different results. China, the second largest CO₂ emitter in terms of total emissions falls to a world rank of 104 with a per capita emissions rate of 0.76 tons in 1996, while the USA is the only country that remains among the top polluting countries (rank 11) with a per capita emissions rate of 5.37 tons. Of the seven selected countries, Canada also had a high per capita emissions rate (3.76), followed by Russia, Germany, Japan and Poland. However, when examining

the change in per capita emissions from 1990-1996 in Table 3.1, China still has the highest growth rate (31%), while Russia, Germany and Canada all experienced declines.

Whether Russia is compared to other countries on a total or per capita emissions basis, it appears to have fared very well in reducing carbon dioxide emissions. However, as shown in Table 3.2 (page 53), when carbon dioxide emissions in the seven countries are compared on a tons per GNP (carbon intensity) basis, Russia in 1994 shows the highest carbon emissions intensity of all the countries. The USA and China, the top emitters in the world, produce far more economic output for every ton of carbon dioxide emitted than Russia and other East European countries. Japan and Germany have the highest efficiency rate of all the countries.

While the fall in total CO₂ emissions in Germany and the lower carbon intensity of its economy can be primarily attributed to industrial restructuring in former East Germany, the same has not been true for Russia. The major reason for the sharp fall in

Table 3.2
Carbon Intensity of
Selected Economies in 1994

Country	Carbon Intensity (tons/\$ million GNP)*
Russia	590
Poland	460
China	330
USA	210
Canada	200
Germany	140
Japan	110

Adapted from: (Flavin and Tunali, 1996, p.34)

* GNP data from 1993 adjusted for Purchasing Power Parity (PPP).

emissions in Russia has been the severe decline in industrial production and economic growth that the country has experienced since the collapse of the Soviet Union. Russia has a high carbon intensity because the decrease in industrial production has exceeded the rate of decline in total CO₂ emissions. Inefficiencies in energy use, exacerbated by long periods of artificially low domestic energy prices, explain the relatively smaller decline in CO₂ emissions. It is important to emphasize that the very high carbon intensity of the Russian economy is related more to the inefficient use of energy, rather than to a carbon-intensive fuel mix, since almost half of Russia's energy comes from natural gas (lower in carbon than oil and coal). In 1996, the energy intensity (energy used per dollar GNP) of the Russian economy was estimated to be more than nine times the average for European OECD member countries. The high energy intensity is due to the fact that the Russian economy is dominated by the raw material and heavy machinery industries, both of which are large energy consumers. Finally, high prices, old infrastructure, poor maintenance and a lack of energy consumption meters all contribute to a low energy efficiency. The potential for energy savings in Russia today has been estimated to range from 40% to 45% (United Nations, 1997, p.9).

Although little comprehensive information on the breakdown of GHG gases is available for Russia, data on the proportion and sources of GHG emissions in the Soviet

Union in 1990 helps to provide a general idea of the structure of Russia's GHG emissions. In 1990, CO₂ emissions in the Soviet Union accounted for 72% of its total GHG emissions, 98% of which came from fuel combustion, with the remaining 2% from industrial processes. Methane accounted for 20% of the Soviet Union's GHG emissions in 1990, representing 7.2% of total global methane emissions. Major sources of methane included fugitive fuel emissions from the production, transport and final use of natural gas, coal, and oil (73%), livestock enteric fermentation and wastes (18%), and solid wastes (9%). Data on the Soviet Union's contribution to total global nitrous oxide emissions in 1990 was not available. However, agriculture (87%) and fuel combustion (12%) were the major sources of nitrous oxide emissions in the USSR in 1990 (United Nations, 1997, p.4). Some CFCs also contribute to the problem of global warming as shown in Table 2.1 (page 16) and an analysis of Russia's production of CFCs can be found in Chapter 2.

While Russia is still one of the world's largest producers of CO₂ and other GHGs, it does have an advantage over other countries because of its huge natural carbon sink in the form of its forests. In 1990, Russia's forests were estimated to absorb 25% of the Soviet Union's total carbon dioxide emissions (United Nations, 1997, p.4). According to other estimates, Russia's forests, covering an area of 714 million ha, absorb from 100 to 200 million tonnes of CO₂ per year, or 30% of Russia's carbon dioxide emissions ("Salvation Lies", 1995). Other estimates have placed Russia's forest area as high as 900 million ha (Medvedev, 1997). Forest regions in Siberia and the Russian Far East alone represent one fifth of the world's total forested area, half of the Earth's boreal forests and are twice the size of the Amazon rainforest in Brazil. It has been estimated that the boreal forests of Siberia, covering an area of 598 million ha, store 40,000 million tons of carbon and account for 25% of the northern hemisphere's non-ocean carbon absorption (Rugo and Weiss, 1996).

Given the fact that Russia is one of the largest emitters of carbon dioxide in the world (and potentially even larger if an economic recovery should occur in the near future) and that its forests play a very important role in maintaining the global carbon cycle, it has been an important and essential player in international efforts to address global warming. An analysis of Russia's participation in international climate change negotiations follows.

International Agreements on Global Warming

In 1979, the Soviet Union participated in the First World Climate Conference held in Geneva, Switzerland aimed at addressing the potential consequences for the global climate of anthropogenic emissions of carbon dioxide into the atmosphere from the burning of fossil fuels, the clearing of forests and other land-use changes. The USSR's involvement in subsequent scientific, climate change and air pollution conferences throughout the 1980's laid the groundwork for Russia's signing of the United Nations Framework Convention on Climate Change (FCCC) at the Rio Earth Summit in 1992.

During the Soviet period, cooperation in international efforts to address climate change primarily took the form of joint scientific research, similar to the case of cooperation on ozone depletion as examined in Chapter 2. According to Clemens, the main reason for the Soviet Union's involvement in international environmental cooperation was to further détente between East and West, and therefore gain concessions from the West in other foreign policy areas of higher concern. Scientific research and exchanges proved to be the least confrontational and intrusive means to cooperate and allowed the Soviet Union to remain relatively uninvolved in the highly politicized international environmental decision-making process (Clemens, 1990, chap.5).

The Soviet Union made significant contributions to scientific research on global climate change as part of such organizations as the Global Atmospheric Research Program, the World Climate Program and the IPCC. During the 1970's and 1980's,

Russian scientists presented the international community with forecasts on global warming and the negative consequences of climate change for life on earth. Russian climate change data collected over a century along with paleoclimatic reconstructions have aided not only the international community, but Russia itself in predicting the potential negative and positive effects of climate change on different regions of its own country. Russian climate change research has shown that a 5% increase in national grain production from an extended growing season of 10 to 15 days could be expected if global warming were to occur. Agricultural production could also benefit from a northward shift of the permafrost zone. However, the melting of the permafrost zone would also have a negative effect on buildings and other structures in Russia's northern cities and would turn large areas of land into swamps, which would then release methane upon evaporation. Another negative effect which could result from global warming is an increase in droughts, and thus crop failure, in southern regions of Russia due to changes in precipitation levels and patterns. Despite the extensive research undertaken by Russian scientists on climate change, there was still no scientific consensus as late as 1995 in Russia as to whether global warming was a natural or human-induced phenomenon (Kotov and Nikitina, 1995).

While the Soviet Union made significant scientific contributions to research on global warming (as was the case for ozone depletion in Chapter 2), the government's political will to take strict measures to solve the problem was never very strong. The Soviet Union's unwillingness to agree to reductions in GHG emissions is evidenced in early inter-governmental conferences on climate change. For example, at the 1989 Ministerial Conference on Atmospheric Pollution and Climate Change in Noordwijk (The Netherlands), many of the countries that participated were in favour of freezing CO₂ emissions at 1988 levels by the year 2005 and reversing global deforestation. However, the Soviet Union, in addition to the United States, the United Kingdom and Japan, opposed setting targets and deadlines, given that reducing their high production and

consumption of fossil fuel emissions would be extremely difficult and detrimental to their economies. Even in 1990, at the Second World Climate Conference in Geneva, plans to introduce deadlines for the reduction of CO₂ emissions did not materialize as a result of strong and continued opposition from the Soviet Union, the United States and Saudi Arabia. The Geneva conference ended by declaring that countries should take measures unilaterally, at national and regional levels, to reduce GHG emissions and to increase natural carbon sinks (Soroos, 1997, chap.7).

Thus, despite the introduction of glasnost and perestroika by Gorbachev in the mid-1980's, and a speech that he made in January 1990 at the Global Forum on Environment and Development held in Moscow, stating the Soviet Union's interest in participating more meaningfully in international environmental efforts to find solutions to global environmental problems (Gorbachev, 1990), the Soviet Union was still unwilling to adopt GHG reduction targets. The Soviet government's lack of genuine concern can to a large extent be attributed to the potential, negative economic consequences that would result if measures were taken to reduce GHG emissions. Similar to other countries who are major producers and consumers of fossil fuels, the Soviet Union in 1990 was still using the excuse of the great scientific uncertainty that exists in linking human activities to global warming as an argument against GHG reductions (Rowlands, 1995, chap.3; Soroos, 1997, chap.7). Soviet delegates in international negotiations at a conference in Sundsvall, Sweden in 1990 even went as far as to question the science supporting global warming, "complaining that some of the figures were 'fictional'" (Rowlands, 1995, p.80). This skepticism appears to be a continuation of the views held by the Soviet Union as early as 1978 that global warming forecasts offered by Soviet scientists were simply "entertaining fantasy" (Yemelyanenko, 1998a).

Despite continued scientific uncertainty concerning the causes of global warming, Russia ultimately signed the United Nations Framework Convention on Climate Change (FCCC) at the Rio Earth Summit in 1992. One reason why Russia

signed the convention was obviously the great media and world attention that the Earth Summit attracted, placing pressure on Russia, one of the world's largest GHG emitters to sign the FCCC. Another possible reason was Russia's need to portray a good image to the rest of the world so that it could distance itself from the Soviet past and more easily integrate itself into world economic and political affairs. Maintaining good foreign relations with the international community was essential if Russia was to obtain Western assistance during the transition period to a market economy and democratic system.

As Table 3.3 (page 59) shows, although Russia signed the FCCC in 1992, it took the government almost 2 years to ratify the climate change convention, 8 months after it had come into force with 50 ratifications. The late ratification by Russia (112th country to ratify) of the FCCC suggests that global warming has not really been a major issue for the government. While the collapse of the Soviet Union brought East and West closer together, initially speeding up cooperation in the short term, it has in the long run slowed down cooperation as Russia has been faced with greater political and economic instability, forcing it to devote more attention to domestic problems. However, regardless of domestic problems, Russia would have made a special effort to ratify the FCCC as soon as possible, had it really felt strongly about global warming.

As summarized in Table 3.3, Russia, having ratified the FCCC, was required to cooperate with other countries in conducting scientific and technical research on climate change, in sharing GHG reduction technology, in taking steps to conserve and enhance GHG sinks, and in attempting to limit the level of CO₂ emissions to 1990 levels by the year 2000. In addition, parties to the FCCC agreed to adopt a precautionary principle, to promote sustainable development, and to consider climate change in as many social, economic and environmental policies as possible. Countries were also requested to provide inventories of GHG emissions and sinks and to report on programs to reduce emissions and enhance sinks in the form of a national communication.

Table 3.3
Summary of Russia's Obligations Under
International Agreements to Combat Global Warming

Agreement and Date Opened for Signature	Date Russia Signed	Date Russia Ratified	Date Came into Force	Main Obligations
United Nations Framework Convention on Climate Change (FCCC) (June 1992)	June 1992	Dec 1994	Mar 1994	<ul style="list-style-type: none"> - adoption of goal aimed at stabilizing emissions at a safe level - definition of principles for action: precautionary principle and leadership from developed countries - requires industrial countries to ensure that GHG emissions do not surpass 1990 levels by 2000 - encourages scientific cooperation and the exchange of GHG technology between countries - requires all countries to take measures to address climate change and to report on progress in the form of national communications
Kyoto Protocol (Dec 1997)	Mar 1999	Not Yet Ratified	Not Yet in Force	<ul style="list-style-type: none"> - world average reduction of 5.2% below 1990 levels for CO₂, CH₄ and N₂O, and below 1995 levels for HCFC's perfluorocarbons, and sulfur hexafluoride from 2008 to 2012 - establishment of specific emissions targets for each country - discussion of Joint Implementation (JI), the Clean Development Mechanism (CDM), and emissions trading to help countries meet their targets

Adapted from: (Depledge, 1999) and (Soroos, 1997, chap.7).

To address the barriers to compliance that different countries face, the FCCC places developed and developing countries into two categories: Annex 1 and Annex 2 respectively. While the FCCC places Russia in Annex 1 as a developed and industrialized country, it was given (along with other CEE and FSU countries) special status as a country in transition. As such, Russia has been granted a certain amount of flexibility in meeting FCCC provisions (Soroos, 1997, chap.7).

Since the signing of the climate change convention in 1992, a number of Conferences of the Parties (COPs) have been held in an attempt to reach an agreement on emissions targets and ways to reduce GHGs. Countries at COP 1 held in Berlin in 1995 agreed that the FCCC, which is only voluntary and contains no mechanisms to ensure compliance, was not a strong enough agreement to guarantee GHG reductions, but decided to wait until COP 3 in Kyoto in 1997 to adopt legally binding commitments. By the time COP 2 was held in 1996 in Geneva, the IPCC had confirmed that humans were

having a visible impact on the Earth's climate, leading many countries to call for stronger and faster action (Depledge, 1999).

Therefore, by the time COP 3 was held in Kyoto, Japan in December 1997, many nations were readily prepared to adopt binding commitments to prevent global warming from occurring. Representatives from 160 nations participated in the Kyoto summit on climate change, which resulted in the signing of a protocol to the 1992 FCCC. As can be seen from Table 3.3 (page 59), the most significant provision of the Kyoto Protocol is the requirement that all industrialized (Annex 1) nations reduce their annual net carbon emissions from six greenhouse gases over the period 2008 to 2012 to an average of 5.2% below 1990 levels for carbon dioxide, methane and nitrous oxide, and below 1995 levels for HCFCs, perfluorocarbons and sulfur hexafluoride (Soroos, 1998). Some countries are faced with an easier task than others, with GHG emission targets ranging from reductions of 8% to increases of 10%. Most countries, primarily European Union member nations, are required to reduce GHG emissions 8%, while the United States agreed to a 7% cut, and Japan and Canada agreed to a 6% reduction. Australia and Iceland are allowed to increase emissions by 8% and 10% respectively (Lanchbery, 1998).

The Kyoto Protocol initially required Russia as an industrialized nation to lower its total GHG emissions by 5% of 1990 levels over the period 2008 to 2012. However protests from the Russian delegation and threats to boycott the agreement resulted in Russia only having to freeze its GHG emissions at 1990 levels (Ukraine and New Zealand also negotiated the same target). The Russian delegation's arguments were based on the fact that industrial pollution had declined dramatically since the collapse of the Soviet Union, and that attempts to further reduce emissions could be costly and undermine the recovery of the Russian economy (Golovnin, 1998). Other CEE countries, unlike Russia, were not able to negotiate lesser reduction targets, with the majority having to reduce GHG emissions by 8%, except Hungary and Poland who must meet a 6% reduction target. However, the Kyoto Protocol did include a special provision for

countries in economic transition, allowing them to select the base year from which they will achieve their emissions reduction target. Hungary, Bulgaria, Romania and Poland have selected 1985-7, 1988, 1989 and 1988 respectively, years in which emissions were almost 22% higher than 1990 levels, making their targets considerably more easy to attain (Baumert, Petkova, and Barbu, 1999, p.8).

Russia has yet another advantage over other countries when the factor of population growth is considered. Given that Russia's population is expected to decline 5% between 1990 and 2010, its Kyoto targets will be even easier to meet, since there will be less people contributing to total GHG emissions. In contrast, the population of countries such as Canada and the United States is expected to rise 15% and 17% respectively from 1990 to 2010, thereby increasing total GHG emissions and the ability of these countries to meet their Kyoto targets (Meyerson, 1998).

GHG emissions targets negotiated at Kyoto could be reduced if countries agree that GHG sinks can be used to offset total emissions. For example, if sinks were included, the USA's Kyoto GHG emissions target would fall from 7% to 4% (Ott, 1998). The issue of including sinks in targets, however, has not been fully resolved since there are methodological problems associated with measuring the ability of forests, in addition to other sinks such as oceans and peatlands, to absorb carbon dioxide from the air (Csagoly, 1998a). Considering the enormous natural forest sink Russia has, the potential inclusion of sinks lowers emissions targets even further, providing yet another major advantage for the country.

In addition to setting binding emissions targets, the Kyoto Protocol also included a number of flexibility mechanisms to help developed countries concerned about the high costs of emissions reductions at home to meet their targets by either trading emissions or undertaking projects in other countries where the reduction in emissions for every dollar invested would be higher. Emissions trading allows countries unable to meet required reductions to purchase excess quotas from other countries who have emissions levels

lower than their stipulated level, while Joint Implementation (JI) projects between developed countries and the Clean Development Mechanism (CDM) between developed and developing countries, allow developed countries to reduce their emissions targets by undertaking energy efficiency, forestry and renewable energy projects abroad.

"Burden sharing" or bubbling, first raised by the EU, is another mechanism that has received a lot of attention, allowing the EU to distribute its 8% Kyoto reduction target among its member states. Since bubbling has very few rules, other countries have also wanted to take advantage of this mechanism. For this reason Japan, the USA, Canada, Australia and New Zealand formed the JUSCANZ group, later known as the Umbrella Group with the addition of Russia and Ukraine. However, considering Russia's uncertain emissions estimates (problems of GHG inventory) and the need for trust to exist and orders to be passed between countries, it is unlikely that the Umbrella Group bubble would work (Lanchbery, 1998; Ott, 1998).

While countries in the JUSCANZ group, and the larger Umbrella Group including Russia and Ukraine, are strongly in favor of flexibility mechanisms, the EU (except for bubbling) and developing countries are against the mechanisms since they do not encourage GHG reductions at home. The EU (with some support from CEE countries who are looking for EU membership) has insisted that a cap be placed on the portion of a country's Kyoto target that can be met through emissions trading and JI. This proposal has faced opposition from the USA (Lanchbery, 1998).

Another objection to emissions trading is connected to the severe industrial decline that has occurred in CEE and former Soviet republics, resulting in emissions levels being dramatically below 1990 levels and not accurately reflecting these countries' true GHG emissions potential given a strong economic recovery. The huge spare emissions that Russia and Ukraine in particular are now eager to trade have become known as "hot air", since they do not represent real emissions under a fully operational economy. The EU and environmentalists are concerned that the inflated emissions

targets that Russia and Ukraine managed to negotiate will result in the sale of the "hot air" to the United States, giving the USA no incentive to restructure its own economy (Webb, 1998a). Other countries that have emissions quotas to sell are concerned about dumping of emissions by Russia on a future, legal GHG market. However, it would be to Russia's disadvantage to dump its emissions since such an action would only lower the price that it could obtain for its excess quotas and destroy the market (Yemelyanenko, 1998b). Furthermore, concern about Russia's "hot air" might not be justified, given projections that Russia's emissions will increase to 96% of 1990 levels by 2010, leaving it little left to trade (Csagoly, 1998b; Lanchbery, 1998).

Given that it took most countries up to 2 years to sign the Kyoto Protocol, and that by October 1999 it had only been ratified by 16 countries, mainly the Island states of the world concerned about rising sea levels, it may be too late by the time the Protocol comes into force to do anything about stopping global warming. Fifty-five countries, representing 55% of 1990 developed world GHG emissions would have to ratify the Protocol for developed world emissions cuts to become legally binding. If the USA does not ratify the Protocol, it would take ratifications from every other developed country together to bring the protocol into force (Lardner, 1998).

Even without ratifying the Kyoto Protocol however, countries are still engaging in negotiations to lay down regulations for emissions trading and joint implementation. In fact, some countries, such as Russia and Ukraine, are eager to start trading emissions immediately, and over 100 pilot JI and CDM projects have already been started around the world. The COP 4 held in Buenos Aires in 1998 resulted in the development of a number of documents on the principles and rules of emissions trading and JI, and on the sanctions that a country would face if it failed to achieve its emissions target set at Kyoto. These documents however, will not be finalized until COP 6 takes place in the Hague towards the end of 2000 (Depledge, 1999; Golub, 1998).

Measures and Policies Adopted by the Russian Government

While Russia is currently in compliance with the FCCC in that its 2000 GHG emissions are well below 1990 levels, the mechanisms outlined in the 1997 Kyoto Protocol represent a way for Russia to ensure that emissions do not return to or rise beyond 1990 levels over the 2008 to 2012 period as a result of economic growth. Cooperation on climate change offers Russia a number of benefits apart from protecting the environment. Industries with old infrastructure and high energy inefficiencies can be upgraded through funds obtained from emissions trading or through JI using finances from other countries. Not only will air quality and human health improve, but industries will become more efficient, contributing to economic growth, while at the same time not increasing GHG emissions. Investments in industrial restructuring today will ensure a permanent fall in emissions instead of just a temporary and sharp decline resulting from severe economic recession. The following review of some of the Russian government's policies and measures on global warming provides an indication of not only whether Russia has complied with all its international reporting commitments and whether it intends to take advantage of the Kyoto Protocol's flexibility mechanisms, but also of how serious the government is about climate change as a whole.

National Reporting

In accordance with the FCCC (see Table 3.3, page 59), all countries were required to prepare national communications providing up-to-date information on GHG emissions and reporting on all activities taken to address climate change. To meet this obligation, the Russian government established the Inter-Agency Commission on Climate Change Problems (ICC) in 1994 and appointed the Federal Service on Hydrometeorology and Environmental Monitoring (Hydromet) as its head. Two dozen state committees and ministries, including the State Committee for Statistics (Goskomstat) and the State Committee for Environmental Protection (Goskompriroda), as well as representatives of various industrial sectors, are members of the ICC. The ICC was given the responsibility

of submitting Russia's first national communication at COP1 in Berlin in March/April 1995, but it was not complete and was entitled, "An Abridged Report of the RF on Activities Within the UNFCCC". The final national communication, submitted two months late in November 1995 (Kotov and Nikitina, 1996), fell below FCCC requirements in that it lacked in detail and transparency, and was missing vital information needed by the FCCC to make cross-country comparisons. Furthermore, the report gave no indication of the methodology used for making emissions estimates and did not properly cite data sources (United Nations, 1997, p.3, p.10).

