

# Annexes

## Annex I List of contributing authors and organisations

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Dr. Sergey A. Shchuka	Institute of Global Climate and Ecology of Roshydromet and RAS	Russia	Marine biology
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# Annex II

## Detailed scoring tables: Kara Sea

### I: Freshwater shortage

Environmental issues	Score	Weight	Environmental concern	Weight averaged score
1. Modification of stream flow	0	N/a	Freshwater shortage	0
2. Pollution of existing supplies	1	N/a		
3. Changes in the water table	0	N/a		

Criteria for Economics impacts	Raw score	Score	Weight %
Size of economic or public sectors affected	Very small  Very large	1	N/a
Degree of impact (cost, output changes etc.)	Minimum  Severe	1	N/a
Frequency/Duration	Occasion/Short  Continuous	1	
<b>Weight average score for Economic impacts</b>		<b>1</b>	
Criteria for Health impacts	Raw score	Score	Weight %
Number of people affected	Very small  Very large	1	N/a
Degree of severity	Minimum  Severe	1	N/a
Frequency/Duration	Occasion/Short  Continuous	1	N/a
<b>Weight average score for Health impacts</b>		<b>1</b>	
Criteria for Other social and community impacts	Raw score	Score	Weight %
Number and/or size of community affected	Very small  Very large	0	N/a
Degree of severity	Minimum  Severe	0	N/a
Frequency/Duration	Occasion/Short  Continuous	0	N/a
<b>Weight average score for Other social and community impacts</b>		<b>0</b>	

N/a = Not applied

### II: Pollution

Environmental issues	Score	Weight	Environmental concern	Weight averaged score
4. Microbiological	0	N/a	Pollution	2
5. Eutrophication	0	N/a		
6. Chemical	2	N/a		
7. Suspended solids	0	N/a		
8. Solid wastes	1	N/a		
9. Thermal	0	N/a		
10. Radionuclides	1	N/a		
11. Spills	2	N/a		

Criteria for Economics impacts	Raw score	Score	Weight %
Size of economic or public sectors affected	Very small  Very large	1	N/a
Degree of impact (cost, output changes etc.)	Minimum  Severe	1	N/a
Frequency/Duration	Occasion/Short  Continuous	1	N/a
<b>Weight average score for Economic impacts</b>		<b>1</b>	
Criteria for Health impacts	Raw score	Score	Weight %
Number of people affected	Very small  Very large	2	N/a
Degree of severity	Minimum  Severe	2	N/a
Frequency/Duration	Occasion/Short  Continuous	2	N/a
<b>Weight average score for Health impacts</b>		<b>2</b>	
Criteria for Other social and community impacts	Raw score	Score	Weight %
Number and/or size of community affected	Very small  Very large	2	N/a
Degree of severity	Minimum  Severe	2	N/a
Frequency/Duration	Occasion/Short  Continuous	2	N/a
<b>Weight average score for Other social and community impacts</b>		<b>2</b>	

N/a = Not applied

### III: Habitat and community modification

Environmental issues	Score	Weight	Environmental concern	Weight averaged score
12. Loss of ecosystems	1	N/a	Habitat and community modification	1
13. Modification of ecosystems or ecotones, including community structure and/or species composition	1	N/a		

Criteria for Economics impacts	Raw score	Score	Weight %
Size of economic or public sectors affected	Very small  Very large	2	N/a
Degree of impact (cost, output changes etc.)	Minimum  Severe	2	N/a
Frequency/Duration	Occasion/Short  Continuous	2	N/a
<b>Weight average score for Economic impacts</b>		<b>2</b>	
Criteria for Health impacts	Raw score	Score	Weight %
Number of people affected	Very small  Very large	3	N/a
Degree of severity	Minimum  Severe	3	N/a
Frequency/Duration	Occasion/Short  Continuous	3	N/a
<b>Weight average score for Health impacts</b>		<b>3</b>	
Criteria for Other social and community impacts	Raw score	Score	Weight %
Number and/or size of community affected	Very small  Very large	3	N/a
Degree of severity	Minimum  Severe	3	N/a
Frequency/Duration	Occasion/Short  Continuous	3	N/a
<b>Weight average score for Other social and community impacts</b>		<b>3</b>	

N/a = Not applied

### IV: Unsustainable exploitation of fish and other living resources

Environmental issues	Score	Weight %	Environmental concern	Weight averaged score
14. Overexploitation	2	N/a	Unsustainable exploitation of fish	1
15. Excessive by-catch and discards	0	N/a		
16. Destructive fishing practices	0	N/a		
17. Decreased viability of stock through pollution and disease	1	N/a		
18. Impact on biological and genetic diversity	0	N/a		

Criteria for Economics impacts	Raw score	Score	Weight %
Size of economic or public sectors affected	Very small  Very large	2	N/a
Degree of impact (cost, output changes etc.)	Minimum  Severe	2	N/a
Frequency/Duration	Occasion/Short  Continuous	2	N/a
<b>Weight average score for Economic impacts</b>		<b>2</b>	
Criteria for Health impacts	Raw score	Score	Weight %
Number of people affected	Very small  Very large	1	N/a
Degree of severity	Minimum  Severe	1	N/a
Frequency/Duration	Occasion/Short  Continuous	1	N/a
<b>Weight average score for Health impacts</b>		<b>1</b>	
Criteria for Other social and community impacts	Raw score	Score	Weight %
Number and/or size of community affected	Very small  Very large	1	N/a
Degree of severity	Minimum  Severe	1	N/a
Frequency/Duration	Occasion/Short  Continuous	1	N/a
<b>Weight average score for Other social and community impacts</b>		<b>1</b>	

N/a = Not applied

## V: Global change

Environmental issues	Score	Weight	Environmental concern	Weight averaged score
19. Changes in the hydrological cycle	1	N/a	Global change	1
20. Sea level change	0	N/a		
21. Increased UV-B radiation as a result of ozone depletion	1	N/a		
22. Changes in ocean CO <sub>2</sub> source/sink function	1	N/a		

