UNITED
NATIONS

E

Economic and Social Council

Distr.
GENERAL

ECE/MP.WAT/WG.2/2007/15
16 April 2007

Original: ENGLISH
ENGLISH AND RUSSIAN
ONLY

ECONOMIC COMMISSION FOR EUROPE

MEETING OF THE PARTIES TO THE CONVENTION ON THE PROTECTION AND USE OF TRANSBOUNDARY WATERCOURSES AND INTERNATIONAL LAKES

Working Group on Monitoring and Assessment

Eighth meeting
Helsinki (Finland), 25–27 June 2007
Item 4 of the provisional agenda

ASSESSMENT OF THE STATUS OF TRANSBOUNDARY WATERS IN THE UNECE REGION[1]

UPDATES AND ADDITIONS TO THE PRELIMINARY ASSESSMENTS OF TRANSBOUNDARY WATERS IN THE EECCA REGION[2, 3]

Submitted by the Chairperson of the Working Group on Monitoring and Assessment

[1] At their fourth meeting (Bonn, Germany, 20–22 November 2006), the Parties to the Convention mandated its Working Group on Monitoring and Assessment with the assessment of transboundary rivers, lakes and groundwaters in the UNECE region. For details, please refer to documents ECE/MP.WAT/WG.2/2007/1 and ECE/MP.WAT/WG.2/2007/3.
[2] Issued as documents ECE/MP.WAT/2006/16/Add.2 and Add.3. Updates and additions to documents ECE/MP.WAT/2006/16/Add.4, Add.5 and Add.6 will be issued separately as document ECE/MP.WAT/WG.2/2007/10.
[3] The editorial changes submitted by EECCA countries to the Russian version, which do not change the meaning of the English text, are not included. Such changes particularly refer to hydrological terms.

GE.07-22288

I. UPDATES AND ADDITONS TO THE PRELIMINARY ASSESSMENT OF THE STATUS OF TRANSBOUNDARY RIVERS DISCHARGING INTO THE CASPIAN SEA AND THEIR MAJOR TRANSBOUNDARY TRIBUTARIES AS PUBLISHED IN DOCUMENT ECE/MP.WAT/2006/16/Add.2

A. Updates by Kazakhstan on the Ural and Ilek rivers

In paragraph 7, for the existing text substitute:

Surface runoff from the oil extraction sites on the Caspian coast (Tengiz, Prorva, Martyshi, Kalamkas, Karazhambas) introduces oil products into the Ural River.

In paragraph 8 (both in the text and the table), for Yanvartsevo substitute Yanvarzsevo

In paragraph 11, substitute the existing text as follows:

The Ilek River, also shared by Kazakhstan and the Russian Federation, is a transboundary tributary to the Ural River. The Ilek carries boron and chromium-VI into the Ural River, originating from the tailing ponds of former chemical plants via groundwater. The water-quality class of the Ilek River varies from 4 (polluted water) to 6 (very polluted water).

B. Updates and additions by Azerbaijan on the Alazani River

In paragraph 39, add the following table:

Discharge characteristics at the Agrichai gauging station (Azerbaijan)
latitude: 41^0 16'; longitude: 46^0 43'

Q_{av}	110 m^3/s	1950–2006
Q_{max}	192 m^3/s	1950–2006
Q_{min}	69.5 m^3/s	1950–2006
$Q_{absolute\ max}$	742 m^3/s	27 August 1983
$Q_{absolute\ min}$	2.40 m^3/s	8 October 1988

Source: Ministry of Ecology and Natural Resources, Azerbaijan.

C. Updates and additions by Armenia on the Debet River

In paragraphs 45 and 46, for the existing tables substitute:

Sub-basin of the Debet River			
Area	Countries	Countries' share	
4,100 km^2	Armenia	3,790 km^2	92.4%
	Georgia	310 km^2	7.6%

Sources: Ministry of Environment, Georgia, and L.A. Chilingarjan et al. "Geography of rivers and lakes in Armenia", Institute of hydro-technology and water problems, Armenia.

Discharge characteristics at gauging stations on the Debet River		
Discharge characteristics at the Sadaghlo gauging station at the Georgian/Armenian border		
Q_{av}	29.2 m^3/s	1936–1990
Q_{max}	48.5 m^3/s	1936–1990
Q_{min}	13.0 m^3/s	…
$Q_{absolute\ max}$	479 m^3/s	19 May1959
$Q_{absolute\ min}$	1.56 m^3/s	12 July 1961
Discharge characteristics at the Airum gauging station (Armenia) upstream of the border with Georgia		
Q_{av}	38.1 m^3/s	Long-term average
Q_{max}	242 m^3/s	Long-term average
$Q_{absolute\ max}$	759 m^3/s	19 May 1959
Q_{min}	10.6 m^3/s	For 95% of time

Source: L.A. Chilingaryan et al. "Geography of rivers and lakes in Armenia", Institute of hydro-technology and water problems, Armenia.

In paragraphs 47 to 52, for the existing text substitute:

In the Armenian part of the sub-basin, the Debet experiences background pollution from hydrochemical processes in ore deposits, which leads to increased concentrations of heavy metals (V, Mn, CU, Fe). These concentrations already exceed in the upper parts of the sub-basin the maximum allowable concentration (MAC)[4] values for aquatic life.

Wastewater from the ore enrichment and processing industry, wastewater from municipal sources (some 110 human settlements in the Armenian part), and diffuse pollution from agriculture (51% of the Armenian agriculture uses water from the sub-basin of the Debet) are the main anthropogenic pollution sources.

In the period 2004–2006, the average mineral content at the border between Armenia and Georgia was 392 mg/l and the maximum value was 438 mg/l.

[4] In Armenia, water classification is based on MAC values for maintenance of aquatic life, which have been used in former Soviet Union, and which are more stringent than the MAC values for other uses.

In Armenia, the closure of the Vanadzorsk chemical factory (1989) and the installations of closed water systems in the Alaverdinsk copper melting factory (2005) and in the Achtalinsk ore processing factory (2006) considerably decreased water pollution.

However, natural background pollution, leakages from a tailing dam that stores wastes from the Achtalinsk factory, and water pollution from agriculture will remain as pollution problems. Spring floods will continue causing damage in the lower part of the basin.