Apart from the data deficiencies of the 1995 national communication, an in depth review of the report by a panel of UN experts revealed that climate change in Russia is still to a large extent regarded as being caused by normal, natural variations in global temperature patterns, or as a problem of climatology, rather than as a result of human activities (United Nations, 1997, p.10). For example, the prevailing, skeptical view of Hydromet, the head of the ICC, is conveyed in the 1995 national communication when it states that, "according to current research, an increase in the concentration of GHGs might be one of the reasons for global warming" (Kotov and Nikitina, 1996, p.349). This position clearly contrasts with the IPCC 1995 statement that humans are having a visible impact on the earth's climate.

A number of reasons can be offered as to why the national communication submitted by the ICC did not meet the reporting requirements and standards of the FCCC. The first and most plausible explanation is the continued government reluctance, a continuation of the Soviet government's mentality, to share data that could potentially, in their view, pose a threat to national security. Second, the availability of strictly Russian data was difficult to produce since most existing data in 1995 represented the collective information for the 15 republics of the FSU. Finally, the greatest difficulty in compiling emissions data for the 1995 national communication was the fact that Goskomstat has yet to collect the required information (Kotov and Nikitina, 1996).

In is also not clear to what degree the Russian government controlled and manipulated the policy views presented in the 1995 national communication. Sharply contrasting views exist on global warming within the ICC itself, most notably between the two most concerned members, that is Hydromet and Goskompriroda. During the 1980s, Hydromet's (Goskomgydromet or the State Hydrometeorological Committee at the time) position on global warming was based on the work of academician Budyko who had developed models to show that global warming would benefit the Soviet Union, mainly in agriculture. This view contrasted sharply with that of Goskompriroda's, which considered climate change to be a very serious and potentially harmful phenomenon (Peterson, 1993, chap.6). According to Victor Danilov-Danilyan, Head of Goskompriroda, the view that Russia is a cold country and so cannot be harmed by global warming seems to exist. Danilov-Danilyan warns that while local effects can be both positive and negative, in the end losses from global warming will affect the entire Earth and all humanity (Speranskaia and Ivashchenko, 1999).

While some good reasons exist to justify Russia's inability to provide comprehensive and appropriate information to the FCCC in 1995, the weak effort by the ICC in preparing Russia's 1995 national communication, and the view that seems to exist among some government institutions that global warming is a natural phenomenon posing little threat, nevertheless raise questions about the Russian government's level of commitment to international cooperation on global warming.

Climate Change Action Plans and Programs

One of the ICC's responsibilities was to develop and implement an action plan to reduce GHG emissions. The plan included a provision to prepare national registers of GHG emissions and sinks to be disseminated internationally, and to implement measures to reduce emissions and enhance sinks so as to ensure that an economic recovery would not prevent Russia from meeting the FCCC's target of freezing GHG emissions at 1990 levels by 2000. Unfortunately, given the many political, social and economic barriers

which Russia has faced as a result of its transition towards a market economy, the implementation of this action plan has not been as successful as it could have been. A lack of funding and the government's weak authority have hampered the fulfilment of the measures contained within the action plan (Kotov and Nikitina, 1995).

In 1996, the Russian Government approved a new, special federal program entitled, "Prevention of Climate Change and Its Negative Impacts" for the period 1997-2000. As of 1997 however, funding for the program had not been confirmed. A number of other federal and scientific research programs on resource conservation, the development of energy-saving technologies, improved transport systems and renewable energy sources are currently under way (United Nations, 1997, p.6). In addition, the government has initiated a program to convert the transportation sector to liquefied gas and reduce the consumption of leaded gasoline. It has been estimated that these latter measures, if implemented, could lead to a 70% reduction in the 1994 level of GHG emissions associated with the transportation sector (Center for Nuclear Ecology and Energy Policy, 1997).

Russia, along with many other East European countries, is currently in the process of developing a Climate Change Action Plan. The plan is intended to help Russia prioritize measures that it could take to meet its commitments. The Russian plan aims to increase public awareness and support from decision-makers, and to expand the country's technological capacity. Climate change mitigation assessments are also being carried out in a number of transition countries, including Russia, with the assistance of the US Country Studies Program. The assessments are undertaken with the view that the development choices that countries in transition make today will affect the degree to which they are able to meet their future commitments. Specifically, the assessments identify possible mitigation and adaptation options that a country could follow, develop different future emissions scenarios, and help transition countries to submit national communications (Baumert et al., 1999, p.17).

GHG Emissions Trading

In order to take full advantage of the surplus emissions that Russia currently has, the Russian government has been particularly interested in speeding negotiations on tradable emissions. In fact, Russia tried unsuccessfully at Kyoto to get other countries to accept their proposal to allow emissions levels achieved before trading becomes legal to be used in transactions (Kuwabara, 1997). There have already been reports of the development of a black market in hot air between countries with excess emissions rights, such as Russia, Ukraine and Australia, and a number of other countries looking to increase their permissible carbon dioxide emissions levels, such as China, the United States, Germany, Japan and the United Kingdom. Such trade, however, is not as yet sanctioned by the world community and no mechanism exists to regulate this new commodity. A report on behind-the-scenes dealings suggests that Ukraine is planning to charge a minimum of US \$100 per tonne of GHGs and that its starting price in bargains with Japan has been US \$115 per ton. Germany is dealing with Russia at US \$17-50 per ton. There have also been rumors that Russia is involved in trying to obtain quotas from Ukraine and Kazakhstan in exchange for customs privileges and additional currency payments. Ukraine and Kazakhstan however are outraged, and so Russia's attempts at obtaining extra quotas cheaply for re-sale at higher rates may not be as successful as it may have hoped (Yemelyanenko, 1998a). If rumors about Russia's attempts to buy emissions from other countries are true, the legitimacy of Russia's cooperation in the international climate change regime to reduce global GHG emissions would come into question.

It is not clear yet whether Russia would allocate the money obtained from the sale of emissions quotas to its environmental protection budget. If money is used for further economic growth, the sale of quotas could in reality only contribute further to the problem of global warming. At a meeting of the Russian-American Commission on Economic and Technological Cooperation in Moscow in January 1999 on how to use

money from the sale of Russia's emissions quotas, Danilov-Danilyan stated that the money would be first spent on undertaking environmental projects in the ferrous metal, oil processing, and energy sectors. However, he also cautioned that there are advocates in the Ministry of the Economy who would like part of the funds from the sale of emissions quotas to be spent on solving social problems (Speranskaia and Ivashchenko, 1999). It is unclear in what proportion the money would be divided between environmental and social problems, but the latter could very well receive the majority of funds.

A certain attitude appears to exist among officials responsible for implementing the provisions of the FCCC in Russia that emissions targets can be easily met by simply relying on the severe economic recession in the country. Such an attitude could undermine efforts to bring about basic structural changes needed to produce sustainable reductions in GHG emissions. A number of scenarios for growth in CO₂ emissions in Russia have been developed, predicting emissions reductions ranging from 5% to 10% below 1990 levels by 2010 (Kotov and Nikitina, 1996). A similar study by the World Bank, together with the Russian, Finnish and Swedish governments has shown that emissions by 2010 will be 4% below 1990 levels, but that with the introduction of new energy saving technology, emissions could be as much as 6% below 1990 levels by 2010 ("Press Reliz: Torgovlya", 1998).

Even though Russian GHG emissions will not likely exceed 1990 levels over the 2008 to 2012 period, it is unclear why the Russian government would not want to do everything in its power to achieve the greatest and most permanent reduction in GHG emissions possible so that it would have a larger quota to sell to other countries. Any new economic growth, particularly if current old and decaying industrial infrastructure and technology continue to be used, could very well result in a larger than expected increase in emissions, and not taking measures today to ensure an emissions surplus

would ruin the country's opportunities to trade and obtain much-needed finances and technologies.

Forests

Considering the large carbon sink that Russia has in the form of its forests, it is vital that the government take measures to preserve this natural advantage over other countries. If measures were taken to increase the country's forested areas by 100 million ha, to change the age structure of forests, to increase fire protection, and to improve cutting techniques, amongst other measures, Russia's natural carbon sink could absorb anywhere from 200 to 400 million tons of carbon per year over a 60 to 80 year period (double the present rate, see page 54) (Kotov and Nikitina, 1996). Although the Federal Forestry Service (FFS) was involved in reforestation efforts between 1988 and 1993, the total area of land planted with trees was 20% less than over the 1983 to 1988 period (Interagency Commission on Climate Change Problems [ICC], 1995, p.11). Thus far the government has not been able to develop a comprehensive forestry program with guaranteed financing to maintain and increase Russia's forested area (Kotov and Nikitina, 1996).

In fact, Russia's natural carbon dioxide sink may be under threat. Unfortunately, since the collapse of the Soviet Union Russian timber and logging companies are increasingly becoming involved in joint ventures with American, Japanese, and Korean firms, resulting in the deforestation of the Siberian taiga at a rate of approximately 4 million hectares per year. Some estimates of the rate at which the forests are disappearing place the figure as high as 12 million hectares a year. Boreal forests are characterized by slow tree growth and regeneration cycles since they are made up of coniferous and deciduous trees, experience long, cold and dry winters, and receive very little annual rainfall (Rugo and Weiss, 1996). An increase in logging could outstrip the natural ability of these forests to replenish themselves. Adding to the environmental degradation of the Siberian forests is the fact that Russian processing plants are extremely

inefficient, requiring 4 to 5 times as much timber as their foreign counterparts to produce the same quantity of finished wood products (Levin, 1993).

As much as 90% of timber in Siberia is harvested by means of clear-cutting, resulting in soil erosion, the melting of permafrost, the creation of deserts and the siltation and clogging of streams and rivers. The impact of logging on global warming is not just a reduction in carbon absorption as a result of fewer trees; soil erosion releases carbon into the atmosphere, while melting permafrost creates swamps, which upon evaporation emit methane (Rugo and Weiss, 1996). A lack of enforcement of environmental standards and uncertainty over natural resource ownership and environmental laws has made it possible for regional leaders to allow the logging of Russia's forests for hard currency, not only in Siberia, but also in Western Russia. Remaining old-growth forests in Western Russia (Arkhangelsk, Komi, Vologda, and Saint-Petersburg) are threatened by nearly 100 Finnish logging companies operating in these regions and exporting the timber to the West ("Finskie lecorubi", 1999; Kucherenko, 1999).

Energy Restructuring

The most significant action that the Russian government has taken, which could potentially lead to a reduction in Russia's contribution to the problem of global warming, was its adoption in 1995 of a new strategy to increase energy efficiency. Russia's energy strategy was developed primarily for economic reasons, that is to reduce the cost of inefficiencies in energy use and to promote the production of energy efficient technologies to stimulate industrial production and create jobs. However, the strategy will also have a secondary benefit in that it will decrease Russia's carbon dioxide emissions in the long-term. An advantage of the new energy strategy is that, unlike in the past, it does not advocate large-scale growth, but instead policies oriented towards conservation. The strategy's major disadvantage however, is that while it contains many objectives, it lacks in concrete targets and programs (Martinot et al., 1997; United

Nations, 1997, p.6). For example, the following are some of its major objectives: to increase the use of natural gas and to improve the efficiency with which it is used; to increase the use of renewable energy sources; to improve the safety of nuclear power; to decentralize the energy supply system in order to limit the distance between suppliers and consumers; to use new energy-saving technologies in all branches of the economy; to introduce prices and taxes to encourage energy savings and the efficient use of resources; and to capture and use methane from landfills and coal mines for energy (Kotov and Nikitina, 1996). While these objectives represent a major step forward, it is not clear how they will be successfully implemented, given the institutional and financial barriers facing the country.

One of the major aims of the energy strategy, as mentioned above, is to increase the use of natural gas, which emits less carbon dioxide per unit of energy generated than solid and liquid fossil fuels. In 1990, natural gas accounted for 40% of total primary energy supply (TPES). The Russian government hopes to further increase the use of natural gas after the year 2000 to more than 50% of TPES. In addition, the strategy also plans for an increase from 1990 to 2010 in the use of hydroenergy, nuclear energy, and renewable energies, and a decrease in the use of oil and coal (ICC, 1995, p36). With respect to renewable energy, many favorable opportunities are available for Russia to invest in wind, biomass, solar and geothermal energies. Some renewable technologies are close to commercialization such as wind farms, solar hot water heating for residential areas, and biomass boilers that use forest products and agricultural wastes (Martinot et al., 1997).

The new Russian energy strategy focuses mostly on greater energy efficiency in the industrial sector. However, there is also potential for increased efficiency in energy use in the residential and commercial sectors. Although a full economic recovery in Russia in the immediate future is not very likely, economic growth will still eventually occur. Therefore it is important that Russia also focus on setting energy efficiency

standards for buildings, that it enforce energy standards for household appliances, and that it plan for a potential increase in automobile emissions in the event of economic growth, and thus higher consumer demand (Flavin and Dunn, 1998). Energy efficiency improvements associated with high economic rates of return in the residential sector in Russia include the installation of meters, valves and controls in apartment buildings, the insulation of building and heating pipes to reduce thermal losses, and the introduction of more efficient municipal lighting systems (Martinot et al., 1997).

While Russia has developed an energy strategy, it is unclear where the financing to implement measures outlined in the strategy will come from. Some companies have decided not to wait for government financing to become available. For example, the joint-stock company "Gazprom", providing 23% of the world's natural gas supply, has undertaken measurements to assess the environmental impact of emissions from its activities. However, the quality of such measurements is questionable, considering that the company insists that its 2.5 million tons of emissions do not pose a threat to the environment. Gazprom has also used a study undertaken at the company's sites in 1996 by German specialists to confirm that leaks from enterprises do not exceed 1.5% of all transported gas, compared to the permissible limit of 3%. However, an article in a German newspaper concerning the same study revealed that Russian pipelines were filled with holes similar to Swiss cheese (Tsukanov, 1997).

In addition to Russia's long-range energy strategy, the government also implemented a policy in the mid-1990's of reducing fossil fuel subsidies in order to increase energy efficiency. In 1990-1991, fossil fuel subsidies in Russia were 48% of the market price, falling to 25% in 1995-1996 (Flavin and Dunn, 1998). However, since Russia's financial crisis in August 1998, rouble devaluation has resulted in a sharp fall of 70-80% (in dollar terms) in domestic fuel prices. The lower prices in recent years have been further reinforced by indirect fuel price subsidies in the form of export taxes and

quotas imposed in 1999 (Popov, 2000). With prices at such a low level in the last few years, hopes for greater energy efficiency will likely not materialize.

However, even with the higher fuel prices over the 1995-1998 period, it is questionable as to whether energy efficiency actually increased. While a normal economy would respond to higher prices by increasing energy efficiency, the same is not true for a transition economy in recession (Popov, 2000). Although output in Russia has significantly declined in recent years, the decline in emissions has not been as dramatic. One reason is the fact that demand for energy is relatively inelastic, that is no matter the price people continue to use energy at around the same rate. A second, and even more important reason for the great fall in output but smaller decrease in emissions is the fact that the Russian economy continues to operate using old, inefficient, decaying and pollutive infrastructure in many cases. For example, Russia's regional energy utilities (ENERGO's) choose to operate the oldest power and heating plants to avoid buying power from the central energy utilities (RAO EES), who own and operate the larger, newer and more efficient power plants (Heuckroth, 2000). Thirdly, emissions have not fallen as much as output in Russia since there is little or no investment in new infrastructure. Given inelastic energy demand, decaying infrastructure and a lack of investment in Russia, changes in the price of fossil fuels will likely have little effect on increasing energy efficiency, or in other words, on decreasing energy intensity.

While energy sector reforms offer Russia multiple benefits, including reduced emissions, improved health, new technology and greater cost-effectiveness, few projects have been undertaken and the many programs developed by the government have not been implemented because of limited government funding. Furthermore, barriers to innovation and investment in energy reforms include unclear property rights, a lack of information on the multiple benefits of greater energy efficiency, subsidies that are still too high, and a lack of investment knowledge and credit-worthiness among potential investors (Baumert et al., 1999, p.16).

External Financial and Technical Assistance

Given the Russian government's difficulty in financing programs to reduce GHG emissions, it is naturally very interested in the possibility of taking advantage of the Kyoto Protocol's JI mechanism. Unlike tradable emissions, JI ensures that money is invested in the environment and in preventing global warming, and thus represents one of the best strategies for ensuring long-term and permanent GHG reductions in Russia, as well as in many other CEE countries. JI is also beneficial since it would encourage countries such as the USA and Japan, who find it far more expensive to undertake restructuring to reduce GHG emissions at home, to overlook Russia's unstable investment climate and implement GHG emission reduction projects in Russia in order to obtain credits towards their Kyoto targets.

Although rules for the JI mechanism have as yet not been adopted and GHG emissions credits cannot be obtained at this point through JI, a total of 72 pilot projects have already been undertaken in Eastern European countries. While the overwhelming majority have been implemented in Latvia (23 projects) and Estonia (18 projects), 8 pilot projects are underway in Russia and are summarized in Table 3.4 (page 76). As can be seen, the USA and the Netherlands have been the most involved in pilot JI projects in Russia, focusing on afforestation/reforestation, energy efficiency, fuel switching and fugitive gas capture projects. While the funding countries will not officially receive credits towards their Kyoto targets for undertaking these pilot projects, it is expected that rules will be developed for JI at COP6 later this year in the Hague (Csagoly, 1998b). The pilot projects currently underway in Russia should result in a combined GHG emissions reduction in Russia of 34 million tons of CO₂ equivalent, and if successful could lead to more projects in the future.

Besides JI, a number of other foreign donor countries are undertaking projects to help Russia in the area of addressing climate change. One such donor has been Germany, which has initiated a project entitled, "Carbon Dioxide Reduction Program". The aim of

Table 3.4
Joint Implementation (JI) Pilot Projects in Progress in Russia

Project Type	Project Title	Funding Country	Project Life (years)	GHG Emissions Reduction* (tons)	Main Aims of Project
Afforestation	RUSAFOR: Saratov Afforestation Project	USA	60	293,000	<ul style="list-style-type: none"> - To evaluate biological/operational/institutional opportunities to manage a Russian forest plantation as a carbon sink. - To establish 4 plantation sites (900ha) on marginal agricultural land and prior burned forest stands.
Energy Efficiency	Horticuture Project in Tyumen	Netherlands	---	---	<ul style="list-style-type: none"> - To reduce CO₂ emissions from greenhouses by installing modern heating and/or cogeneration units, using computers to control heat demand, lowering heat losses from structures and increasing crop yields.
Energy Efficiency	Modelling/Optimization of the Volgotransgas Gas Transportation System	Germany	2	225,000	<ul style="list-style-type: none"> - To increase the energy efficiency of the grid operation and gas transportation system 'Ushgorod Corridor' in Nizhni Novgorod.
Energy Efficiency	Zelenograd District Heating System Improvements	USA	30	1,575,000	<ul style="list-style-type: none"> - To install new equipment (valves, control systems, heat exchangers) in 28 sub-stations and 1 boiler of the district heating system in order to lower natural gas consumption.
Reforestation	Reforestation in Vologda	USA	60	858,000	<ul style="list-style-type: none"> - To convert 2,000ha of collective state farmland next to and in the Russki Sever National Park back to forest by legally changing the land to an environmental classification. - To remove land from hay production and allow it to naturally regenerate based on 15% planting.
Fuel Switching	District Heating Tikhvin	Netherlands	---	---	---
Fugitive Gas Capture	RUSAGAS: Fugitive Gas Capture Project	USA	28	31,000,000	<ul style="list-style-type: none"> - To reduce methane emissions by sealing leaking valves (150 of 190) in the natural gas transmission and distribution system at 2 compressor stations in Pallasovka and Saratov.
Fugitive Gas Capture	Sanitary Landfill with Energy Recovery in Moscow Region	Netherlands	10	255,000	<ul style="list-style-type: none"> - To reduce methane emissions from landfills through extraction, flaring and landfill gas use. - To install gas extraction equipment, pipework, and a compressor station at two landfill sites in Moscow.

Adapted from: United Nations Framework Convention on Climate Change (UNFCCC) Website. "Activities Implemented Jointly (AIJ)".

(<http://www.unfccc.de/program/aij/aijproj.html>) June 25, 1999.

• Estimated GHG emissions that will be reduced or sequestered during life of project expressed as CO₂ equivalent in metric tons. --- Data not available.

the project is to use Germany's experience to help Russia undertake an inventory of its carbon dioxide emissions and better understand the technical options available for reducing its emissions of this GHG. The World Bank Global Environment Facility (GEF) has also been involved in helping Russia address climate change through a project entitled, "Greenhouse Gas Reduction". The US \$3.2 million grant offered to Russia is intended to identify sources of methane and carbon dioxide emissions in the City of Volgograd. Specifically, the project will target methane venting from pipelines and carbon dioxide emissions from compressor stations and other sources. Estimates of emissions from power generation, heating and households will be made. The success of the Volgograd project could lead to further cooperation between the GEF and Russia on GHG reductions (United States Agency for International Development, 1998).

Japan has also offered assistance to Russia to address climate change. In July 1998, during a meeting between the Japanese Minister of Trade and the Russian Prime Minister, Japan selected 20 of 500 projects proposed by Russia to reduce GHG emissions ("Japan May Finance", 1998; "MITI Proposes", 1998). The new projects will focus on repairing natural gas pipelines in Siberia and on reducing CO₂ emissions at coal-burning power plants across Russia. The projects will be worth up to US \$500,000 each ("MITI Proposes", 1998) and will target 28 of Russia's 72 thermal plants, which require immediate conversion to natural gas. When completed, the power industry in Russia should emit 10 million tons less of CO₂ per year, or 3% of Japan's annual emissions ("Sumitomo to Help", 1998). More recently, in November 1998, Japan and Russia signed another memorandum to increase joint activities on environmental protection. Part of this agreement focuses on reducing GHGs by compiling a catalogue detailing emissions sources and by conducting aerial monitoring of methane gases released in the Russian tundra ("Japan, Russia Sign", 1998).

