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Meeting of the Parties to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes

Working Group on Monitoring and Assessment

Twelfth meeting
Geneva, 2–4 May 2011
Item 5 (b) of the provisional agenda
Assessment of the status of transboundary waters in the UNECE[1] region: assessment of transboundary rivers, lakes and groundwaters in Central Asia.

Assessment of transboundary waters discharging into the Sea of Okhotsk and Sea of Japan[2]

Note prepared by the secretariat*

Summary

This document was prepared pursuant to decisions taken by the Meeting of the Parties to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes at its fifth session (Geneva, 10–12 November 2009) (ECE/MP.WAT/29, para. 81 (e)), and by the Working Group on Monitoring and Assessment at its eleventh meeting (Geneva, 6–7 July 2010), requesting the secretariat to finalize the Central Asia assessment for the second Assessment of Transboundary Rivers, Lakes and Groundwaters in time for its submission to the Seventh "Environment for Europe" Ministerial Conference (Astana, 21–23 September 2011).

This document contains the draft assessments of the different transboundary rivers, lakes and groundwaters which are located in the Basins of the Sea of Okhotsk and Sea of

[1] United Nations Economic Commission for Europe.
[2] This document was submitted for publication without formal editing.
* The present document has been submitted on the present date due to late receipt of inputs by concerned countries and resource constraints in the secretariat.

Japan.

For background information and for the decisions that the Working Group on Monitoring and Assessment may wish to take, please refer to document ECE/MP.WAT/WG.2/2011/4−ECE/MP.WAT/WG1/2011/4.

Contents

I. Introduction

1. The present document contains the assessments of the different transboundary rivers, lakes and groundwaters which are located in the Basins of the Sea of Okhotsk and the Sea of Japan. The document has been prepared by the secretariat with the assistance of the International Water Assessment Centre (IWAC) on the basis of information provided by the countries in the Central Asia sub-region.

2. For descriptions of the transboundary aquifer types and related illustrations, Annex V of document ECE/MP.WAT/2009/8 should be referred to.

3. For background information and for the decisions that the Working Group on Monitoring and Assessment may wish to take, please refer to document ECE/MP.WAT/WG.2/2011/4−ECE/MP.WAT/WG1/2011/4.

II. Amur Basin[3]

4. The 2,824-km long Amur River is taken to begin at the confluence of the Argun and Shilki rivers. For the most of its length it forms the border between China and the Russian Federation. Mongolia's share of the basin is small.

5. The most important transboundary tributaries of the Amur are the Argun and the Ussuri. The Sungari (Songhua) River which flows entirely on China's territory, is the biggest tributary of the Amur. There are more than 61,000 lakes are in the basin; among them the transboundary Lake Xingkai/Khanka (in the sub-basin of the Ussuri River). In the Russian part of the Amur Basin, lakes and reservoirs make up some 0.6 per cent of the area.

Table 1
Area and population in the Amur Basin

Country	*Area in the country (km^2)*	*Country's share %*	*Population*	*Population density (persons/km^2)*
China	820 000	44.2		
Mongolia	32 000	1.7		
Russian Federation	1 003 000	54.1		
Total	**1 855 000**			

Hydrology and hydrogeology

6. Surface water resources in the Amur Basin at the level of Khabarovsk are estimated at 253 km^3/year (average for the years from 1963 to 2005). Depending on the year, the Russian Federation estimates 25 to 42 per cent of this amount to flow from outside its territory.

7. As groundwater occurs in alluvial aquifers connected to the river that forms the state border, there is consequently little transboundary groundwater flow.

[3] Based on information provided by the Russian Federation and the first Assessment of Transboundary Rivers, Lakes and Groundwaters

Pressures and status

Table 2
Total withdrawal and withdrawals by sectors

Country	*Year*	*Total withdrawal* $\times 10^6$ m^3/*year*	*Agricultural* %	*Domestic* %	*Industry* %	*Energy* %	*Other* %
China							
Russian Federation	2008	903					
	2015	1 363[a]					
	2020	2 375[b]					

Note: The share of groundwater of the total water use is about 37 per cent.
[a, b] forecasts

8. The pollution load from the Argun, Sungari/Songhua and Ussuri impacts on the status of the Amur the most.

9. The waters of the Sungari River are the most significant pollution sources in the middle part of the Amur basin and the water quality has continued to deteriorate. Chemical production along the Sungari in particular has affected the water quality negatively, resulting in pollution by oil products and their derivatives, phenols as well as pesticides and herbicides, and industrial accidents have added to the pollution.