Criteria for Economics impacts	Raw score	Score	Weight %
Size of economic or public sectors affected	Very small  Very large	1	N/a
Degree of impact (cost, output changes etc.)	Minimum  Severe	1	N/a
Frequency/Duration	Occasion/Short  Continuous	1	N/a
<b>Weight average score for Economic impacts</b>		<b>1</b>	
Criteria for Health impacts	Raw score	Score	Weight %
Number of people affected	Very small  Very large	0	N/a
Degree of severity	Minimum  Severe	0	N/a
Frequency/Duration	Occasion/Short  Continuous	0	N/a
<b>Weight average score for Health impacts</b>		<b>0</b>	
Criteria for Other social and community impacts	Raw score	Score	Weight %
Number and/or size of community affected	Very small  Very large	1	N/a
Degree of severity	Minimum  Severe	1	N/a
Frequency/Duration	Occasion/Short  Continuous	1	N/a
<b>Weight average score for Other social and community impacts</b>		<b>1</b>	

N/a = Not applied

## Comparative environmental and socio-economic impacts of each GIWA concern

Concern	Types of impacts								Overall score	Rank
	Environmental score		Economic score		Human health score		Social and community score			
	Present (a)	Future (b)	Present (a)	Future (b)	Present (a)	Future (b)	Present (a)	Future (b)		
Freshwater shortage	0	0	1	1	1	1	0	0	0.5	5
Pollution	2	2	1	1	2	2	2	2	1.8	2
Habitat and community modification	1	1	2	2	3	3	3	3	2.3	1
Unsustainable exploitation of fish and other living resources	1	1	2	2	1	1	1	1	1.3	3
Global change	1	1	1	1	0	0	1	1	0.8	4

# Annex II

## Detailed scoring tables: Laptev, East Siberian, Chukchi seas

### I: Freshwater shortage

Environmental issues	Score	Weight	Environmental concern	Weight averaged score
1. Modification of stream flow	0	N/a	Freshwater shortage	0
2. Pollution of existing supplies	0	N/a		
3. Changes in the water table	0	N/a		

Criteria for Economics impacts	Raw score	Score	Weight %
Size of economic or public sectors affected	Very small  Very large	1	N/a
Degree of impact (cost, output changes etc.)	Minimum  Severe	1	N/a
Frequency/Duration	Occasion/Short  Continuous	1	
<b>Weight average score for Economic impacts</b>		<b>1</b>	
Criteria for Health impacts	Raw score	Score	Weight %
Number of people affected	Very small  Very large	0	N/a
Degree of severity	Minimum  Severe	0	N/a
Frequency/Duration	Occasion/Short  Continuous	0	N/a
<b>Weight average score for Health impacts</b>		<b>0</b>	
Criteria for Other social and community impacts	Raw score	Score	Weight %
Number and/or size of community affected	Very small  Very large	0	N/a
Degree of severity	Minimum  Severe	0	N/a
Frequency/Duration	Occasion/Short  Continuous	0	N/a
<b>Weight average score for Other social and community impacts</b>		<b>0</b>	

N/a = Not applied

### II: Pollution

Environmental issues	Score	Weight	Environmental concern	Weight averaged score
4. Microbiological	0	N/a	Pollution	1
5. Eutrophication	0	N/a		
6. Chemical	1	N/a		
7. Suspended solids	0	N/a		
8. Solid wastes	0	N/a		
9. Thermal	0	N/a		
10. Radionuclides	0	N/a		
11. Spills	1	N/a		

Criteria for Economics impacts	Raw score	Score	Weight %
Size of economic or public sectors affected	Very small  Very large	0	N/a
Degree of impact (cost, output changes etc.)	Minimum  Severe	0	N/a
Frequency/Duration	Occasion/Short  Continuous	0	N/a
<b>Weight average score for Economic impacts</b>		<b>0</b>	
Criteria for Health impacts	Raw score	Score	Weight %
Number of people affected	Very small  Very large	1	N/a
Degree of severity	Minimum  Severe	1	N/a
Frequency/Duration	Occasion/Short  Continuous	1	
<b>Weight average score for Health impacts</b>		<b>1</b>	
Criteria for Other social and community impacts	Raw score	Score	Weight %
Number and/or size of community affected	Very small  Very large	2	N/a
Degree of severity	Minimum  Severe	2	N/a
Frequency/Duration	Occasion/Short  Continuous	2	N/a
<b>Weight average score for Other social and community impacts</b>		<b>2</b>	

N/a = Not applied

### III: Habitat and community modification

Environmental issues	Score	Weight	Environmental concern	Weight averaged score
12. Loss of ecosystems	1	N/a	Habitat and community modification	1
13. Modification of ecosystems or ecotones, including community structure and/or species composition	1	N/a		

Criteria for Economics impacts	Raw score	Score	Weight %
Size of economic or public sectors affected	Very small  Very large 0 1 2 3	1	N/a
Degree of impact (cost, output changes etc.)	Minimum  Severe 0 1 2 3	1	N/a
Frequency/Duration	Occasion/Short  Continuous 0 1 2 3	1	N/a
<b>Weight average score for Economic impacts</b>			<b>1</b>
Criteria for Health impacts	Raw score	Score	Weight %
Number of people affected	Very small  Very large 0 1 2 3	3	N/a
Degree of severity	Minimum  Severe 0 1 2 3	3	N/a
Frequency/Duration	Occasion/Short  Continuous 0 1 2 3	3	N/a
<b>Weight average score for Health impacts</b>			<b>3</b>
Criteria for Other social and community impacts	Raw score	Score	Weight %
Number and/or size of community affected	Very small  Very large 0 1 2 3	3	N/a
Degree of severity	Minimum  Severe 0 1 2 3	3	N/a
Frequency/Duration	Occasion/Short  Continuous 0 1 2 3	3	N/a
<b>Weight average score for Other social and community impacts</b>			<b>3</b>

N/a = Not applied

### IV: Unsustainable exploitation of fish and other living resources

Environmental issues	Score	Weight %	Environmental concern	Weight averaged score
14. Overexploitation	1	N/a	Unsustainable exploitation of fish	0
15. Excessive by-catch and discards	0	N/a		
16. Destructive fishing practices	0	N/a		
17. Decreased viability of stock through pollution and disease	1	N/a		
18. Impact on biological and genetic diversity	0	N/a		

