

Conflict Studies Research Centre

Russian Series

06/41



**Russian Environmental
Problems**

Dr Mark A Smith

September 2006

Defence Academy of the United Kingdom

Russian Environmental Problems

Dr Mark A Smith

Key Points

- * Russia inherited a grave environmental legacy from the Soviet Union. Air and water pollution are extremely high and have had an extremely deleterious effect on health.
- * Spending on environmental protection is very low, and is insufficient to clean up the environment. Most major projects are funded by international institutions
- * Efforts to uncover information regarding pollution at nuclear and military facilities is hampered by the state's concern to maintain security.
- * Environmental controls and monitoring capacity have been reduced since 2000. The state places more emphasis on economic growth than countering pollution. Consciousness of environmental issues amongst the population is relatively low.
- * NGOs play a major role in attempting to raise consciousness and to lobby for environmental conservation and controls. The leadership however is generally averse to such activities, particularly if they have international connections.

Russian Environmental Problems

Dr Mark A Smith

This paper will give a brief overview of the general environmental situation in the Russian Federation, and the post-Soviet leadership's policies towards the environment and pollution.¹

A General Overview of the Environmental Situation

The Soviet Union bequeathed the Russian Federation an unenviable environmental and ecological legacy. The emphasis that the Soviet system had placed on heavy industry, largely for the purposes of national security, meant that environmental concerns took second place to the need for industrial development. Little concern was expressed during the Soviet period over environmental issues, although it would be wrong to say that there was complete silence. Voices were raised during the 1960s, for example, over pollution in Lake Baikal.² By and large, however, green issues were not discussed.

The state of the environment is partly responsible for the health crisis that affected the Soviet population. At the 19th conference of the Soviet Communist Party in 1988 it was claimed that 53 per cent of all school children were in poor health partly as a result of environmental factors. In The State Report on the State of Health of the Population of the Russian Federation in 1992, it was stated that only 40 per cent of all Soviet babies were born healthy.³ In March 1994 the then Russian Federation Deputy Minister of Public Health Nikolay Vaganov, warned that: "For the first time in its centuries old history, there is a danger of the nation's physical degeneration, of irreparable damage to the genetic fund."⁴

Dr. A. I. Potopov, a former minister of health of Russia, reportedly said in 1989, "to live longer, breathe less".⁵ In their 1992 book Ecocide in the USSR, Murray Feshbach and Alfred Friendly claimed that 70 million out of 190 million Soviet citizens living in 103 cities suffered from respiratory diseases as a result of air carrying up pollutants five times greater than the legally permitted limits.⁶ In 68 cities air pollution was ten times higher than the legally permitted limits.⁷ They also stated that 75 per cent of all surface water was polluted, and 25 per cent of it was untreated.⁸

The contraction experienced by the Russian economy in the immediate post-communist years meant that there was a reduction in pollution levels due to the decline in industrial output. However the fundamental problems remained, and the ability of the Russian state to clean up existing environmental problems and to provide environmental protection to a degree comparable with that of western industrialised countries was, to say the least, extremely limited. The following points give an overview of the environmental situation in the Russian Federation since 1991.

- It is reckoned that one child in three may be ill because of environmental pollution. A 1996 joint US-Russian government study found that one-

quarter of kindergarten pupils in one city had lead concentrations above the threshold at which intelligence is impaired, while a US government study noted a rise in the incidence of waterborne diseases and environmentally related birth defects. A Russian government report cited air pollution as a contributing factor to 17 percent of childhood and 10 percent of adult illnesses.