Summary Remarks

The analysis in this chapter has shown that Russia's GHG emissions have fallen dramatically since 1990 and that Russia possesses an enormous natural CO₂ sink in the form of its forests. These positive aspects, however, are offset by the high energy intensity of the Russian economy and by the potential for economic recovery in the short term. Similar to findings in the analysis of the ozone case, it appears that Russia is committed to combating global warming based on its record of attending international conferences, participating in scientific cooperation, developing energy restructuring plans, initiating a number of GHG reduction action plans and programs, and establishing institutions such as the ICC to coordinate Russia's global warming activities. The effectiveness of these measures, however, has been reduced because of the lack of government funding and institutional weakness. Beyond economic and political problems, Russia's full commitment to global warming, as was the case for ozone depletion, is questionable given its skepticism as late as 1995 about the connection between human activities and rising global temperatures, its continuing reluctance to provide appropriate and detailed information on its GHG emissions, and its reported aggressive participation in developing a black market for the trading of hot air. All these factors suggest that Russia's motivation for participating in international negotiations and agreements on global warming may be primarily driven by the perception of the economic benefits that it can reap from emissions trading and JI project resource transfers. Russia's commitment to and motivation for cooperating in international efforts to combat global warming and ozone depletion will be examined in further detail in Chapter 6.

CHAPTER 4

GLOBAL ATMOSPHERIC POLLUTION: A PRIORITY FOR RUSSIA'S ENVIRONMENTAL MOVEMENT?

The analysis undertaken in Chapters 2 and 3 has shown that the Russian government has participated in international efforts to combat global warming and ozone depletion. Russia's involvement in international environmental cooperation, however, has not only been influenced by the Russian government. Throughout the 70 years of communist authoritarian rule in Russia, a number of committed individuals, primarily scientists and students working in informal groups, managed to keep the environmental movement alive at the societal level. Mass support for and the politicization of the environmental cause, however, did not really flourish until the introduction of Gorbachev's policies of glasnost and perestroika in 1986. Since that time Russian non-governmental organizations (NGOs) have been legally allowed to exist and citizens have finally been able to freely voice their opinions and act independently of the government to promote the protection of the environment.

In addition to establishing the magnitude and characteristics of the environmental movement in Russia today, this chapter will attempt to determine whether Russian NGOs, and in particular environmental NGOs (ENGOS), have been able since the collapse of the Soviet Union to take advantage of their new found freedom to pursue environmental issues. More specifically, this chapter will examine the extent to which ENGOS in Russia today are involved in activities to protect the global environment, particularly to combat global warming and ozone depletion. As background, and to better understand the circumstances behind its development and some of the resulting barriers that have faced the movement in the past decade, it is necessary to begin with a brief overview of the evolution of the environmental movement in Russia.

The Evolution of Russia's Environmental Movement

Despite the strong authoritarian leadership of the Communist Party during the Soviet era, and contrary to the belief that environmentalism only developed in Russia starting in the Gorbachev period, a number of informal environmental groups did exist in the Soviet Union. In fact there were three time periods during Russia's history, accompanied by radical political and social changes, in which the environmental movement was particularly strong and was able to flourish: 1910-1930, 1950-70 and the second half of the 1980s (Mirovitskaya, 1998; Weiner, 1988).

The first period of early environmentalism in Russia was largely dominated by ecologists and conservationists, and supported by the educated and wealthier social classes. In fact, until the 1930s, Russia was ahead of most countries in terms of conservation activities and theories (Weiner, 1988). The early environmental movement, made up of scientists and intellectuals, is credited with establishing an impressive system of *zapovedniks* (nature preserves) and other protected areas, in addition to introducing regional land planning and developing the science of phytosociology (branch of ecology dealing with the study of plant communities). Informal organizations grew primarily around universities in the form of special nature protection groups, organizations promoting local traditions and geographical societies (Mirovitskaya, 1998; Weiner, 1988).

Part of the reason for the growth in environmentalism after the 1917 revolution was Lenin's favorable inclination towards the need for environmental protection. Lenin, however, was not a radical supporter of the environmental movement. He only endorsed research that would advance the socialist objective of transforming the backwardness of the country and help Russia understand the structure of nature, which "in order to be commanded, had to be obeyed" (Mirovitskaya, 1998, p.33). The goal was to create a sustainable economy based on the principle of the rational use of nature. Under Lenin urban cleanliness was targeted, a national medical and sanitary-hygienic system was

established, a forestry management system was created, a network of protected areas was set aside for scientific research, and a national system of environmental monitoring was developed (Mirovitskaya, 1998).

One of the largest environmental organizations formed during the early period was the All-Russian Society for Conservation (VOOP). With an initial membership of 1,000 in 1924, and increasing dramatically thereafter, VOOP reflected an attempt by conservationists to create a unified environmental movement concerned with research, education and building public awareness and concern. Besides VOOP, many other conservation organizations and societies were formed across Russia in the 1920s. Youth emerged as the most dedicated and active supporters of the environmental cause (Mirovitskaya, 1998).

Unfortunately, the early environmental movement in Russia was short-lived. Stalin's rise to power in 1928 shifted priorities to rapid economic growth and massive industrialization with great costs to human lives and natural resources. Nature was to be dominated by humans to ensure the survival of socialism. The environmental movement was severely restricted and informal conservation groups were persecuted for their 'elitist' views. While VOOP, with 15,000 members by 1932, did not disappear completely during the Stalin period, its activities were not very meaningful and were extremely limited. Despite the fact that no public protest or involvement in political decision-making was allowed, many small groups of citizens concerned about Russia's deteriorating environment managed to survive, as did nature reserves and protected areas. Many scientists exiled to Siberia were able to continue their conservation research and environmental education activities (Mirovitskaya, 1998; Weiner, 1999; Yanitsky, 1993, chap.1).

It was not until Khrushchev's 'thaw' beginning in the 1950s that the environmental agenda was able to emerge once again. This second phase of environmentalism in Russia was mainly dominated by scientists and intellectuals, but also included university

students, and was more politically oriented than the first phase. Conservation was still a major goal of these informal environmental groups, but new environmental problems of alarming magnitude had emerged as a result of industrialization and war. Unfortunately, political liberalization in the 1950s and 1960s was not sufficient enough to allow intense protests against pollution on a mass scale. However, a number of large environmental issues were publicly protested, particularly the pollution of Lake Baikal, a symbol of national pride for many Russians. Protests against the pollution of the lake by pulp and paper mills unfortunately did not result in actual plant closures. Nevertheless, letters of protest signed by doctors, scientists, writers and publicists appeared in newspapers, and campaigns and public meetings were organized by writers, artists, students and journalists, all of which collectively contributed to greater awareness among the general public about the importance of protecting the environment, and increased efforts to use pollution abatement equipment (Mirovitskaya, 1998; Yanitsky and Khalyi, 1996).

Nature protection clubs were officially allowed to exist during the Khrushchev period as long as they did not address environmental problems caused by industrial pollution. Consequently, most environmental groups focused on politically safe issues such as wildlife conservation and the establishment and maintenance of nature reserves and protected areas (French, 1990, p.32). Opposition was in general 'silent', with environmental advocates offering only technological and scientific criticism, avoiding political issues (Tickle and Welsh, 1998). In this restricted atmosphere, protesters of the pollution of Lake Baikal took considerable personal risks to publicize the environmental threat to the lake.

One of the most active groups within the environmental movement during the 1960s was the Students' Nature Protection Corps. Although students and youth made up the majority of the members in this group, intellectuals also joined the group, which provided them with a cover to pursue liberal thinking banned by the Party. While the Students' Nature Protection Corps focused on controlling poaching, identifying

endangered species, managing nature reserves, and promoting environmental education, these activities were not really addressing the root of the country's environmental problems, that is the overarching importance allocated to economic growth and industrial production (Mirovitskaya, 1998; Yanitsky and Khalyi, 1996).

During the Brezhnev period (1970s) conservation groups existed but continued to be excluded from high level decision and policy-making which was dominated by party apparatchiki and industrial interests. Industrial and commercial groups, fortified by their strong connections with the Party, unanimously supported economic production over environmental protection and misused scientific information to defend their interests. Government environmental protection agencies existed but lacked the political influence of industry groups, and therefore were unable to affect policy decisions or enforce environmental standards. Informal environmental groups and public organizations were not well organized, had few connections with important Party agencies, and consequently were not included in decision-making even though well known scientists and experts were often members (Kelley, 1976). Despite their lack of political influence, however, scholars within informal environmental groups were able to use their positions to add strength to research findings and to disseminate their viewpoints in publications read by scholars and scientists from a wide range of academic disciplines (DeBardeleben, 1985, chap.4).

With Gorbachev's coming to power in 1985, the environmental movement was revived and once again able to openly voice its concerns and demand change. For years, underground concern among individuals and groups for the state of the environment had existed. When Gorbachev's policy of glasnost made it possible for citizens concerned about the environment to freely speak out and demonstrate, it became apparent that a large informal network of environmental groups had in fact become rooted in Soviet life (Yanitsky, 1993, chap.3). With glasnost underway, environmentally sensitive information was made public and citizens became alarmed about the state of the

environment and human health. The communist regime was blamed for the country's environmental ills. Unlike Russia's first two phases of environmentalism, eco-glasnost in the late 1980s permitted, for the first time, mass protest and demonstrations against the pollution of the environment.

The fact that Gorbachev's glasnost was accompanied by perestroika, which included restructuring in the environmental sphere, added an extra boost to the environmental movement. A new, state environmental protection committee was established and a number of decrees to protect national treasures such as Lake Baikal and the Aral Sea were passed. Thousands of enthusiastic protesters joined environmental groups to protest pollution from chemical, nuclear and industrial plants. The environmental movement reached its peak in 1990, with approximately 1,000 environmental groups registered, and many with high levels of membership. These environmental groups used public protests, petitions, meetings, picketing, letters and strikes to promote their cause. The Central Committee of the Communist Party, the government and the mass media received countless letters and petitions from citizens concerned about the environment. As a result, the government was forced to suspend work at nuclear power plants and to close many polluting factories (Mirovitskaya, 1998).

While the widespread activism of the environmental movement in Russia in the late 1980s achieved numerous successes, they were only short-term. The initial enthusiasm and idealism of environmentally concerned citizens dramatically waned along with the collapse of the Soviet Union in 1991. People began to feel the negative economic effects of factory closures and the government was forced to re-open many polluting plants to provide consumer goods and medicines, and as well, much needed jobs (DeBardeleben, 1992b; Yanitsky and Khalyi, 1996). Consequently, Russian citizens' priorities shifted from concern for the state of the environment to the need for the government to address the social and economic problems brought about by the rapid transition to a market economy.

The outcome of the sharp decline in public concern for the environment was a drop in membership in the environmental movement. For example, in 1989 when the Socio-Ecological Union (SEU) organized a country-wide protest against the proposed construction of the Volga-Chograi Canal, this umbrella ENGO group, which was only formed in 1987, was able to engage the participation of nearly 1 million people. In 1997, however, the SEU had less than 20,000 active volunteers, which represents only one activist per 10,000 people compared to the 1989 case with one activist per 150 Russian citizens (Zabelin, 1998, p.193). Another indication of the decline in environmental activism is the number of letters that citizens sent to the Ministry of the Environment in 1993 compared to 1995. During 1993, 12,400 people, either individually or collectively, sent 1,620 letters to the Ministry of the Environment. By 1995, however, the number of people sending letters had declined by 71%, while the number of individual and collective letters written by these concerned people fell by 44% (Ministry of Environmental Protection and Natural Resources [Minpriroda], 1994, p.232; Minpriroda, 1996, p.321).

The sharp decline in environmental activism in Russia is only partly explained by the economic crisis that has faced Russia in its transition to a market economy. Another plausible reason for the decline in environmental activism is the fact that not all members of the environmental movement in the late 1980s were genuinely concerned about the state of the environment. Since the environment was an issue that was never completely banned from discussion, many individuals with different causes used the environment as a platform to obtain such goals as freedom of speech and political liberation (Yanitsky and Khalyi, 1996). The phenomenon of eco-nationalism, that is using the environmental movement to achieve nationalistic goals such as independence from the USSR, was particularly pronounced in republics of the FSU. The Russian environmental movement, however, was not used as a platform for achieving nationalist goals, since Russia did not

have an enemy in the Soviet Union as did many of the former republics whose independence had been taken from them by the USSR (Dawson, 1996, chap.5).

With the collapse of the Soviet Union came national independence among former republics of the USSR, freedom of speech and political liberation, and new priorities emerged such as building a market economy, attracting foreign investment, and providing Russians with a Western standard of living. Given these new priorities, the ideas the environmental movement had originally fought for became overshadowed (Waller, 1998).

Characteristics of Russian NGOs Today

Despite the limited political influence of the environmental movement today in Russia compared to the Gorbachev period, and the many barriers that it faces in promoting the need for environmental protection, there are still a large number of NGOs and ENGOs that have been formed and are active across the country. In order to obtain a better understanding of the extent, distribution and focus of Russian ENGOs, an analysis based on a listing of selected NGOs provided in "The Post-Soviet Handbook: A Guide to Grassroots Organizations and Internet Resources", published by the Center for Civil Society International (CCSI) based in Seattle, has been undertaken.

While thousands of grassroot entities have been established in Russia since the collapse of the Soviet Union (estimated at 50,000 in 1993, although many of these could be one-person operations with little or no funding and influence), the Post-Soviet Handbook only profiles 354 of these organizations (Ruffin, Deutschler, Logan, and Upjohn, 1999, p.12). The handbook, however, is very current and is the most comprehensive guide to the Russian NGO sector available today. The producers of the handbook attempted to select and include only the most stable, effective and active organizations in Russia. To meet these selection criteria, the authors relied on the following sources: on-site visits to seven cities in Russia to meet with NGO coordinating centers; knowledge of NGOs that have undertaken significant work, based on CCSI's

activities in Russia for many years; and an e-mail questionnaire sent to CCSI subscribers (1,500) soliciting input for the book. With regard to the e-mail questionnaire, approximately 150-200 responses were received and only replies were used if they were judged to contain coherent and plausible information. An effort was also made to identify more NGOs in cities other than Moscow and St. Petersburg, and to represent a variety of NGO interests, including advocacy organizations, professional groups, and cultural and human rights NGOs, to name a few (Ruffin, 2000). Thus, the following analysis assumes that the organizations listed in the 1999 handbook, in terms of interest and scope of activities, are representative of Russia's NGO sector. While the results of this analysis may not be entirely accurate in the statistical sense, they should still provide a general and reasonable idea as to the magnitude, distribution and focus of NGOs and ENGOs in Russia today.

As can be seen from Figure 4.1 (page 88), and not surprisingly considering the higher concentration of people living in the Western part of the country, two-thirds of all Russian NGOs profiled are located West of the Urals. The city of Moscow in the West alone represents 25% of all NGOs surveyed. In contrast, the largest concentration of profiled NGOs in the East is in Novosibirsk (8%), the third largest city in the country with nearly 1.5 million people.

What is surprising is that the environmental movement appears as the largest NGO sector in Russia, representing 17% of all NGOs surveyed (Figure 4.2, page 88). The education and welfare sectors of Russian civil society fall just behind the environmental sector, accounting for 14% and 13% respectively of all Russian NGOs profiled. The fourth largest sector included organizations providing legal, financial and technical assistance to other NGOs, followed by human rights, women's, youth and health organizations.

Interestingly, while over 60% of all NGOs profiled in the Post-Soviet Handbook are located in Western Russia, the reverse is true for environmental organizations. As

Figure 4.1
Distribution of NGOs Across Russia

Figure 4.2
Distribution of Russian NGOs Across Different Sectors

Figure 4.3
Percentage of NGOs East and West of the Urals by Largest Sectors

can be seen from Figure 4.3 (page 88), 64% of environmental NGOs are located in Eastern Russia. In fact, the environmental sector is the only one with more organizations in the East than the West. The majority of organizations in other large NGO sectors, including education, welfare, NGO support, human rights, women, youth and health, are located in Western Russia.

Characteristics of Russia's Environmental NGOs

As shown in Figure 4.4 (page 90), Vladivostok in eastern Russia has the highest concentration of ENGOS in the entire country (15%), followed closely by Novosibirsk representing 14% of all Russian ENGOS profiled and Irkutsk accounting for 8%. Moscow is the only city in western Russia with a concentration of surveyed ENGOS greater than 10%. In terms of ENGOS per capita, the three eastern cities are well ahead of Moscow despite its much greater population. One possible explanation for the higher concentration of profiled ENGOS in eastern cities in Russia could be the larger reserve of natural resources, endangered flora and fauna, and pristine landscapes in the east, which demand special protection. Natural resources and pristine environments in eastern Russia are threatened with exploitation as a result of the pressure that the transition to a market economy and the need for foreign currency have placed on the environment in the east for increased resource extraction.

The largest area of focus for ENGOS in Russia has been on environmental education, with over 60% of profiled environmental organizations including this important activity in their mandates (Figure 4.5, page 90). Many ENGOS have also been involved in environmental journalism of one type or another, publishing their own newsletters or submitting articles to national and regional newspapers. Around 40% of surveyed ENGOS have been involved in providing support to other ENGOS in the form of legal, financial and technical counsel. Other significant ENGO interests include preventing water pollution, carrying out environmental monitoring and protecting animals, birds and fish. A smaller number of the ENGOS profiled are concerned with

establishing and maintaining national parks, protecting forests, safeguarding human health from environmental pollution, ensuring biodiversity, protecting the environment and humans from nuclear power plants and testing, pursuing environmental law, restoring degraded environments, preventing air pollution and ensuring proper waste disposal. Only a few ENGOs in Russia are concerned with soil pollution, energy efficiency, climate change, ecotourism, environmental architecture (eco-homes), and ozone depletion.

When the focus and concerns of environmental organizations in western and eastern Russia are compared, some interesting differences emerge (Figure 4.6, page 90). Of all ENGOs profiled, those in the east are considerably more involved in environmental education and journalism, ENGO support, the prevention of water pollution, environmental monitoring, resource use, parks, health and biodiversity than organizations in the west. The greater dedication to these issues among ENGOs is connected to the considerable water resources in the east, such as Lake Baikal, pristine areas either already set aside as nature reserves or exhibiting the potential to become protected areas, and rich natural resources and biodiversity. Western and eastern organizations are equally concerned about forest protection and climate change and show almost the same level of commitment to protecting animals, birds and fish. Not surprisingly, western ENGOs are more concerned about nuclear problems given the high concentration of atomic power plants in the west near large population centers. Environmental law, efforts to restore degraded environments, air and soil pollution, waste disposal and the need for energy efficiency all appear to be of greater importance to the environmental movement in the west. The few environmental organizations in the Post-Soviet Handbook who focus on ecotourism, environmental architecture and ozone depletion were located in eastern Russia.

NGOs Focusing on Global Warming and Ozone Depletion

As could be expected, all Russian NGOs profiled focus on domestic environmental problems as part of their organizational mandates. Only 20%, however, have an international or global focus in addition to their domestic initiatives. Most of the environmental organizations in the Post-Soviet Handbook with an international perspective are also, not surprisingly, connected with environmental organizations in other countries or internationally. Of those Russian NGOs profiled with an international or global outlook, 83% are located in western Russia and 25% can be found understandably in Moscow given its position as the seat of the Russian government and the administrative center for most international organizations operating in Russia.

The low level of priority given by the Russian environmental movement to international and global environmental problems is expected, given the overwhelming national, regional and local environmental problems that the country faces. For Russians, it is local problems that are the most immediate and alarming, and towards which limited funds must be channelled. However, it would seem that the environmental movement in Russia could benefit by combining efforts to combat domestic and global environmental problems and thus promote 'think globally, act locally' initiatives, which would contribute to the coordination of international efforts to protect the world environment with local initiatives addressing domestic environmental problems.

More disturbing is the fact that only four of the twelve NGOs with an international or global environmental perspective listed in the Post-Soviet Handbook are concerned about global warming, while only one is concerned about the depletion of the ozone layer. The low priority accorded to global warming and ozone depletion by Russia's environmental movement leaves little hope at present for developing opportunities to increase Russian citizens' awareness and concern for these two very important global environmental problems.

One of the environmental organizations in Russia with a focus on global warming is the Center for Energy Efficiency (CENef), an independent Russian-American organization based in Moscow. Founded in 1992, CENef is made up of a number of organizations from both the USA and Russia, and is supported by the World Wildlife Fund (WWF), the US Environmental Protection Agency (EPA), the Charles Stewart Mott Foundation, the US Department of Energy, the US Agency for International Development (USAID), and the MacArthur Foundation. The primary goal of CENef is to increase energy efficiency and promote environmental protection in Russia. CENef is involved in developing legislation to implement more efficient use of energy resources in Russia, in initiating projects to increase energy efficiency, in promoting cooperation between Russian and foreign companies to share energy efficient equipment and technology, in disseminating materials in the media to promote public education, in conducting energy efficiency training programs for NGOs, and in publishing two newsletters on energy policy and projects in Russia. CENef is also active in helping regions develop energy efficiency plans, in implementing a model program for improving district heating efficiency, in conducting energy audits at enterprises, and in creating energy efficiency building codes. Relating more directly to the problem of global warming, CENef has been involved in IPCC reports and in identifying strategies to reduce GHG emissions in Russia. CENef has also played a role in the JI pilot program and conducted a workshop for UNEP in 1997 on the climate convention. In 1998, CENef held a seminar entitled, "Opportunities for International Cooperation Under the Kyoto Protocol" (Center for Energy Efficiency, 2000; Ruffin et al., 1999, p.167).