Currently, the chemical and ecological status of the water system is not satisfactory for the maintenance of aquatic life, but meets the requirements for municipal, agricultural, industrial and other uses.

D. Updates and additions by Armenia on the Agstev River

In paragraphs 53 to 55, for the existing text substitute:

Armenia (upstream country) and Azerbaijan (downstream country) share the sub-basin of the Agstev River.

Sub-basin of the Agstev River

Area	Countries	Countries' share	
2,500 km^2	Armenia	1,730 km^2	69.2%
	Georgia	770 km^2	30.8%

Sources: Ministry of Environment, Georgia, and L.A. Chilingarjan et al. "Geography of rivers and lakes in Armenia", Institute of hydro-technology and water problems, Armenia.

The Agstev River has its source at 3,000 m above sea level. Its total length is 121 km; 81 km of which are in Armenia. The river has two main transboundary tributaries: the 58 km long Getik River (586 km^2) and the 58 km long Voskepar River (510 km^2).

Discharge characteristics of the Agstev River at the Idshevan gauging station (Armenia) upstream of the border with Azerbaijan

Q_{av}	9.07 m^3/s	Long-term average
Q_{max}	75.3 m^3/s	Long-term average
$Q_{absolute\ max}$	177 m^3/s	29 August 1990
Q_{min}	1.78 m^3/s	During 95% of the year

Source: L.A. Chilingaryan et al. "Geography of rivers and lakes in Armenia", Institute of hydro-technology and water problems, Armenia.

Pressure factors

The main anthropogenic pollution of the river on Armenian territory stems from household and municipal wastewaters. The high concentration of heavy metals (Fe, Cu, Mn) is mainly due to natural background pollution, which was proved through measurements in the upstream stretches of the river.

Transboundary impact

Following Armenian data, the concentration of heavy metals exceeds the MAC value by a factor of 2–6. Sulphates did never exceed these norms. From 2005 onwards, the measurements of oil products ceased temporarily for technical reasons. In the long run, the phenol concentrations never exceeded the MAC norm. Water pollution, exceeded MAC values for drinking water, was not observed.[5]

In the period 2004–2006, the average mineral content at the border was 559 mg/l and the maximum 600 mg/l.

Trends

Currently, the ecological and chemical status is satisfactory for aquatic life as well as municipal, industrial and other uses.

E. Updates and additions by Armenia on the Araks, Achurjan, Arpa, Vorotan and Voghji rivers

<u>In paragraphs 63 to 68, for the existing text substitute</u>:

Araks River

Armenia, Azerbaijan, Iran and Turkey share the sub-basin of the Araks River with a total area of 102,000 km^2.

The 1,072 km long Araks has its source at 2,200–2,700 m above sea level. The Araks crosses the Armenia border twice: at 364 km and 746 km from its source. In Armenia, the river flows for 192 km and drains an area of 22,560 km^2.

---

[5] Note by the secretariat: Unfortunately there were no joint measurements with Azerbaijan at the border section, thus it is difficult to explain differences in measurements by both countries. Following information by Azerbaijan (ECE/MP.WAT/2006/16/Add.2), the maximum permitted concentrations are exceeded for phenols by a factor of 9, for metals by a factor of 5–8, for oil products by a factor of 3–4, and for sulphates by a factor of 2.

Sub-basin of the Araks River and average discharge for the last 30 years

Country	Area		Discharge	
	In km^2	In %	In km^3	In %
All countries	102,000	100	9.37	100
Armenia	22,560	22	5.01	53.5
Turkey	19,500	19	2.46	26.2
Iran	41,800	41	0.81	8.5
Azerbaijan	18,140	18	1.09	11.7

Source: L.A. Chilingaryan et al. "Geography of rivers and lakes in Armenia", Institute of hydro-technology and water problems, Armenia.

The Araks is of particular importance for Armenia, which is the reason for extensive measurements. Following Armenian data, the pollution originates from household waters and municipal wastewaters. The impact of natural hydrochemical processes, which are responsible for the increased concentration of heavy metals in the river water, has also been observed. The concentration of nitrite is 2–4 times above the MAC for aquatic life (MAC = 0.024 mg/l) and 3–6 times above the MAC for heavy metals; which is a general feature for Armenia. On the border between Turkey and Armenia, heavy metals exceed the MAC for aquatic life by a factor of 2–8. However, concentrations exceeding the MAC for drinking water and municipal uses have not been observed.

From 2005 onwards, the measurements of oil products ceased temporarily for technical reasons. In the long run, the phenol concentrations never exceeded the MAC norm; therefore, phenol measurements are not any more carried out.

At the Turkish-Armenian border, the average mineral content for the period 2004–2006 was 368 mg/l with a maximum at 678 mg/l. At the border between Armenia and Iran, joint measurements of both countries showed an average mineral content of 673 mg/l with a maximum at 746 mg/l.

Currently, the ecological and chemical status is satisfactory for aquatic life, municipal and industrial uses, and other uses.

Achurjan River

Armenia and Turkey share the sub-basin of the Achurjan River.

Sub-basin of the Achurjan River			
Area	Countries	Countries' share	
9,700 km^2	Armenia	2,784 km^2	28.7%
	Turkey	6,916 km^2	71.3%

Source: L.A. Chilingarjan et al. "Geography of rivers and lakes in Armenia", Institute of hydro-technology and water problems, Armenia.

The 186 km long river has its source at 2,017 m above sea level; its most important tributary in Armenia is the Karkachun River. There are two reservoirs on the Achurjan River, the Arpilich reservoir close to the river's source and the Achurnsk reservoir in the middle stretch.

Main pressure factors arise from municipal sources and agriculture as well as natural chemical processes.

According to Armenian measurements in the lower part of the sub-basin, the concentration of nitrites exceeds the MAC norms by a factor of 2–6; the concentration of heavy metals is 3–8 times higher than the corresponding MAC. For copper, the river exceeds the MAC value for aquatic life (0.001 mg/l) by a factor of 10–18 in the upper part and by a factor of 5–12 in the lower part. However, concentrations exceeding the MAC for drinking water and municipal uses have not been observed.

From 2005 onwards, the measurements of oil products ceased temporarily for technical reasons. In the long run, the phenol concentrations never exceeded the MAC norm; therefore, phenol measurements are not any more carried out.