- Through the 1990s, nearly 100 million Russian citizens in 200 large cities were estimated to be breathing air with pollution levels that exceeded Russian ambient air quality standards, and most of the country's rivers and lakes were classified as "moderately polluted" or "polluted".
- Data from the late 1990s indicate that more than 90 cities had annual concentrations of particulate matter and nitrogen dioxide that exceeded WHO standards. The worst areas are the cities of Moscow, Chelyabinsk, Norilsk in northern Siberia, and Kemerovo in southern Siberia.
- About one-half of Russia's population consumes drinking water that fails to meet required standards. In Saint Petersburg, according to official reports, a litre of drinking water contains about 20 micrograms of chlorinated hydrocarbons, twice the level permitted under German standards. In Kemerovo, there is 320 times the German limit on chloroform in drinking water. Seven out of 10 children born there come into the world sick. It has been estimated that the cost of raising the quality of Russia's drinking water supply to official standards could be as high as \$200 billion.
- Heavy metals, hydrocarbons and organic chemicals from industrial activity contaminated more than 2 million hectares of soil, and industrial activity in many cities has probably contributed to a high rate of respiratory diseases and a high incidence of lead-related childhood mental development problems.
- Since 1986 Russia's life expectancy has been declining and at least 30 per cent of this decline can be accounted for by environmental causes. Specialists estimate that 350,000 early deaths occur annually. The average male life expectancy is about 59 years.⁹
- Nuclear waste and chemical munitions contamination is so extensive and costly to reverse that remedial efforts are likely to continue to be limited largely to fencing off affected areas.
- The number of vehicles on the road has increased rapidly since 1991, and their emissions offset reductions in industrial air pollution caused by reduced economic activity and greater reliance on natural gas. Leaded petrol is still widely used. Solid waste generation has increased substantially due to adoption of Western-style consumption patterns. Russian municipalities, however, lack management expertise and landfill capacity to cope with disposal problems.
- Hazardous waste disposal problems are extensive and growing. Russian officials estimate that about 200 tonnes of the most highly toxic and hazardous wastes are dumped illegally each year in locations that lack effective environmental or public health protections or oversight.
- Radioactive contamination caused by nuclear powered submarines and ships of both the Northern Fleet and Pacific Fleet has become a major problem. Reporting on this has raised issues of civil rights including the right to freedom of information.

- A team of Russian experts has pegged overall economic losses from environmental degradation at 10 to 12 percent of GDP. By contrast the loss in western industrialised countries is around 1 to 2 percent of GDP.

Budgetary constraints have made cleaning up the environment much more problematical. Spending on the environment is less than 0.5 percent of total federal budget spending - a significant drop from the modest levels of the late Soviet period. In the 2005 federal budget, spending on the environment amounted to 0.15 per cent of the total budget. In 2006, the figure was slightly less.¹⁰ In 1999, federal budget allocations to the principal environmental protection agency in Russia were less than one-quarter of the amount requested. By contrast, in the 1970s Japan had to spend 5 per cent of the country's budget to overcome what were her then disastrous environmental problems.

Spending on maintaining drinking water quality in Russia, for example, is down 90 percent from the levels of the 1980s. The monitoring of the environment has also suffered from funding shortfalls. Although the size of the observational network for water quality was roughly the same in 2000 as at the end of the Soviet era 10 years earlier, the quality of the data declined due to inadequate staff training, obsolete equipment, irregular maintenance, and poor data quality assurance procedures. In 1998, fewer than 40 per cent of the laboratories that analyzed water quality were certified. Furthermore, the infrastructure of municipal drinking water and wastewater treatment facilities—which was funded predominantly by central budgets in the Soviet era—has deteriorated due to deferred maintenance and insufficient capital investment by local municipalities. These issues probably contributed to significant reported increases in gastroenteritis, hepatitis A and bacterial dysentery in the 1990s.¹¹

SOME KEY ISSUES

The Baltic Sea

Untreated sewage from St.Petersburg is a major source of Baltic pollution.¹² In June 2003, Sweden's Commission on Marine Environment warned that the Baltic Sea was in a "critical" condition and in danger of dying unless pollution from St Petersburg is drastically cut. Untreated sewage flows straight into the Neva river, and from there to the Baltic. In 2003, Alexander Ridko, then head of the health and ecology commission at the St Petersburg legislative assembly said that only 60 per cent of the water dumped into the sea from St Petersburg has been filtered sufficiently. Half of the fish species in the Baltic are at levels below the critical biological level, while pregnant Swedish women have been warned not to eat herring - a staple diet - because of dioxins. Massive over-fishing in the Baltic has decimated stocks, and pollution has meant they are unable to grow again.¹³