A second environmental organization involved in addressing global warming in Russia is the Institute for Sustainable Communities (ISC). While ISC is an organization based in Vermont, USA, a Moscow office was established in 1996. The ISC Moscow branch was created to implement a national environmental grants and information program (to run until August 2000) called Replication of Lessons Learned (ROLL),

aimed at improving environmental management in order to achieve sustainable development in Russia by replicating the most successful US government environmental activities in as many of Russia's administrative districts as possible. More recently, USAID expanded the scope of ROLL by means of a targeted grants program to include global climate change activities in an effort to protect Russia's large, natural carbon sink through forest fire protection, reform of forestry policy and reforestation (Institute for Sustainable Communities, 2000; Ruffin et al., 1999, p.176).

Two other environmental organizations that have been involved in efforts to address global warming are ISAR-Siberia and the Siberian Environmental Fund, both located in the city of Novosibirsk in eastern Russia. The Initiative for Social Action and Renewal in Eurasia (ISAR) was founded to promote citizen participation and to aid in the creation of an NGO sector in FSU countries. ISAR has three offices in Russia, located in Moscow, Siberia, and the Far East. ISAR-Siberia was created in Novosibirsk in 1997 and provides information and technical support to ENGOs in Siberia, researches environmental grant programs available to Siberian ENGOs, offers training to ENGOs on project development, proposal writing and financial management, and manages a project called 'Search for Partners', which attempts to promote cooperation between international environmental organizations and Siberian ENGOs with similar interests (Initiative for Social Action and Renewal in Eurasia, 2000; Ruffin et al., 1999, p.262, p.264).

In November 1997, ISAR-Siberia and the Siberian Environmental Fund (described below) helped to organize 'The Climate Train Project', together with the funders of the project, the British Know How Fund and Scientists for Global Responsibility (a UK based organization). The project involved a train trip through Russia and China, in which forty scientists from fourteen countries (including the USA, Germany, England, Ukraine and Poland) participated. After China, the environmentalists went on to participate in the climate change negotiations held in Kyoto. Participants on the 'Climate Train' exchanged information and promoted environmental protection in a

number of cities along the way. The most important activity took place in Novosibirsk where ISAR-Siberia and the Siberian Environmental Fund organized a two-day conference on Siberia and its role in global climate change, which was attended by 30 local ENGOs (Ruffin et al., 1999, p.262, p.264; "Vsemirnaia konferentsiia", 1997).

The only organization to focus on both global warming and ozone depletion is the Siberian Environmental Fund based in Novosibirsk. The major focus of this Fund has been to promote environmental protection and education. However, because of its leader Sergei Pashenko, an expert in the Russian Academy of Sciences on the pollution of the atmosphere from aerosols and other pollutants, the Siberian Environmental Fund has been very active in research efforts on ozone loss and global warming. In November 1997, Pashenko and six other Russian environmentalists joined the 'Climate Train' across Russia and participated in the climate change negotiations in Kyoto (Ruffin et al., 1999, p.264).

The two-day conference held in Novosibirsk by ISAR-Siberia and the Siberian Environmental Fund was an important means of educating ENGOs and residents of the city and the larger Siberian region about the importance of global warming and the need for Siberia, with its vast fossil fuel and forestry resources, to play an active role in taking measures to prevent negative climate changes. In addition, the international conference, attended by more than 100 people and consisting of 30 presentations, agreed on a resolution concerning Siberia's role in climate change, which it presented in Japan. The resolution recognized the importance of Siberian forests in stabilizing the global climate, the existence of sustainable development plans in the region, and the special difficulties facing transition countries and Siberia in particular with its severe climate. Participants requested in the resolution presented at Kyoto that developing and transition countries, and particularly Siberia in light of its importance to the global climate, be given special economic aid to undertake projects to protect forests in the region, to set up stations to measure greenhouse gas concentrations and monitor climate change indicators, and to

support research into ways and means of introducing energy and resource efficient technology for housing, mining and industrial processes ("Sibir' i global'nyi klimat", 1997).

Although only a few Russian environmental organizations are presently focusing on global warming and ozone depletion, they have played an important role in bringing these global environmental problems (particularly global warming) to the attention of the public and in promoting energy efficiency and forestry protection projects. However, it is questionable whether the four ENGOs focusing on global warming and ozone depletion would have been as successful had it not been for the extensive financial and organizational support that they received from foreign governments, organizations and foundations. All four organizations were directly affiliated with a western organization and were supported with financial aid. In fact, almost 45% of all Russian ENGOs listed in the Post-Soviet Handbook receive some form of support from foreign organizations, whether it be financial, institutional or both. As will be seen in the following section, while Russian ENGOs' heavy reliance on the West for support has enabled many environmental organizations in Russia to stay alive, it has also created a number of problems for Russia's environmental movement.

Problems Facing Russian Environmental Organizations

Although environmental organizations may represent the largest NGO sector in Russia, they face a number of barriers that have prevented them from playing a more active role in advancing environmental protection principles either within Russian political networks or at the societal level. The following analysis examines some of the major problems the Russian environmental movement presently faces in an effort to better understand why ENGOs in Russia have not taken more of an interest in addressing the problems of global warming and ozone depletion.

Lack of Financial Resources

A major barrier to ENGOs playing an active role in decision and policy-making at the governmental level and educating the public about global warming and ozone depletion has been the general lack of financial resources available to the environmental movement. Even Russia's State Committee for the Protection of the Environment (Goskompriroda), downgraded in August 1996 from the status of a Ministry, is poorly funded. In 1998, Goskompriroda only received US \$48 million or 0.06% of the total federal budget, as opposed to the US \$13 billion or 16% of the budget allocated to national defence (Analiticheskaya sluzhba, 1998).

Given that Goskompriroda is seriously underfunded, ENGOs can expect little or no federal funds, and consequently must continue to survive with their own extremely limited sources of financing. Unlike environmental organizations in the West which have access to a greater number of funding sources, including government grants, private foundations, membership subscriptions and volunteer work, ENGOs in Russia, apart from very limited government funds, receive no donations from domestic companies who, in most cases, are indifferent to protecting the environment (Mirovitskaya, 1998). Furthermore, Russian ENGOs do not even receive tax subsidies or any other special payments from the government budget to help them financially operate (State Committee for Environmental Protection, 1997). The few financial resources that ENGOs are able to obtain are mostly used to address priority local environmental issues that are of most concern to average citizens. Consequently, world environmental problems such as global warming and ozone depletion are virtually ignored.

Dependence on Western Aid

The lack of domestic financial resources available for ENGOs in Russia has meant that the environmental movement has had to increasingly rely on foreign sources of funding. When the Soviet Union collapsed, expectations were great that the creation of a market economy and a democratic society, and an inflow of western investment,

would generate enough funds to combat environmental problems. Environmental funds, however, were not as forthcoming as originally expected. The West wanted the East to share the burden of cleaning up the environment and investors were afraid of the unstable economic situation in Russia and the low creditworthiness of many businesses (Kolk and Vand Der Weij, 1998; Waller, 1998).

Although there has been a shortfall in funding from the West, ENGOs in Russia have still benefited considerably from both the financial and institutional support that has been offered by foreign governments, NGOs and foundations. Western aid, however, has had both its advantages and disadvantages. In terms of benefits, many ENGOs in Russia today could not have survived without making connections with international environmental organizations. Besides financial aid, the environmental movement has also benefited from cooperation with international ENGOs, gaining knowledge about effective activism and lobbying, and learning how to educate the public and fundraise. Furthermore, interaction with foreign organizations has resulted in Russian ENGOs learning about and replicating many of the practices and principles used by environmental movements in other countries and internationally (Jancar-Webster, 1998).

Despite the benefits of external aid, the Russian environmental movement's increasing dependence on foreign sources of financing has created a number of problems for ENGOs. For example, donor agencies and organizations have preferred to use highly paid external professionals and companies as opposed to Russian ENGO experts. As a result of this tied-aid, conflicts have arisen over which environmental priorities and goals should be pursued. As Waller suggests, "Aid, expertise and advice brought an element of tutelage which has influenced the evolution of the environmental movement in the region, substituting itself for grass-roots activism and weakening environmental groups in relation to their government" (Waller, 1998, p.29). Local groups have lost their ability to formulate their own environmental agendas and must often abandon local knowledge and methods of solving issues in favor of foreign consultants and donor priorities

(Mirovitskaya, 1998). Allowing western specialists to take a more important role in funded projects in Russia does not result in first-hand knowledge being passed to local ENGOs and does not contribute to the long-term capacity of ENGOs to address environmental issues on their own.

Another problem with Russian ENGOs becoming too dependent on foreign aid is the potential for anti-western sentiment to develop. During the late 1980s, the Russian environmental movement had great strength since it was supported by citizens at the grass-roots level and demanded the solution of local problems of most concern to many Russians. "The great weakness today is that NGOs are organised, nurtured and sustained by the West in the name of democracy building. Should public opinion turn against the West, environmental NGOs could find themselves isolated and out of touch" (Jancar-Webster, 1998, p.88).

Another difficulty noted by Jancar-Webster is that by relying on foreign funding the Russian environmental movement has experienced a loss of local perspective as their concerns have become subordinated to donor priorities. Kolk and Van Der Weij state that the environmental priorities considered important to the West, such as ozone depletion and acid rain, have been targeted by ENGOs in Eastern Europe since it is easier to get funding for these problems even though there are more damaging local pollution problems that should be addressed.

The observations of Jancar-Webster, and Kolk and Van Der Weij, seem questionable considering the analysis that was undertaken of Russian ENGOs profiled in the Post-Soviet Handbook. Only 20% of ENGOs have an international or global perspective, and only 2% and 7% of these environmental organizations are focusing on ozone depletion and global warming respectively. If Russian ENGOs were targeting global warming and ozone depletion just because they are issues of importance to the West, there would certainly be more ENGOs addressing these issues. Moreover while 44% of ENGOs were receiving some form of foreign support, more than half of these had

a purely local focus. Even the organizations that had a global or international perspective also had a local perspective. In fact, as seen in the previous section, western aid has been the only way in which the Russian environmental movement has been able to focus on global warming and ozone depletion, since little or no funding has been available domestically for these environmental issues. Furthermore, focusing on global or transboundary environmental problems (issues of concern to the West) does not necessarily imply a loss of local perspective, since global and local issues are closely connected. Projects and action taken to address global warming and ozone depletion can result in improvements at both the global and local levels.

Lack of Unity and Direction in the Environmental Movement

Another barrier to Russian ENGOs operating more effectively has been the lack of unity and direction within the environmental movement itself. Although there has been vertical cooperation between ENGOs in Russia and foreign donors, there has been little horizontal cooperation between Russian ENGOs (Kolk and Van Der Weij, 1998). Instead of working together, many ENGOs are competing against one another for limited foreign funds. Many ENGOs distrust one another, are reluctant to share information which is regarded as an asset to be sold for profit, and are concerned about losing their identity should they cooperate (Jancar-Webster, 1998; Mirovitskaya, 1998). The potential also exists for the movement to become even more fragmented if a gap forms between those ENGOs working at the grass-roots level and those with financial and institutional support from foreign governments and international organizations (Jancar-Webster, 1998). Furthermore, the environmental movement has developed no plans of its own for how Russia should achieve sustainable development and has been oriented more towards correcting environmental problems caused by the communist regime, as opposed to confronting the new government to ensure that the environmental focus is not just on clean-up but also on prevention (Yanitsky and Khalyi, 1996).

Continuation of Past Soviet Ideologies and Values

The inability of ENGOs to influence government decisions is related to the continuation of ideas and values from the Soviet era. Many officials still do not understand the importance of environmental protection and fail to include ENGOs in decision and policy-making processes. Similar to the Soviet past, the environmental movement continues to lose debates over economic growth versus environmental protection, since safeguarding the environment is contrary to the belief and interests of many new business elites and the old bureaucracy, all who lack tolerance for environmental groups and see them as a threat to economic progress (Jancar-Webster, 1998).

Resistance to change still exists within the state and regional bureaucracies, which are dominated by many of the same people that were in power during the Soviet era (Tickle and Welsh, 1998). Despite some decentralization of authority and funding to local and regional levels, strong centralization in decision-making still occurs, making it difficult for ENGOs to attract attention to environmental problems of concern to them and to play a meaningful role in decision-making (Kolk and Van Der Weij, 1998). The privatization process in the transition to a market economy resulted in almost no changes in the management structure for resource use, except for the new economic *nomenklatura* (really just the old managers) acquiring monopoly ownership of major resource-using industrial enterprises. Owners of the new resource monopolies have tremendous power to influence the government, but unfortunately most are on the side of anti-environmental forces (Mirovitskaya, 1998).

Also a continuation of past practices has been the lack of enforcement of environmental regulations. The huge and extensive military and energy complexes are all officially exempt from environmental regulations, while new industrial managers with a vested interest in the exploitation of the environment for profit make use of loopholes in environmental regulations to avoid paying pollution fines, installing environmentally

friendly equipment or undertaking assessments of the impact of their activities on the environment. Another problem with environmental laws pertains to ENGOs themselves who in many cases do not pursue legal action against companies, preferring instead to use political connections or the media to protect the environment (Mirovitskaya, 1998). Part of the reason for the lack of ENGO legal action is explained by their low standing in Russia's legal system, as well as the weakness in legal institutions themselves. Unfortunately, unless the legal system in Russia is strengthened and made more democratic, ENGOs may continue to lack the stature within Russian law to take effective measures against businesses violating environmental standards (Jancar-Webster, 1998).

Low Political Representation

Another difficulty facing the environmental movement, as in the past, is that it still has no significant presence in the Russian Duma. Although Russia's Green Party (RGP) participated in the December 1993 elections, it was not able to surpass the 5% limit required to obtain seats in the Duma. Another green political party, the Constructive Environmental Movement of Russia (KEDR), was even less successful, unable to collect enough votes to register in the 1993 elections. While other political parties included environmental issues on their election agendas, they only concentrated on economic priorities once in the Duma. Furthermore, many nation-wide parties did not even include environmental issues on their agendas in 1993 (Minpriroda, 1993, p.229). Although green parties and ENGOs in Russia today have the freedom to express their views unlike before, they have even less influence than in the late 1980s and early 1990s and continue to be marginalized from decision-making processes at all levels of government.

Minimal Role of Women

The environmental movement has also been handicapped by the limited role that women have been able to play in decision-making. While the number of women's environmental groups has been increasing, they lack political influence and the

majority of women are predominantly concerned with the health of their families who are exposed to environmental pollution (Mirovitskaya, 1998). Just as women played a major role in the formation of the Western environmental movement, gender politics could also be important in creating and strengthening civil societies in Russia so that the views of women, in addition to those of men, can be heard. At present women are much less represented in political life and government positions (Mirovitskaya, 1993).

Low ENGO Citizen Membership

One of the greatest barriers to the widespread political involvement of Russian ENGOs in decision-making with respect to environmental problems, including global warming and ozone depletion, has been the low level of citizen membership in the Russian environmental movement. In a Russia-wide survey conducted in 1990¹ as part of the Inter-university Consortium for Political and Social Research's (ICPSR) World Values Program, less than 1.6% of Russians were members of environmental groups, similar to other East European countries, but considerably lower than membership in Western countries such as Canada and the USA where 7.5% and 8.1% of citizens respectively were members in 1990. In the repeat of the ICPSR World Values Survey conducted in Russia in 1995², survey results showed continued low membership (1.5%) in environmental organizations among Russian citizens.

A survey by the International Social Survey Program (ISSP) on the environment in 1993³ conducted across Russia found that, over a five year period starting in 1988,

¹ The ICPSR 1990-1993 World Values Survey was carried out in 43 countries, including Russia where a total of 1,961 people were surveyed. Although the ICPSR 1990-1993 survey was primarily designed to measure changes in values and attitudes in different countries, for example towards work, marriage, family life, leisure time, friends, religion, politics, and social issues, it also included questions on citizen membership in and support for the environmental movement. See the Appendix for questions used in this chapter.

² The ICPSR repeated the World Values Survey from 1995 to 1997 in 57 countries. A total of 2,040 people across Russia were sampled in 1995 for the repeat of the World Values Survey. Questions used from this survey can be found in the Appendix.

³ The ISSP 1993 survey on the environment was conducted in 20 countries, including Russia where 1,931 people were surveyed. Questions on Russian activity within the environmental movement used in this chapter from the ISSP 1993 survey can be found in the Appendix.

11% of Russians had signed an environmental petition, 12% had donated money to an environmental group, and 4% had participated in a demonstration to protect the environment. While these levels of active Russian participation in the environmental movement were similar to other East European countries in 1993, they were, with the exception of demonstrations, considerably lower than in Western countries. In terms of petition signing, participation from 1988 to 1993 ranged from the highest levels of 55% in New Zealand and 45% in both Canada and Australia, to 30%, 25% and 24% respectively in the USA, Japan and Italy. Citizens of New Zealand were also the greatest contributors of money to the environmental movement (49%), followed by the Dutch at 44%, and Canadians and Australians at 41%. While Russian donations were significantly lower than these countries, they matched contributions made in such countries as Italy and Japan.

Strengths of Russian Environmental Organizations

While the environmental movement in Russia is faced with a formidable set of problems, it does have a number of inherent strengths: strong public support, high public trust and increasing institutional capacity. These strengths provide opportunities for Russian ENGOs to grow in stature and broaden their influence over Russia's future policies and actions on environmental issues.

Strong Public Support

While membership, petition signing and donation levels have not been particularly high in Russia in comparison with other countries, the Russian environmental movement enjoyed an extremely high level of public support in 1990 as compared to other social interest groups. A total of 73% of Russians approved of the environmental movement a great deal in 1990, compared to 70% support for human rights, 61% for disarmament, 55% for anti-apartheid, 49% for women's rights, and only 40% support for the anti-nuclear movement. When compared to other countries in terms of a great deal/a

fair amount of support, there was virtually no difference between Russia and other countries, with over 95% of citizens of almost all nations supporting their respective environmental movements. However, Russians and other East Europeans are considerably more supportive of the environmental movement when only citizens indicating a great deal of support are compared. People indicating a great deal of support are greatest in Poland (81%) and Brazil (82%), followed by Russia and East European countries in the 70% to 80% range, and Japan, Canada and the USA at 59%, 54% and 47% respectively.

High Public Trust

In addition to the high degree of support that Russians gave to the environmental movement in 1990, they also trusted environmental organizations the most for reliable information on environmental issues. In the George H. Gallup Institute 1992 Health of the Planet (HOP) survey⁴, nearly 80% of Russians trusted environmental organizations a great deal/a fair amount, followed by 70% trust for university scientists, 60% for the press and 55% for television. The lowest level of trust was expressed for government and unions at 25%, and business and industry at 15%. Results from a similar question asked in the ICPSR 1995 World Values survey show that trust in environmental groups remained high, with again 78% of Russians expressing a great deal/a fair amount of confidence, still higher than Japan (65%) and the USA (54%). While trust in the Russian government remained at the same level as in 1992, confidence in the press and television decreased slightly, and trust in businesses and labour unions increased significantly. Given the great trust that people in Russia seem to have for environmental organizations even as late as 1995, it would appear that ENGOs, as opposed to the government, could be the most effective group at reaching out to Russians about the importance of

⁴ A short version of the HOP survey questionnaire was conducted in 24 countries. The longer version of the HOP 1992 survey, which is used in this thesis, was carried out in 6 countries including Russia, where 964 people were surveyed. See the Appendix for questions used in this chapter.

environmental protection in general, and global warming and ozone depletion in particular.

Improved Institutional Capacity

A number of positive developments have occurred over the past decade that provide some additional prospects for a stronger environmental movement in the future. Firstly, environmentalism has not only survived during this time of economic hardship, but has grown in terms of the number of ENGOs and the range of specific environmental goals and problems that they embrace. Secondly, ENGOs in Russia have become more professional, with increasing links to state and local authorities and to international epistemic communities. Finally, the Russian environmental movement has shifted tactics from the negative criticism and mass protest that characterized it in the late 1980s to a more positive and constructive role in pressing for environmental protection (Mirovitskaya, 1998; Jancar-Webster, 1998; Tickle and Welsh, 1998).

Summary Remarks

While Russia's environmental movement faces a number of difficult challenges today in playing a stronger and more influential role in governmental decision-making, it still represents the largest NGO sector in the country in terms of the number of contributing organizations. Unfortunately, and primarily due to the lack of financial resources, Russian ENGOs have not focused to a large extent on global environmental issues, concentrating limited funds instead on relatively more serious and immediate local problems that pose a greater threat to citizens. It is only thanks to foreign funding and institutional support that a small percentage of ENGOs have been able to take measures to educate the public and implement projects aimed at addressing global warming and ozone depletion.

If more ENGOs in Russia are to become seriously involved in combating global warming and ozone depletion in the future, the environmental movement will have to overcome one of its greatest limitations, that is the low participation of the Russian public

in environmental organizations. While Russians show high support and trust in environmental organizations, they are not very active in the movement itself. The following chapter will examine and analyze the views of Russian citizens with respect to environmental issues in general, and to global warming and ozone depletion in particular. The information obtained from the analysis of public opinion on environmental issues is crucial to understanding what action should be taken to mobilize citizens and to strengthen ENGOs so that they will be better able to address global atmospheric pollution.

CHAPTER 5

THE RUSSIAN PUBLIC: GENERAL ENVIRONMENTAL ATTITUDES AND SPECIFIC VIEWS ON GLOBAL WARMING AND OZONE DEPLETION

Since the first United Nations Conference on the Human Environment was held in Stockholm in 1972, international attention has been increasingly directed towards educating the general public about the importance of protecting the environment, and towards ensuring that ordinary citizens are integrated into environmental decision and policy-making processes. A major outcome of the 1992 United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro was the strong international consensus that was reached on the importance of including citizens of all nations in the solution of global environmental problems. International support for environmental education and citizen participation is clearly evidenced in the concepts and principles embodied in Agenda 21 from the Rio conference. Given that Russia was a participant in the UNCED and a supporter of Agenda 21, this chapter will aim to determine to what degree the Russian public is aware of and concerned with environmental issues and is willing to make sacrifices to protect the environment. In particular, Russians' willingness to participate in finding solutions to global warming and ozone depletion will be examined. To achieve this, all existing and available environmental public opinion data on Russia will be compiled and analyzed.