The average mineral content at the border is 223 mg/l with a maximum at 285 mg/l (period 2004–2006).

Currently, the ecological and chemical status is satisfactory.

Arpa River

Armenia and Azerbaijan share the sub-basin of the Arpa River.

Sub-basin of the Arpa River			
Area	Countries	Countries' share	
2,630 km^2	Armenia	2,080 km^2	79%
	Azerbaijan	550 km^2	21%

Source: L.A. Chilingarjan et al. "Geography of rivers and lakes in Armenia", Institute of hydro-technology and water problems, Armenia.

The total length of the river is 128 km from which 92 km are in Armenia. In the Armenian part, three rivers join the Arpa: the Elegis (47 km long; 526 km^2), the Gerger (28 km; 174 km^2) and the Darb (22 km; 164 km^2).

Discharge characteristics of the Arpa River at the Areni gauging station (Armenia) upstream of the border with Azerbaijan		
Q_{av}	23.2 m^3/s	Long-term average
Q_{max}	146 m^3/s	Long-term average
$Q_{absolute\ max}$	280 m^3/s	12 May 1960
Q_{min}	4.36 m^3/s	During 95% of the year

Source: L.A. Chilingaryan et al. "Geography of rivers and lakes in Armenia", Institute of hydro-technology and water problems, Armenia.

The river is very clean. There is almost no human impact; however, natural hydrochemical processes influence the river's water.

From source to mouth, the concentration of V and Cu is 2–3 times higher than the MAC norms for aquatic life, which is typical for Armenian rivers. The MAC values for other uses are not being exceeded.

T he average mineral content on the border is 315 mg/l with a maximum of 439 mg/l (period 2004–2006).

Currently, the ecological and chemical status is "normal and close to natural conditions".

Vorotan River

Armenia and Azerbaijan share the sub-basin of the Vorotan River.

Sub-basin of the Vorotan River			
Area	Countries	Countries' share	
5,650 km^2	Armenia	2,030 km^2	36%
	Azerbaijan	3,620 km^2	64%

Source: L.A. Chilingarjan et al. "Geography of rivers and lakes in Armenia", Institute of hydro-technology and water problems, Armenia.

The total length of the river is 178 km. In the Armenian part, two rivers join the Vorotan: the Sisian (33 km long; 395 km^2) and the Gorisget (25 km; 146 km^2).

Discharge characteristics of the Vorotan River at the Vorotan gauging station (Armenia) upstream of the border with Azerbaijan		
Q_{av}	21.8 m^3/s	Long-term average
Q_{max}	101 m^3/s	Long-term average
$Q_{absolute\ max}$	1,140 m^3/s	18 April 1959
Q_{min}	2.82 m^3/s	During 95% of the year
Source: L.A. Chilingaryan et al. "Geography of rivers and lakes in Armenia", Institute of hydro-technology and water problems, Armenia.		

There is almost no human impact of the river. Natural hydrochemical processes cause an increase of the Vanadium concentration.

Given Armenian measurements, an increase in nitrites' concentration (MAC for aquatic life exceeded by a factor of 2) and vanadium concentration (MAC for aquatic life exceeded by a factor of 6, which signals background pollution) appears in the central part of the river's sub-basin. On the border, no measurements of nitrites were carried out. Except for aquatic life, the MAC values for other uses are not exceeded.

The average mineral content at the border is 199 mg/l with a maximum of 260 mg/l (period 2004–2006).

Currently, the ecological and chemical status is "normal and close to natural conditions".

Voghji River

Armenia and Azerbaijan share the sub-basin of the Voghji River.

Sub-basin of the Voghji River			
Area	Countries	Countries' share	
1,175 km^2	Armenia	788 km^2	67%
	Azerbaijan	387 km^2	33%
Source: L.A. Chilingarjan et al. "Geography of rivers and lakes in Armenia", Institute of hydro-technology and water problems, Armenia.			

Of the river's total length of 82 km, 43 km are in Armenia. The Gechi is the most important tributary.

Discharge characteristics of the Voghji River at the Kapan gauging station (Armenia) upstream of the border with Azerbaijan		
Q_{av}	11.6 m^3/s	Long-term average
Q_{max}	68.1 m^3/s	Long-term average
$Q_{absolute\ max}$	118 m^3/s	20 May 1976
Q_{min}	2.72 m^3/s	During 95% of the year

Source: L.A. Chilingaryan et al. "Geography of rivers and lakes in Armenia", Institute of hydro-technology and water problems, Armenia.

Industrial activities are the main pressure factor. Natural hydrochemical processes in the areas of ore deposits also affect water quality.

According to Armenian data, the concentration of nitrites in the lower area of the sub-basin exceeds the MAC for aquatic life by a factor of 2. The MAC values for metals (Cu, Zn, Mn, Cr, V) are also exceeded, caused by hydrochemical processes in the sub-basin and, partly, by human activity.

In the period 2004–2006, the average mineral content was 296 mg/l with a maximum of 456 mg/l.

Currently, the ecological and chemical status of the river system is "not satisfactory for aquatic life", but appropriate for other uses.

F. Updates and additions by the Russian Federation on the Samur River

<u>In paragraphs 70 to 75, for the existing text substitute:</u>

The basin of the Samur River is shared by the Russian Federation and Azerbaijan, as indicated in the following table.

Basin of the Samur River			
Area*	Countries	Countries' share	
7,330 km^2	Azerbaijan	340 km^2	4.6%
	Russian Federation	6,990 km^2	95.4%

Source: Federal Agency for Water Resources (Russian Federation).

* Including the tributary Giolgerykhay.

Hydrology

The river rises in Dagestan (Russian Federation). The common border on the river between the Russian Federation and Azerbaijan is 38 km long. Before flowing into the Caspian Sea, the river divides into several branches, located both in Azerbaijan and the Russian Federation. 96% of the river flow originates on Russian territory.

Pressure factors

Use of the water for irrigation (currently some 90,000 ha in Azerbaijan and 62,000 ha in the Russian Federation)[6] and to supply drinking water to the cities of Baku and Sumgait in Azerbaijan (up to 400 million m^3/a) and settlements in Dagestan (Russian Federation) has led to pressure on water resources.

Transboundary impact

The Russian Federation carries out monitoring close to the mouth of the river.