In 2003 it was announced that the European Bank for Reconstruction and Development (EBRD) was lending 35.4 million euros to complete the construction of the St Petersburg Southwest Waste Water Treatment Plant (SWWTP). Construction began in the Soviet era but was halted after 1991 because of shortage of funds. Two key related projects - construction of inlets to collect the sewage for treatment (€15 million) and the SWWTP's separate sludge incinerator (€22 million) - are earmarked for financing by the European Investment Bank (EIB) and EU-TACIS.¹⁴

The Caspian Sea

This is a problem which Russia shares with the other littoral states.¹⁵ The dumping of waste products into the Caspian by inflowing rivers is a major problem. About 130 rivers flow into the Caspian. About 80 per cent of the water comes from the Russian River Volga. Untreated waste from the Volga -- into which half the population of Russia and most of its heavy industry drains its sewage -- empties directly into the Caspian Sea, while pesticides and chemicals from agricultural run-off are threats to the sea's flora and fauna. Scientists estimate that each year an average of 60,000 tonnes of petroleum byproducts, 24,000 tonnes of sulfites, 400,000 tonnes of chlorine and 25,000 tonnes of chlorine are dumped into the sea. Concentrations of oil and phenols in the northern sea are four to six times higher than the maximum recommended standards. Around Baku in Azerbaijan, where oil drilling and industrialization have been happening for almost a century, these pollutants are ten to sixteen times higher.

Thousands of seals in the Caspian Sea have died since 2000 due to pollution that weakened their immune systems, and overfishing, especially of sturgeon, has caused a dramatic decline in fish stocks. In the 1980s the average annual catch of sturgeon was approximately 25,000 tonnes of sturgeon, by 1994 the legal catch stood at 7,000 tonnes. Poaching is rife.

Mineral deposit exploitation, particularly oil and gas extraction and pipeline construction, have contributed to the pollution of about 30,000 hectares of land. In August 2001, Tengizchevroil, the ChevronTexaco-led international consortium developing the giant Tengiz oil field in western Kazakhstan, was fined around \$75 million for ecological damage. In addition, Kazakhstan forced Agip KCO, the consortium developing the offshore Kashagan field in shallow water, to halt operations temporarily and pay a hefty fine after several oil spills from exploratory wells operated by the consortium. The inability of the littoral states to reach agreement on the legal status of the Caspian Sea makes environmental control and cooperation more difficult.

However there have been several initiatives to boost regional cooperation in protecting the environment, including the establishment of the Caspian Environment Programme (CEP) in conjunction with the World Bank's Global Environmental Facility. The aim of the CEP is defined as "environmentally sustainable development and management of the Caspian environment, including living resources and water quality, so as to obtain the utmost long-term benefits for the human populations of the region, while protecting human health, ecological integrity, and the region's sustainability for future generations."

Far East

In addition to the problems caused by the Pacific Fleet (see below), major problems were caused in the Russian Far East in 2004 when the Amur river was heavily polluted by a leakage from a benzene factory belonging to PetroChina upstream in northeast China. As a result allowable levels of concentration for different types of phenol were exceeded. The chlorophenol group now actively exceeds the allowable level of concentration by almost 30 times.

Lead poisoning is a serious problem in Primorsky Krai and the rest of Russian Far East. There is little control of industrial pollution. Many industries use old equipment and old technologies that increase environmental contamination. At the same time there are very few government regulations regarding the risk of lead

poisoning and few studies addressing the relationship between lead contamination of the environment and the health of population. Some children that were tested in Vladivostok, Spassk, Kavalerovo, and Dalnegorsk had blood lead concentrations over 80 µg/dl. The present Russian "safe" standard is 8 µg/dl.¹⁶

CO₂ Emissions

The collapse of the Soviet Union and Russia's ensuing economic contraction led to a dramatic decrease in Russian carbon dioxide (CO₂) emissions in the early- and mid-1990s. The severe decline of industrial production, highlighted by the closure of hundreds of factories, resulted in a huge drop in CO₂ emissions. In 1992, the first full year after the demise of the USSR, Russian carbon dioxide emissions stood at 573.5 million tonnes, but by 1997 had fallen to 394.7 million tonnes - a 31 per cent decline in just five years.¹⁷

