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**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<sup>1</sup>**

**PRELIMINARY ASSESSMENT OF TRANSBOUNDARY RIVERS DISCHARGING TO  
PACIFIC OCEAN AND THEIR MAJOR TRANSBOUNDARY TRIBUTARIES**

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

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<sup>1</sup> 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 3.

## I. ASSESSMENT OF THE STATUS OF TRANSBOUNDARY RIVERS IN THE AMUR RIVER BASIN<sup>2</sup>

1. China, Mongolia and the Russian Federation share the Amur River basin.

<b>Basin of the Amur River</b>			
Area	Countries	Countries' share	
1,855,000 km <sup>2</sup>	China	820,000 km <sup>2</sup>	44.2%
	Mongolia	32,000 km <sup>2</sup>	1.7%
	Russian Federation	1,003,000 km <sup>2</sup>	54.1%
<i>Source:</i> Information bulletin on the status of surface waters, water management systems and installations in the area of the Amur River Basin Management Authority, 2005, volume I, analytical description.			

### Hydrology

2. The Amur River begins at the confluence of the Argun and Shilki rivers next to the village of Pokrova. Its length is 2,824 km (4,444 km from the source of the Argun) and its discharge at mouth is 11,330 m<sup>3</sup>/s (357,3 km<sup>3</sup>/a).

3. The most important tributaries include the Argun (transboundary, see assessment below), Shilka, Zeya, Bureya, Ussuri (transboundary, see assessment below) and Amgun rivers. More than 61,000 lakes are in the basin, including the transboundary Lake Xingkai/Khanka, located in the sub-basin of the Ussuri River (see assessment below).

<b>Discharge characteristics of the Amur River</b>		
Discharge characteristics at the Pashkovo station		
Q <sub>av</sub>	4,440 m <sup>3</sup> /s	1896–1980
Q <sub>max</sub>	21,000 m <sup>3</sup> /s	11–13 September 1897
Q <sub>min in winter</sub>	80.3 m <sup>3</sup> /s	5 March 1922
Q <sub>min ice-free watercourse</sub>	1,344 m <sup>3</sup> /s	7 November 1921
Discharge characteristics at Khabarovsk		
Q <sub>av</sub>	8,360 m <sup>3</sup> /s	1896–2004
Q <sub>max</sub>	25,500 m <sup>3</sup> /s	6 June 2004
Q <sub>min</sub>	4,360 m <sup>3</sup> /s	11 November 2004

<sup>2</sup> Based on information provided by the Russian Federation.

<b>Discharge characteristics at the Bogorodsk station*</b>		
$Q_{av}$	10,100 m <sup>3</sup> /s	1896–2004
$Q_{max}$	26,300 m <sup>3</sup> /s	22 June 2004
$Q_{min}$	938 m <sup>3</sup> /s	23 March 2004
<p><i>Sources:</i></p> <p>Information bulletin on the status of surface waters, water management systems and installations in the area of the Amur River Basin Management Authority, 2005, volume I, analytical description.</p> <p>Long-term data on the regime of surface waters, volume I/19, the Amur and Udy basins, Gidrometizdat, 1986.</p> <p>* Calculated based on measurements at Khabarovsk.</p>		

#### *Pressure factors and transboundary impact*

4. Most critical for the status of the Amur River is the pollution load from the Argun, Sungari/Songhua and Ussuri rivers as described below.

#### *Trends*

5. Improving the ecological and chemical status of the Amur strongly depends on pollution control measures in China.

6. The Russian Federation has already identified a number of measures to achieve good status of the watercourses in the Amur basin. These measures include: stabilization of the riverbed and decreasing negative consequences of the erosion of riverbanks (for the Amur in Amur Oblast), increasing capacities for wastewater treatment, use of low-waste and non-waste technology, legal measures to respect use restriction in water protection zones, and improving sanitary conditions in cities and other human settlements, including collection and treatment of storm water run-off. There is also a need for a bilateral agreement on joint monitoring of the Ussuri and joint action to achieve the required water quality by decreasing human impact in the sub-basin.

#### **A. Argun River**

7. The 1,620 km long Argun River is shared by China and the Russian Federation. It flows for 669 km in China. 951 km above the mouth, it enters the Russian Federation and forms, more downstream, the border between China and Russia.