Response

10. Management measures related to for example riverbed stabilization, limiting erosion, restriction of activities in water protection zones as well as wastewater and storm water treatment have been identified in the Russian Federation for achieving good status of the watercourses in the Amur Basin.

11. In the Russian part of the Amur Basin, there are 646 protected areas with a total area of 9,536 km^2 (about 1 per cent of the Russian part of the basin).

12. A Chinese-Russian joint commission operates on the basis of the 2008 Agreement between the countries concerning rational use and protection of transboundary waters.

Future trends

13. Development of the ecological and chemical status of the river depends heavily on pollution control on China.

14. The Russian Federation predicts its withdrawal from the Amur to increase by about 50 per cent by 2015 and by about 160 per cent by 2020 compared with the level of withdrawal in 2008.

15. Possible impacts of climate change on water resources of the Amur have not been studied or have not been studied sufficiently according to the Russian Federation.

III. Argun sub-basin[4]

16. The 1,620-km long Argun River[5] originates in China and forms for 940 km the border between China and the Russian Federation before discharging to the Amur.

17. The basin has a hilly character, with the mean elevation in the range from 530 to 600 m a.s.l. For information on the relatively large flood plain and the ecosystems, please refer to the box on wetlands in the basin.

Table 3
Area and population in the Argun sub-basin

Country	*Area in the country (km^2)*	*Country's share %*	*Population*	*Population density (persons/km^2)*
China	114 900	70		
Russian Federation	49 100	30		
Total	164 000			

Hydrology and hydrogeology

18. Groundwaters are in alluvial aquifers connected to the bordering river, which consequently results in little transboundary flow.

Pressures

Table 4
Total withdrawal and withdrawals by sectors

Country	*Year*	*Total withdrawal $\times 10^6$ m^3/year*	*Agricultural %*	*Domestic %*	*Industry %*	*Energy %*	*Other %*
China							
Russian Federation	2009	38.91	0.7	16.2	79.1	3.34	0.66

Note: Groundwater is not really used in the Russian part of the basin.

19. About a half of the Russian part of the basin is forest and about 30 per cent is with little or no vegetation cover.

20. The Russian Federation assesses as severe but local the extreme pollution events of the river mainly from industries, which occur regularly during wintertime between the villages of Molokanka and Kuti, resulting in the death of fish and animals living close to the river.

[4] Based on information provide by the Russian Federation and the first Assessment of Transboundary Rivers, Lakes and Groundwaters

[5] The upper part of the Argun in China is called "Hailaer". After Mutnaya Channel connects it to nearby Dalai Lake, for 940 kilometers, Argun River serves as Sino-Russian borderline and finally after confluence with Shilka forms Amur River .

Status and response

21. From the late 1990s until mid-2000s, the concentrations of for example the following elements or substances have exceeded the Maximum Allowable Concentrations in the river water: copper, zinc, phenols and oil products. The overall water quality in the Argun River has been classified according to the Russian classification as "polluted" or "very polluted" at the border between China and the Russian Federation.

22. Since 2006, there is an agreement between the riparian countries on cooperation related to the protection of water quality and the ecological status of the Argun River, and an approved plan for joint water quality monitoring.

Future trends

23. The Russian Federation predicts its total withdrawal to decrease less than 4 per cent in the period from 2010 to 2012 compared with the withdrawal in 2009. The percentages of the different sectors are not expected to change markedly.

IV. Daurian wetlands in the Argun sub-basin[6]

General description of the wetland area

24. The Argun River in the Dauria Steppe supports a globally significant network of wetlands. The network includes the following transboundary wetlands: 1) Argun River transboundary floodplains[7] (200,000 ha, shared by the Russian Federation and China, 40 per cent and 60 per cent of the area, respectively); 2) Dalai Lake National Nature Reserve (750,000 ha; in China, the site's southern edge borders Mongolia on transboundary Buir Lake); and 3) Lake Buir and its surrounding wetlands[8] (104,000 ha of which the lake covers 61,500 ha).

25. Transboundary stretch of Argun from Muntaya mouth to Priargunsk has 2,000 km^2 of wide floodplain rich in biodiversity.

