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PRELIMINARY ASSESSMENT OF TRANSBOUNDARY RIVERS DISCHARGING FROM EECCA COUNTRIES TO THE ARCTIC OCEAN AND THEIR MAJOR TRANSBOUNDARY TRIBUTARIES*

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

Addendum

1. This preliminary assessment is an intermediate product that deals with major transboundary rivers flowing through countries of Eastern Europe, Caucasus and Central Asia (EECCA) and discharging into the Arctic Ocean and their major transboundary tributaries.

2. Based on the countries' responses to the datasheets[1] and on data available from other sources, this assessment focuses on major watercourses in the Ob River basin as shown in the following table. The other watercourses will be included in the updated version to be submitted to the sixth Ministerial Conference "Environment for Europe" (Belgrade, October 2007) as explained in document ECE/MP.WAT/2006/16.

* This document was submitted on the above date because of processing delays.

[1] The cut-off date was 1 September 2006.

Transboundary rivers flowing through EECCA countries and discharging into the Arctic Ocean and their major transboundary tributaries

Basin/sub-basins	Riparian countries	Recipient	Status of assessment			
			Hydrology	***Pressure***	***Impact***	***Trends***
Yenisey	MN, RU	Arctic Sea	…	…	…	…
Ob	CN, KZ, MN, RU	Arctic Sea	x	(x)	…	…
- Irtysh	CN, KZ, MN, RU	Ob	x	x	x	x
- Tobol	KZ, RU	Irtysh	x	x	x	x
- Ishim	KZ, RU	Irtysh	x	x	x	x

The dispute regarding which river should be considered the main watercourse, the Ob or the Irtysh, was settled in the nineteenth century in favour of the Ob.

The following abbreviations for country names are used: China (CN), Kazakhstan (KZ), Mongolia (MN) and Russian Federation (RU). The following abbreviations for the status of the assessment are used: x – draft assessment made; (x) – draft assessment partially made. Three dots (…) indicate that no data were submitted.

I. ASSESSMENT OF THE STATUS OF TRANSBOUNDARY RIVERS IN THE YENISEY RIVER BASIN

3. Information from ROSVODRESURCY, the water agency of the Russian Federation, indicates that Mongolia and the Russian Federation share the Yenisey basin which covers an area of 2,557,800 km^2. The river assessment will be made at a later stage.

II. ASSESSMENT OF THE STATUS OF TRANSBOUNDARY RIVERS IN THE OB RIVER BASIN

A. Ob River

4. China, Kazakhstan, Mongolia and the Russian Federation share the basin of the Ob River as follows:

Basin of the Ob River

Area	Countries	Countries' share	
2,972,493 km^2	Russian Federation	2,192,700 km^2	73.77%
	Kazakhstan	734,543km^2	24.71%
	China	45,050 km^2	1.51%
	Mongolia	200 km^2	0.01%

Source: Ministry of Environmental Protection of Kazakhstan.

Hydrology

5. The Ob together with its first-order tributary, the Irtysh, forms a major river basin in Asia, encompassing most of Western Siberia and the Altai Mountains.

6. The Ob River basin includes major transboundary rivers, including the Irtysh (1,914,000 km^2), which is the chief tributary of the Ob, and the Tobol (395,000 km^2) and Ishim (177,000 km^2), which are both tributaries of the Irtysh. The River Tobol has a number of transboundary tributaries.

Pressure factors

7. In addition to the pressure factors in the catchment areas of the Irtysh and its tributaries (see following section), other pressure factors on the Ob River basin arise from the large oil and gas deposits in the Russian Federation, which are located in the middle and lower Ob. Severe pollution in the lower Ob has damaged the river's formerly famous fisheries.

Transboundary impact and trends

8. For transboundary impact and trends, see the assessment of the rivers Irtysh, Tobol and Ishim in the following sections.

B. Irtysh River

9. China, Kazakhstan, Mongolia and the Russian Federation share the catchment area of the Irtysh River, located in the Ob River basin, as shown in the following table.