Criteria for Economics impacts	Raw score	Score	Weight %
Size of economic or public sectors affected	Very small  Very large 0 1 2 3	1	N/a
Degree of impact (cost, output changes etc.)	Minimum  Severe 0 1 2 3	1	N/a
Frequency/Duration	Occasion/Short  Continuous 0 1 2 3	1	N/a
<b>Weight average score for Economic impacts</b>			<b>1</b>
Criteria for Health impacts	Raw score	Score	Weight %
Number of people affected	Very small  Very large 0 1 2 3	1	N/a
Degree of severity	Minimum  Severe 0 1 2 3	1	N/a
Frequency/Duration	Occasion/Short  Continuous 0 1 2 3	1	N/a
<b>Weight average score for Health impacts</b>			<b>1</b>
Criteria for Other social and community impacts	Raw score	Score	Weight %
Number and/or size of community affected	Very small  Very large 0 1 2 3	1	N/a
Degree of severity	Minimum  Severe 0 1 2 3	1	N/a
Frequency/Duration	Occasion/Short  Continuous 0 1 2 3	1	N/a
<b>Weight average score for Other social and community impacts</b>			<b>1</b>

N/a = Not applied

## V: Global change

Environmental issues	Score	Weight	Environmental concern	Weight averaged score
19. Changes in the hydrological cycle	1	N/a	Global change	1
20. Sea level change	0	N/a		
21. Increased UV-B radiation as a result of ozone depletion	1	N/a		
22. Changes in ocean CO <sub>2</sub> source/sink function	1	N/a		

Criteria for Economics impacts	Raw score	Score	Weight %
Size of economic or public sectors affected	Very small  Very large	1	N/a
Degree of impact (cost, output changes etc.)	Minimum  Severe	1	N/a
Frequency/Duration	Occasion/Short  Continuous	1	N/a
<b>Weight average score for Economic impacts</b>		<b>1</b>	
Criteria for Health impacts	Raw score	Score	Weight %
Number of people affected	Very small  Very large	0	N/a
Degree of severity	Minimum  Severe	0	N/a
Frequency/Duration	Occasion/Short  Continuous	0	N/a
<b>Weight average score for Health impacts</b>		<b>0</b>	
Criteria for Other social and community impacts	Raw score	Score	Weight %
Number and/or size of community affected	Very small  Very large	1	N/a
Degree of severity	Minimum  Severe	1	N/a
Frequency/Duration	Occasion/Short  Continuous	1	N/a
<b>Weight average score for Other social and community impacts</b>		<b>1</b>	

N/a = Not applied

## Comparative environmental and socio-economic impacts of each GIWA concern

Concern	Types of impacts								Overall score	Rank
	Environmental score		Economic score		Human health score		Social and community score			
	Present (a)	Future (b)	Present (a)	Future (b)	Present (a)	Future (b)	Present (a)	Future (b)		
Freshwater shortage	0	0	1	1	0	0	0	0	0.3	5
Pollution	1	1	0	0	1	1	2	2	1.0	2
Habitat and community modification	1	1	1	1	3	3	3	3	2.0	1
Unsustainable exploitation of fish and other living resources	0	0	1	1	1	1	1	1	0.8	4
Global change	1	1	1	1	0	0	1	1	0.8	3

# Annex III

## List of important water-related programmes

### International programmes and projects

#### Arctic Environmental Protection Strategy (AEPS) 1991

Main issues:

- Protect the Arctic ecosystems, including humans;
- Provide for the protection, enhancement and restoration of environmental quality and sustainable utilisation of natural resources, including their use by local populations and indigenous peoples in the Arctic;
- Recognise and, to the extent possible, seek to accommodate the traditional and cultural needs, values and practices of indigenous peoples as determined by themselves, related to the protection of the Arctic environment;
- Review regularly the state of the Arctic environment, identify, reduce and, as a final goal, eliminate pollution.

The five programmes established under the AEPS are:

#### *Arctic Monitoring and Assessment Programme (AMAP)*

An international organisation established to implement components of the AEPS. AMAP has responsibilities to monitor the levels of, and assess the effects of, anthropogenic pollutants in all compartments of the Arctic environment, including humans. AMAP is now a programme group of the Arctic Council, and its current objective is "providing reliable and sufficient information on the status of, and threats to, the Arctic environment, and providing scientific advice on actions to be taken in order to support Arctic governments in their efforts to take remedial and preventive actions relating to contaminants".

#### *Conservation of Arctic Flora and Fauna (CAFF)*

The Programme for the Conservation of Arctic Flora and Fauna, under the AEPS, was established to address the special needs of Arctic species and their habitats in the rapidly developing Arctic region. CAFF has responsibilities to facilitate the exchange of information and coordination of research on species and habitats of Arctic flora and fauna.

#### *Emergency Prevention, Preparedness and Response (EPPR)*

Established as an expert forum to evaluate the adequacy of existing arrangements and to recommend necessary systems of cooperation.

#### *Protection of the Arctic Marine Environment (PAME)*

PAME addresses policy and non-emergency response measures related to protection of the marine environment from land and sea-based activities. PAME has responsibilities to take preventative and other measures, directly or through competent international organisations, regarding marine pollution in the Arctic, irrespective of origin.

#### *Sustainable Development Working Group (SDWG)*

Established by Arctic Ministers in 1998. The objective is to protect and enhance the economies, culture and health of the inhabitants of the Arctic, in an environmentally sustainable manner.

#### **Arctic Climate Impact Assessment (ACIA)**

An international project organised under the auspices of the Arctic Council to evaluate and synthesise knowledge on climate variability, climate change, and increased ultraviolet radiation and their consequences.

#### **International Arctic Science Committee (IASC)**

IASC is a non-governmental organisation to encourage and facilitate cooperation in all aspects of Arctic research, in all countries engaged in Arctic research and in all areas of the Arctic region. The IASC member organisations are national science organisations covering all fields of Arctic research.

#### **Arctic Environmental Impact Assessment (ARIA)**

The purpose of the project is to develop Guidelines for EIA in the Arctic. A circumpolar ad hoc group, whose task was to evaluate a proposal for an electronic information system supporting Arctic EIAs, has recommended that an electronic network on the internet should be established.