Average pollution level near to the mouth of the Samur River (Russian Federation)

Determinands	Measured concentration, compared to MAC
BOD5	0.7–1.7 times MAC
Ammonia	0.4 times MAC
Nitrites	0.6 times MAC
Iron	0.4–3.0 times MAC
Sulphates	0.4–4.5 times MAC
Copper	0.5–1.2 times MAC
Manganese	Up to 5 times MAC
Oil products	0.2–3.2 times MAC
Phenols	0.03 times MAC

Source: Federal Agency for Water Resources (Russian Federation).

Thus, the river is classified as "moderately polluted".

The total water demand of both countries considerably exceeds the available resources. For six month, there is almost no water flow downstream the hydrotechnical installation at Samursk. The considerable decrease of water flow from source to mouth and the absence of any flow downstream Samursk has caused a drop in the groundwater table, which also has ecological and other consequences for the relic forest in the Samur Valley and nature conservation areas in the delta.

Trends

Over a period of time, pollution problems and adverse impact of overuse will remain. The drawing up of a bilateral agreement is of utmost importance in order to ensure that the transboundary waters of the Samur are used in a reasonable and equitable way and to guarantee the ecological minimum flow in the delta region.

---

[6] The countries' irrigation inventory indicates 210,000 ha for Azerbaijan and 155,700 ha for the Russian Federation.

G. Updates and additions by the Russian Federation on the Sulak River

In paragraph 76, for the existing text substitute:

The basin of the Sulak River is shared by Georgia and the Russian Federation. The total basin area, including all tributaries, is 15,200 km^2.

Hydrology

The confluence of the Avarsk-Koisu (Russian Federation; 7,660 km^2) and Andis-Koisu (transboundary river shared by Georgia and the Russian Federation; 4,810 km^2) rivers is taken as the source of the Sulak. The Sulak River itself flows entirely in the Russian Federation.

Sub-basin of the Andis-Koisu River

Area	Countries	Countries' share	
4,810 km^2	Georgia	869 km^2	18%
	Russian Federation	3,941 km^2	82%

Source: Ministry of Environment (Georgia) and Federal Agency for Water Resources (Russian Federation).

Pressure factors and transboundary impact in the sub-basin of the Andis-Koisu River

Irrigation and human settlements constitute the main pressure factors. The transboundary impact is insignificant. The transboundary Andis-Koisu River is in a good ecological and chemical status.

Measurements at Agvali (Russian Federation, 75 km upstream of the confluence with the Sulak)

Determinands	Measured concentration, compared to MAC
BOD5	0.9 times MAC
Iron	0.5–2.1 times MAC
Nitrites	0.8–4.6 times MAC
Ammonia	0.2–0.6 times MAC
Oil products	0.2–0.6 times MAC
Mineral content	Does not exceed 300 mg/l

Source: Federal Agency for Water Resources (Russian Federation).

Trends

There are no pressure factors, which would significantly affect this good status in the near future. However, there are plans to construct a number of hydropower stations in the Russian part of the sub-basin.

H. Updates and additions by Georgia and the Russian Federation on the Terek River

In paragraphs 76 to 82, for the existing text substitute:

Georgia (upstream country) and the Russian Federation (downstream country) share the basin of the Terek River. The river is a key natural asset in the Caucasus region.

Basin of the Terek River			
Area	Countries	Countries' share	
43,200 km^2	Georgia	869 km^2	18%
	Russian Federation	3,941 km^2	82%

Source: Ministry of Environment (Georgia) and Federal Agency for Water Resources (Russian Federation)

Hydrology

The Terek rises in Georgia on the slopes of Mount Kazbek. After some 61 km, the river crosses the Georgian-Russian border and flows through North Ossetia/Alania, Kabardino-Balkaria, the Stavropol Kraj, Chechnya and Dagestan (Russian Federation).

The river is 623 km long. Usually, inventories quote 43,200 km^2 as the size of the hydrographic basin. However, the area which is directly and indirectly influenced by the Terek's water management is larger and counts for 90,000 km^2.

The water resources of the Terek (in the hydrographic basin) are 11.0 km^3/a in an average year, 10.1 km^3/a in an average dry year and 9.0 km^3/a in a dry year (figures for the Stepnoye station). The period of high water levels in spring-summer is very long (end of March to September), which is characteristic for rivers fed by glaciers and rainwater.

Spring floods cause damage, particularly in the Russian part of the basin.

Discharge characteristics at the Kazbeki gauging station (Georgia): latitude: 44° 38' 24''; longitude: 42° 39' 32''		
Q_{av}	24.1 m^3/s	1928–1990
Q_{max}	30.4 m^3/s	1928–1990
Q_{min}	18.6 m^3/s	1928–1990
$Q_{absolute\ max}$	481 m^3/s	6 August 1967
$Q_{absolute\ min}$	1.0 m^3/s	27 February 1938

Source: Ministry of Environment, Georgia.

Pressure factors

Irrigational water use and human settlements are the main pressure factors in the Georgian part of the basin. In the Russian part of the basin, pressure arises from irrigation (>700,000 ha), industry, aquaculture/fisheries and human settlements

Transboundary impact

Based on Georgian estimates, $17 \cdot 10^3$ kg BOD and 41 t suspended solids were discharged in 2004 into the Georgian part of the basin. Measurements are carried out by Russia downstream the border (see table below).

Measurements upstream of the village Lars (Russian Federation, 1 km downstream the border with Georgia, 560 km upstream of mouth)	
Determinands	**Measured concentration, compared to MAC**
BOD5	0.9 times MAC
Iron	3.2 times MAC
Aluminium	8.9
Manganese	1.8
Copper	Up to 2
Oil products	0.22–0.84 times MAC
Source: Federal Agency for Water Resources (Russian Federation).	

Trends

At the border, the river has a good ecological and chemical status. High metal concentrations, exceeding the MAC values, are of natural origin. There are no real threats, which would decrease the status of the river in the near future.

I. Updates and additions by the Russian Federation of the Malyi Uzen and Bolshoy Uzen rivers

In paragraph 84, for the existing text substitute:

Malyi Uzen

The Russian Federation (upstream country) and Kazakhstan (downstream country) share the basin of the Malyj Uzen River.