Nevertheless, Russia still ranks among the highest CO₂-emitting countries in the world. Furthermore, since bottoming out in the post-Soviet era in 1997, Russia's carbon dioxide emissions have been on the increase, buoyed by the rebound of oil extraction and industrial production. In 2001, Russia's CO₂ emissions totalled 440.3 million tonnes, an 11.6 per cent increase from 1997. In comparison, the United States emitted 1,565 million tonnes of carbon dioxide in 2001, while China emitted 832 million tonnes. The world's next highest carbon dioxide emitters - Japan (316 million tonnes), India (251 million tonnes), and Germany (223 million tonnes) - trailed far behind. Russia's per capita CO₂ emissions in 2001, at 3.05 tonnes per person, were higher than Germany (2.71), Japan (2.48), China (0.65), and India (0.25), but still far lower than that of the United States (5.51). In November 2004 the Russian leadership signed into law the Kyoto Accord on Climate Change, largely to get EU support for Russia's bid to join the World Trade Organisation.

Nuclear Waste Processing

In 2001 Vladimir Putin signed into a law a package of legislation that would permit Russia to become a large scale importer and processor of spent nuclear fuel. Russia could import around 20,000 tonnes of foreign spent nuclear fuel in the next 20 years and earn around \$20 billion on such operations. Around \$7 billion of the earnings is to be spent on various environmental and social programmes. Russia currently has about 15,000 tonnes of her own nuclear waste. There is one processing plant, Mayak (RT-1), near Chelyabinsk in the southern Urals. It is old, and is not capable of processing the nuclear waste it currently receives.¹⁸

The level of radioactive contamination in the area around Mayak is extremely high. Lake Karachay, adjacent to the Mayak complex, is now considered to be one of the most polluted spots on Earth. It has been reported to contain 120 million curies of radioactive waste, including seven times the amount of strontium-90 and cesium-137 that was released in the April 1986 explosion at the Chernobyl nuclear power plant in Ukraine.

The construction of another plant at Krasnoyarsk (RT-2) started in 1976, but was not completed due to lack of funds. In 1985, a storage pool for waste from VVER-1000 reactors, which was to be a part of RT-2, was commissioned. The rest of the construction was frozen in 1989. Later the initial design was drastically modified. The entire plant will now be commissioned not earlier than 2015. The storage pool

has a capacity of 6,000 tonnes and is more than 50 per cent full. The pool requires overhaul and repairs.

Minatom does not plan immediate reprocessing of nuclear waste, and plans to dry store the fuel for around 40 to 50 years. Moreover the power of Gosatomnadzor, the nuclear regulatory authority is limited. The government is partial towards Minatom, as it sees the development of nuclear power as a higher priority than environmental protection.

Nuclear Submarine Contamination

This has been an extremely controversial issue nationally and internationally, due to the whistleblowing activities of former military personnel, and has raised issues of press freedom, human rights and state security.¹⁹

The Nikitin Case Alexander Nikitin served as a nuclear engineer onboard nuclear submarines. He retired in 1992 and in 1996 he contributed to the Bellona report The Russian Northern Fleet: Sources of Radioactive Contamination.²⁰ He revealed the poor safety standards, and inadequate facilities for storing, transporting and disposing of nuclear waste. The report gave a comprehensive view of the serious situation in the Northern Fleet. According to the report, 18 per cent of the nuclear reactors in the world are situated in the area where the fleet is based. The Northern Fleet has a total of 270 reactors in service or in storage. Waste from an additional 90 reactor cores are stored under unsafe conditions at Zapadnaya Litsa. Eighteen reactor cores are stored under similar conditions on board storage ships and barges.

Nikitin revealed that there had been leakage from pools used to store nuclear waste at Zapadnaya Litsa. By September 1982 water was leaking from the storage pools at the rate of 30 tonnes a day. The water had sunk to such a low level that there was a risk of contamination because the containers of fuel assemblies would no longer be covered. This incident was only confirmed by the Russian authorities in 1993.