#### **AMAP's Assessment: State of the Environment Report**

During its initial phase of operation (1991-1996), AMAP designed and implemented a monitoring programme and conducted its first assessment of the State of the Arctic Environment with respect to pollution issues. A special group (the AMAP Assessment Steering Group) was established to oversee the preparation of the AMAP Assessment, which is based on input from several hundred scientific experts. Two Assessment reports were produced to present the results of the AMAP assessment firstly to decision makers and the general public (the SOAER; full text), and secondly to fully document the scientific basis for the assessment (the AAR). This first AMAP Assessment was presented in 1997.

## GEF Projects in the region

### UNEP-GEF-International Waters

*Support for the National Plan of Action in the Russian Federation for the Protection of the Arctic Marine Environment from Anthropogenic Pollution.*

The project will focus on pre-investment studies of identified priority hot spots with known significant transboundary consequences. Additional activities will include the necessary support in the development of legal, institutional and economic measures.

### UNEP-GEF-Biodiversity

*An Integrated Ecosystem Approach to Enhance Biodiversity Conservation and Minimise Habitat Fragmentation in the Russian Arctic.*

## Other actors and initiatives

- European Commission Report on the Northern Dimension, November 1998.
- Conclusions of the Foreign Ministers Conference on the Northern Dimension, November 1999.

## Russian programmes and projects

### Federal programme

*Economic and social development of northern minorities up to 2000 year (1996)*

Includes the following sub-programmes:

- *Economy and culture development of northern minorities:*  
State support of the production of local natural food production is stipulated. Clubs for 16 800 visitors will be constructed; investments for the development of trades, publishing of manuals and belles-lettres in the languages of northern minorities, scientific research work connected with their history and culture are planned in the federal and local budgets.
- *Medical and health care:*  
Permanent regional health monitoring will be organised. Mobile special medical care will reach all remote northern settlements. Building of hospitals for 3 500 patients and the construction of 101 obstetric and doctor assistants clinics, along with the modernisation of health transport are stipulate).

*World Ocean*

includes the following subprograms:

- Development and use of the Arctic region;
- Creation of high-tech installations, machines and equipment for marine production of oil, gas and development of hydrocarbon deposits on the continental shelf of the Arctic from 2004-2012 (Shelf).

*Economic and social development of northern minorities up to 2011 year*

*Reduction of differences in socio-economic development of regions of Russian Federation (2002-2010 and up to 2015).*

# Annex IV

## List of conventions and specific laws that affect water use

### International Conventions

#### United Nations Convention on the Law of the Sea (UNCLOS)

1982, UN Documents A/CONF. 62/122

#### United Nations Conference on Environment and Development (UNCED)

Rio de Janeiro, 1992

#### Rovaniemi Declaration on the Protection of the Arctic Environment

Rovaniemi, 1991

#### Convention on Biological Diversity (CBD)

Rio de Janeiro, 1992

#### World Summit on Sustainable Development (WSSD)

Johannesburg, 2002

#### Convention on Long-Range Transboundary Air Pollution (LRTAP)

The purpose of the UN Economic Commission for Europe's LRTAP Convention is to prevent, reduce, and control transboundary air pollution from both existing and new sources. This regional, binding agreement and the five related protocols represent the most appropriate instrument for addressing relevant components of the Arctic pollution problem. Current negotiations in LRTAP include efforts to conclude a new protocol on photochemical pollution, acidification, and eutrophication, and to prepare new protocols on heavy metals and persistent organic pollutants.

#### Convention for the Protection of the Marine Environment of the North East Atlantic (OSPAR)

OSPAR was developed under the Oslo and Paris Commissions to update two existing Conventions (the 1974 Paris Convention for the Prevention of Marine Pollution from Land-based Sources, and the 1972 Oslo Convention for the Prevention of Marine Pollution from Ships and Aircraft). The 1992 OSPAR Convention is currently one of the most applicable international agreements for addressing Arctic marine pollution from various sources.

#### The International Convention for the Prevention of Pollution from Ships (MARPOL)

From 1973 and modified by the Protocol of 1978 (MARPOL 73/78):

This convention is a combination of two treaties adopted in 1973 and 1978. It covers all the technical aspects of pollution from ships, except the disposal of waste into the sea by dumping, and applies to ships of all types. It has five annexes covering oil, chemicals, sewage, garbage, and harmful substances carried in packages, portable tanks, freight containers, etc.

#### Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Dumping Convention)

The London Dumping Convention is the primary international agreement regulating ocean dumping of wastes. It has direct significance for several aspects of environmental protection of the Arctic, particularly in relation to radioactive waste disposal issues. All eight Arctic countries are Contracting Parties and have signed a recent comprehensive revision and restructuring of this Convention.

#### Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer

The Vienna Convention of 1985 identified the threat to ozone in the atmosphere and resulted in the adoption of the 1987 Montreal Protocol, which limits the production of substances responsible for stratospheric ozone depletion. Compliance with the protocol including its amendments is the primary mechanism for protecting stratospheric ozone.

#### United Nations Framework Convention on Climate Change (UNFCCC)

Adopted at the Rio Conference in 1992, the United Nations Framework Convention on Climate Change provides an international framework to discuss greenhouse gases, especially carbon dioxide. A ministerial declaration at a meeting of parties at the convention in June 1996 includes instructions to negotiate binding agreements to reduce emissions.

#### UNEP Global Programme of Action

The 9<sup>th</sup> session of the UNEP Governing Council decided to establish a negotiating committee before July 1, 1998 to prepare a global, legally binding agreement on at least persistent organic pollutants, and to finish its work before 2000. This fulfils a ministerial agreement within UNEP's Global Programme of Action for the Protection of the Marine Environment from Land-based Activities.