Basin of the Bolshoy Uzen River			
Area	Countries	Countries' share	
13,200 km^2	Russian Federation	5,980 km^2	45.3%
	Kazakhstan	7,220 km^2	54.7%

Source: ТОО «Уралводпроект» «Водохозяйственный баланс бассейнов рек Малый и Большой Узени», заказ № 02.044, Книга 1 (Water management balance of the Malyj and Bolshoy Uzen River basins, TOO Uralvodproject)

The river's source is the Syrt chain of hills (Saratov Oblast, Russian Federation). It discharges into Lake Sorajdyn, which belongs to the Kamysh-Samarsk lakes (Kazakhstan). The river's total length is 638 km (374 km in the Russian Federation, 264 km in Kazakhstan). The mean annual discharge at the Malyj Uzen station is 8.54 m^3/s. The population density is 28.4 persons/km^2.

Downstream the border between the Russian Federation and Kazakhstan, irrigated agriculture is the main form of land use. The share of land that requires irrigation strongly depends on the actual river's water availability (depending on hydrometeorological conditions) and varies between 1,961 ha in wet years and 45,979 ha in dry years.

The biggest reservoirs on the Russian side are the Upper Perekopnovsk (65.4 million m^3), Molouzensk (18.0 million m^3) and Varfolomejevsk (26.5 million m^3) reservoirs and several artificial lakes (87.33 million m^3). Reservoirs in Kazakhstan include: the Kaztalovsk-I (7.20 million m^3), the Kaztalovsk-II (3.55 million m^3) and the Mamajevsk (3.50 million m^3) reservoirs and several artificial lakes (4.83 million m^3).

Most recently (2005), water construction works to increase water protection in the basin were carried out in the Russian part of the basin.

The main pressure on water resources comes from irrigated agriculture.

Water quality problems are also caused by wastewater discharges, surface run-off from the basin's surface area, sediments and erosion of riverbanks. A significant problem is that economic and other activities in water protection zones next to the water bodies do not respect established environmental standards. Reconstruction works (buildings, installations, communications and other works), which are not approved by the relevant water authorities, have a negative effect on surface water quality, and consequently on the drinking water supplied to local populations.

According to the 2005 measurements in the Russian part of the basin, water quality falls into class 3, which means "moderately polluted". It is worth mentioning that both countries have agreed on a schedule for joint sampling of water at the border of the river.

Average water quality characteristics of the Malyj Uzen River in the Russian part of the basin

Determinands	Mean values
Dissolved oxygen	12.24 mg/l
Oxygen saturation	101%
Nitrates	0.194 mg/l
Nitrites	0.033 mg/l
Ammonia	0.25 mg/l
Chlorides	131.8 mg/l
Phosphates	0.236 mg/l
Chromium	0.003 mg/l
Iron	0.18 mg/l
Zinc	0.002 mg/l
COD	30.3 mg/l
Suspended solids	43.0 mg/l
Sulphates	20.0 mg/l
Calcium	56.5 mg/l

Source: Federal Agency for Water Resources (Russian Federation).

Water quality and water quantity at the border between the two countries respect the Agreement between the Russian Federation and Kazakhstan on the joint use and protection of transboundary waters (27 August 1992). Water transfer, including transfer from the Volga basin, is subject to annual agreements between both countries. A minimum of 17.1 million m^3 shall pass the Russian-Kazakhstan border; this amount was increased in 2006 at the request of Kazakhstan (to 19.2 million m^3) following very dry weather conditions and low water flow in the river.

Taking into account that water resources in the Russian part of the basin are mainly used for agricultural purposes and that the population density is relatively small, the status of the watercourses is assessed as “stable”.

Bolshoy Uzen

The Russian Federation (upstream country) and Kazakhstan (downstream country) share the basin of the Bolshoy Uzen River.

Basin of the Bolshoy Uzen River			
Area	Countries	Countries' share	
14,300 km^2	Russian Federation	9,660 km^2	67.6%
	Kazakhstan	4,640 km^2	32.4%

Source: ТОО «Уралводпроект» «Водохозяйственный баланс бассейнов рек Малый и Большой Узени», заказ № 02.044, Книга 1 (Water management balance of the Malyj and Bolshoy Uzen River basins, TOO Uralvodproject)

The river's source is the Syrt chain of hills (Saratov Oblast, Russian Federation). It discharges into Lake Ajden, which belongs to the Kamysh-Samarsk lakes (Kazakhstan).

The river's total length is 650 km (397 km in the Russian Federation, 253 km in Kazakhstan). The mean annual discharge at the Novouzensk station is 11.1 m^3/s.
The population density is 27.9 persons/km^2.

Downstream from the border between the Russian Federation and Kazakhstan, irrigated agriculture is the main form of land use. The share of land requiring irrigation depends greatly on the actual hydrometeorological conditions and varies between 1,200 ha in wet years and 27,000 ha in dry years.

The biggest reservoirs on the Russian side are the Nepokojevsk (48.75 million m^3) and Orlovogajsk (5.4 million m^3) reservoirs and several artificial lakes (183.67 million m^3). Three reservoirs are in Kazakhstan: the Sarychganaksk (46.85 million m^3), the Ajdarchansk (52.3 million m^3) and the Rybnyj Sakryl (97 million m^3) reservoirs.

Most recently (2005), water construction works to increase water protection in the basin were carried out in the Russian part of the basin, following decisions of the joint Russian-Kazakhstan Commission for the joint use and protection of transboundary waters.

The main pressure on water resources comes from irrigated agriculture.

Water quality problems are also caused by wastewater discharges, surface run-off from the basin's surface area, sediments and erosion of riverbanks. A significant problem is that economic and other activities in water protection zones next to the water bodies do not respect general environmental standards. Reconstruction works (buildings, installations, communications and other works), which are not approved by the relevant water authorities, have a negative effect on surface water quality, and consequently on the drinking water supplied to local populations.

According to the 2005 measurements in the Russian part of the basin, water quality falls into class 3, which means "moderately polluted". It is worth mentioning that both countries have agreed on a schedule for joint sampling of water at the border section of the river.