Sub-basin of the Irtysh River			
Area	Countries	Countries' share	
1,914,000 km^2	Russian Federation	1,370,000 km^2	…
	Kazakhstan	498,750 km^2	…
	China and Mongolia	45,250 km^2	…
Source: Ministry of Environmental Protection of Kazakhstan.			

Hydrology

10. The River Irtysh, with a total length of 4,248 km (1,200 km in Kazakhstan), has its source in the Altai Mountains in Mongolia, at an altitude of 2,500 m. The Irtysh flows through Chinese territory for a distance of 618 km, along which water abstraction for irrigation decreases water flow. In Kazakhstan, a cascade of large hydroelectric power stations (Bukhtarminskaya, Shulbinskaya, Ust-Kamenogorskaya and others) influences the water level.

Discharge characteristics at the two gauging stations in Kazakhstan		
Buran gauging station on the Irtysh (Black Irtysh): distance to mouth – 3,688 km		
Q_{av}	296 m^3/s	1937–2004
Q_{max}	2,330 m^3/s	21 June 1966
Q_{min}	20.4 m^3/s	30 November 1971
Bobrovsky gauging station on the Irtysh: distance to mouth – 2,161 km		
Q_{av}	730 m^3/s	1980–2004
Q_{max}	2,380 m^3/s	June 1989
Q_{min}	285 m^3/s	September 1983
Source: Ministry of Environmental Protection of Kazakhstan.		

Pressure factors

11. In the upper reaches of Mongolia, the Irtysh is one of the cleanest and least mineralized rivers in the world.

12. Regarding pressure factors in China, Kazakhstan reported[2] that pollution sources include industry and irrigated agriculture. At the border with China, near the village of Buran (Kazakhstan), the concentrations of copper and oil products exceeded the maximum permitted concentration (MPC) values by a factor of 4 and 5, respectively. Regarding pressure on water availability, an irrigation canal more than 300 km long and 22 m wide stretching from the Black Irtysh to Karamay (China) is estimated to take 20% of the annual water flow of the Black Irtysh.

13. In Kazakhstan itself, according to the 1997 Kazakhstan Action Plan for the Protection and Rational Utilization of Water Resources, the Irtysh River was in the mid-1990s one of the most polluted transboundary rivers in Kazakhstan. According to research by Kazhydromet, in the 92 days of the fourth quarter of 1996, for example, 94 cases of water pollution with copper, zinc, boron and/or phenol and two cases of extremely high-level pollution with zinc, exceeding the MPC by a factor of 190, occurred on the Irtysh or its tributaries. The sources of pollution included the metal-processing industry, discharge of untreated water from mines and ore enrichment and leakages from tailing dams. The level of water pollution in the Irtysh River rose considerably in Ust-Kamenegorsk and the lower Irtysh under the influence of sewage discharges and industrial wastewater discharges (heavy metals, oil and nitrogen products).

Transboundary impact

14. The following table shows the improvement of water quality along the watercourse in Kazakhstan.

[2] 1997 Kazakhstan Action Plan for the Protection and Rational Utilization of Water Resources.

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)	…
Pavlodar	1.00 (class 2)	1.39 (class 3)	1.22 (class 3)	…

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

Source: Ministry of Environmental Protection of Kazakhstan.

Trends

15. In the first half of the 1990s, the Irtysh was classified by Kazakhstan as polluted in the upstream section and extremely polluted in the downstream section. In the second half of the 1990s, the quality of water in the Irtysh basin tended to improve, although the overall water pollution situation remained unfavourable. Starting in 2000, water quality improved.

C. Tobol River

16. The Russian Federation and Kazakhstan share the catchment area of the Tobol River, located in the Ob River basin, as shown in the following table. The Tobol's main transboundary tributaries, including the Sinashty (also known as the Dshelkuar), Ayat, Togusak and Uj rivers, originate the Russian Federation. The Uj River forms the border between Kazakhstan and the Russian Federation for some 150 km.

Sub-basin of the Tobol River

Area	Countries	Countries' share	
395,000 km^2	Russian Federation	274,000 km^2	69%
	Kazakhstan	121,000 km^2	31%

Source: Ministry of Environmental Protection of Kazakhstan

Hydrology

17. The River Tobol is 1,591 km long (including 800 km in Kazakhstan) and has its source in the south-western part of Kostanai Oblast in northern Kazakhstan.