The Federal Security Service (FSB) arrested Nikitin in February 1996 and charged him with espionage and state treason. Amnesty International considered him to be a prisoner of conscience who was held solely for the peaceful exercise of his right to freedom of expression. Many other human rights organisations around the world raised concerns regarding the case. Nikitin spent 10 months in detention, and went through 13 court hearings before he was finally acquitted by the presidium of the Russian supreme court in 2000. This is the only case in Soviet-Russian history where the defendant was fully acquitted of state treason charges. In October 1997 a new law on state secrets was signed into law by then President Boris Yel'tsin, which established all information on military bases, marine yards, labour conditions and radioactive waste as being secret.

The Pasko Case This was similar to the Nikitin case. Grigory Pasko, an investigative journalist who worked for the Pacific Fleet's newspaper, was arrested in Vladivostok in November 1997. The FSB accused Pasko of committing treason through espionage when working with Japanese journalists. Pasko's publications were focused primarily on nuclear safety issues in the Pacific Fleet. In July 1999 the court of the Pacific Fleet in Vladivostok acquitted Pasko of the treason charges, but sentenced him to three years in prison for 'abuse of his official position' and released him under a general amnesty. Pasko appealed, but so did the prosecution, insisting that he was a spy. In November 2000 the military collegium of the Russian supreme court cancelled the verdict, and sent the case back for a re-trial at the

Pacific Fleet court. The new trial ended on Christmas Day 2001, with Pasko being acquitted on nine out of ten charges, but he was still sentenced to four years hard labour for treason. Amnesty International adopted Pasko as a prisoner of conscience in January 2002, saying that his prosecution appeared to be "motivated by political reprisal for exposing the practice of dumping nuclear waste". After serving two thirds of his sentence Pasko was released on parole by decision of the Ussuriysk city court in January 2003.

The infrastructure of the Pacific Fleet is dilapidated and perhaps the most difficult naval nuclear dismantlement project in Russia. The Northern Fleet now has a well established infrastructure, but the Pacific Fleet, which is home to some 40 submarines awaiting dismantlement with their nuclear fuel on board, poses a bigger challenge. These rusted-out derelict subs are moored from 100-1,000 kilometres from the nearest dismantlement point. In all, some 14,000 fuel assemblies remain on board. The amount stored on technical service vessels (i.e. vessels that service nuclear submarines) is unknown.

The lack of maintenance of submarines has long been a major problem. A reactor explosion occurred at Chazma bay in 1985 during refuelling. Another sub off Kamchatka sank in 1997 due to its rust-ridden state. The poor state of the Pacific Fleet's submarines make further accidents likely. The radioisotope thermoelectric generators (RTGs) that dot the eastern coast are also unguarded health hazards that have been used in the past to power navigation beacons, but are now dilapidated and neglected.

The Pacific Fleet has two storage sites for radioactive waste—one on Kamchatka and the other on the Shkotovo Peninsula, southeast of Vladivostok. Spent nuclear fuel (SNF) is stored at Shkotovo, which suffered an accident in 1980. There is, as yet, no publicly available data on how much is stored by the Pacific Fleet. The SNF is transported to Mayak in the southern Urals, but there is no direct rail-head, meaning the waste is transported over 60 kilometres of bumpy roads for rail shipment. Spills of waste have been recorded.

The willingness of the Russian authorities to prosecute whistleblowers under state secrecy laws, and to accuse them of acting for foreign intelligence services is obviously aimed at deterring journalists and environmental activists from investigating cases of pollution at military installations, which makes it difficult for the public to become fully aware of the extent of the problem. The armed forces do have an administration dealing with ecological security, which was formed in July 1992. However the impact of its work is limited.²¹

Several foreign countries, most notably Norway and Japan, have played a major role in programmes to dismantle obsolete Russian nuclear submarines in an environmentally safe fashion. Situated near major Russian naval bases, they have an obvious interest in reducing the environmental threat posed by these submarines.²² Although these programmes have yielded positive results, the regions where the Pacific and Northern Fleets are based are still subject to a high degree of radioactive contamination.