## Russian-specific federal laws and other federal acts

- The law of the Russian Federation "About natural environment conservation" (1992, 2002)
- The law of the Russian Federation "About natural protected territories" (from 14.03.1995)
- The Water Code of Russian Federation (from 16.11. 1995 with additions in 2001, 2002)
- The Land Code of Russian Federation (from 25.10. 2001)
- The law of the Russian Federation "About the continental shelf of the Russian Federation" (1995)
- The law of the Russian Federation "About the Exclusive Economic Zone of the Russian Federation" (from 17.12.1998)
- The law of the Russian Federation "About Earth's interior" (1992)
- The law of the Russian Federation "About fundamentals of state regulating of social and economic development of the Russian Federation North" (from 19.06.1996).
- The law of the Russian Federation "About state guarantees and compensations for people living and working at the Far North and similar territories" (from 19.02.1993).
- The law of the Russian Federation "About territories of traditional use of natural resources by the small indigenous peoples of North, Siberia and Far East of Russian Federation " (2000)
- The law of the Russian Federation "About the distribution of housing subsidies to the citizens leaving from Far North regions and similar territories» (from 25.07.1998)
- The Ukase of the President of Russian Federation "About the State Strategy of the Russian Federation on the Protection of Environment and Ensuring of Sustainable Development" (No 236 from 04.02.94).
- The Ukase of the President of Russian Federation "About of the Concept of Transition of the Russian Federation to Sustainable Development" (No 440 from 01.04.1996).
- Federal government regulations "About the statement of organisation of delivery and carriage of production (goods) for maintenance of a national economy and population of Far North regions and similar territories" (No 207 from 06.01.93 and No 450 from 05.05. 95).
- Resolution of lower house of Russian Parliament (State Duma) "About ensuring the sustainable development of Far North regions and similar territories" (2000)

# Annex V

## The health and social welfare of the Arctic indigenous population in Russia

### The modern regional demographic situation

The indigenous population of the Russian North belongs to 30 northern minorities (about 200 000 people). These minorities live in the territories of 27 regions of the Russian Federation. Eleven of these minorities live in the Arctic region: the Saami, the Enets, the Nenets, the Khants, the Nganasans, the Dolgans, the Evens, the Evenks, the Chukchi, the Eskimos and the Yukagirs. Minorities that live in the adjacent regions are the Selkups, the Chuvans, the Mansi, the Kets and the Koryaks. On January 1, 2001, 1 854 800 people lived on the Arctic coastline of the GIWA region Russian Arctic region. The indigenous population comprises about 3.4% of this total. Population numbers and the ethnic structure of the indigenous peoples in the region are presented in Table 1.

The indigenous population comprises 60.6% of the Sakha Republic, and in the autonomous okrugs: 60% in the Nenets, 66.2% in the Yamalo-Nenets, 64.2% in the Taimyr (the Dolgano-Nenets), and 67.7% in the

Chukchi. For the majority of northern minorities, the female population is slightly larger than the male population (by 8%). The female percentage of the population is lower only for the Kets, the Saami, the Enets, and the Yukagirs. The overall economic crises, which were more serious in the north, led to a decrease in the population of the Arctic zone both because of natural decreases and emigration processes.

For the first time in 1994, a natural decrease in the general population was recorded for the regions where northern minorities live. The population decrease in 1995 as compared to 1994 was marked for the Saami (-14), the Nganasans (-6), the Kets (-3), the Enets (-1). Other minorities have shown a slight natural population increase. The growth in migration from economically depressed northern regions of Russia after the collapse of the USSR was accompanied by the abandonment of settlements and has had serious social consequences for the indigenous population, because it has led to a decrease in the availability of food, paid services, and medical care.

The major part of the indigenous population (more than 90%) of the region is rural. The percentage of the population that is urban is relatively high for the Nenets (17.1%) and the Chukchi (10%). Residence in multinational settlements and cities entirely changes the indigenous peoples' lifestyle, resulting in many negative consequences. Large shifts in the traditional distribution of the indigenous population are mainly connected with the development and exploitation of mineral deposits, transport routes and construction. This disturbs pastures, hunting lands, productive fishing areas and undermines the indigenous peoples' natural resources base.

**Table 1** Rural indigenous population in the Russian Arctic region.

Minority	Sakha Republic (Yakutia)	Taimyr AO (Dolgano-Nenets)	Murmansk	Nenets AO	Yamalo-Nenets AO	Chukchi AO
Nenets	6	2419	127	474	297	18
Khants	1	-	-	10	7 009	-
Mansi	1	-	-	-	68	-
Evenks	12 914	-	2	3	65	38
Koryaks	-	-	-	-	-	39
Chukchi	403	-	-	-	-	11 605
Saami	-	-	1 130	-	-	-
Enets	-	130	-	-	-	-
Nganasans	-	20	-	-	-	-
Dolgans	871	4 872	-	-	-	-
Yukagirs	560	-	-	-	-	-
Even	6 304	-	-	-	-	115
Eskimo	4	-	-	-	-	1219
Selkups	-	3	-	1	1 616	-
Chuvan	-	-	-	-	-	520
Kets	-	-	-	1	1	-
Total	21 064	7 444	1 259	489	9 056	13 557

Note: AO = Autonomous Okrug

### Population health

#### Morbidity structure

The health of people living in the Arctic region is poor. A general decrease in living standards, a change for the worse in medical care, changes in the traditional way of life and nutrition patterns combine to increase morbidity and mortality, even in children. Four of the most common diseases, per 1 000 people, are: infectious and parasitic diseases 54.5, nervous system diseases 56.9, respiratory diseases 301.2, traumas and poisoning 74.2. The mortality rate from different diseases is 2.5 times higher than the Russian average. Thus, because of inadequate medical care, infant mortality from infectious and parasitic diseases in the Taimyr (Dolgano-Nenets) AD is 60% higher than in Norilsk. Indigenous infants often are infected with opisthorhosis during the first year of their life. 95% of the population experiences hypovitaminoses.

After 1990, the frequency of active tuberculosis grew by 23%; for the indigenous population this rate is 2-3 times higher than for the rest

of the region's residents. (The Federal programme "Urgent measures for tuberculosis control in Russia in 1995-1999" has resulted in special measures for indigenous peoples.) There is a marked tendency towards alcoholism and alcoholic psychosis growth. After 1990, alcoholism grew by 39% in the Taimyr (Dolgano-Nenets) AD, by 51% in the Yamalo-Nenets AD, and by 37% in the Chukchi AD (37% growth). Venereal diseases are also problematic.

Morbidity directly connected with environmental pollution is of special concern. This problem is most acute in the large industrial cities of the region, such as Norilsk and Vorkuta. Chronic illnesses in these cities are common, particularly in children. These include bronchitis, pneumonia, lung cancer, bronchial asthma, and allergies. Women have pregnancy complications and other reproductive problems. Heavy metals, PAHs and other have a strong mutagenic effect. In Norilsk the frequency of congenital defects for infants is 11.2 per 1 000 (the Russian average is 6-8), including the Daun 1.05 (as compared to the far from ecologically clean Krasnoyarsk 0.87).