<b>Sub-basin of the Argun River</b>			
Area	Countries	Countries' share	
164,000 km <sup>2</sup>	China	11,4900 km <sup>2</sup>	70%
	Russian Federation	49,100 km <sup>2</sup>	30%

*Source:* Hydrological knowledge, Volume 18, Gidrometizdat, Leningrad, 1966.

8. At the border between China and the Russian Federation, the Argun River is classified as “polluted” or “very polluted”. Apart from regular measurements, field trips were carried out in 2005 (April and December), which have shown that for a number of water-quality determinands, the MAC values, which represent the maximum allowable concentration of pollutants for the maintenance of aquatic life, are exceeded by a factor of 2 to 7, and for copper even by a factor of 28.

9. Regularly, extreme pollution events, mainly caused by industries, occur during wintertime in the section between the villages of Molokanka and Kuti leading to fish kills and the death of animals living close to the river.

<b>Pollution characteristics of the Argun River downstream from the border with China</b>								
Determinands	MAC in mg/l	1995	1997	1999	2001	2002	2004	2005
Copper	0.001	0.005	0.004	0.003	0.0025	...	0.011	0.006
Zink	0.01	0.005	0.015	...	0.014	...	0.033	0.002
Phenols	0.001	0.004	0.014	0.002	0.001	0.002	0.002	0.002
Oil products	0.05	0.18	0.21	0.08	0.22	0.07	0.094	2.48

*Source:* Information by the Zabaikalsk Branch of the Hydrometeorological Service, Russian Federation.

10. The flood plain of the Argun is relatively large compared to the river's width (10–12 km, sometimes even larger) and acts as a natural buffer against human impact on the river. So far, this ecosystem is in a good status, however, the planned water transfer from the Chajlar River, a transboundary watercourse in the sub-basin of the Argun, into Lake Dalajnor may destroy the terrestrial ecosystem of the Argun.

11. In August 2006, during the ordinary session of the permanent Chinese-Russian working group on the ecology of the Argun River, an agreement has been signed on cooperation related to the protection of water quality and the ecological status of the river, and a plan for joint water-quality monitoring, including the ecological status of the river zones, was approved.

## B. Impact from the Sungari/Songhua River<sup>3</sup>

12. The waters of the Sungari (Songhua) River, which flows entirely on Chinese territory, are the most significant pollution sources in the middle part of the Amur basin. According to Chinese statistics from the last decade, the river ranks among the five most polluted Chinese watercourses, and its quality continues to deteriorate. Frequent industrial accidents, such that of 13 November 2005 at Harbin, add to the pollution load. Furthermore, hazardous substances enter the river during flood events.

13. There are more than 20,000 chemical production sites in the basin. Russian experts estimate that more than 15 billion tons of substances, including pesticides and herbicides, and various forms of oil products and derivatives, enter the Sungari River. Phenols in the river often exceed the MAC values by a factor of 50.

14. In 2006, joint measurements to investigate the consequences of the 2005 on the aquatic ecosystem of the Amur were carried out, based on an agreement between the riparian Chinese and Russian provinces.

## C. Ussuri River

15. The Ussuri (897 km length), shared by China and Russia, has its source in the southern part of the Sikhote-Alin Mountains, forms part of the Chinese-Russian border and conflues with the Amur at Khabarovsk.

Sub-basin of the Ussuri River			
Area	Countries	Countries' share	
193,000 km <sup>2</sup>	China	57,000 km <sup>2</sup>	30%
	Russian Federation	136,000 km <sup>2</sup>	70%

*Source:* Surface water resources of the USSR, Gidrometizdat, 1972.

16. The river is known for its catastrophic floods. In general, water quality varies between classes III and IV.

<sup>3</sup> The Sungari/Songhua River is not a transboundary watercourse, due to its impact on the Amur, it has been inserted in the assessment.

<b>Water quality of the Ussuri River</b>					
Watercourse	Water-quality class*				
	2001	2002	2003	2004	2005
Ussuri at Novomichailovka	III	III	III	III	IV
Ussuri at Kirovskij	III	III	III	III	V
Ussuri at Lesozavodsk	III	III	III	III	IV
Ussuri at Rushino	III	III	II	III	IV

Source: Primorskij Service for Hydrometeorology and Environmental Monitoring, Russian Federation.