STATE POLICY TOWARDS THE ENVIRONMENT

During the Soviet period, minimal concern was shown for the environment.²³ It was only in 1988 that a Union Committee for Environmental Protection was formed. The Union Committee's charge included the regulation and enforcement of environmental standards, management of "nature protection", and the coordination

of environmental activities of the various ministries and agencies. The Union Committee for Environmental Protection became the Russian Federation's State Committee for Environmental Protection (Goskomekologiya) in 1991.

That same year, passage of the Russian Federation's Law on Environmental Protection established pollution charges countrywide and provided the legal basis for "environmental funds". However, the funds were often used to pay for non-environmental activities. In 1993, President Boris Yel'tsin elevated Goskomekologiya to the more powerful Ministry of Environmental Protection and Natural Resources. This ministerial status lasted for only three years. Yel'tsin reduced the environmental protection component of the ministry to a subordinate State Committee for Environmental Protection after his reelection in 1996. In May 2000, President Vladimir Putin eliminated Goskomekologiya altogether and placed its responsibilities and personnel in the Federation's Ministry of Natural Resources.

Putin's decision to abolish Goskomekologiya signified a downgrading of concern for the environment by the state. Goskomekologiya was concerned with enforcing and monitoring environmental standards, rules and regulations. However by merging Goskomekologiya with the Ministry of Natural Resources, its capacity to control environmental pollution was constrained. The Ministry is primarily concerned with the exploitation of natural resources for economic growth and development, rather than conservation which may constrain economic growth.

In addition to the merging of Goskomekologiya with the Ministry of Natural Resources, there have been several other negative trends from the stand point of environmental protection since 1995.

- The State Atomic Inspectorate has lost much of its mandate;
- The State Sanitary and Epidemic Inspectorate was demoted to a department within the Ministry of Health;
- The Department of Environmental Protection and the Use of Natural Resources within the Presidential Administration has been formally abolished;
- The Security Council Interagency Commission on Ecological Security has virtually no power or influence;²⁴
- The Governmental Commission on Resolving the Problem of Radioactive Waste has been formally abolished.

In November 2001 the Russian Ministry of Natural Resources issued an ecological policy doctrine, which put forward a 10 year plan for cleaning up the Russian environment. However little has been done to ensure that this plan will be realised. A new law on the environment came into force in 2002, but this has done little to improve the situation. The emphasis on economic growth is the main reason why the legislative programmes for protecting the environment have had little impact.

NGOs have been one of the main means of raising concern for the environment in the Russian Federation.²⁵ Without pressure from NGOs it is unlikely that the Russian state would have paid much, if any, attention to environmental issues. The current leadership's desire to constrain the independence of NGOs, particularly those which have overseas connections, such as Bellona, is likely to make the work of environmentally focused NGOs more difficult in the future. Vladimir Putin's April

2006 decision to route the Far East oil pipeline away from Lake Baikal indicates that the Russian leadership is not immune to pressure about the environment, although to a large extent, Lake Baikal is perceived as a special case due to its immense natural beauty.

Although various projects, many of which are funded by international organisations such as the EBRD, will have some effect in improving the environment, Russia (and also other former Soviet states) will remain an environmental disaster zone for decades to come. This is obviously a threat to her neighbours as well as to the Russian Federation, and can thus be regarded as a security threat. For Russia, environmental pollution is also a major factor affecting the health of the population.²⁶

Endnotes

¹ Information is taken from the following:

http://www.dni.gov/nic/special_russianoutlook.html ;

<http://gadfly.igc.org/russia/yablokov2.htm>. See also

<http://www.eia.doe.gov/emeu/cabs/russenv.html> and

<http://countrystudies.us/russia/25.htm>

² See Thane Gustafson, Reform in Soviet Politics: Lessons of recent policies on land and water, Cambridge, Cambridge University Press, 1981, pp.40-46.

³ *Ibid.* 1992, p.10.