### **Human life span and mortality**

Recent changes in the lifestyles of the indigenous populations have appeared to be greatly adverse for these peoples' overall well-being. The average life span in the north is 3-4 years less than the Russian average, while for indigenous people the number is 10-11 years lower. The following data shows why indigenous population numbers tend to decrease: their general mortality rates are 1.7 higher than the average, and infant mortality 2 times higher than for the region's population in general. The marital status of men has decreased, while the number of unmarried indigenous women with children is increasing. Non-traditional families are 25-35% of the total number. About 50% of reindeer herders remain unmarried. In 1990-1993 the birth rate had decreased by 34% and mortality had increased by 42%, which caused a ten-fold decrease in the population.

Nutritional imbalances have resulted because of the adoption of European diets, and these diets also mean that not enough calories are consumed, and the foods that are eaten are poor in microelements. This is why an increase in the consumption of traditional foods, such as reindeer meat, fish, wild berries and mushrooms not only solves food problem, but also solves a problem of population ethnic survival. The poor physiological state of northern minorities, along with their poor physical condition is one of the causes of their shortened life spans. Poverty is closely connected with the lost reliance on natural resources as a basis for traditional lifestyles. More than 30% of deaths are violent. The suicides level is 3-4 times higher than the Russian average.

Every twentieth death in the indigenous population is a child one year or younger, a statistic that is five times higher than the Russian average. The highest infant mortality is found in the Chukchi AD. The mortality rate of the able-bodied indigenous population is also 3-4 times higher than in the non-indigenous population.

### **Measures to improve overall health in the population**

The socio-economic basis for improving the health of the people in the region has been mapped out by "Economic and social development of northern minorities up to the year 2000 ", a federal programme developed in 1996. A special section was directed at the improvement of health in the northern minority population. Permanent regional health monitoring will be organised. Mobile special medical care will be created to reach all remote northern settlements. Regional problems concerning morbidity of the Arctic zone population will be solved by "Northern minorities health", a programme that is currently being developed.

### **Socio-economic situation**

The social structure of the Russian Arctic region has been built within the framework of the industrial development of northern territories. The food supply, along with the supply of and industrial products, transportation and energy, were provided through connections with the parent state. This is why the social structure has developed unequally, with relatively good services in cities and big industrial enterprise sites and poor services in rural zones. This is also why it is very vulnerable to economic downturns and weakened links with the more populous and developed south.

### **Professional occupation and unemployment rate**

The immigrant population of the Russian Arctic mainly works in industry, while the indigenous population is employed in agriculture, hunting and fishing. There are 154 farms in the region, covering 12 000 ha. They are concentrated mostly in the Nenets AD, where there are 29 farms, with 31 farms in the Chukchi AD, and 39 farms in both the Tyumen region and the Sakha Republic (Yakutia). The average size of farms varies greatly from 1 ha in the Taimyr (Dolgano-Nenets) AD to 141 ha in the Sakha Republic (Yakutia). The average size is 49 ha. Traditional land management is the most important historical component of northern ecosystems, as it provides ecologically sound forms of nature management. It is an important source of raw goods for the market. Thus, 96% of the reindeer herd is concentrated in the region; hunting provides 52% of the bulk fur purchases and 58% of wild animal meat.

The decrease in production, reduction of investments, and increase in consumer costs drastically influenced socio-economic situation,

because it resulted in a growth in unemployment, reduction in indigenous peoples' incomes, and disruptions in the consumer goods and services supply. About 25-35% of the indigenous population has no permanent job and survives only by gathering berries and mushrooms gathering. The unemployment level is especially high for women and young people. 15% of the unemployed indigenous population has stopped looking for a job.

### Medical care

The current declines in caloric intake and overall living standards, combined with the great difficulties in transportation of sick people to hospitals has led to a growth in both morbidity and mortality. The existing forms of medical care do not meet the demands of population because there are relatively few numbers of settlements scattered over vast territories, and because of the nomadic way of life of indigenous people, which is inadequately factored into health care programmes. Because of the decrease in the highly educated non-indigenous population in the region, there is a tendency for the numbers of doctors and clinics to decrease. Only two-thirds of the medical services that are typically found in other regions of Russia are available in the territories where the indigenous population is found.

In order to improve medical care, its offerings must be enlarged, and aspects of this care must be made more efficient, such as the transportation of the sick to larger hospitals. The medical system must also improve prophylactic care and the availability of medicines. More indigenous people must be trained as medical personnel, and the use of traditional treatment methods should be expanded. Sanitary and veterinary services should also be offered. Some of these priorities are reflected in existing programmes (Children of Russia), new programmes (Economic and social development of northern minorities up to 2000 year" and projects (Women of Russia etc.). For example, in the Federal programme "Urgent measures to fight tuberculosis in Russia in 1995-1999", 13 mobile medical groups for examining and treatment of active tuberculosis are planned, as well as 10 ambulances for prophylactics and personnel training from indigenous people. The Federal programme "Economic and social development of northern minorities up to 2000 year" plans the construction of hospitals for 3 500 patients, 101 obstetric and doctor' assistants clinics, along with the modernisation of health transport vehicles, with the purchase of 20 helicopters, 60 automobiles, 10 boats and 5 four-wheel drive transports.

### Education and culture

The education level of the region's immigrant population does not greatly differ from the Russian average, but the indigenous population differs greatly from the average. Only 10-15% of indigenous children has

**Table 2** Indigenous people education level.

Region	Nenets AO	Yamalo-Nenets AO	Taimyr (Dolgano-Nenets) AO	Chukchi AO	Sakha Republic (Yakutia)	Murmansk region
Primary education (%)	40	50	50	20	38	40
Secondary and special education (%)	45	40	40	70	40	45
Higher education (%)	15	10	10	10	12	15

Note: AO = Autonomous Okrug

completed 10-11th grade (Table 2). The majority of the population that have not completed a secondary education are without jobs. Recently the number of school children studying native languages increased. Aside from high school, higher education is available to northern minorities in ethnology, ethnopolitics, economy and ecology at the Polar Academy in St.-Petersburg, which offers programmes that are directed at training high-level specialists for work in the Arctic and the creation of a new generation of intellectuals.