26. Large shallow Dalai (Hulun) Lake is the most prominent natural feature of the Argun River Basin in China. It receives waters of the Kherlen and Wuershun rivers from Mongolia. The Dalai Lake Ramsar site is a complex of lakes, rivers, marshes, shrublands, grasslands and reedbeds typical of wetlands in arid steppes.

[6] *Sources*:
Kiriliuks, V. & O., Goroshko, O. DIPA -10 years of cooperation. Express, Chita. 2006. (http://www.dauriareserve.narod.ru/index_eng.htm)
Simonov, E., Yadong, Z., Goroshko, O., Tkachuk, T., Glushkov, I., Kiriliuk, V. Transboundary conservation of wetlands in Dauria and adaptation to climate change. International Congress for Conservation Biology. Beijing, July 2009. Report at Wetlands Conservation Section. (http://www.dauriarivers.org/documents/conservation-and-climate-cycles/)
Wetlands of the Amur River Basin. Compiled by: Markina, A., Minaeva, T., Titova, S. WWF, Vladivostok. 2008.
Internet-site of Ramsar Convention (www.ramsar.org)
Simonov, E., Dahmer, T. Amur-Heilong River Basin Reader. Ecosystems LTD, Hongkong. 2008. (http://www.wwf.ru/resources/publ/book/299).

[7] In China the site protected by three local nature reserves: Erka, Huliyetu, and Ergunashidi. In Russia a cluster of Daursky biosphere reserve is envisioned in the National Protected Areas plan.

[8] Establishment of a nature reserve is planned by the Mongolian Government.

27. Buir Lake shared by Mongolia and China is fed by the Khalkh River, with headwaters in China. The river forks at Ramsar site and supplies water to Buir Lake and Dalai Lake via the Wuershun River.

28. Dauria Steppe's natural climate cycle with a span of 25-40 years, is the major force shaping regional ecosystems and lifestyles. Pulsating Dalai Lake at maximum covers 2,300 km^2, but is known to become a chain of shallow pools. "Pulsating" water bodies provide much higher (but uneven) biological productivity than stable ones. The alternation of the wet and dry phases as well as the diversity in water bodies is of key importance in sustaining the biodiversity and productivity of the Dauria ecosystems.

Main wetland ecosystem services

29. The Daurian wetlands the following main ecosystem services:

- Water retention in a semi-arid region
- Cyclical change in water levels sustains river floodplains and supports productivity and dynamic diversity of successional lake habitats.
- Important faunal refugia in times of drought
- Important bird migratory routes and stop-over sites
- High biological productivity, breeding areas for aquatic fauna;
- Wetlands are zones of groundwater recharge and discharge;
- Flood control; storm protection; flow regulation;
- Sediment retention and nutrient cycling, accumulation of organic matter;
- Climate regulation

30. The three sites possess complementary qualities. Thus Buir Lake is most important stable water body; Dalai Lake has greater temporal and spatial diversity of habitats; and the Argun floodplain provides more important faunal refugia in time of drought, for example.

Supporting socio-economic services

31. Upper Argun River is the source of municipal water supply for south-east Zabaikalsky province in the Russia Federation and Hulubeier in China, as well as water source for industry, mining enterprises and agriculture. Local farming communities heavily depend on the Argun River floodplain for watering for cattle, pastures and hayfields, which is most critical in dry years. Subsistence fishing and hunting are also widespread. In China riverscapes are important assets for nature-based tourism. Both Dalai and Buir lakes sustain important fishing enterprises, with just Dalai Lake Fishing Farm producing up to 10,000 tons of fish per year. Dalai Lake supports numerous tourist camps and resorts. The grasslands on Dalai lakeshores support a total of 2 million livestock. Both lakes are important sources of water for livestock farms and mining enterprises. The Khalkh River is supporting municipalities and irrigated agriculture in both China and Mongolia. Altogether approximately 2 million people directly depend on wetlands of the Argun River Basin.

Cultural values of the wetland area

32. The Daurian wetlands in the Argun sub-basin exhibit a number of cultural values and the following can be highlighted:

- Nomadic lifestyle of Mongolian tribes is the key cultural value of Dauria – and forcenturies has been the most effective socio-economic adaptation to climate fluctuations.
- Lakes and river valleys have many "oboo" – sacred places where locals worship local deities and organize religious festivals.