⁴ Julia Rubin, 'Hard Times, Poor Care Blamed for Birth Crisis,' Associated Press, 16 March 1994, cited by Feshbach and Friendly, *ibid.*, p.12.

⁵ <http://www.environmentalreview.org/vol02/feschba.html>

⁶ Murray Feshbach and Alfred Friendly, Jr, Ecocide in the USSR : health and nature under siege , London, Aurum, 1992, p.2. See also Murray Feshbach, Ecological disaster : cleaning up the hidden legacy of the Soviet regime, New York, Twentieth Century Fund Press, 1995.

⁷ Feshbach and Friendly *ibid.* 1992, p.8.

⁸ *ibid.* 1992, p.2-3.

⁹ See Steven J. Main, 'Russia's 'Golden Bridge' is Crumbling: Demographic Crisis in the Russian Federation', Conflict Studies Research Centre, UK Defence Academy, 06/39, August 2006. <http://www.defac.ac.uk/colleges/csrc>

¹⁰ In the 2005 federal budget, total spending was 3,047,929,300 thousand roubles. Spending on environmental protection was 4,629,981.6 thousand roubles. In the 2006 federal budget total spending was 4,270,114,718.3 thousand roubles. Spending on environmental protection was 6,334,260.7 thousand roubles. Environmental spending as a percentage of total spending is about 0.15 per cent. (Information on the federal budgets is taken from <http://www1.minfin.ru/budjet/budjet.htm>). By contrast, environmental spending in the UK 2006 budget was 3.44 per cent of the budget (this includes spending on housing). In the USA 2006 Federal Budget environmental spending was 0.28 per cent. In the draft German 2007 Federal Budget, environmental spending is scheduled to be 0.29 per cent.

¹¹ Kris Wernstedt, Environmental Management in the Russian Federation: A Next Generation Enigma, January 2002 Discussion Paper 02-04, p.7.

www.rff.org/Documents/RFF-DP-02-04.pdf

¹² <http://www.ccb.se/index.html>

¹³ http://news.bbc.co.uk/1/hi/world/middle_east/3007228.stm

¹⁴ <http://www.ebrd.com/new/stories/2003/030529x.htm>

¹⁵ Much of the information for this section comes from the following source:

<http://www.caspianstudies.com/article/Rachel%20Nevil.htm>

¹⁶ <http://www.fehealthfund.org/index.html> This information is taken from a 2002 study Environmental Lead Contamination in the Rudnaya Pristan – Dalnegorsk Mining and Smelter District, Russian Far East by Margrit C. von Braun, et al, Environmental Science and Engineering Programs, University of Idaho, Moscow, Idaho 83844; TerraGraphics Environmental Engineering Inc., 121S. Jackson St., Moscow, Idaho, 83843; and Pacific Geographical Institute, Russian Academy of Science, Vladivostok, Russia.

¹⁷ Information taken from <http://www.eia.doe.gov/emeu/cabs/russenv.html>. For information on Russian CO₂ emissions see <http://cdiac.esd.ornl.gov/trends/emis/rus.htm>

¹⁸ Information from this section is from http://www.bellona.org/english_import_area/international/russia/nuke_industry/waste_imports/22414

¹⁹ See the discussion of this on the Bellona website <http://www.bellona.no/> which is the main source of information for this section.

²⁰ This report is available on-line at:

<http://spb.org.ru/bellona/ehome/russia/nfl/index.htm>

²¹ See the interview with the then head of the ecological security administration, Major General Alevtin Yunak in 'Russia's Ecological Shield,' *Krasnaya Zvezda*, 12 July 2002. See also <http://www.mil.ru/eng/1864/12074/index.shtml>

²²For information on the dismantling of Russian submarines, see

http://www.armscontrol.org/act/1999_06/subjun99.asp ;

<http://www.spacewar.com/news/submarine-05q.html> ;

<http://cns.miis.edu/pubs/week/031203.htm>

<http://www.nti.org/db/nisprofs/russia/naval/forasst/forasovr.htm>

²³ Information in this section is from <http://gadfly.igc.org/russia/yablokov2.htm>