18. The basin has 190 reservoirs, among them the Kurgan reservoir (Russian Federation), with a storage capacity of 28.1 million m^3; 23 reservoirs with storage capacities of 5 to 10 million m^3; and 166 reservoirs with a storage capacity below 5 million m^3. In addition to hydropower production, these reservoirs provide drinking water and water for flood regulation.

Discharge characteristics at two stations on the Tobol in Kazakhstan		
Grishenka gauging station: 1,549 km upstream from the river's mouth		
Q_{av}	8.54 m^3/ s	1938–1997, 1999–2004
Q_{max}	2250 m^3/ s	2 April 1947
Q_{min}	No flow	For 10% of time during 9 June – 23 October 1985; for 74% of time in winter
Kustanai gauging station: 1,185 km upstream from the river's mouth		
Q_{av}	9.11 m^3/s	1964–1997, 1999–2004
Q_{max}	1850 m^3/s	12 April 2000
Q_{min}	0.13 m^3/s	10 September 1965
Source: Ministry of Environmental Protection of Kazakhstan.		

Pressure factors

19. Parts of the Tobol catchment area, which stretch into the Ural region in the Russian Federation, have mineral-rich bedrock that causes high natural background pollution with heavy metals in many water bodies in the Tobol catchment area; even under natural conditions, the MPC values are often exceeded. In Kazakhstan, the natural salt lakes in the catchment area of the River Ubagan produce additional background pollution of up to 0.8 g/l of salt ions, which cause problems for the drinking-water supply in the Kurgan area (Russian Federation). The significant salinity of soils and a high geochemical background in the Kazakhstan part of the catchment area are further reasons for the pollution of watercourses; the acid snow-melting waters enrich themselves with chlorides, sulphates and a number of other substances (e.g. Na, Fe, Mn, B, Be, Al, As, Ni, Co, Cu, Zn, Pb, Cd, Mo).

20. In Kazakhstan, the main anthropogenic pollution sources are municipal wastewaters, wastewater from ore mining and processing, residual pollution from closed-down chemical plants in Kostanai, accidental water pollution with mercury from gold mining in the catchment area of the River Togusak, and heavy metals from other tributaries to the Tobol. While diffuse pollution from fertilizers in agriculture is decreasing, it remains a problem, as does polluted surface runoff during spring flood periods.

21. Through transboundary tributaries to the Tobol, notably the Uj River, the Russian Federation contributes to the pollution of the Tobol River on Kazakhstan's territory with nutrients and organic substances from communal wastewater as well as hazardous substances from urban waste dumps, power stations' ash deposits and the fat-processing industry.

Transboundary impact

22. The pollution load of the Tobol River at the Kazakhstan-Russian border originates from pollution sources in Kazakhstan and pollution carried by the transboundary tributaries to the Tobol from pollution sources in the Russian Federation. Downstream of the border with Kazakhstan, the Tobol is further polluted from Russian point and diffuse sources.

Water pollution in the Tobol River in Kazakhstan upstream of the border with the Russian Federation

Year	Determinands	Mean concentration (mg/l)	Factor by which MPC is exceeded	Water quality
2001	Sulphates	159.0	1.59	Class 5
	Iron (total)	0.168	1.68	
	Iron (2+)	0.056	11.3	
	Copper	0.029	28.7	
	Phenols	0.002	2.0	
2002	Sulphates	122.129	1.22	Class 5
	Iron (total)	0.258	2.58	
	Iron (2+)	0.109	21.8	
	Copper	0.022	22.1	
	Zinc	0.011	1.07	
2003	Sulphates	167.176	1.67	Class 3
	Iron (total)	0.159	1.59	
	Iron (2+)	0.065	13.06	
	Copper	0.010	10.0	
	Phenols	0.002	2.0	
2004	Sulphates	145.55	1.46	Class 3
	Iron (total)	0.18	1.8	
	Iron (2+)	0.054	10.8	
	Copper	0.0103	10.3	

Note: Class 3 – moderately polluted; class 5 – heavily polluted.