- Many areas in the Argun sub-basin are associated with activities of Genghis Khan,and there are several archeological sites in the river valley
- Buir Lake shores contain important memorials of Kahlkhin-Gol Battle of 1939.

Biodiversity values of the wetland area

33. The wetlands in the Argun sub-basin have global importance associated with nesting of rare birds and huge numbers of migrating waterbirds. Several million migratory waterbirds pass through these wetlands in spring and autumn via Intra-continental branch of the Eastern-Asian-Australian flyways. Almost 300 bird species are known there. Wetlands support globally significant populations of 20 IUCN Red List bird species, including the Japanese Crane, Swan Goose, Great Bustard, and Tundra and Whooper Swans. Areas of reed marshes provide important breeding areas for many rare birds and spawning areas for fish.

34. Buir Lake, the most species-rich lake in Mongolia, has 29 species of fish, among them, for example, Taimen, Lenok, Amur grayling, Amur pike and Amur catfish.

35. Drought cycle dictates unceasing succession in plant and animal communities, which increases the number of ecological niches and sustains high diversity of species and habitats.

Pressure factors and transboundary impacts

36. Wastewater from upstream industries in China makes upper Argun highly polluted. Wildfires annually affect vegetation in most of the Argun valley. In both lakes, over-fishing results in exhaustion of resources. Over-grazing is resulting in desertification in the area surrounding Dalai Lake. In the past, during the dry phases of the climate cycle, populations of rare species have been especially vulnerable to human pressure, for example rare birds practically halt breeding.

37. The mean annual temperature in Dauria has already increased by 2 ºC and more prolonged and severe droughts are predicted within the natural cyclical pattern, resulting in low grass productivity, higher evaporation, a greater competition for remaining waterbodies between humans, cattle and wildlife.

38. The impacts of climate change and resulting water shortages are being intensified by the accelerating unsustainable development that threatens both the traditional lifestyle, as well as biodiversity. Mongolian nomadic tribes of the past have been adapted to the naturally occurring temporal and spatial changes in the availability of water. With increasing numbers of stationary settlements and their associated infrastructure, however, the traditional way of life is rapidly changing, and various demands for the scarce water resources increase.

39. The following developments are known to threaten wetlands in the Argun River basin:

- Transfer of some 1.05 km^3 of water annually from the Hailaer (Argun) River to Dalai Lake (already in operation since 2009): This causes concern about pollution concentrating in the lake which threatens public health and security, fisheries, and tourism, as well as about allowing for starting large-scale industrial water supply to mines from this Ramsar wetland. The transfer disrupts the natural wet-dry cycle, completely changing ecological character of the site, and hence threatening to degrade the biodiversity and productivity of the lake.
- Water consumption from new reservoirs in China tributaries -1.0 km^3. annually (under construction)

- Illegal water pipelines from Dalai Lake to mining sites (stopped after Ramsar Secretariat inquiry)
- Water transfer scheme from the Kherlen River to Gobi Desert (Mongolia's National Water Programme)
- Oil fields under development in China and Mongolia have an associated risk of pollution and change in hydrology
- Coal mines and thermal power stations in river valleys cause thermal pollution and may change hydrology
- Expansion of polluting industries along some tributaries in China (on-going)
- Discharge of municipal sewage from Hailaer and Manzhouli cities in China (growing)
- Irrigation schemes along the Hailaer and Khalkh rivers (underway)
- Khalkh (Halahahe) River – water transfer in China (under an Environmental Impact Assessment in 2010)
- Massive embankment construction along Argun River in China and Russia (on-going).

40. Cumulative impacts may be significant, thus several projects in China may reduce the flow of the Argun River along the Russian-Chinese border at Muntaya by 50 to 60 per cent, drastically reducing flooding on which well-being of wetlands depends.

41. Most serious of all, the traditional capacity for adaptation to climate fluctuations is being rapidly decreased in the countries of Dauria, and risky projects like stabilizing level of Dalai Lake, or massive tree-planting in grasslands and wetlands are being presented as valid "adaptation to climate change".

Transboundary wetland management

42. On-site management is relatively weak at all three sites, however the greatest challenge is ensuring proper water allocation to wetlands basin-wide.

43. The Dalai National Nature Reserve in China can enforce minor prohibitions, but it cannot prevent mining, infrastructure development or stop influx of settlers in the area. The other two sites have no protection measures in place yet.