Average water quality characteristics of the Bolshoy Uzen River in the Russian part of the basin	
Determinands	Mean values
Dissolved oxygen	10.34 mg/l
Oxygen saturation	83%
Nitrates	0.161 mg/l
Nitrites	0.02 mg/l
Ammonia	0.32 mg/l
Chlorides	369.9 mg/l
Phosphates	0.195 mg/l
Chromium	0.001 mg/l
Iron	0.33 mg/l
COD	39.7 mg/l
Suspended solids	38.0 mg/l
Sulphates	30.3 mg/l
Calcium	84.6 mg/l

Source: Federal Agency for Water Resources (Russian Federation).

Water quality and water quantity at the border between both countries respects the Agreement between the Russian Federation and Kazakhstan on the joint use and protection of transboundary waters (27 August 1992). Water transfer, including transfer from the Volga basin, is subject to annual agreements between both countries. At minimum 17.1 million m^3 shall pass the Russian-Kazakhstan border.

Taking into account that water resources in the Russian part of the basin are mainly used for agricultural purposes and that the population density is relatively small, the status of the watercourses are assessed as "stable".

II. UPDATES AND ADDITONS TO THE PRELIMINARY ASSESSMENT OF TRANSBOUNDARY RIVERS DISCHARGING FROM EECCA COUNTRIES TO THE ARCTIC OCEAN AND THEIR MAJOR TRANSBOUNDARY TRIBUTARIES AS PUBLISHED IN DOCUMENT ECE/MP.WAT/2006/16/Add.3

A. Updates and additions by the Russian Federation on the Yenisey River

In paragraph 3, for the existing text substitute:

Yenisey River

Mongolia (upstream country) and the Russian Federation (downstream country) share the Yenisey basin.

The Yenisey River flows only on Russian territory.

The upper part of the Yenisey River basin is transboundary, including parts of the transboundary Selenga River (total length 1,024 km; 409 km in Russia), and shared by Mongolia (upstream) and the Russian Federation (downstream).

Basin of the Yenisey River			
Area	Countries	Countries' share	
2,580,000 km²	Mongolia	318,000 km²	12.3%
	Russian Federation	2,261,700 km²	87.7%

Sources: Integrated Management and Protection of Water Resources of the Yenisey and Angara rivers, Krasnojarsk Regional Branch of the International Academy of Ecology and Nature, Krasnojarsk, 2006; Surface water resources of the USSR, Gidrometizdat, Leningrad, 1973.

Hydrology

The recharge area of the Yenisey basin is made up of the following principal watercourses: the Selenga River, Lake Baikal (31,500 km^2) and the Yenisey and Angara rivers.

The Yenisey's source is the confluence of the Bolshoy (Bij-Chem) and Malyi (Kaa-Chem) Yenisey rivers at the city of Kysyl. The river's length from this confluence to the mouth at the Arctic Ocean is 3,487 km; the total length from the source of the Bolshoy Yenisei is 4,092 km. The total discharge at the mouth is 18,730 m^3/s.

According to natural conditions, the character of valleys, the features of the riverbed and the hydrological regime of the Yenisey River, the entire basin is usually split into three parts: the Upper Yenisey (from the source of the Bolshoy Yenisey to the mouth of the Tuby River; 1,238 km), the Middle Yenisey (from the mouth of the Tuby to the mouth of the Angara River; 717 km) and the Lower Yenisey (downstream from the mouth of the Angara to the Arctic Ocean; 2,137 km).

Discharge characteristics of the Yenisey River		
Discharge characteristics at the Kyzyl gauging station (Tyba Republic, Russian Federation)		
Q_{av}	1,010 m^3/s	1927–1968
Q_{max}	7,990 m^3/s	21 April 1940
Q_{min}	153 m^3/s	…
Discharge characteristics at the Igarka gauging station (Russian Federation)		
Q_{av}	17,700 m^3/s	1927–1968
Q_{max}	153,000 m^3/s	11 June 1959
Q_{min}	3,540 m^3/s	…
Total discharge at mouth (Arctic Ocean)		
Q_{av}	18,730 m^3/s	1927–1968

Source: Surface water resources of the USSR, Gidrometizdat, Leningrad, 1973.

Pressure factors in the transboundary sub-basin of the Yenisey River

The population density in the transboundary part of watercourses in the sub-basin of the Upper Yenisey (border area between the Republic of Tyba (Russian Federation) and Mongolia) is very small and the area is practically not economically developed.

The transboundary water pollution in the Yenisey basin stems mainly from Mongolia (the Selenga River) and, partly, from the Russian Federation through the Selenga's tributaries. Lake Baikal serves as a natural barrier for the transboundary flow of pollutants, preventing their impact on the downstream parts of the watercourse.

Transboundary impact

Following the 1995 Agreement between the Russian Federation and Mongolia, a number of measures are being jointly carried out to protect, rationally use and rehabilitate the water resources of the Yenisey.

These include monitoring and assessment of the status of watercourses in the Yenisey basin, establishment of water protection zones, planting of vegetation strips on riverbanks, cleaning of riverbeds of small tributaries, siting of management structure as well as land use in protected zones. Measures also include environmental impact assessment, safe operation of water construction works and the operational schedule of hydropower installations. In the Russian Federation, wastewater treatment, including the construction of new and rehabilitation of existing wastewater treatment plants, became part of these measures in order to treat wastewater from municipalities and small enterprises and storm water overflow.

Trends

The status of the watercourses is "stable". An increasing human impact on the river Angara (Russian Federation) is most likely after completion of the construction of the Boguchansk hydropower dam.

Further planned measures to protect the waters of the Yenisey basins in the Russian Federation include: changes of the operational regime of reservoirs (hydropower stations in the Angara-Yenisey cascade of dams) and Lake Baikal; protection of human settlements against floods and adverse effects of rising groundwater levels; further cleaning up of riverbeds of small watercourses; further development of wastewater collection systems; construction and/or rehabilitation of wastewater treatment plants; construction of systems for the collection of storm water overflows and their treatment in wastewater treatment plants; fight against illegal waste disposal and cleaning of water protection zones from such illegal deposits; fight against erosion through afforestation and other types of vegetation; and further development of monitoring and assessment of the status of watercourses.