\* There are altogether seven water-quality classes from I (clean) to VII (heavily polluted).

#### **D. Lake Xingkai/Khanka**

17. For an assessment of this transboundary lake, located in the Ussuri sub-basin, please refer to document ECE/MP.WAT/2006/16/Add.1.

## **II. ASSESSMENT OF THE STATUS OF THE TUMEN RIVER<sup>4</sup>**

18. China, the Democratic People's Republic of Korea and the Russian Federation share the basin of the Tumen River, also known as Tumannaya.

<b>Basin of the Tumen River</b>			
Area	Countries	Countries' share	
33,800 km <sup>2</sup>	China *	23,660 km <sup>2</sup>	70%
	DPR Korea *	10,140 km <sup>2</sup>	30%
	Russian Federation	25.8 km <sup>2</sup>	<0,01%

*Sources:*

Project on water construction works to stabilize the riverbed in the border region of the Tumen River in order to fortify the State border between the Democratic People's Republic of Korea and the Russian Federation, Vladivostok, 2000.

Surface water resources of the USSR, Gidrometizdat, 1972.

\* The figures for China and the Democratic People's Republic of Korea are approximations.

<sup>4</sup> Based on information from the Russian Federation and the Russian version of the UNEP/GEF project RAS/98/G31 on the strategic action programme for the Tuman River: Transboundary diagnostic analysis, Vladivostok, 2002.

*Hydrology*

19. The Tumen, with a total length of 549 km (16 km in downstream Russia), flows into the Pacific Ocean (Japanese Sea). The discharge at mouth is 10.1 km<sup>3</sup>/a.

20. In its lower part, the river flows through an area with light soils, which are easily washed out and transported away by water, so that the river changes its bed annually. The hydrological regime is still poorly understood; therefore, only preliminary discharge characteristics are available.

<b>Discharge characteristics of the Tumen River at the Kasan gauging station (Russian Federation)</b>		
Q <sub>av</sub>	320 m <sup>3</sup> /s	1934–2000
Q <sub>max</sub>	11,000 m <sup>3</sup> /s	Maximum during 1% of the year
Q <sub>min</sub>	0.74 m <sup>3</sup> /s	Minimum during 95% of the year
<p><i>Source:</i> Project on water construction works to stabilize the riverbed in the border region of the Tumen River in order to fortify the State border between the Democratic People's Republic of Korea and the Russian Federation, Vladivostok, 2000.</p>		

*Pressure factors*

21. Industrial wastewaters enter the river mainly from the Democratic People's Republic of Korea. Main pressure factors are iron mining at the Musansk ore deposit; industries at Undoksk (chemical factory, paper production and sugar production) and municipal wastewater from municipalities in the Democratic People's Republic of Korea.

22. In China, the industrial pollution currently decreased, however, pollution with municipal wastewater is permanently increasing.

23. In the Russian Federation, there are almost no human activities; the main form of land use is wetlands, which are famous breeding areas for birds.

*Transboundary impact*

24. Apart from water pollution from China and the Democratic People's Republic of Korea, a number of water-quantity related problems exist. Most significant are the erosion of the left riverbank and the shift of the riverbed towards the left-hand side in the Russian Federation. This requires water construction work to fortify the riverbank, particularly on the border between the Democratic People's Republic of Korea and the Russian Federation. This works begun in 2004 and will continue until 2008. These do not seem quality related?

*Trends*

25. Improving river water quality requires joint activities of all three riparian countries. The drawing up of a multilateral agreement between China, the Democratic People's Republic of

Korea and the Russian Federation is of utmost importance. It should provide for joint measures on monitoring and assessment as well as the achievements of water-quality targets in order to decrease the overall human impact on the waters in the Tumen River basin.

26. The Tumen River basin and adjacent areas in the Democratic People's Republic of Korea are famous breeding areas of birds. Due to urbanization and the destruction of wetlands, these birds lose their breeding grounds and measures to protect and restore wetlands are of great importance.

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