The federal programme "Economic and social development of northern minorities up to 2000 year" envisions the construction of clubs for 16.8 thousand visitors, investments that will help in the development of trades, the publishing of manuals and belles-lettres in the languages of northern minorities, scientific research work connected with their history and culture. Inadequate attention has paid, however, to the study of the history and culture of the old settlers population and their part in the Russian national heritage.

### Importance of conservation of the marine environment

Because marine environments are closely connected with their terrestrial counterparts, the conservation of the Arctic seas is important not only for maintaining a stable ecological situation in the region, but as a basis for the continued existence and development of the ethnocultural northern minorities. It also supplies the region with its living environment, from which products are derived. A clean environment also supplies a place for the recreational activities of the local population and migrants.

### Preservation of northern minorities ethnocultural formations

The traditional occupations of the peoples who inhabit the region, including the Russian old settlers Russian and the Yakut population, have been hunting, fishing, and reindeer herding. This last has resulted in the development of a special type of cultural landscape that in the best case is perceived as untrammelled virgin lands, but unfortunately more often as waste lands that do not need any protection. Generations of experience allowed indigenous people to balance economic

demands against the ecological capacity of the fragile environment. Specialisation and structure of nature management corresponded to zonal-landscape structure. The specialisation and the structure of this type of nature management corresponded to the natural landscape structure, which provided stable functioning of its components and supported the ethnic groups who made their living from the land. Local ecological crises of the past have been caused by fires, cutting of northern taiga, and overgrazing, but the scale of these disturbances has never been so large as to prevent the ecosystem from rebounding.

In recent times, the damage to natural ecosystems in these vast territories of the region has destroyed their ability to support the resource-based activities of indigenous peoples. In particular, industrial development in the Arctic is accompanied by severe losses of many natural resources. Recently, such development has resulted in a huge decrease in the area available for reindeer pastures and its quality, resulting in a two- to three -old decrease in forage, and a concomitant decrease in the reindeer herd. In the European North, the total area of reindeer pastures has decreased by 3.6 million ha since 1970, while in the Yamalo-Nenets AD it has decreased by 7.1 million ha.

Other causes of the decrease in available pasture lands were fires and overgrazing. Because lands have been expropriated for industrial uses and are tainted by pollution, the rural population has lost not only its pastures but hunting lands and fishing sites, as well as territories where wild berries and mushrooms can be gathered. Thus in the Tyumen region alone, 1200 small and 250 big rivers were lost, including more than 20 former fishing sites, including 20 thousand ha of fish reproduction territories. Pollution of the Ob caused a 10-fold reduction in salmon harvesting over the last 15 years and 2-fold decrease in the total number of fish caught. Because the Ob and other rivers are polluted by municipal wastes, as much as 60% of the carp population and a part of the sig population has been infested with opistharhosis and other helminth diseases, which are dangerous for the population. In the Yenisey mouth, the catch rate has dropped by 1.5-2 times.

During the reform years, the harvest of fish, furs, and marine animals dropped by one-third, while the gathering of berries, mushrooms, nuts, medical plants and algae nearly stopped. Because of high transportation costs 60% what is produced is not shipped to market and is wasted. A lack of local processing facilities for deer meat, fishing and hunting products means that these traditional branches of economy have become cheap sources of raw materials for other industries. The lack of profitability in the traditional trades has caused a serious unemployment problem.

The destruction of collective farms and loss of public property, which was the structure of all deer husbandry and hunting farms and that provided prosperity for the workers associated with these farms, resulted in serious problems for the rural population. The loss of these traditional economic activities has destroyed the basis for of the distinctive indigenous population culture. Changes caused by the social-economic situation, changes in nutrition patterns and the decrease in caloric intake, along with the continued spread of European culture at the expense of traditional forms and spiritual institutions of indigenous peoples has worsened the outlook for their survival .

### Food production

The Arctic is an important region for natural food production, not only for the local population, but also, for some items, for the whole of Russia. Local products - deer meat, fish, and wild berries have traditionally occupied an important place in the nutrition of both the indigenous and old settlers population. Thus, compared to the newcomer population, the indigenous population consumed 3-5 times more deer and wild animal meat, 8 times more marine mammal meat and fat, and 2-8 times more river fish. Both the indigenous and newcomer population often eat local wild plants and marine fish (Table 3). The production of deer for slaughter makes up nearly half of all stock production in the region.

**Table 3** Production of meat and fish.

Region	Meat and meat products (kg)	Fish and fish products (kg)	Potatoes (kg)
Yamalo-Nenets autonomous okrug	82.0	21.3	27.9
Taimyr (Dolgano-Nenets) autonomous okrug	40.8	90.9	-
Nenets autonomous okrug	30.6	28.4	60.4
Sakha Republic (Yakutia)	31.6	56.5	8.8

The Federal programme "Economic and social development of northern minorities to the year 2000" includes support for local food production. Thus, 24 deer slaughterhouses, 25 meat and wastes processing factories, 48 processing facilities for wild berries, mushrooms, 20 fish processing plants, 28 plants for the processing of marine mammals harvest, 5 for marine products processing and 5 hatcheries for valuable fish species. Many Arctic regions continue to produce natural products although their volumes have been reduced recently. But the continuing expansion of territories occupied by oil and gas production sites and pipelines, combined with the activities of environmentally harmful enterprises in the big Arctic river basins (the Yenisey, the Ob, the Northern Dvina) and the transport of pollution (oil, radionuclides) by the North Atlantic current are harmful for this production. Some Arctic regions (Pechenga-Nickel, Monchegorsk, Norilsk etc.) are currently referred to as ecologically unfavourable, and agricultural products,

along with gathered products, like wild berries that come from these regions may contain higher-than-acceptable concentrations of heavy metals and other pollutants.