Source: Ministry of Environmental Protection of Kazakhstan.

23. The Ubagan, a right-hand-side (eastern) tributary to the Tobol which is entirely on Kazakh territory and discharges into the Tobol, carries an additional pollution load and adds to the load of the Tobol from Kazakhstan sources.

Water pollution index in Kazakhstan upstream of the border with the Russian Federation				
Measuring station	2001	2002	2003	2004
Tobol (Kazakhstan)	5.53	4.20	2.55	2.78
Source: Ministry of Environmental Protection of Kazakhstan.				

24. Also downstream of the Kazakhstan-Russian border, pollution from the territory of the Russian Federation adds to the pollution load of the Tobol. This is particularly visible in the Kurgan reservoir (upstream of Kurgan), where to date the annual mean concentrations of copper have exceeded the MPC by a factor of 16.7, zinc by a factor of 2.5, and total iron by a factor of 4.6. Downstream of Kurgan, the annual mean concentrations of copper continue to exceed the MPC value 17.8 times, zinc 2.4 times, manganese 32.3 times, total iron 6.2 times, and oil products 2.8 times.

25. Annually, more than 25,000 tons of BOD; 6,000 tons of oil products; 21,200 tons of suspended matter; 1,560 tons of phosphorus; 4,800 tons of ammonia nitrogen; 618 tons of iron; 167 tons of copper; 296 tons of zinc; 5.7 tons of nickel; 4.9 tons of chromium; and 2.13 tons of vanadium are discharged into water bodies in the Tobol River catchment area.

Trends

26. As the water pollution index indicates, pollution has been decreasing since 2001, and water quality has been upgraded from class 5 (very polluted) to class 3 (moderately polluted), supported by a slight decrease in concentrations of individual water-quality determinands.

27. Nevertheless, pollution will continue to have an adverse impact, particularly on the drinking-water supply. This is a critical issue for both countries, as the supply of drinking water relies exclusively on surface-water resources.

28. Flooding will also remain a problem.

D. Ishim River

29. Kazakhstan (upstream country) and the Russian Federation (downstream country) share the catchment area of the Ishim River, a tributary to the Irtysh River in the Ob River basin, as shown in the following table.

Sub-basin of the Ishim River			
Area	Countries	Countries' share	
177,000 km^2	Russian Federation	35,000 km^2	19.8%
	Kazakhstan	142,000 km^2	80.2%
Source: Ministry of Environmental Protection of Kazakhstan.			

Hydrology

30. The River Ishim has a total length of 2,450 km, of which 1,089 km are in Kazakhstan.

Discharge characteristics at two gauging stations in Kazakhstan		
Turgenyevka gauging station on the Ishim: distance to river's mouth 2,367 km		
Q_{av}	3.78 m^3/s	1974–2004
Q_{max}	507 m^3/s	16 April 1986
Q_{min}	No flow	For 19% of time in period of open riverbed (12 July – 23 October 1986); for 100% of time in winter period (24 October 1986 – 12 April 1987)
Petropavlovsk gauging station on the Ishim: distance to river's mouth 7.83 km		
Q_{av}	52.5 m^3/s	1975–2004
Q_{max}	1,710 m^3/s	28 April 1994
Q_{min}	1.43 m^3/s	27 November 1998
Source: Ministry of Environmental Protection of Kazakhstan.		

Pressure factors

31. Pressure factors will be analysed at a later stage.

Transboundary impact

32. According to the following table, there should be no major transboundary impact from Kazakhstan on the Russian part of the Ishim River.

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)	…
Petropavlovsk	0.89 (class 2)	0.90 (class 2)	1.24 (class 3)	

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

Source: Ministry of Environmental Protection of Kazakhstan.

Trends

33. Since the mid-1990s, the water quality has fallen into class 2 (slightly polluted) or class 3 (moderately polluted), showing no significant impact from Kazakhstan on the downstream part of the Ishim in the Russian Federation or on the Irtysh River.