B. Updates and additions by the Russian Federation on the Ob River

Add the following source of information:

Source: Drawing up of the water management balance for the Ob River, phases I and II, ZAO PO “Sovintervod, Moscow, 2004.[7]

C. Updates and additions by the Russian Federation on the Irtysh River

In paragraph 9, for the existing table substitute:

Sub-basin of the Irtysh River

Area*	Countries	Countries’ share	
1,643,000 km^2	Russian Federation*	1,099,000 km^2	67%
	Kazakhstan**	498,750 km^2	30%
	China and Mongolia**	45,250 km^2	3%

Sources:
* Схема комплексного использования и охраны водных ресурсов бассейна р. Иртыш.
Том 2. Водные объекты и водные ресурсы. ЗАО ПО «Совинтервод», Москва, 2006г. (Integrated water resources management of the Irtysh basin, volume 2, water bodies and water resources, ZAO PO “Sovintervod, Moscow, 2006).
** Ministry of Environmental Protection of Kazakhstan.

In paragraph 10 on hydrology, add the following text:

A cascade of reservoirs in Kazakhstan (the Bukhtarminsk, Ust’-Kamenogorsk and Shul’binsk reservoirs) regulates the river flow.

For hydrological measurements and hydrochemical analysis, one transboundary monitoring stations on the Irtysh was recently established: the station at Tartarka on the border between Kazakhstan and the Russian Federation.

It is also important to note that China started with the construction of a canal to transfer water from the Black Irtysh for developing oil industries nearby Urumchi, supposed to transfer water of up to 2 km^3/a.

In paragraphs 11 to 13 on pressure factors, add the following text:

Water management strongly depends on the requirements of the main users: hydropower production and water transport. These requirements, but also the need for water to support flora and fauna in the flood plain areas, are to be taken care of in the operation of the reservoirs on the Irtysh (Bukhtarminsk and Shul’binsk hydropower stations). Due to limited water resources availability, the conflict between hydropower production and shipping is increasing. Over the

---

[7] Разработка водохозяйственного баланса по реке Обь (II и III этапы). ЗАО ПО «Совинтервод». Москва, 2004г.

recent years, hydropower production at Shul'binsk considerable increased in wintertime as the new (private) owner gives priority to energy production; thus releasing water over winter and retaining water in the reservoir over summer time.

Due to a decrease of river flow, industrial wastewater discharges from Ust-Kamenogorsk (Kazakhstan) have a more pronounced negative effect on the pollution level in the Irtysh, the quality of drinking water supplied to Semipalatinsk and Pavlodar, and the water transfer through the Irtysh-Karaganta Canal (which is the main source of water supply to Central Kazakhstan).

<u>In paragraph 14 on transboundary impact, add the following text</u>:

Given measurements by the Russian Federation, pollution by oil products, phenols and iron exceed the MAC values, both for the maintenance of aquatic life and other uses. The maximum concentration of oil products occurs downstream of Tobolsk (44 times MAC for maintenance of aquatic life). The iron concentration at all measuring points exceeds the MAC values (both aquatic life and other uses), sometimes by a factor of 12. Copper and zinc concentrations are also above the MAC values for aquatic life, whereby the highest value for copper was observed downstream of Tobolsk (15 times MAC, with a maximum of 30 times MAC). In some watercourse, pesticides (DDT and γ-HCH) have been found with concentrations exceeding the WHO recommended values (6–7 times for DDT and 10 times for γ-HCH).

The declining water quality of the Irtysh has also negative impact on water management in Omsk Oblast (Russian Federation). The potential threat to these downstream parts of the Irtysh sub-basin is mercury from "hot spots" in Kazakhstan. Since 1997, the Russian Federation (through its Ministry of Natural Resources) has been involved in the abatement of mercury pollution sources.

In the Russian Federation, the water quality of the Irtysh falls into the classes "polluted" and "very polluted".

<u>In paragraph 15 on trends, add the following text</u>:

In order to improve water quality through more stringent measures to prevent, control and reduce pollution, a number of joint projects are being carried out by the Russian Federation and Kazakhstan as part of activities under the joint Russian-Kazakh Commission on the on the Joint Use and Protection of Transboundary Waters.

In the period 2001–2003, an international project, financed by France, has also been carried to prepare the ground for an international system for the assessment and management of Irtysh's water resources, based on the principles of integrated water resources management. It is expected that China will become involved in these activities.

D. Updates and additions by Kazakhstan on the Irtysh River

In paragraph 14, update the table as follows:

Water pollution index and water quality classification for two monitoring stations in Kazakhstan

Measuring station	1997	2000	2001	2002
Ust Kamenogorsk	1.02 (class 3)	1.55 (class 3)	1.62 (class 3)	1.47 (class 3)
Pavlodar	…	1.09 (class 3)	0.97 (class 2)	0.97 (class 2)
Measuring station	**2003**	**2004**	**2005**	**2006**
Ust Kamenogorsk	1.18 (class 3)	1.90 (class 3)	1.12 (class 3)	1.56 (class 3)
Pavlodar	1.00 (class 2)	1.39 (class 3)	1.22 (class 3)	1.06 (class 3)

Note: Class 2 – clean; class 3 – moderately polluted.

Source: Ministry of Environmental Protection of Kazakhstan.

E. Updates and additions by the Russian Federation on the Tobol River

In paragraphs 16 and 17, for the existing text substitute:

The Russian Federation and Kazakhstan share the sub-basin of the Tobol River.

Sub-basin of the Tobol River

Area*	Countries	Countries' share	
426,000 km^2	Russian Federation*	305,000 km^2	71.5%
	Kazakhstan**	121,000 km^2	28.5%

Sources:
* Схема комплексного использования и охраны водных ресурсов бассейна р. Иртыш. Том 2. Водные объекты и водные ресурсы. ЗАО ПО «Совинтервод», Москва, 2006г. (Integrated water resources management of the Irtysh basin, volume 2, water bodies and water resources, ZAO PO "Sovintervod, Moscow, 2006).
** Ministry of Environmental Protection of Kazakhstan.

Given its total water discharge, the Tobol is the biggest tributary to the Irtysh. From its total length (1,591 km), the river flows for 570 km in Tyumen' Oblast (Russian Federation). The Tobol's main tributaries include the Ubagan, Uj, Ayat, Sintashty (also known as the Dshelkuar) and Toguzyak rivers.

For hydrological measurements and hydrochemical analysis, two transboundary monitoring stations on the river have been recently established: the station at Zverinogolovsk and Lioutinka.