The Importance of Public Opinion Data

While the importance of environmental awareness and public participation has been stressed at the international level since the early 1970's, the majority of national surveys on environmental issues have primarily focused on assessing where environmental problems rank in priority among other global and domestic problems and on the seriousness of particular environmental problems at the community and national levels. Little survey research has focused on public awareness and concern about global environmental problems, with the exception of some studies in the United States and

Canada. Most opinion studies on global issues such as the greenhouse effect and ozone loss have only emphasized the views of major actors in the debate such as environmentalists, scientists, entrepreneurs, and government authorities (Dunlap, 1998).

One reason why most governments have shown little support for conducting environmental public opinion surveys is that government technocrats hold the view that opinions expressed by people in surveys do not accurately reflect what they would actually do in reality. A second reason is the assumption of policy-makers that people are more concerned about economic growth than environmental protection, thus making it unnecessary to ascertain the views of the public. In addition, there are many policy-makers who believe that the only solution to environmental problems is through the development and implementation of new technologies, and that changing the attitudes and behavior of society at large will make little difference. Finally, pro-technology policy-makers are often worried that social science research on environmental problems with the goal of societal change will detract from modernization and will only lead to lower living standards (Lofstedt, 1995).

Assumptions that people care about economic growth alone and that only technology is capable of solving environmental problems are debatable. An alternative, and a more realistic view, is that solutions to environmental problems will only be found through *both* technology and social change. Thus, public opinion research has an important role to play in measuring levels of citizen knowledge about and support for environmental protection and can serve as a useful tool for gauging a society's willingness to adopt new technologies, participate in environmental protection programs and accept less economic growth for more environmental protection.

Limited public opinion data is particularly a problem in the case of Russia, where prior to the collapse of the Soviet Union in 1991 no efforts were made to assess the views of citizens with regard to environmental issues at either the local or global levels. The lack of surveys on public environmental attitudes in the Soviet Union is explained by two

major factors. Firstly, all decisions in the Soviet Union were made by the state (no open public debate was allowed until glasnost in 1986) and hence there was no need to bother gathering the views of average citizens. Second, while environmental problems were acknowledged in specialized literature, they were largely kept a secret from the public in order to maintain the belief that socialism was the superior and most effective method of solving such problems. Even today, policy-makers in Russia (and in many other countries as well) do not appear to be giving enough importance to public opinion surveying and rarely make attempts to include the results of environmental survey research into the larger decision-making process. While surveys might not perfectly represent public opinion, they still provide a realistic perspective on where the public stands on issues and can be useful in determining to what degree citizens exhibit pro-environmental attitudes.

Hypotheses on Russian Environmental Attitudes

Since the late 1970's, many researchers have studied public attitudes in an effort to characterize the attributes and behavior of environmentally aware, concerned and active citizens. A recent study undertaken by Hawthorne and Alabaster (1999) in England in June 1996 attempted to develop a set of criteria to define responsible environmental citizenship based on existing theories in environmental literature. While it is not possible to embrace all the characteristics of model environmental citizens as defined by Hawthorne and Alabaster, an attempt will be made using available survey data to analyze whether Russians possess some of the most important traits characteristic of environmental stewardship. Accordingly, this chapter at the outset will focus on determining whether a number of important relationships between socio-demographic variables and selected questions testing environmental attitudes that have been noted in other studies hold for the Russian case, and to what degree Russians display the environmental personality traits necessary for society to be appropriately pro-active on environmental issues.

The following discussion outlines some of the major factors and associated relationships that were put forward by Hawthorne and Alabaster (1999, pp.26-29) in their study of environmental citizenship. For each case, hypotheses on Russian environmental attitudes are formulated.

Education

Many past studies have found a positive relationship between education and support for environmental protection. In other words, the higher the education, the greater the exposure people will have to environmental issues at the local and national levels, and particularly at the global level. Greater exposure to a variety of environmental issues leads to increased awareness and thus concern about the state of the environment, and hopefully to an increase in environmentally responsible behavior. Given the very high literacy rate and average level of education in Russia, it is logical to assume that Russians would show a correspondingly high level of environmental sensitivity.

Social Class

A positive link has also been found in previous studies between social class and environmental attitudes: the higher the social class, the greater the level of environmentally responsible behavior. The relationship between higher social class and pro-environmental attitudes was termed "post-materialist values" by Ronald Inglehart (Inglehart, 1990). Post-materialist theory assumes that concern for environmental problems, whether local or global, is only possible after people's material needs are met, that is after they achieve a certain level of economic security as have higher social classes. In light of the economic setbacks that have occurred in Russia in its transition to a market economy, it would be expected that apart from the elite, the majority of Russians would not be highly sensitive to environmental issues since they face great economic hardship.

Age

The relationship between age and environmental citizenship has not been thoroughly established. Some studies have found that environmental concern increases with age, while others have noted that younger people express more pro-environmental attitudes and show greater environmentally responsible behavior. In the case of Russia, one would expect the latter relationship to hold since younger people have been exposed to outside, Western influences more than their elders who might still value economic growth more than environmental protection, having been influenced by the priority placed on industrialization during the Soviet era.

Gender

The relationship between gender and environmental concern also remains disputed. Ecofeminist theory, developed by French feminist Francoise d'Eaubonne in 1974 to link the feminist and environmental movements, would suggest that women are more concerned about environmental problems than men since they possess nurturing and cautious personalities as opposed to the more aggressive and domineering qualities characteristic of men that have led to environmental degradation (Booth, 1997). A large percentage of members in Russia's Green Party (33%) and the organization Blue Movement for Social Ecology of Human Beings (50%) are women (Mirovitskaya, 1993). Since female membership is so high in these environmentally-oriented groups relative to other parties and organizations, it is assumed, in the case of Russia, that women may exhibit ecofeminist traits and thus show a higher level of concern for environmental problems and greater environmentally responsible behavior than men.

Religion

The relationship between religion and environmental concern is still not clear. Most studies, however, have found that there is no relationship between particular religious denominations and concern for the environment but rather that environmentally responsible behaviour is dependent more on whether or not a person is religious. Since

religious freedoms have been restored in Russia, it is assumed that religious people might be exposed to a wider range of values and morals, and thus exhibit more environmental sensitivity, than non-religious Russians.

In addition to the hypotheses presented from Hawthorne and Alabaster, two other socio-demographic variables will be tested to better assess environmental attitudes in Russia. They are as follows:

Children

In most societies it is assumed that people with children living at home would be more likely to display pro-environmental attitudes than those without children at home. Young children and adolescents would be exposed to some degree of environmental education and would bring home new ideas to share with their parents. Also, people with young children should be more concerned about the environment since environmental problems present a threat to the livelihood and happiness of their children's future. With the strong ties that have always existed in Russian families, it is expected that Russians with children at home would exhibit more sensitivity to environmental issues than those with no children.

Region

While it is not possible to hypothesize about environmental attitudes in every region of Russia, it may be possible to distinguish differences in environmental views in a number of general areas of the country. It is expected that people living in the North/North West (NNW) area of Russia (including St. Petersburg) would display the highest level of pro-environmental attitudes since they are highly influenced by the neighboring Scandinavian countries. People living in Siberia and the Far East (i.e. east of the Urals) should also be more environmentally conscious because of the vast natural resources and untouched land found in this part of the country. People west of the Urals (including Moscow) are expected to be the least environmentally sensitive, concerned

more with economic growth, despite higher pollution levels associated with higher population densities.

Russian Environmental Public Opinion Surveys

Since the 1991 demise of the Soviet Union, a number of public opinion surveys have been conducted in Russia addressing environmental issues. The first nation-wide public opinion survey including questions on the environment was the Inter-university Consortium for Political and Social Research's (ICPSR) 1990-1993 World Values Survey, carried out in 43 countries. A total of 1,961 people were sampled across Russia in 1990. Although the ICPSR 1990 survey was primarily designed to measure changes in values and attitudes in different countries, for example towards work, marriage, family life, leisure time, friends, religion, politics, and social issues, it also included questions on citizen membership in and support for the environmental movement (World Values Study Group, 1994). The ICPSR repeated the World Values Survey from 1995 to 1997. A total of 2,040 people across Russia were sampled in 1995 for the repeat of the World Values Survey. A number of questions were repeated from the ICPSR 1990 survey in the ICPSR 1995 survey, and a number of new questions were added. Questions (see Appendix) from both the ICPSR 1990 and ICPSR 1995 surveys were used in Chapter 4 to measure the level of public involvement in and support for the Russian environmental movement.

The most pertinent and comprehensive survey for assessing the level of knowledge and concern that exists among Russians for environmental problems, including global warming and ozone depletion, is the 1992 survey that was conducted by the George H. Gallup Institute entitled Health of the Planet (HOP). The short version of the HOP survey questionnaire (20 questions) was conducted in 24 countries, while a longer version (61 questions) focusing specifically on global warming, was carried out in 6 countries, one of which was Russia. The HOP 1992 survey sampled 964 people across Russia. Although the HOP survey was conducted in 1992, the information has not as yet been archived and as a result, limited analysis of the data has been undertaken to date.

The Appendix provides a list of the questions from the long version of the HOP survey that are used in the following analysis of Russian environmental attitudes in general, and of global warming and ozone depletion in particular. One question from the HOP 1992 was also used in Chapter 4 to analyze public trust for the environmental movement in Russia.

A fourth nation-wide survey on environmental issues was conducted in Russia in 1993 by the International Social Survey Program (ISSP). While the ISSP 1993 survey concentrated more on environmental issues in general, it did include several questions on global warming. The ISSP 1993 survey was carried out in 20 countries, with a sample population of 1,931 people in Russia. Several questions from this survey on Russian activity within the environmental movement were analyzed and discussed in Chapter 4. Questions used from the ISSP 1993 survey can be found in the Appendix.

More recently, the Institute for Comparative Social Research Ltd. (CESSI) based in Moscow took part in the 1997 International Environmental Monitor (IEM) Program, which conducted a survey measuring global public opinion on environmental issues in 24 countries. A total of 1,023 Russians were surveyed. The IEM 1997 survey included around twenty questions, seven of which were repeated from the HOP 1992 survey. Only one question on the IEM 1997 survey dealt with global warming, and unfortunately it did not duplicate any of the 1992 climate change questions.

While the IEM 1997 survey is now conducted annually, it was not yet possible to obtain the latest data from private research firms who still retain commercial rights to these survey results. More current survey data on global warming and ozone depletion would have enhanced the findings of the thesis, but this was not possible owing to financial constraints and to the fact that conducting an independent survey was beyond the scope of the thesis. Enough data from the very extensive 1992 HOP survey exists, however, to be able to draw important conclusions about Russian public awareness and

concern with respect to global warming, and to a lesser extent with respect to ozone depletion.

The following analysis of Russian attitudes with regard to general environmental issues is primarily based on the HOP 1992 and IEM 1997 data. The specific issues of global warming and ozone depletion are also analyzed using primarily HOP 1992 data, and are supplemented with three questions from the ISSP 1993 survey. Data from the HOP 1992, ISSP 1993 and IEM 1997 surveys were weighted by the survey organizations and were analyzed for this thesis using the statistical computer program SPSS, Version 9.0. Where cross-tabulations between environmental questions and socio-demographic data are undertaken, only strong (Cramer's v or Kendall's $\tau_b > 0.05$) and significant ($p < 0.05$) relationships are discussed.

The Environment: A Priority for Russians?

Before undertaking a detailed analysis of Russian public opinion on global warming and ozone depletion, it is first important to establish to what degree Russian citizens consider the environment to be a priority at the community, national and global levels and in the future. Determining how concerned Russian citizens are about the general environment and whether they are willing to sacrifice to protect the environment is also necessary to establish a baseline or framework within which Russian attitudes on global warming and ozone depletion can be more realistically assessed.

The analysis of Russian concerns for environmental problems at the community, national and global levels, and in the future, based on the HOP 1992 survey are summarized in Figures 5.1 to 5.4 (page 117)¹. Figure 5.1 shows that 22% of Russians consider the environment, at the community level, to be one of the most important issues, ranking almost equally with concerns for poverty/hunger and economic problems. At the national level, environmental problems are ranked third (10%), but are heavily

¹ All graphs in this thesis indicate the number of respondents (n) that answered any given question.

Figure 5.1
Most Important Community Problems in 1992

n=899

Figure 5.2
Most Important National Problems in 1992

n=973

Figure 5.3
Most Important World Problems in 1992

n=811

Figure 5.4
Most Important Future Problems in 1992

n=789

Figure 5.5
Most Important Future Problems in 1997

n=986

Figure 5.6
Degree of Personal Concern for the Environment
Among Russians in 1992 and 1997

1992: n=958 1997: n=985

overshadowed by economic problems (37%) and poverty (26%) (Figure 5.2). What is very surprising is that 37% of Russians consider the environment to be the second most important problem at the global level after international conflict (Figure 5.3). The results for future environmental problems (Figure 5.4) are even more remarkable in that over 50% of Russians indicated that the environment will be the most important issue in the future.

While the 1992 data show that Russians exhibited a high degree of concern for the environment at the global and future levels, by 1997 Russian future concerns had shifted dramatically towards economic problems, with 38% of respondents identifying economic issues as the most important future problem, 31% identifying war/conflict, and 23% (compared to 51% in 1992) identifying the environment (Figure 5.5, page 117). The emergence of economic hardship as the most important future problem ahead of the environment in 1997 is understandable given the continual decline in living standards that the majority of Russians experienced over the 5 year period from 1992 to 1997. The hope that still existed in 1992 that a successful transition to a market economy would improve living standards, allowing Russians to devote more attention to the environment, had faded. By 1997, with the further erosion of family incomes, more Russians had become preoccupied with economic survival.

While Russians no longer considered the environment to be the most important future problem in 1997, concern for the environment over the five year period remained relatively unchanged (Figure 5.6, page 117). In both 1992 and 1997, a total of 80% of all Russians felt either a great deal or a fair amount of personal concern for the environment. Concern for the environment is especially high, at least in 1992, when people perceive direct personal harm as a result of environmental problems. Russians are least likely to believe that environmental problems affected health in the past (35%), and most likely to feel that the health side effects of environmental problems will be the most severe in the future (62%) (Figure 5.7, page 119). Concern for the effect of environmental problems

on health in the present, however, fell by almost 20% between 1992 and 1997. Similar to the greater importance of economic hardship as a future problem for most Russians, human health was no longer considered to be as threatened by environmental problems in 1997 as it was in 1992.

As shown in Figure 5.8 (page 119), a strong belief in the ability of science and technology to solve most problems existed in Russia in 1992. Around 80% of Russians either 'strongly agreed' or 'agreed' that science can solve most problems. The relatively high support for science and technology is not surprising considering that during the Soviet period the prevailing ideology propagated a strong belief in the progress and prosperity that technology could bring, putting the highest faith in scientists and thinking that nature could be mastered by technology (DeBardeleben, 1992a). While a large percentage of Russians believe in the ability of technology to solve problems, it is significant, that at the same time, over 70% acknowledge that solutions also require major changes in the way people live (data not shown).

In 1992, over 65% of Russians felt that protecting the environment should be given priority over economic growth, while only around 12% felt that economic growth should come first (Figure 5.9, page 119). Russians were supportive of making environmental protection a priority over economic growth in 1992, but were somewhat less willing to personally sacrifice economic benefits to protect the environment. Overall, 50% of Russians are very willing or somewhat willing to pay higher taxes (Figure 5.10, page 119) to protect the environment. Similarly, it was found that half of Russians stated 'yes' that they were willing to pay higher prices (data not shown).

By 1997, support for environmental protection as a priority fell at the expense of an increase in Russians who felt that economic growth should come first (Figure 5.9). The decline in support for placing the environment ahead of economic concerns mirrors the greater importance, as discussed earlier, that Russians attributed in 1997 to economic as opposed to environmental problems in the future. Surprisingly, while Russians were

less supportive of environmental protection over economic growth in 1997, they were somewhat more willing than in 1992 to sacrifice part of their income to prevent pollution (Figure 5.10). Almost 60% of Russians in 1997 were very or somewhat willing to give part of their earnings to protect the environment, compared to the 50% in 1992.

Another measure of willingness to sacrifice, although more indirect, is the degree to which Russians support their government contributing money and giving authority to an international agency to work on solving global environmental problems. Nearly 60% of Russians in 1992 strongly favored contributing money, while up to 50% strongly favored giving away authority to an international agency (Figure 5.11, page 119). It is interesting to note that maintaining Russia's authority was more important to many Russians than saving the government's money, suggesting the existence of a nationalistic spirit in Russia in 1992. By 1997, this nationalistic spirit had grown dramatically, with only 27% of Russians strongly approving of giving away authority to an international agency, and those strongly opposed rising to 22% compared to only 6% in 1992. The sharp fall in support for giving away the government's authority reflects the growing anti-western sentiment that had been developing in Russia up to 1997 in step with the increasing failures of the transition process to a western-style, market economy.

Unfortunately, but understandably given the country's recent emergence from the oppressive Soviet era, Russians appear to be somewhat skeptical towards the view that individual citizens and groups can make a contribution to the solution of environmental problems. In 1992, Russians were evenly divided (a great deal/a fair amount vs not very much/none at all) in their opinions that citizens groups could have an influence on the solution of environmental problems (Figure 5.12, page 119).

Characteristics of Russian Environmental Citizens

While there has been some erosion of Russians' pro-environmental attitudes in the five year period up to 1997, the preceding analyses show that collectively at least half of the Russian population are environmentally sensitive. The following analysis will

endeavor to disaggregate the HOP 1992 survey results by socio-demographic factors to establish the profiles of Russians who attribute the greatest importance to the environment, show the highest personal concern, and are most willing to sacrifice to protect the environment. In doing so, an attempt will be made to prove or disprove the hypotheses deductively formulated earlier in this chapter for Russian environmental citizenship.

In terms levels of education, Figures 5.13 to 5.16 (page 123) show the strongest and most significant relationships that emerged from the HOP 1992 data. As can be seen from Figure 5.13, Russians with an exposure to university education (university incomplete or university complete and higher) were the most likely to mention the environment as an important problem in all cases. Interestingly, the reverse was true for people stating war/international conflict as the most important world problem, with less educated people believing that this was the most important problem (data not shown). Russians with a higher education were also more willing to pay higher prices (Figure 5.14) and higher taxes (Figure 5.15) to protect the environment, and were slightly more supportive of the Russian government giving an international agency authority to influence Russia's global environmental policies (Figure 5.16). While Russians with a higher education are more likely to think that the environment is a problem and are more willing to personally sacrifice (proving the original hypothesis), no significant relationships were found between educational levels in Russia and concern for environmental problems.

In terms of social class (Figures 5.17 to 5.20), the middle and upper classes exhibited the greatest pro-environmental attitudes. As shown in Figure 5.17 (page 123), Russians in the upper class were more likely to state the environment as the most important community problem, while the middle class was slightly more likely to mention the environment as the most pressing world and future problem. Russians from

Figure 5.13
Educational Level of Russians Mentioning
the Environment as the Most Important Community,
National, World and Future Problem

Community: $\chi^2=0.176$ $p<0.001$ $n=899$ National: $\chi^2=0.154$ $p<0.001$ $n=772$
World: $\chi^2=0.151$ $p<0.001$ $n=811$ Future: $\chi^2=0.160$ $p<0.001$ $n=789$

Figure 5.14
Russians Who are Willing to Pay Higher Prices to
Protect the Environment by Age, Education, Social
Class and Children Living at Home

Age: $\chi^2=0.183$ $p<0.001$ $n=772$ Education: $\chi^2=0.294$ $p<0.001$ $n=771$ Social Class: $\chi^2=0.154$ $p<0.001$ $n=614$ Children at Home: $\chi^2=0.101$ $p<0.005$ $n=770$

Figure 5.15
Degree to Which Russians of Different Educational
Backgrounds are Willing to Pay Higher Taxes to
Protect the Environment

Kendall's Tau-b = -0.282 $p<0.001$ $n=911$

Figure 5.16
Degree to Which Russians of Different Educational
Levels Support the Government Giving an
International Agency Authority to Influence Russia's
Global Environmental Policies

Kendall's Tau-b = -0.116 $p<0.001$ $n=852$

Figure 5.17
Social Class of Russians Mentioning
the Environment as the Most Important Community,
World and Future Problem

Community: $\chi^2=0.139$ $p<0.001$ $n=712$ World: $\chi^2=0.169$ $p<0.001$ $n=636$
Future: $\chi^2=0.182$ $p<0.001$ $n=636$

Figure 5.18
Degree to Which Russians are Personally Concerned
about the State of the Environment by Social Class

Kendall's Tau-b = -1.03 $p<0.002$ $n=743$

the lower social class considered war/international conflict to be the most important world problem (data not shown). Personal concern for the environment also increases with social class (Figure 5.18), as does the belief that environmental problems affect health a great deal today (data not shown). While the upper class was more likely to mention the environment as an important problem and to express more environmental concern (supporting the original hypothesis) they were not as willing as the middle class to pay higher prices (Figure 5.14) and taxes (Figure 5.19), and to support the Russian government giving away authority to an international environmental agency (data not shown). The middle class was also the most likely to believe that individuals and citizens' groups could contribute to the solution of environmental problems (Figure 5.20). Thus, it appears that the middle class in Russia is the most environmentally conscious as opposed to the hypothesized upper class.

The relationship between age and pro-environmental attitudes was not as clear as that for education and social class. However, it appears that younger people are more willing to pay higher prices to protect the environment than older people (Figure 5.14, page 123). Older people are also less willing (see 'not at all willing', Figure 5.21, page 125) to pay higher taxes, possibly because many elderly Russians receive very small pensions on which they can barely survive. It is however, not possible to test whether income, as opposed to age, is the real explanatory factor behind the greater willingness of younger people to pay higher taxes, since the HOP 1992 survey did not include any income questions. Thus, the original hypothesis for age appears to hold in that younger people are more willing to sacrifice to protect the environment, but no significant relationships were found between age and people who consider the environment to be the most important problem and who are concerned about the state of the environment

The only significant relationships found in terms of gender related to questions dealing with personal environmental concern and the effect of environmental problems on health. As hypothesized, Russian women are considerably more concerned than men

about the environment (Figure 5.22, page 125). Women are also significantly more likely to believe that environmental problems affected, affect and will affect health 'a great deal' in the past, present and future (Figure 5.23, page 125). No significant relationships were found between gender and those people who consider the environment to be the most important problem and who are more willing to make more personal sacrifices for the environment.