²⁴ For information on this see http://www.scrf.gov.ru/documents/mvk_ecolog_1.shtml

²⁵ For information on NGOs, see: http://www.indepsocres.spb.ru/sbornik6/6_redact.htm

See also Office for Central Europe and Eurasia Development, Security, and Cooperation Policy and Global Affairs National Research Council In cooperation with the Russian Academy of Sciences, The Role of Environmental NGOs -- Russian Challenges, American Lessons: Proceedings of a Workshop Committee on Improving the Effectiveness of Environmental Nongovernmental Organizations in Russia, Washington DC. National Academy Press, 2001. Online at <http://darwin.nap.edu/books/0309076188/html>

²⁶ See papers from the conference "Health and Demography in the States of the Former Soviet Union," held at Harvard University, Weatherhead Center for International Affairs, April 29-30, 2005, <http://www.wcfia.harvard.edu/conferences/demography/papers.asp> .

Websites Concerned with Russian Environmental Issues (some are Russian language only)

<http://www.biodiversity.ru>

<http://www.ecopolicy.ru/en>

<http://oracle.cas.muohio.edu/ies/russia.htm>

<http://gadfly.igc.org/russia/otoh.htm>

<http://www.bellona.no>

<http://www.seu.ru/index.en.htm>

http://www.atomsafe.ru/index_e.htm

<http://www.ecoindustry.ru/>

<http://enrin.grida.no/>

<http://aarhusclearinghouse.unece.org/resources.cfm?c=1000058&sortby=title&startrow=1>

<http://www.ecoline.ru/>

http://www.rusrec.ru/homepage/index_en.htm

<http://ecologyserver.icc.ru>

<http://www.ineca.ru/?cs=0&om=1>

<http://www.ecoguild.ru/>

<http://www.stnature.ru>

<http://www.greenpeace.org/russia/en/>

Want to Know More ...?

See:

Nato Economic Colloquium, 30 June, 1 and 2 July 1993, Brussels
Economic Developments in Cooperation Partner Countries from a Sectoral Perspective,
<http://www.nato.int/docu/colloq/1993/eco9328.txt>

Murray Feshbach *A Two-edged Sword: the Impact of Ecological Threats on Economic Reforms and the Impact of Economic Reforms on Ecological Issues* NATO Colloquium 1995. <http://www.nato.int/docu/colloq/1995/95-10.htm>

Environmental Review Newsletter Vol 2 No.9, September 1995, *Health and the Environment in the Former Soviet Union Part I. An Interview with Murray Feshbach*.
<http://www.environmentalreview.org/vol02/feschba.html>

Kris Wernstedt, *Environmental Management in the Russian Federation: A Next Generation Enigma*, January 2002 Discussion Paper 02-04.
www.rff.org/Documents/RFF-DP-02-04.pdf

Kris Wernstedt *Who is Protecting Russia's Natural Resources? Why Should We Care?* Resources 148 (Summer 2002): 22-28. <http://www.rff.org/Documents/RFF-Resources-148-russia.pdf>

Conference "Health and Demography in the States of the Former Soviet Union," held at Harvard University, Weatherhead Center for International Affairs, April 29-30, 2005 <http://www.wcfia.harvard.edu/conferences/demography/papers.asp>

Office for Central Europe and Eurasia Development, Security, and Cooperation Policy and Global Affairs National Research Council In cooperation with the Russian Academy of Sciences, The Role of Environmental NGOs -- Russian Challenges, American Lessons Washington DC. National Academy Press, 2001 Online at <http://darwin.nap.edu/books/0309076188/html>

Disclaimer

The views expressed are those of the
Author and not necessarily those of the
UK Ministry of Defence

ISBN 1-905058-86-1

Published By:

**Defence Academy of the
United Kingdom**

Conflict Studies Research Centre

Defence Academy of the UK
Watchfield
Swindon
SN6 8TS
England

Telephone: (44) 1793 788856
Fax: (44) 1793 788841
Email: csrc@da.mod.uk
<http://www.da.mod.uk/csrc>

ISBN 1-905058-86-1