In paragraphs 18 to 21 on pressure factors, add the following text:

The sub-basin of the Tobol belongs to a region with developed industry and agricultural activities as well as developed water management infrastructure. The human impact on the river flow and the availability of water resources is clearly visible: abstractions of water from the river, inter-basin water transfer, operation of dams and reservoirs and melioration work on agricultural land and forested areas. Having a mean annual flow of 0.48 km^3/a, the Tobol's real flow largely varies (between 0.2 km^3/a and 0.4 km^3/a) depending on the operation of the Karatomarsk reservoir.

In paragraphs 22 to 25 on transboundary impact, add the following text:

Given data from the Russian Federation, the main pollutants originating from wastewater discharges include chlorides (40%), BOD_5 (6%), sulphates (33%), ammonium-nitrogen (2%) and other pollutants (13%). The total mass of substances discharged into the watercourses of the Tobol's sub-basin amounts to 58% (BOD_5) and 7% (zinc), respectively, of the total mass of these substances discharged into the watercourses of the entire Irtysh sub-basin. A comparative analysis of wastewater discharges from different sources has shown that only 29% of pollutants originate from industrial enterprises.

In the period from 1995 to 2000, water pollution in the Tobol River decreased. Compared to the 1985–1990 data, a significant decrease of phenols and oil products was observed over the total length of the river. Characteristic pollutants, whose concentrations are above the MAC values, include ammonium-nitrogen and nitrites-nitrogen (MAC exceeded by a factor of 2), iron compounds (2–7 times MAC), copper (3–12 times MAC), zinc (1–2 times MAC), manganese (17–34 times MAC), phenols (5–7 times MAC) and oil products (1–13 times MAC). A number of extreme pollution events occurred, obviously caused by accidental discharges.

In the Russian Federation (Tyumen' Oblast), the water quality of the Tobol falls into the classes "polluted" and "very polluted".
Trends

In paragraphs 26 to 28 on trends, add the following text:

In order to improve water quality through more stringent measures to prevent, control and reduce pollution, a number of joint projects are being carried out by the Russian Federation and Kazakhstan as part of activities under the joint Russian-Kazakh Commission on the on the Joint Use and Protection of Transboundary Waters.

F. Updates by Kazakhstan on the Tobol River

In the table in paragraph 22, for Class 2 – slightly polluted substitute Class 2 – clean

G. Updates and additions by the Russian Federation on the Ishim River[8]

In paragraph 29, substitute the table as follows:

Sub-basin of the Ishim River			
Area*	Countries	Countries' share	
176,000 km^2	Russian Federation*	34,000 km^2	19%
	Kazakhstan**	142,000 km^2	81%

Sources: * Federal Agency for Water Resources, Russian Federation.
** Ministry of Environmental Protection of Kazakhstan.

In paragraphs 30 to 33, add in the appropriate sub-sections (hydrology, transboundary impact and trends) the following statements:

On the Ishim River, there are 16 reservoirs with a volume exceeding 1 million m^3; all of them are located in Kazakhstan.

Over the last decades and given the operational rules for the joint management of two reservoirs (Segrejevsk and Petropavlovsk reservoirs), the guaranteed minimum flow at the border section was 1 m^3/s. After reconstruction of the Segrejevsk dam, the minimum guaranteed discharge has been increased to 2.4 m^3/s, which has favourable effects on the downstream territory of Tyumen' Oblast in the Russian Federation.

A specific working group under the auspices of the joint Russian-Kazakhstan Commission[9] deals with water-quantity issues, including operational issues of flow regulation at the border depending on the actual hydrological situation after the spring floods.

For hydrological measurements and hydrochemical analysis, two transboundary monitoring stations on the rivers have been recently established: the station at Dolmatovo (Kazakhstan) and the station at Il'insk (Russian Federation).

Given data from the Russian Federation, iron, copper, zinc, lead, manganese, phenols, pesticides and oil products cause transboundary impact.

Given the 2006 data by the Tyumen' Branch of the Hydrometeorological Service (Russian Federation), the MAC values for some pollutants were significantly exceeded: iron in February, copper in January–May, zinc in January–May and manganese in March. In the period October 2005 – May 2006, high nickel pollution was observed. In May 2006, extreme high pollution by

---

[8] Схема комплексного использования и охраны водных ресурсов р. Ишим. Том 1. 2004г. (Integrated water resources management of the Ishim River, volume I, 2004).

[9] Протокол пятнадцатого заседания Российско-Казахстанской Комиссии по совместному использованию и охране трансграничных водных объектов от 08 ноября 2006 г. Астана (Protocol of the 15th meeting of the Russian-Kazakh Commission on the Joint Use and Protection of Transboundary Waters, Astana, 8 November 2006).

oil products occurred. The reasons for these pollution events are not yet fully understood. However, both countries started with joint measurements for nickel.

The trend analysis for 1999–2005 has shown that there is an improvement of water quality as regards BOD_5, COD, manganese, phenols, nitrites copper and zinc. Significantly, the mean annual concentrations of nickel increased and some increase in iron concentration also occurred.

H. Updates by Kazakhstan on the Ishim River

UIn paragraph 32, update the table as follows:

Water pollution index for the Ishim River at monitoring stations in Kazakhstan

Measuring station	**1997**	**2000**	**2001**	**2002**
Astana	0.51 (class 2)	1.01 (class 3)	1.09 (class 3)	0.09 (class 2)
Petropavlovsk	0,93 (class 2)	0,99 (class 2)	0,71 (class 2)	0.71 (class 2)
Measuring station	**2003**	**2004**	**2005**	**2006**
Astana	0.92 (class 2)	0.84 (class 2)	0.75 (class 2)	0.87 (class 2)
Petropavlovsk	0.89 (class 2)	0.90 (class 2)	1.24 (class 3)	0.95 (class 2)

Note: Class 2 – clean; class 3 – moderately polluted.

Source: Ministry of Environmental Protection of Kazakhstan.

In paragraph 33, substitute the text as follows:

From the mid-1990s onwards, the water quality can be described as “clean” (class 2) and “moderately polluted” (class 3). This shows that there was no significant impact from Kazakhstan on the downstream part of the Ishim in the Russian Federation or on the Irtysh River.