Similar to gender, strong relationships exist between religion and pro-environmental attitudes related to personal environmental concern and health (Figures 5.24 to 5.26). Religious Russians are both more personally concerned (Figure 5.24, page 125) and more likely than non-religious Russians to believe that environmental problems have affected health in the past and affect health today (Figure 5.25, page 127). Religious people are also more likely to favor environmental protection over economic growth than non-religious Russians (Figure 5.26, page 127). Although not as strong or significant, it was also found that Russians who are religious are more supportive of the Russian government contributing money and giving away authority to an international environmental agency and are more willing to pay higher taxes to protect the environment (data not shown). All these relationships support the original hypothesis that religious people are inclined to be more environmentally conscious. One result, however, that seems to contradict the original hypothesis is that religious people seem to be more likely to agree that most problems can be solved through the use of more and better technology (data not shown).

While there were few strong relationships in terms of people with and without children under 18 living at home, people with young children were more willing to pay higher prices (Figure 5.14, page 123) and taxes (Figure 5.27, page 127) to protect the environment. People with children are also somewhat more likely to mention the environment as the most important community and future (obviously concerned about their children's future well-being) problem than people without children. While the

greater willingness of people with children to pay higher taxes and their greater concern about the future environment supports the original hypothesis, people *without* children are somewhat more likely to express a great deal of concern about environmental problems and to believe that environmental problems affected health a great deal in the past (data not shown).

In most cases, and as hypothesized at the beginning of the chapter, people from regions located in Russia's North/North-West (NNW) exhibited the greatest pro-environmental attitudes (Figures 5.28 to 5.30). Russians from the NNW and from regions east of the Urals were more likely to mention the environment as the most important community, national, world and future problem (Figure 5.28, page 127). People from the NNW area of the country, followed by regions west of the Urals, also expressed the greatest personal concern for the environment (Figure 5.29, page 127) and were the most likely to believe that individuals and citizens' groups could help contribute to solving environmental problems (Figure 5.30, page 127). Contrary to the original hypothesis, however, Russians living west of the Urals were more likely (by around 15%) to believe that environmental problems affected health 'a great deal' in the past (data not shown). Residents of regions in the west and NNW of Russia were almost 14% more willing than those in the east to pay higher prices to protect the environment (data not shown).

A summary of the preceding analysis based on the HOP 1992 survey shows that Russians with the greatest environmental awareness, that is those people who consider the environment to be the most important community, national, world and future problem, tend to be highly educated and from NNW and eastern Russia. The environment is also considered to be the most important community and future problem by Russians from the middle and upper classes and by people with children under the age of 18 living at home. Concern for past, present and future health effects associated with environmental problems is greatest among women and religious Russians. Women,

religious persons, people from NNW Russia, and oddly enough people *without* young children, express the greatest personal concern for the environment. Russians showing the greatest willingness to pay higher prices and/or taxes tend to be highly educated, from the middle class, younger, religious and from the NNW and western regions of Russia. The greatest support for the Russian government giving away authority to an international environmental agency comes from highly educated, middle class and religious people. Finally, the middle class and Russians living in the NNW portion of the country are the most likely to believe that individuals and citizens groups can help find solutions to environmental problems.

In some cases, the data did not support the hypotheses given at the beginning of the chapter since several relationships were not statistically significant. For example, no significant relationship was found between education and personal environmental concern and gender did not seem to influence willingness to pay. In other cases, although there were very few, the results did not support the original hypothesis. For example, for some reason, people without children at home tended to show greater personal environmental concern. Overall however, the original hypotheses held for most cases in 1992.

The preceding analysis only provides a general idea of those characteristics which best describe Russians who are environmentally sensitive. As hypothesized, Russians who are more educated, from the middle and upper classes, younger, female, religious, have children living with them and who reside in the NNW region of the country exhibit one or more of the traits of environmentally sensitive citizens. They attribute great importance to the environment and/or show a high degree of personal environmental concern and/or are willing to sacrifice to protect the environment. Cross-tabulations for those questions in the IEM 1997 survey that were similar to the HOP 1992 survey in all cases showed the same relationships to those found in the 1992 data, providing additional support for the hypotheses given at the beginning of the chapter. Some additional,

significant relationships emerged from the IEM 1997 that did not appear in the HOP 1992 data. The majority of these additional 1997 relationships added further support to the original hypotheses for education, social class, age, gender, and region.

Unfortunately, since it was beyond the scope of this thesis, no regressions were undertaken to determine which factors best predict Russian environmental citizenship. For example, it could be that Russians from higher social classes are more willing to pay higher prices not because of greater wealth, but because of higher education. Similarly, younger Russians might be more willing to pay higher taxes to protect the environment not so much because of their age and thus different attitude towards environmental issues, but because they earn more money than older people. The primary purpose of this section of the chapter has been to obtain a general understanding of those attributes which best describe environmentally sensitive Russians. Since the main focus of the thesis is on global warming and ozone depletion, a regression analysis of those characteristics which best explain Russians' understanding of and attitudes on global atmospheric pollution problems will be undertaken.

Russian Views on Global Warming and Ozone Layer Depletion

The preceding analysis has demonstrated that despite severe economic circumstances, the Russian public overall still exhibits a great deal of concern for environmental issues. With this environmental sensitivity baseline established, the following analysis will determine which specific environmental problems are of the greatest concern to Russians, and in particular will examine global warming in depth. Unfortunately, only a general idea of Russian public opinion on ozone loss is possible since, unlike global warming data from the HOP 1992, no equivalent survey on ozone depletion has ever been conducted.

As can be seen from Figure 5.31 (page 131), air pollution was considered by 30% Russians to be the most important national environmental problem in 1992, followed by toxic/hazardous wastes, poor water quality and loss of natural resources. Air pollution

Figure 5.31
Most Important National
Environmental Problems in 1992

n=867

Figure 5.32
Most Important World
Environmental Problems in 1992

n=802

Figure 5.33
Most Important
Environmental Problems in 1997

n=933

Figure 5.34
Respondents Stating that Global Atmospheric
Problems are 'Very Serious' by Country, 1992

■ Air Pollution ■ Global Warming ■ Ozone Loss

Figure 5.35
Self-Reported Understanding of
Global Warming in Different Countries, 1992

■ Very/Fairly/Not Very Well
■ Not Very Well/DK/NA

Figure 5.36
Volunteered Causes of Global
Warming in Different Countries, 1992

■ Pollution ■ CFCs/Ozone ■ Fossil Fuel Use ■ Land Use ■ DK/NA

was also considered to be the most important global environmental problem in 1992, but only by 19% of Russians (Figure 5.32, page 131). Toxic/hazardous wastes and water quality problems were thought to be equally important at the global level, followed by loss of natural resources. Ozone loss was considered by 8.1% of Russians to be the fifth most important environmental problem in the world, a very important result considering that the question was open-ended. Global warming, however, was mentioned by only 1.5% of respondents indicating the lack of awareness, concern or both among Russians for this important problem.

In the comparable IEM 1997 survey question, Russian public opinion had shifted with 32% indicating water quality as the most serious environmental problem, followed by air pollution mentioned by 26% of Russians (Figure 5.33, page 131). Also significant were the sharp declines in the relative importance of natural resource loss and global warming/ozone depletion, which fell to less than 3% in each case. Specifically, in 1997 as compared to 1992, ozone loss as a serious environmental problem had fallen from 8.1% to 1.5% and global warming from 1.5% to 1.1%.

When Russians were asked in 1992 to rate global atmospheric problems from a given list, the highest concern was for world air pollution with 71% rating it as very serious (Figure 5.34, page 131). Ozone loss was the next most serious world problem according to 58% of Russians. Global warming was only considered to be a very serious problem by 41% of Russians. Compared to other countries² shown in Figure 5.34, Russia shows the lowest level of concern for global warming, but interestingly not much lower than the 47% in the USA. Surprisingly, the percentage of Russians expressing serious concern for ozone loss is even greater than among Americans. Brazil shows the highest

² HOP 1992 data for other countries is taken from: Dunlap, Riley E. "Lay Perceptions of Global Risk: Public Views of Global Warming in Cross-National Context." *International Sociology*. Vol.13(4), December 1998, pp.473-498. The long version of the HOP 1992 survey, in which the global warming questions were asked, was conducted in six countries including Canada, the USA, Mexico, Brazil, Portugal and Russia. For comparative purposes, only Canada, the USA and Brazil will be used for the analysis in this chapter.

concern for all atmospheric environmental problems, possibly because of the greater awareness brought about by the UNCED conference, held in Rio de Janeiro in 1992.

Having established the level of concern with respect to a number of different global environmental problems, the long version of the HOP 1992 survey then focused on global warming in particular. The first question was aimed at determining how well respondents felt they understood global warming and was used as a filter to ensure that the more specific global warming questions that followed were only answered by those respondents who felt they understood the problem to some extent³. Those respondents answering not at all well and don't know/no answer did not answer the questions on global warming.

As can be seen in Figure 5.35 (page 131), Russians have the lowest self-reported understanding of global warming, while Canadians have the highest. The fact that 57% of Russians feel that they have no understanding of global warming is an extremely revealing result and provides an explanation for why global warming was not considered to be as serious a problem as ozone loss and world air pollution in Figure 5.34. Furthermore, 20% of Russians who answered the global warming questions (that is those who responded 'very/fairly/not very well') fell into the 'not very well' category. Russians' understanding of global warming as illustrated in Figure 5.35 is also questionable since knowledge is self-reported. The problem of self-reported understanding is discussed further on page 137.

A comparison of volunteered causes of global warming (open-ended question) across countries based on those respondents who felt they understood global warming

³ Only respondents who answered very/fairly/not very well (42.8% of the weighted Russian sample population or 428 people) are used for the analysis relating to the global warming questions from the HOP 1992 survey. While it seems strange that respondents who answered 'not very well' to this question are included in the category of people who have an understanding of global warming, they were left in for the analysis in this chapter, since they have some understanding (although very limited), and since the questionnaire did have them continue on to answer the questions on global warming. Furthermore, removing those people who responded 'not very well' would considerably reduce the number of people answering the global warming questions even further, making an analysis of the data very difficult.

very, fairly and not very well is shown in Figure 5.36 (page 131)⁴. As can be seen, 34% of Russians lacked the knowledge to be able to answer this question, considerably greater than the other three countries. Among those Russians who felt they knew the causes of global warming, 31% felt that pollution (predominantly air) was a cause, followed by 18% (surprisingly higher than Americans at 12%) who mentioned the burning of fossil fuels. These answers are fairly correct, although a greater percentage of people stating fossil fuels would have indicated a higher level of knowledge. Air pollution is a rather general cause and it is difficult to determine whether people were referring to carbon dioxide pollution from fossil fuel burning (this, however, is a common problem for all the countries since air pollution was mentioned the most often as a cause). While Canadians are more likely than any other country to correctly mention fossil fuels as a cause of global warming, it appears that they, along with Americans in particular, are confused about the role of CFCs in causing the greenhouse effect. CFCs do contribute to global warming but not nearly as much as fossil fuels, which are less mentioned as a cause. Brazil is the only country with a higher percentage of respondents noting that land use contributes to global warming, no doubt because of the greater knowledge among its citizens about the effects of the deforestation of the Amazon rainforest on the Earth's climate. Overall however, there appears to be a fairly low understanding of the causes of global warming in all the countries since fossil fuels and land use (the most important causes) were not mentioned by even 25% of the population in any of the countries.

Respondents who felt that they knew something about global warming were also asked a second question on the causes of the greenhouse effect, in which they had to rank six suggested causes as major, minor or not a cause of global warming. Figure 5.37 (page 135) shows the percentage of respondents in each country who ranked each cause

⁴ Although respondents were asked to give two responses to this question, only the first response will be used for this analysis.

as major. The causes are graphed according to the degree to which they contribute to global warming, that is from coal/oil power plants (major cause) to nuclear power plants (not a cause). Therefore, the greater the downward slope of a country's graph, the greater knowledge that country's citizens have about the causes of global warming. Canadians appear to have the most knowledge, as evidenced by the nearly uniform downward slope of the graph, and are the least likely to rank nuclear power plants as a major cause. Brazilians appear to be the least knowledgeable, ranking the loss of rainforests (correct but ranked relatively too high) and nuclear power plants higher than other causes. Russians and Americans appear to have ranked the causes in a similar way, and with the exception of the high importance given to nuclear power plants, exhibit a good understanding of which causes contribute most to global warming. Overall, respondents in all countries were better able to identify the primary causes of global warming (coal/oil power plants, auto exhaust and loss of rainforests) in the fixed answer question as opposed to the open-ended question in Figure 5.36.

While the preceding analysis of the causes of global warming included only those respondents who considered each cause to be major, another possible way of analyzing this question (for Russia only since data for other countries was not obtained), is to rate each respondent overall on how well they ranked each cause. In order to do this, an index representing Russians' overall real knowledge of the causes of global warming was developed. In this knowledge index system, points awarded for each cause ranged from 0 to 2, with total possible index scores ranging from a minimum of 0 (no knowledge) to a maximum of 10 (highest knowledge)⁵. As shown in Figure 5.38 (page 135), most

⁵	Major	Minor	Not a Cause	Don't Know
Coal/Oil/Power plants:	2	0	0	0
Automobile exhaust:	2	1	0	0
Loss of Rainforests:	2	1	0	0
Aerosol Sprays:	0	1	0	0
Refrigerators/AC's:	0	1	0	0
Nuclear Power Plants:	0	0	2	0

Russians score between 4 and 7 on the index, with the mean score falling at 5.3. The relationship between the real knowledge index and Russians' self-reported understanding of global warming is presented in Figure 5.39 (page 135). These results show a direct correlation between self-reported and real knowledge, that is the level of self-reported understanding increases with increasing real knowledge and vice versa. Thus, a positive relationship exists between self-reported and real knowledge of global warming, but this relationship is fairly weak, making it difficult to refute the concern identified earlier (page 133) that Russians' understanding of global warming as illustrated in Figure 5.34 (page 131) is questionable since knowledge is self-reported.

Using an open-ended question, the HOP 1992 survey also sought to determine which effects of global warming were of most concern to citizens in different countries⁶. As shown in Figure 5.40 (page 135), environmental and weather-related effects were mentioned the most across all countries, but nearly 50% of Russians selected environmental effects, which was well ahead of the other countries who were at 30% or less. Canadians and Brazilians were more likely than the other two countries to mention the effects on human health from global warming, while no one country seemed too concerned about the agricultural effects of global warming. Almost 17% of Russians were unable to suggest any possible effects of global warming, but this was not out of step with the other countries, and surprisingly less than the USA, with 21% of the respondents not knowing or declining to answer the question. Overall, the responses to the open-ended question on the effects of global warming suggest that respondents in all four countries are more concerned about the possible negative consequences of the greenhouse effect on the natural environment (ecology, weather) than on human society.

The HOP 1992 survey also asked respondents through a fixed answer question how harmful they thought the effects of global warming in the next 25 years might be

⁶ Although respondents were asked to give two responses to this question, only the first response will be used for this analysis.

on the following: human health, economic well-being, agricultural production, locations for human settlement, survival of animal and plant species, and ocean levels. Figure 5.41 (page 135) shows the results for only those respondents across the four countries who indicated that the effects of global warming on these six areas would be 'very harmful'. As can be seen, Brazilians tend to see considerably more harm to all six areas from global warming than any of the other countries (possibly because of the 1992 Rio Conference), while Russians seem to perceive the least overall threat. Similar to the open-ended question in Figure 5.40, respondents in all the countries in the fixed answer question (Figure 5.41) again seem to feel that the greatest risk from global warming will be to animals/plants and ocean levels, that is to the natural environment. There is also great concern across all countries for the possible impact on agricultural production, which is also to a large extent associated with the natural environment. Except in Brazil, respondents from all countries show relatively little concern (as compared to the natural environment) for the impact of global warming on location and the economy; this result is especially true for Russia.

The final question on the HOP 1992 survey, addressing global warming, was aimed at determining when people believed the effects of global warming would start to be felt. As can be seen from Figure 5.42 (page 135), over 60% of respondents in all countries except Russia at 45%, felt that global warming had already started to happen. Higher than any other country, almost 20% of Russians think that global warming will only affect future generations. When broken down into global warming happening in the short term (already happening/will happen within a few years/within my lifetime) versus the long term (not within my lifetime but future generations/will never happen), 72% of Russians indicate the short term, compared to USA at 78%, Canada at 87%, and Brazil at 92%. While opinions as to whether global warming has in fact already started vary widely, even among scientists, the fact that Russians are the least likely to indicate that global warming is already happening accords with previous results

(Figures 5.34, 5.40 and 5.41) showing that Russians do not think that the problem is very serious or that the effects will be very harmful.

The ISSP 1993 survey on the environment, conducted in Russia, also included questions on global warming. Similar to the HOP 1992 data (Figure 5.37, page 135), results of the ISSP 1993 survey showed that Russian citizens, compared to other countries, had a reasonably good understanding that the use of coal, oil and gas causes global warming. As shown in Figure 5.43 (page 140) nearly 56% of Russians were correct in saying that the greenhouse effect is definitely/probably caused by the use of fossil fuels, compared to 64% and 78% of Americans and Canadians respectively. It is important to note, however, that while many Russians were able to correctly answer this question, 30% could not answer the question at all, which is almost four times the number of respondents in Canada and the USA who did not know whether fossil fuel use was a cause of global warming.

The ISSP 1993 survey also explored the degree to which Russians perceived danger to the environment and to their personal and family well-being from global warming. As shown in Figures 5.44 and 5.45 (page 140), and similar to the HOP 1992 questions regarding the effects of global warming (Figures 5.40 and 5.41, page 135), Russians, in addition to Canadians and Americans, perceive more danger from a rise in the world's temperature to the environment than to themselves and their families. Furthermore, Russians were more than twice as likely as Canadians and Americans to say that they did not know how harmful a rise in world temperatures would be to both the environment and their family's well-being.

In order to determine which Russians displayed the greatest understanding and concern about global atmospheric pollution, a further analysis was undertaken to establish whether any significant relationships exist between Russian socio-demographic data and questions on global warming and ozone depletion. Unfortunately, few very strong or significant correlations were found. Dunlap's analysis for other countries in

which the long version of the HOP 1992 survey was conducted also found little correlation. His assessment that this result supports the risk society hypothesis, that is that concern for global environmental problems or "mega-hazards" is widespread throughout society, seems to be a good explanation for the absence of concern among any one group of people (Dunlap, 1998). Another reason for the lack of strong and/or significant relationships in the Russian data, however, is the poor understanding of the problem, which resulted in the majority of people being filtered out, with only 40% of the original Russian sample population answering the more detailed global warming questions.

Four questions dealing with global warming and ozone depletion, however, did yield significant results when cross-tabulated with the socio-demographic variables used to form hypotheses at the beginning of this chapter. These were, belief that ozone depletion is a serious world problem, belief that global warming is a serious world problem, understanding of global warming, and opinion as to when global warming will start to happen. The results from those cross-tabulations that were significant are presented in Figures 5.46 to 5.52 (pages 140 and 142), and the most important and interesting features are highlighted as follows:

- Figure 5.46 (page 140) shows that self-reported understanding of global warming increases with Russians' level of education, a result that Dunlap also found for the other five countries in which the long version of the HOP 1992 survey was conducted (Dunlap, 1998).
- Educated Russians were also more likely to believe that the effects of global warming had already started (Figure 5.47, page 142). Around 40% of Russians with no education/primary/secondary incomplete, double the other education categories, thought that global warming would only be a threat to future generations or that it would never happen.

- Russians from the lower class had the least self-reported understanding of global warming, while there was little difference on an overall basis between the middle and upper classes (Figure 5.48, page 142).
- Figure 5.49 (page 142) shows that understanding of global warming decreases with increasing age, coinciding with Dunlap's findings for the five other countries surveyed (Dunlap, 1998).
- Men had a greater self-reported understanding of global warming than women (Figure 5.50, page 142), a result Dunlap also found for the other countries (Dunlap, 1998).
- Religious Russians are more likely than non-religious Russians to believe that ozone depletion and global warming are very serious world problems (Figure 5.51, page 142).
- The NNW region of Russia has the highest self-reported understanding of global warming, followed by regions east of the Urals (Figure 5.52, page 142).

Although not illustrated in graphical form, five additional relationships emerged from the cross-tabulations. These relationships were statistically significant, but were not as strong as those presented above:

- Russians from the lower class were more likely than the middle and upper classes to think that global warming is a very serious problem.
- Women were less likely than men to think that global warming had already started.
- People with children at home feel that they have a better understanding of global warming.
- People with children are also somewhat more likely to think that global warming has already started to happen than people without children.
- Russians *without* children, however, are more likely to believe that global warming is a very serious world problem.

Thus, it appears that Russians with the greatest self-reported understanding of global warming tend to be highly educated, from the middle and upper classes, young, male, religious, have children and come from the NNW portion of the country. Religious Russians are more likely to think that global warming and ozone depletion are serious world environmental issues, while the lower class and people without children are slightly more likely to say that global warming is a very serious world issue. Educated Russians, men and people with children are the most likely to think that global warming is already happening. On the basis of the significant relationships that were found between socio-demographic variables and global warming/ozone depletion questions, it appears that the hypotheses for education, social class, age, religion and region given at the beginning of the chapter are again supported as was the case for the general environmental cross-tabulations presented earlier in this chapter. The relationships for gender and children, however, were not as clear.

In addition to the preceding cross-tabulation analysis, regressions were also undertaken for questions on ozone loss and global warming in an effort to better understand which independent variables best predict levels of perceived seriousness about global warming and ozone loss, and which predictors best describe levels of self-reported understanding about global warming. As shown in Table 5.1 (page 145), a number of independent variables were used to try to find the strongest predictors of answers to three dependent questions. Table 5.1 shows the beta values of the linear regression analyses and only reports those values that are statistically significant ($p < 0.05$).