The migration of pollutants up through food chains (both terrestrial and aquatic) often results in the accumulation of the pollutant at a higher trophic level. Thus, concentrations of organochlorine pollutants (PCBs, etc.) in tissues of fish-eating gulls and other birds may be 50 thousand times higher than is found in plankton. Though DDT compounds and pesticides pollution is more typical for the non-Russian Arctic, increased concentrations of these compounds have been measured in the tissues of marine mammals from the White and the Barents seas. The following fact is illustrative: large numbers of deer meat shipments from western Siberia to Scandinavian countries have been rejected as unacceptable because of higher-than-acceptable concentrations of heavy metals and radionuclides.

### **Recreational demands**

The Arctic region possesses various recreational resources, providing a basis for recreation activities for both locals and visitors from other regions of Russia. The interest in recreation development in northern regions is stimulated by a necessity to diversify income from the region's natural environment, the reduction of popular recreation territories in Russia (particularly in the Baltic sea region, the Carpathians region, and the Caucasus), the increase in recreational costs as compared to the decrease in the Russian standard of living, and the worldwide growth in non-traditional recreation.

The following types of recreational activities are the most promising for the Arctic region of Russia: health-promoting (natural, hiking and ecotourism), cognitive (excursion and industrial tourism), sports recreation including hunting and fishery. Currently, the recreational resources of the Russian Arctic are being used and exploited without controls, which often leads to conflicts with indigenous population over the use of hunting and fishing sites. Preliminary studies of the recreational resources of the Russian Arctic have shown there is a value in the coastal zone for marine cruises. This activity has been actively developed in the Murmansk region, which hosts between two to seven days of marine excursions with tourists from neighbouring Scandinavian countries. Traditional folk festivals involving the northern minorities in the Murmansk region and the Chukchi AD (Sireniki) are also attractive as tourist activities. Tourism that involves hunting or gathering of wild foods is the most popular for Russia's urban population (the gathering of berries and mushrooms, fishing and hunting).

The recreational development of the Arctic region depends on healthy natural environments, which are attractive to residents of overcrowded cities and industrial areas. Unique natural phenomena, such as the aurora borealis and nesting bird colonies are also of interest to tourists. Nature conservation in the Russian Arctic sets the stage for this kind of recreational use, which in its turn may help to solve several serious social-economic and ecological problems with the development of a nature reserves system, a reduction in industry, the development of folk trades and cultural centers. All of these developments have the potential to provide new jobs for the local population, particularly women in the service sector, while broadening opportunities for professional employment for the young.

# Annex VI

## General requirements for development of plans on prevention and elimination of oil spill accidents

Requirements were approved by governmental resolution "Urgent measures to minimise the risk of oil spill accidents", No 240 from 15.02.2002. According to the resolution, oil spills are classified as an emergency and are to be eliminated according to the legislation of the Russian Federation.

Depending on the size and volume, the oil spill accidents are classified as follows:

- Local - the volume of oil spill is up to 500 tonnes;
- Regional - from 500 to 5 000 tonnes;
- Federal - more than 5 000 tonnes.

Depending on the location of an oil spill and hydrometeorological conditions, the category of emergency may be increased. The plan on the prevention and elimination of oil spill accidents is developed on the basis of the existing regulations allowing for the maximum possible volume of an oil spill.

The plan encompasses:

- Monitoring of the possible oil spill accidents;
- Number of forces and facilities needed for the liquidation of an oil spill accident, their correspondence to the tasks of liquidation activities;
- Organisation of cooperation between forces;
- Composition and dislocation of forces and facilities;
- System of control and warning;
- Securing of constant readiness of all forces, appointing the organisations responsible for their upkeep;
- System of the information exchange;
- Immediate actions right after the emergency alarm;
- Geographic, navigational, hydrographic, hydrometeorological and other features of the area of an oil spill accident, which should be taken into account when planning the liquidation activities;
- Safety of the population, provision of medical aid;
- Technical, engineering and financial provision.

When defining the number of facilities and forces needed for the liquidation of an oil spill accident, the following aspects should be taken into account:

- The maximum possible volume of leakage;
- The area of an oil spill;
- The year when the damaged object was brought onto operation and the year of the last overhaul;
- The maximum volume of oil kept at an object;
- Physical and chemical properties of the spilled oil;
- Hydrometeorological, hydrogeological and other conditions influencing the spreading of an oil spill;
- The presence of terminals for the transport, storage and processing of oil wastes;
- The transport infrastructure in the area of an oil spill accident;
- The time needed for the transport of liquidation forces to the area of an oil spill accidents;
- The time of oil spill localisation, which should be less than 4 hours for an accident at sea and less than 6 hours for an accident on land.

## Annex VII

# Urgent measures for environmental protection

Urgent measures for environmental protection are necessary in the following impact regions of Russian Arctic:

- Pechenga (heavy metals pollution);
- Murmansk (petroleum, organic compounds, heavy metals pollution, potential pollution by radionuclides);
- Archangel-Severodvinsk (petroleum, organic compounds, heavy metals pollution, potential pollution by radionuclides);
- Ob'-Yamal (petroleum pollution);
- Norilsk-Enisey (heavy metals, organic compounds, petroleum pollution);
- Lena (petroleum, heavy metals pollution);
- Chaun (petroleum, heavy metals pollution, potential pollution by radionuclides).

Urgent measures of environmental protection to implement NPA-Arctic should be carried out for the following objects:

- Oil producing and oil transporting complexes of West Siberia and Timan-Pechora provinces;
- Oil storage and oil treatment sites for all ports of the Arctic coast of Russia;
- "Pechenganickel" and "Norilsknickel". It is known, that reconstruction of "Pechenganickel" requires about 256 million USD and "Norilsknickel" requires about 2 billion USD. However even before full scale reconstruction one can improve the treatment installations and exclude the discharges of untreated waters;
- Archangel and Solombala PPM. In pulp processing it is necessary to replace chlorination with ozonation. As preliminary step one can consider improvement of treatment facilities for existent technologies;
- Ob' and Enisey region wood producing combines;
- Mining and enrichment combines of Sakha-Yakutia and Chukchi regions;
- Development of modern sewage treatment systems for towns and settlements on the Arctic coast of Russia;
- Unloading of spent nuclear fuel from laid off nuclear submarines and construction of new storage places for the fuel;
- Development of the system of treatment of liquid and solid radioactive waste at Kola Peninsula and Severodvinsk and construction of regional disposal sites.