As can be seen from Table 5.1, Russians who show a great deal of personal concern for the environment in general, support environmental protection over economic growth, rate world environmental quality as bad, and have a high self-reported understanding of global warming, are most likely to perceive ozone depletion to be a very serious issue. Surprisingly, education works in the opposite direction than would be

Table 5.1
Predictors of Russians Who Think that Ozone Depletion and Global Warming are Serious, and Who Possess High Self-Reported Levels of Understanding About Global Warming*

Variables	Ozone Depletion Perceived as Serious	Global Warming Perceived as Serious	High Self-Reported Knowledge Global Warming
Education (high)	-0.105	-0.184	0.319
Social class (high)		-0.111	
Age (young)			0.181
Urban/Rural (urban)		0.166	
Gender (female)			
Technology can solve most problems (disagree)		-0.092	
Personal concern for the environment (high)	0.120	0.191	
Environment vs economic growth (pro-environment)	0.090	0.090	0.093
Rating of world environmental quality (bad)	0.151	0.148	
Perceived seriousness of global warming (high)			0.150
Self-reported understanding of global warming (high)	0.185	0.180	
Multiple R	0.31	0.41	0.48
Adjusted R ²	0.09	0.16	0.22

* Beta values for predictors where $p < 0.05$.

expected, since less educated Russians are more likely than those who are educated to regard ozone depletion as a serious world environmental problem. One explanation for this finding could be that educated people have greater knowledge about ozone depletion than less educated Russians who would fear a problem that they do not understand fully and thus consider it to be more serious. Together, the five predictors of perceived seriousness of ozone depletion only explain 9% of the variance in this dependent variable, and thus are not very revealing.

Regressions for perceived seriousness of global warming and self-reported understanding of the greenhouse effect proved to explain more of the variance in views on these questions than in the case of ozone depletion. As can be seen from Table 5.1,

socio-demographic variables are the strongest predictors of Russians who perceive global warming to be a serious world environmental problem. Similar to the situation with perceived seriousness of ozone depletion however, the less educated, as well as the lower social classes in this case, are more likely to perceive global warming as a serious problem. Again, this could be connected to apprehensions that less educated people (also in the lower social classes) might have about global warming as a result of less knowledge about the problem than more educated Russians. People who believe that technology can solve most problems, who have a high degree of personal environmental concern, who support environmental protection over economic growth, and who rate world environmental quality poorly, are also most likely to regard global warming as serious. Interestingly, people with a high self-reported understanding of global warming are also more likely to think that global warming is a serious problem. Thus it appears that knowledge about global warming as opposed to a high level of education is most important if Russians are to believe the problem is serious.

The most explanatory regression is that for self-reported knowledge of global warming (explaining 22% of the variance). As expected, Russians with a higher level of education and those who are younger have a greater level of self-reported understanding about global warming. People who support environmental protection over economic growth and those who perceive global warming to be serious also have a higher self-reported understanding of global warming.

Summary Remarks

The analysis of Russian public opinion data on environmental issues presented in this chapter has shown that Russians continue to exhibit a remarkably high level of environmental sensitivity, given the difficult and deteriorating economic conditions in the country which have evolved with the transition to a market economy. Despite a significant shift in public perceptions over the 1992 to 1997 period, giving increased priorities to economic issues over environmental problems, 80% of Russians in 1997 still

expressed personal concern for the environment. Surprisingly, even in the face of increasing economic hardship, the percentage of Russians willing to pay taxes or to give part of their income to protect the environment actually increased over the five year period up to 1997. While it has been established that Russians on average are good environmental citizens, it was further determined that, as hypothesized, those Russians exhibiting the greatest environmental sensitivity were most likely to be highly educated, from the middle and upper classes, young, female, religious, have children living at home, and reside in the NNW region of the country.

On global atmospheric problems, Russians showed greater concern for ozone loss than global warming. Russian concern for ozone depletion was at nearly the same levels as other countries, and was better than the USA. For global warming, however, just over 40% of Russian citizens felt they had some understanding of global warming, which was considerably lower than in other countries. Yet Russians who claimed that they had some understanding of global warming scored reasonably well relative to other countries on questions testing real knowledge about the causes and effects of global warming. The low level of understanding of global warming, and thus lack of seriousness attributed to the problem in Russian society, has contributed to the broadly held views that the effects of global warming will not be very harmful to humans and that global warming will not start until some point far into the future.

Given that global warming is a relatively new world environmental issue, and that to date only one or two Russian ENGOs are attempting to educate and sensitize the public about global atmospheric pollution issues, it is understandable why many Russians exhibit a low level of knowledge about and concern for global warming. Since, however, Russian citizens show high levels of concern for environmental issues in general, and the majority are willing to sacrifice to protect the environment, even in times of economic hardship, it should be possible through public educational programs to significantly increase Russian concern about and action on global warming. As the regression for

perceived seriousness of global warming showed, it is not education in general but education of the problem that will increase concern for global warming. ENGOs in Russia have an increasingly important role to play in ensuring that the Russian public understands the importance and potential consequences of global warming and ozone depletion, and that these issues do not disappear from the Russian government's agenda. As will be discussed in Chapter 6, it is only through greater public understanding and involvement that the Russian government will become fully committed to cooperating with other countries to find solutions to global warming and ozone depletion.

CHAPTER 6

PROSPECTS FOR MEANINGFUL RUSSIAN PARTICIPATION IN COMBATING GLOBAL ATMOSPHERIC POLLUTION

The Russian government's involvement in and commitment to international cooperation on ozone depletion and global warming has had, as seen in Chapters 2 and 3, both its strengths and weaknesses. The following summary overview and analysis of the government's position on these global atmospheric problems, its performance in negotiations, the measures it has adopted, and the foreign assistance that it has received will make it possible to draw some important conclusions and to speculate about the future prospects for the Russian government's meaningful participation in international efforts aimed at addressing ozone depletion and global warming. A similar summary analysis, based on Chapters 4 and 5, will also be undertaken to provide a comprehensive overview of the role that ENGOs and the Russian public have played to date in responding to general and global environmental issues. From this analysis, important conclusions, and as well, prospects for the future participation of ENGOs and Russian citizens in combating global atmospheric pollution, will be derived.

Government Performance on Ozone Depletion

Multilateral negotiations in the early 1980's to develop an international convention to address ozone depletion proceeded very slowly given the initial scientific uncertainty surrounding the causes of ozone depletion. The Soviet Union, like many other countries, attempted to protect their ODS industry and export markets by arguing that no ozone treaty should be developed until further scientific evidence linking human-made CFCs to ozone depletion had been gathered. The Soviet government's skeptical viewpoint that ozone loss was a natural phenomenon persisted well after most countries had conformed. Even after ratifying the Vienna Convention in 1986 and the Montreal Protocol in 1988, the Soviet government still did not seem to accept the increasingly mounting evidence connecting human-made ODSs with the destruction of the ozone

layer. The Soviet government's continued rejection of international scientific findings was still very evident in 1989 when their delegation at the Save the Ozone Layer Conference in London stated that "Arctic ozone depletion was primarily caused by weather and climate, and not by man's emission of gases" (Rowlands, 1995, p.58). Furthermore, the Soviet delegation stressed that measures to strengthen the Montreal Protocol could not take place until more concrete scientific findings became available, implying that research to date had proven nothing. It was therefore a complete surprise, when the USSR suddenly changed its viewpoint two months later. The reasons behind this sudden turnabout are unclear. It could be that the Soviet government had a change in scientific judgement.

Despite the Soviet government's persistent unwillingness to completely accept scientific assessments linking human activities to ozone loss, it must nevertheless be given credit for being one of the first countries to ratify the Vienna Convention, and subsequently for quickly ratifying the Montreal Protocol. Credit may not be so forthcoming, however, when the potential motivations behind and the circumstances surrounding the USSR's quick ratification are considered. As many political analysts, notably Clemens (1990), Kotov and Nikitina (1995), and Darst (1997a, 1997b) have suggested, Soviet commitments to international environmental cooperation were highly declarative and symbolic in nature, and were closely linked with obtaining foreign policy concessions in areas of high politics, namely national defence and economic security. While the analysis of the facts presented in this thesis do not provide concrete evidence to support this view, the USSR's failure to meet its international obligations and its continued questioning of scientific findings certainly raise some doubts about its reasons for adopting international ozone agreements. It is also possible that the Soviet authorities reasoned that they could safely ratify the documents since the Vienna Convention was not binding and only required parties to take action in the event of greater scientific certainty. Finally, what may have also contributed to the USSR's ratification of the Montreal

Protocol was the strong US persuasion under the Reagan administration combined with Gorbachev's policies of glasnost and perestroika. Given all these extenuating circumstances, the degree of genuine Soviet commitment to solving the ozone loss problem is hard to evaluate.

Russia has always cooperated fully in terms of scientific research and the exchange of data on ozone depletion. However, when actual commitments are at stake, the Russian government has failed to act. For example, it did not comply with advanced ODS phase out schedules specified in the Copenhagen Amendment. While the government did establish the IAC in 1992 and ordered it to develop action plans and programs to phase out ODS production in Russia, institutional and financial barriers have impeded the successful realization of these measures. A lack of resources, however, cannot be used to fully excuse the Russian government's prolonged inaction on preventing illegal ODS exports; political will has also been a factor impeding action. For example, it was not until 1995, and largely because of international pressure over Russia's contribution to the world's black market in ODSs, that the government passed a resolution requiring licences to be obtained for the export and import of ODS shipments. While this was an important step in controlling ODS exports, the government resolution was late in being issued and the degree to which Russia's licensing system has been enforced since 1995 is unclear.

In May 1995, the Russian government, because of financial difficulties, requested that it be granted an extension of 4 years (to 2000) to phase out its ODS production, that it be temporarily exempt from having to make financial contributions to the MLF, and that it be provided with financial assistance. However, according to an assessment by the co-chair of the Montreal Protocol's Halon Technical Options Committee, it was not only because of financial problems that Russia had failed to meet its ODS production phase out targets. Apparently, the government remained concerned about the effects that the phase out would have on both the country's export earnings and on many Russian towns

still reliant on the ODS industry. While this is the opinion of only one expert, the Russian government's failure to take quick action to phase out ODSs and control illegal ODS exports supports the view that it has been more preoccupied with its export earnings than with the global human and environmental impacts of ozone loss.

Further evidence of the Russian government's lack of moral commitment to protecting the ozone layer has been its failure to make voluntary payments to the MLF, a fund created to help developing countries phase out their ODS use. Despite a 1992 resolution decreeing that the Russian Ministry of Finance allocate funds on an annual basis to the MLF, Russia did not comply with its MLF obligations, and its arrears up to 1995 reached US \$47 million. Even Bulgaria, the Czech Republic and Hungary had fully or almost paid their voluntary obligations to the MLF. In fact, and to the irritation of developing countries, Russia and some other transition countries went so far as to suggest that they were temporarily worse off than less developed countries and that they should thus be eligible for MLF assistance.

Upon examination of Russia's recent federal budgets, it would appear that the government has not been entirely justified in using financial difficulties as a reason for not making MLF contributions and for not allocating resources to implement the phase out of ODSs. For example, in the 1998 federal budget totalling US \$83 billion, only 0.06% and 0.10% respectively were allocated to the two principal environmental agencies, Goskompriroda and Hydromet. In sharp contrast, 16% of the federal budget, or nearly US \$14 billion was allocated to national defence. Interestingly, the Medical Center for the President's Administration received 0.11% of the 1998 budget, almost equal to the total funds earmarked for both Goskompriroda and Hydromet (Analiticheskaya Sluzhba, 1998). Given that Russia's MLF arrears of US \$47 million up to 1995 only represented 0.06% of the 1998 federal budget, it is difficult to understand why it was not possible for the Russian government to have contributed at least some

money to the MLF. The government's failure to do so suggests that ozone depletion has been a relatively unimportant priority in terms of national security.

While Russia was given special consideration and granted a 4 year extension to phase out its ODSs, even with this extra time allowance, it still could not find the money to finance the implementation of ODS phase out programs. In fact, Russia stated that it could meet the new deadline, provided, that it received financial assistance. Thus, it was only through a grant from the World Bank's GEF for a total of US \$60 million that major progress since 1995 has been made in phasing out a large portion of Russia's ODS consumption. Furthermore, a new multi-bi trust fund to extend the World Bank's GEF project in Russia and targeted at permanently phasing out ODS production capacity in Russia will bring total foreign financial assistance to almost US \$80 million, an amount still representing only 0.10% of Russia's federal budget. In view of this relatively modest phase out cost, it would seem that the Russian government could have found the means to allocate some money to meeting its international ozone commitments. Its failure to allocate funds suggests that its political will to share the cost of protecting the Earth's ozone layer has not been very strong.

Government Performance on Global Warming

It was apparent as early as 1978 that the Soviet Union regarded global warming as natural phenomenon, labelling temperature increase forecasts developed by their own scientists as 'entertaining fantasy' (Yemelyanenko, 1998a). The Soviet government's cynicism as to the impact of human generated GHGs on global temperatures was further evidenced by a remark made by the Soviet delegation at a conference in Sundsvall, Sweden, in 1990 about international scientific research on global warming producing fictional figures (Rowlands, 1995, p.80). Despite extensive research on climate change by Russian scientists, no scientific consensus had been reached as of 1995 in Russia as to whether global warming was a natural or human-induced phenomenon. In fact, Russia's 1995 National Communication to the UNFCCC Secretariat attests to the fact that the

Russian government still regarded global warming to be caused to a large extent by normal and natural variations in global temperature patterns. Even more worrisome, as noted by the Head of Goskompriroda in 1995, is the apparent lack of a sense of global awareness on the part of many Russian officials because of the perception that Russia is a cold country and therefore cannot be harmed by global warming.

Similar to the position taken in responding to international cooperative efforts on ozone depletion, the Soviet Union, and many other countries, again used the argument of scientific uncertainty concerning the occurrence and causes of global warming to justify its inaction. Despite Soviet opposition to the global warming concept and its reluctance to adopt GHG emissions reduction targets, Russia did acquiesce and adopt the 1992 UNFCCC. In a sense, Russia was pressured to adopt the FCCC, given the great media and world attention that the Earth Summit in Rio attracted and the fact that Russia is one of the world's largest GHG emitters. Another possible reason for Russia signing the FCCC, although no strong evidence was found, could be that it wanted to portray a good image to the rest of the world and integrate quickly into international economic and political structures following the collapse of the Soviet Union. Beyond any of these possible underlying motivations for signing the FCCC, Russia's subsequent commitment to addressing global warming became questionable in light of the fact that it took the government 2 years to ratify the climate convention, 8 months after it had come into force having already been ratified by 50 other countries. The late ratification by Russia (112th country to ratify) might suggest that global warming was still being debated within political and scientific institutions in Russia.

Russia's strong political and economic views on global warming were most vividly demonstrated during negotiations on the Kyoto Protocol in 1997. Initially required to reduce GHG emissions by 5% of 1990 levels over the 2008-2012 period, the Russian delegation actually threatened to boycott the agreement on the grounds that industrial pollution had declined dramatically in Russia since the collapse of the Soviet

Union and that further attempts to reduce emissions could be costly and undermine the recovery of the Russian economy. The Russian delegation's arguments resulted in Russia being granted a special concession, only having to freeze GHG emissions at 1990 levels. Considering that Russian CO₂ emission as of 1996 were 28% below 1990 levels, that its population was declining, and that it has a tremendous GHG sink in the form of its forests, it could have realistically, and with minimal difficulty, met the initial 5% reduction. Thus, certainly one way of interpreting Russia's performance at the Kyoto negotiations is that the Russian government may have exploited its economic problems to garner sympathy from the international community and in turn to obtain greater GHG reduction surpluses which could later yield significant economic benefits through emissions trading.

Russia's reaction to the GHG emissions trading mechanism contained within the Kyoto Protocol raises questions about its true commitment to the climate convention. Following Kyoto, reports began to circulate concerning the development of a black market in air between countries with excess emissions rights, such as Russia, Ukraine, and Australia, and those countries looking to increase their permissible CO₂ emission levels, such as China, the United States, Germany, Japan and the United Kingdom. Furthermore, if rumors of Russian attempts to obtain additional emissions quotas from Ukraine and Kazakhstan in exchange for customs privileges and additional currency payments are true, the legitimacy of Russia's cooperation in international efforts to combat global warming becomes even more questionable. Another concern related to GHG emissions trading is how money from the sale of surplus emissions will be allocated in Russia. If money is used for further economic growth, the sale of quotas could in reality contribute to global warming and thereby offset the intended benefits of emissions trading.

A certain attitude appears to exist among officials responsible for implementing the provisions of the FCCC in Russia, that emissions targets can be met by simply relying

on the severe economic recession in the country. While this position has worked for Russia in meeting the 1992 FCCC requirement to reduce GHG emissions to 1990 levels by 2000, relying on recession to meet targets set in the Kyoto Protocol means that basic structural changes in the energy sector required to permanently reduce GHG emissions production capacity will not take place. As such, given a strong economic recovery in Russia, which is entirely possible over the next 10 years, GHG emissions might return to previous levels and could even be higher given old and decaying infrastructure which is highly energy intensive.

Similar to ozone depletion, Russia has played a credible and an important role in scientific cooperation on global warming research, but has not done well in implementing, on its own, effective measures to reduce GHG emissions. While Russia appeared to be on track when it created the ICC in 1994 to coordinate the government's effort on GHG emission reductions, this Commission, made up of many ministries and industrial representatives, was never very effective, probably because of its awkward structure and the adversarial positions taken by Goskompriroda and Hydromet. Indeed, the performance of the government-controlled ICC in preparing Russia's National Communication in 1995 for the UNFCCC Secretariat was sub-standard. The report lacked transparency in terms of data citing and GHG estimation methodology, and was submitted 2 months late. The ICC was also mandated to develop action plans to reduce Russia's GHG emissions, but implementation was not very successful given institutional and financial problems in Russia.

Given that Russia has a significant advantage over many countries in reducing GHGs since it possesses the world's largest natural carbon sink in its vast forest reserves, it would be expected that Russia would be active in taking measures to protect this valuable environmental and economic asset. However, no comprehensive program with guaranteed financing has yet been developed. Furthermore, Russian forests in Siberia and the Far East are threatened as a result of increased joint ventures between Russian

and foreign logging companies, which harvest anywhere from 4-12 million ha/year of trees primarily using clear-cutting methods. Remaining old growth forests in Western Russia are also under threat. Unfortunately, until the government enforces environmental standards and clarifies uncertainties over property ownership, little is likely to change in the way of forest protection, which will have a negative impact on the world's global carbon balance.

The most promising initiative, although primarily undertaken for economic reasons, was the Russian government's introduction of a new energy strategy in 1995 to increase energy efficiency. While the strategy offers many constructive suggestions for greater energy efficiency, including increased use of natural gas and renewable energies, price and tax incentives to promote conservation, and the use of methane from landfills and coal mines, no financial allocations or implementation plans have been put forward. Furthermore, Russian energy sector reforms have faced many barriers to innovation and investment as a result of unclear property rights, subsidies that are still too high, and a lack of investment knowledge and credit-worthiness of investing parties.

Given Russia's current financial difficulties and institutional weaknesses, and its very questionable commitment to reducing GHGs, it appears that the government will, as was the case for ozone depletion, increasingly rely on foreign technical and economic assistance to meet its global warming commitments. At present, eight pilot JI projects are under way in Russia, focusing on afforestation/reforestation, energy efficiency, fuel switching and fugitive gas capture. If these pilot projects are successful, Russia could stand to benefit considerably in the future from the Kyoto Protocol's JI mechanism when it is eventually fully approved. Furthermore, if Russia can maintain its GHG emissions at their present level, it will also financially benefit once emissions trading is officially permitted. However, unless the resulting economic gains from emissions trading are invested appropriately, the initial objective of reducing GHGs will not be met.

ENGO Performance in Addressing Global Atmospheric Pollution

Despite the serious economic problems that have resulted from the collapse of the Soviet Union and the subsequent and ongoing transition to a democratic and market-oriented society, the vitality of the NGO sector in Russia has not diminished. Of particular significance has been the growth in ENGOs, both in terms of the number of organizations and the range of specific environmental goals embraced. According to the 1999 Post-Soviet Handbook, ENGOs currently represent around 17% of all Russia's NGOs profiled. Also important is the extensive geographic distribution of ENGO activities across the country, with the majority or 60% of environmental groups located east of the Urals. The high concentration in the east is clearly connected to the attention the environmental movement is giving to the protection of vast natural resources and virgin landscapes located in Siberia and the Far East.

It is encouraging that over 60% of ENGOs profiled identify environmental education as their most important function, meeting the important need of informing the Russian public about environmental issues and thereby helping to build the necessary public knowledge base for environmental activism at the grass-roots level. Also impressive is the fact that 20% of ENGOs profiled in Russia today have developed an international or global interest as part of their environmental activities. Furthermore, while still low, it is encouraging that 7% of ENGOs profiled are concerned with global warming although only 2% have placed ozone loss on their agendas. Thus, a core of ENGOs realizing the importance of global environmental problems has already started to form in Russia.

Increasing the environmental movement's focus on global environmental issues, however, will face the same set of problems experienced by most NGOs operating in Russia today. Limiting factors to greater ENGO activity on ozone depletion and global warming include the following: a severe lack of financial resources and a small number of potential domestic funding sources; an absence of trust and widespread cooperation

between ENGOs; opposition from government and industrial groups that still, similar to the Soviet period, value economic growth over environmental protection; and a low level of citizen membership in ENGOs, remaining at only 1.5% over the past decade, well below membership levels in Western countries.

Growing Russian ENGO dependence on foreign assistance is also problematic, since the priorities of many local environmental groups often become subordinated to those of foreign donors. On the other hand, however, foreign contributions of technical assistance and funding have been crucial in strengthening the institutional capacity, that is the technical expertise, management skills and fund-raising capabilities, of ENGOs in Russia. Since little domestic funding is available for ENGOs focusing on such issues as ozone depletion and global warming, foreign financial assistance has, in most cases, been the only means of encouraging the development of globally minded ENGOs. Thus, until domestic government and private support becomes more readily available, the presence of international environmental organizations in Russia will continue to be necessary.

Russian ENGOs have a number of advantages that offer opportunities for a stronger environmental movement in the future. Most importantly, ENGOs enjoy a remarkably high level of public support, trust and confidence and have become increasingly more professional over the past decade. Hopefully, Russia's ENGOs will be able to draw on their high public support and increasing institutional strength to become more involved in future decision and policy-making processes affecting the environment, and to play a more influential role in lobbying government and industry for greater environmental protection.

Public Potential to Combat Global Atmospheric Pollution

Given the deteriorating economic and social conditions that vast majority of Russians have experienced throughout the transition towards a market-oriented economy, it is difficult to believe that Russians would have any sensitivity left for environmental issues in general and certainly not for the more abstract issues of ozone depletion and

global warming. Surprisingly, however, Russians indicated in 1992 that the environment was the second most important world problem, and that it would become the number one problem in the future. As a result of the prolonged economic downturn, by 1997 Russians were identifying economic hardship as the most important future problem. The environment, however, was still considered to be the third most important future problem after war/conflict.

Despite increasing economic and social problems, 80% of Russians in 1992 and 1997 expressed a high degree of personal concern for the environment, particularly when they perceived direct personal harm to their health. Also surprising is that most Russians appeared ready and willing to give up part of their income or pay higher taxes and prices to protect the environment. It is particularly remarkable that Russians' concern for the environment in terms of their readiness to make sacrifices did not diminish from 1992 to 1997, despite less support for environmental protection over economic growth and significant falls in personal and family real incomes. Thus, one of the most significant findings from the analysis of public opinion surveys in this thesis is that Russians on average are good environmental citizens, comparing well with citizens of other countries. Also comparable to other countries are the characteristics of the most environmentally sensitive citizens in Russia society. Russians exhibiting a high level of environmental sensitivity tend to be highly educated, young, female, religious, and to come from the middle and upper social classes.

In terms of specific global atmospheric issues, Russians showed a relatively high degree of concern for ozone depletion, comparable to the level of public concern in other countries. Russian concern for global warming, however, was much lower. This low level of concern is explained by the fact that almost 60% of Russians have no knowledge of global warming. Furthermore, even among those Russians who have some understanding of the greenhouse effect, not many perceive a high level of threat to humans from global warming and a low percentage seem to believe that global warming

has already started to happen. Another result that could have serious implications for Russia playing a larger and more meaningful role in international cooperative efforts aimed at addressing ozone depletion and global warming is the more than 50% fall in support from 1992 to 1997 for giving away the government's authority to an international environmental agency to work on solving global environmental problems. As of 1997, a Russian nationalistic spirit had emerged, reflecting the growing anti-Western sentiment that has been developing in Russia in step with the failures associated with the transition process to a Western-style, market economy.

The low level of concern expressed by Russian citizens for global warming cannot be attributed to a lack of environmental sensitivity. It is rather a result of the lack of information that has been made available to the Russian public about this relatively new global atmospheric issue. One possible reason for the deficiency in public awareness about the potential consequences of increasing world temperatures could be the Russian government's failure to properly inform Russians about global warming. A more important reason for the low level of awareness and concern expressed by the Russian public, however, is the very small number of ENGOs focusing on the problem of global warming.

Given the Russian public's high level of environmental sensitivity, it represents a very important and potential force which could be mobilized to become active on environmental issues in general, and on global warming and ozone depletion in particular. In order for this to occur, however, Russia's citizens will require the help of ENGOs who must learn how to channel the high degree of environmental sensitivity expressed by the Russian public towards grass-root initiatives that will address both local and global environmental problems. Given the extremely low understanding of global warming among the Russian public, there is a serious need for increased information and education about the causes, effects and onset of this problem. The environmental movement has an important role to play in educating Russian citizens about ozone depletion and global

warming, since as was discovered in Chapter 5, education of the problem as opposed to being highly educated is the key to stimulating greater concern for and, thus hopefully greater action on, global atmospheric pollution among the Russian public.

Major Conclusions on Russia's Role in Addressing Global Atmospheric Pollution

The preceding summary analysis provides the basis for reaching a number of important conclusions about the degree to which Russia's government, ENGOs and citizens have considered and responded to the environmental threats posed by global atmospheric pollution. The following are the major conclusions that have been reached based on the analysis undertaken in this thesis:

- The Russian government has not been a particularly reliable partner in international efforts aimed at addressing either ozone depletion or global warming. In both cases it was reluctant to agree to ODS and GHG emission reductions and skeptical about compelling scientific evidence.
- Based on indirect evidence, it seems likely that the Russian government would not have developed programs and committed funds to ozone depletion and global warming, even if it had had surplus resources. Funding from foreign donors has been the key to ODS phase out in Russia and will likely play an equally crucial role, in the form of JI and emissions trading, in reducing GHG emissions. Had the international community not agreed to provide financing to phase out ODSs and to reduce GHGs, the Russian government would likely not have responded strongly to its international obligations.
- At present, ozone depletion and global warming are still not high priorities for the Russian environmental movement. One-fifth of ENGOs, however, are currently focusing on global issues, and this establishes a good base from which to expand the interests of the Russian environmental movement on ozone loss and global warming.
- International environmental organizations have played a significant and crucial role in providing financial and institutional support to ENGOs in Russia. In fact, foreign

financial and technical assistance has been the only way that Russian ENGOs have been able to focus on ozone depletion and global warming.

- Russian citizens exhibit a very high level of environmental sensitivity despite the severe economic and social problems that they face. Over 80% of Russians in 1992 and in 1997 expressed a high level of concern for the environment. Furthermore, many Russians are willing to pay higher taxes and prices, and to donate part of their income to protect the environment.
- The Russian public shows a relatively high level of concern for ozone loss, presumably because it possesses a reasonable amount of knowledge about this global environmental problem. In contrast, the level of understanding of and thus concern for global warming is very low among citizens. Russians had difficulty identifying the causes and effects of global warming, perceived little threat from rising temperatures, and doubted that the greenhouse effect had already started to happen.

Overall, of the three major actors analyzed in this thesis, the Russian government appears to be the least committed to addressing ozone depletion and global warming. A significant number of ENGOs have a global focus, and thus provided that they receive adequate financing, global atmospheric pollution could be a priority area in which to focus their activities. The Russian public also shows a high degree of concern for environmental issues, and provided that economic conditions improve and that education on ozone depletion and global warming is made available, Russian citizens could become an important grass-roots force to pressure the government to become more seriously committed to combating global atmospheric pollution.

Prospects for Future Russian Cooperation and Action on Global Atmospheric Pollution

In view of the rapidly changing and complex political and economic environment that exists in Russia today, it is almost impossible to make any reliable projections as to the effort that Russia's government, ENGOs and citizens might make in the future to

participate more fully in and respond to world efforts to reduce global atmospheric pollution. It is however possible, based on the impressions and insights gained from this thesis, to offer the following possible scenarios about how Russia may or may not react in the future to fulfilling its obligations under international ozone depletion and global warming agreements.

As late as 1997, the Russian public exhibited a remarkably high level of sensitivity towards environmental issues, even in the face of harsh economic circumstances. As such, the public represents an important potential force that could be mobilized to influence government policies on global environmental problems. Unfortunately the steep and relentless decline in living standards in Russia over the past five years is seriously eroding public spirit, especially in terms of peoples' ability to continue to show a high level of concern for the environment. At the end of 1999 the Mayor's office in Moscow reported that 52% of Muscovites were living below the poverty line, which is based on the official, minimum subsistence level of US \$34 monthly. Goskomstat has estimated that the average monthly Russian salary in 1999 was only US \$63 and that the minimum pension had fallen to US \$13. Furthermore, a countrywide poll in January 2000 found that 70% of Russians consider themselves to be poor, with only 14% reporting that they could pay for necessary medical services ("One in Two Muscovites", 2000).

These extremely bleak statistics lead to the conclusion that the concerns of the Russian people since 1997 must have shifted even more towards ameliorating economic hardship. While there is some hope that an economic recovery may begin this year, given increased government revenues in recent months from rising world oil prices, the average Russian will not likely see any significant improvement in their living standards in the near future. Consequently the prospect that many Russian citizens will become engaged and active in environmental matters is remote, and the hope that a grass roots movement

could develop and influence the government's decisions on environmental issues is not foreseeable in the near term.

The sharp economic decline since 1995 must have also had a negative impact on Russia's ENGOs. The environmental movement however has already managed to survive through some of Russia's most difficult political and economic upheavals and will continue to survive. Given the lack of domestic funding available to ENGOs, especially in light of Russia's current, severe economic and political instability, the Russian environmental movement will need to continue to rely heavily on foreign sources of funding. If ENGOs in Russia are to be successful, they will also need to be able to influence a greater number of citizens to take a more active role in environmental protection activities. Given the extremely high level of support and trust that Russians have for the environmental movement, ENGOs could be very successful in educating the Russian population about local and global environmental issues, and in encouraging greater membership, donations and environmentally responsible activity. The important role that ENGOs have to play in educating and motivating the public, however, will not be fulfilled until the economic situation in Russia significantly improves and provides new hope for the Russian majority.

The Russian government's lack of commitment and action on ozone depletion and global warming to date may be partly explained by the economic and political problems facing Russia. Recent increases in world oil prices, more than doubling in the past year, have generated substantial hard currency earnings for Russia and have greatly increased the government's revenue base. If the economic recovery continues, which is now more likely than not, Russia should very soon be in a position to contribute funds and to participate more meaningfully in international environmental programs. In addition to greater financial resources available domestically, Russia will also continue to receive foreign assistance from other countries who remain concerned about the potential for Russian activities to negatively impact on the global environment. Nevertheless, even if

financial resources are available, it will still require Russia to have the political and moral will to take necessary administrative and institutional measures to meet its obligations.

In order to become committed, the government must take the decision to make global atmospheric pollution a high priority. The real test for Russia in the near future will be the quality and completeness of its second national communication under the climate change convention and whether it takes the lead and becomes one of the first industrialized countries to ratify the Kyoto Protocol. It is very unlikely, however, considering the recent election of Vladimir Putin as Russia's President, that the government will devote greater attention to ozone depletion and global warming in the near future. While it is impossible to predict what direction the government's policies might take, it would appear, based on Putin's statements over the past few months as acting President, that he may emphasize and concentrate primarily on rebuilding the military establishment and industrial sectors of the economy. If this occurs, there will be little hope for greater action from Russia on addressing global atmospheric pollution problems even if confronted by international pressure, which in previous political regimes appears to have been a factor in soliciting greater cooperation. Even more troublesome, is the potential for Russia to retreat from building a political and economic system based on democratic values and to move towards a more authoritarian and centralized type of political rule. If democracy in Russia weakens, it is likely that very little or no consideration will be given to environmental problems, and that the opportunities presently available for ENGOs and Russian citizens to become more involved in finding solutions to protecting the Earth's atmosphere will be seriously diminished.

APPENDIX

QUESTIONS USED IN CHAPTER 5 FOR PUBLIC OPINION ANALYSIS*

Inter-university Consortium for Political and Social Research (ICPSR) World Values Survey 1990

Q26 Please look carefully at the following list of voluntary organizations and activities and say which, if any, do you belong to.

H) Conservation, environment and ecology

There are a number of groups and movements looking for public support. For each of the following movements, which I read out, can you tell me whether you approve or disapprove of this movement?

	Strongly Approve	Somewhat Approve	Somewhat Disapprove	Strongly Disapprove	DK
Q290 a) Ecology movement of nature protection	1	2	3	4	9
Q291 b) Anti-nuclear energy movement	1	2	3	4	9
Q292 c) Disarmament movement	1	2	3	4	9
Q293 d) Human rights movement at home or abroad	1	2	3	4	9
Q294 e) Women's movement	1	2	3	4	9
Q295 f) Anti-apartheid movement	1	2	3	4	9

George H. Gallup Memorial Survey Health of the Planet (HOP) 1992 - Long Version

Q1 What do you think is the most important problem facing:

- a) * our nation today? _____
- b) your community today? _____
- c) the world today? _____

Q2 Looking ahead, what do you think will be the most important problem facing our children and their children - say 25 years from now? _____

* Questions marked with a star were also asked in the short version of the HOP 1992 survey, conducted in 18 of the 24 countries surveyed.

- Q8*** How concerned are you personally about environmental problems - would you say:
- 1 A great deal
 - 2 A fair amount
 - 3 Not very much
 - 4 Not at all
 - 5 Not sure/Don't know
 - 6 No answer

- Q12*** Thinking about our nation as a whole, what is the most important environmental problem facing our nation? If you feel that there are no serious environmental problems facing our nation, please feel free to say so. _____

- Q13** Thinking about the world as a whole, what is the most important environmental problem facing the world as a whole? If you feel that there are no serious environmental problems facing the world, feel free to say so. _____

- Q14*** Please tell me how much, if at all, you believe environmental problems:

	A great deal	A fair amount	Not very much	Not at all	Not sure/ DK	Refused
a) Now affect your health?	1	2	3	4	5	6
b) Affected your health in past - say 10 years ago?	1	2	3	4	5	6
c) Will affect the health of our children/grandchildren - say over the next 25 years?	1	2	3	4	5	6

- Q15** Next, I'd like to read several statements about our relationship with the environment and technology. For each one tell me whether you strongly agree with it, agree with it disagree with it, or strongly disagree with it?

	Strongly Agree	Agree	Disagree	Strongly Disagree	Not Sure/ DK	Refused
b) Most problems can be solved by applying more and better technology	1	2	3	4	5	6

Q19 In your opinion, is it possible or not possible to have economic growth and protect the environment at the same time?

- 1 Possible
- 2 Not possible
- 3 Don't know
- 4 No answer

Q26* Now let's talk about the world as a whole. Here is a list of environmental issues that may be affecting the world as a whole. As I read each one, please tell me how serious a problem you personally believe it to be in the world.

	Very Serious	Somewhat Serious	Not Very Serious	Not at All Serious	Can't Judge	Refused/ No Answer
a) Air pollution and smog	1	2	3	4	5	6
f) Global warming or the "greenhouse effect"	1	2	3	4	5	6
g) Loss of ozone in the earth's atmosphere	1	2	3	4	5	6

Q27 Do you think that these world-wide environmental problems can be solved mostly through advances in science or technology, or do you think that it will be also necessary for people to make major changes in the way they live?

- 1 Can be solved mostly through science and technology
- 2 Will also require major changes in the way people live
- 3 Not sure/Don't know
- 4 Refused/No answer

Q28 Thinking about the issues of global warming or the "greenhouse effect", how well do you feel you understand this issue?

- 1 Very well
- 2 Fairly well
- 3 Not very well
- 4 Not at all well - SKIP TO Q34
- 5 Not sure/Don't know - SKIP TO Q34
- 6 Refused/No answer - Skip to Q34

Q29 Just as you understand it, what are the main causes of global warming, sometimes called the greenhouse effect?

First response _____

Second response _____ (Not used in Chapter 5 analysis)

- Q30** Here is a list of possible causes of global warming. For each one, please tell me whether you think it is a major cause, a minor cause, not a cause of global warming, or don't you know enough to say?

	Major Cause	Minor Cause	Not a Cause	Don't Know/ No Answer
a) Automobile exhaust	1	2	3	4
b) Loss of rainforests	1	2	3	4
c) Aerosol sprays	1	2	3	4
d) Power plants that burn coal or oil	1	2	3	4
e) Nuclear power plants	1	2	3	4
f) Refrigerators and air conditioners	1	2	3	4

- Q31** Again, just as you understand it, what effects, if any, do you think global warming will have?

First response _____

Second response _____ (Not used in Chapter 5 analysis)

- Q32** Now, would you tell me how harmful, if at all, you think global warming will be to the following during the next 25 years:

	Very Harmful	Somewhat Harmful	Not Very Harmful	Not at All Harmful	No Answer/ Don't Know
a) Human health	1	2	3	4	5
b) Economic well-being	1	2	3	4	5
c) Agricultural production	1	2	3	4	5
d) The choices people will have in where they live	1	2	3	4	5
e) The survival of many animal and plant species	1	2	3	4	5
f) The levels of the oceans	1	2	3	4	5

- Q33** When do you think the effects of global warming will begin to happen?
- 1 They have already begun to happen
 - 2 They will start happening within a few years
 - 3 They will start happening within my lifetime
 - 4 They will not happen within my lifetime, but they will affect future generations
 - 5 They will never happen
 - 6 Unsure/Don't know
 - 7 No answer
- Q36*** Would you favor or oppose our government contributing money to an international agency to work on solving global environmental problems?
- 1 Strongly favor
 - 2 Somewhat favor
 - 3 Somewhat oppose
 - 4 Strongly oppose
 - 5 Not sure/Don't know
 - 6 Refused/No answer
- Q37*** Would you favor or oppose giving an international agency the authority to influence our government's policy in environmentally important areas?
- 1 Strongly favor
 - 2 Somewhat favor
 - 3 Somewhat oppose
 - 4 Strongly oppose
 - 5 Not sure/Don't know
 - 6 Refused/No answer
- Q41*** Now I would like to ask you several questions about the environment and people's actions. In your opinion, how much of an effect can individual citizens and citizens groups have on solving our environmental problems?
- 1 A great deal
 - 2 A fair amount
 - 3 Not very much
 - 4 Almost none at all
 - 5 Not sure/Don't know
 - 6 Refused/No answer
- Q44*** Increased efforts by business and industry to improve environmental quality might lead to higher prices for the things you buy. Would you be willing to pay higher prices so that industry could better protect the environment, or not?
- 1 Yes, willing
 - 2 No willing
 - 3 Not sure/Don't know
 - 4 Refused/No answer

Q46 How willing would you be to pay somewhat higher taxes to the government if you knew the money would be spent to protect the environment?

- 1 Very willing
- 2 Somewhat willing
- 3 Not very willing
- 4 Not at all willing to pay somewhat higher taxes
- 5 Not sure/Don't know
- 6 Refused/No answer

Q53 Here is a list of sources of information about the environment. For each, tell me how much you trust it for information on environmental issues.

	A great deal	A fair amount	Not very much	Not at all	Not sure/DK	Refused
a) Government agencies	1	2	3	4	5	6
b) Labor unions	1	2	3	4	5	6
c) TV and radio	1	2	3	4	5	6
d) Newspapers and magazines	1	2	3	4	5	6
e) Environmental organizations	1	2	3	4	5	6
f) Business and industry	1	2	3	4	5	6
g) University scientists	1	2	3	4	5	6

**International Social Survey Program (ISSP)
Survey on the Environment 1993**

Q37 Every time we use coal or oil or gas, we contribute to the greenhouse effect

- 1 Definitely true
- 2 Probably true
- 3 Probably not true
- 4 Definitely untrue
- 5 Can't choose

Q52 In general, do you think that a rise in the world's temperature caused by the greenhouse effect is dangerous for the environment?

- 1 Extremely dangerous
- 2 Very dangerous
- 3 Somewhat dangerous
- 4 Not very dangerous
- 5 Not dangerous at all
- 6 Can't choose

- Q53** Do you think that a rise in the world's temperature caused by the greenhouse effect is dangerous for you and your family?
- 1 Extremely dangerous
 - 2 Very dangerous
 - 3 Somewhat dangerous
 - 4 Not very dangerous
 - 5 Not dangerous at all
 - 6 Can't choose
- Q60** Are you a member of a group to preserve the environment?
- 1 Yes
 - 2 No
 - 3 Can't choose/DK
 - 4 NA/Refused
- Q61** Have you signed a petition in the last five years to protect the environment?
- 1 Yes
 - 2 No
 - 3 Can't choose/DK
 - 4 NA/Refused
- Q62** Have you given money to an environmental group in the past five years?
- 1 Yes
 - 2 No
 - 3 Can't choose/DK
 - 4 NA/Refused
- Q63** Have you participated in a protest or demonstration in the past five years to protect the environment?
- 1 Yes
 - 2 No
 - 3 Can't choose/DK
 - 4 NA/Refused

**Inter-university Consortium for Political and Social Research (ICPSR)
World Values Survey 1995**

Now I am going to read off a list of voluntary organizations; for each one, could you tell me whether you are an active member, an inactive member or not a member of that type of organization?

V33 Environmental organization

- 1 Active
- 2 Inactive
- 3 Not a member

I am going to name a number of organizations. For each one, could you tell me how much confidence you have in them: is it a great deal of confidence, quite a lot of confidence, not very much confidence or none at all?

		A great deal	Quite a lot	Not very much	None at all	DK
Q138	The press	1	2	3	4	9
Q139	Television	1	2	3	4	9
Q140	Labour unions	1	2	3	4	9
Q142	The government	1	2	3	4	9
Q146	Major companies	1	2	3	4	9
Q147	The green/ecology movement	1	2	3	4	9

**Institute for Comparative Social Research (CESSI)
International Environmental Monitor (IEM) 1997**

Q2a In your opinion, what is the greatest threat to future generations? _____
(Q2b - next greatest future threat not used)

Q3 How concerned are you about environmental problems?

- 1 Very concerned
- 2 Somewhat concerned
- 3 Not concerned
- 4 Not concerned at all
- 9 Unsure

Q4a Which environmental issue are you most concerned about? _____
(Q4b - next environmental issue of most concern not used)

- Q6** Which do you think should be given priority: economic development or environmental protection?
- 1** Environmental protection
 - 2** Economic development
 - 3** Both should be given equal priority
 - 9** Unsure
- Q7** Do what degree do you think that environmental problems affect your health today?
- 1** A great deal
 - 2** A fair amount
 - 3** Not very much
 - 4** Not at all
 - 9** Unsure
- Q9d** I would give part of my income to prevent pollution.
- 1** Completely agree
 - 2** Somewhat agree
 - 3** Somewhat disagree
 - 4** Completely disagree
 - 9** Unsure
- Q11** To what degree would you support giving an international agency authority to influence the Russian government's environmental policies and activities?
- 1** Strongly for
 - 2** Somewhat for
 - 3** Somewhat against
 - 4** Strongly against
 - 9** Unsure

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