44. The Dauria International Protected Area (DIPA) was created by Mongolia, China and Russia in 1994 to protect and study biodiversity of the region. It includes Dalai Lake as well as two Ramsar sites of Torey-Uldz Basin with similar ecological character. While all major lakes of Dauria are Ramsar sites, floodplains receive little protection and are found only in the Mongol Daguur Biosphere Reserve.

45. In 2006, the trilateral Joint Committee of DIPA approved a plan to expand and upgrade the nature reserves of the DIPA, including expansion to the Argun floodplain and Buir Lake. Since 2007, the government of the Zabaikalsky Province and the Daursky Biosphere Reserve work on an expansion of the Biosphere Reserve to the Argun River floodplains and in late 2009 they agreed on establishing a wide cooperation zone of the Biosphere Reserve in 6 districts of Zabaikalsky Kray along the national border with Mongolia and China.

46. Despite the fact that bilateral agreements on transboundary waters exist between all three countries of the basin they do not contain provisions for joint measures in wetland conservation, sustaining environmental flows or adaptation to climate change. Dialogue on transboundary waters is has very limited scope and goes with great difficulties.

47. The lack of transboundary coordination in planning water use and regional development will lead to a drastic deterioration of environment of Dauria, perhaps irreversibly. Water diversion and reservoir projects serve as worrying precedents stimulating the growth of water consumption in this arid region with making unilateral poorly thought-out decisions.

48. It is possible to reverse the negative trends by

1) Establishment of a Chinese-Russian-Mongolian intergovernmental task force on economic and ecological adaptation of management policies in Dauria to changing climate conditions;

2) Signing an agreement on environmental flow norms for transboundary rivers of the Argun sub-basin and provisions for sustaining natural dynamics of water allocation to wetlands;

3) Setting up a wetland monitoring system to measure the effects of climate change and human impacts;

4) Enhancing the network of protected wetland areas to provide for migration and breeding of species and to preserve the key hydrological features and all important refugia during drought period; and

5) Implementing an awareness-raising programme on climate adaptation in transboundary Dauria

V. Ussuri sub-basin[9]

49. The 897-km long Ussuri River[10] originates in the Sikhote-Alin Mountains, forms a part of the border between China and the Russian Federation, and discharges to the Amur.

Table 5
Area and population in the Ussuri sub-basin

Country	*Area in the country (km^2)*	*Country's share %*	*Population*	*Population density (persons/km^2)*
China	57 000	30		
Russian Federation	136 000	70		
Total	**193 000**			

Hydrology and hydrogeology

50. Surface water resources in the Russian part of the sub-basin are estimated at 9.678 km^3/year (based on observations at the Kirovsk gauging station from 1952 to 2009).

51. Transboundary groundwaters in the sub-basin occur in alluvial aquifers linked to the river, and consequently there is little transboundary flow.

[9] Based on information provided by the Russian Federation and the first Assessment of Transboundary Rivers, Lakes and Groundwaters

[10] The river is also known as the Wusuli

Pressures and status

Table 6
Total withdrawal and withdrawals by sectors

Country	*Year*	*Total withdrawal* $\times 10^6$ m^3/*year*	*Agricultural* %	*Domestic* %	*Industry* %	*Energy* %	*Other* %
China							
Primorsk Krai, Russian Federation	2009 ?	291.85	62.6	7.4	4.5	1.7	23.8
Khabarovsk Krai, Russian Federation	2009	5.64	12.6	45.9	3.1	17.1	21.3

52. Catastrophic floods occur on the river.

53. From 2001 to 2005 the water quality in general was mostly ranked as moderately polluted or polluted (class 3 or 4) according to the Russian classification system.

Future trends

54. The Russian Federation predicts total water withdrawal to increase in 2010 by more than 60 per cent compared with the year before.

55. In the Habarovsk Krai, the relative share of withdrawals for industrial purposes is predicted by the Russian Federation to increase by two per cent units, and the total withdrawal to increase by more than 30 per cent in 2011 compared with 2009.

VI. Lake Khanka/Xingkai

56. Khanka/Xingkai Lake is the largest freshwater lake in Northeast Asia, located on the border between China and the Russian Federation. The lake's overall size is 4,520 km^2. It is connected with the Ussuri River through River Song'acha which is the lake's outlet. The Muling River floodwater makes up most of the water input from the Chinese part of the lake basin.

57. The total population in the lake basin is 345,000 with a population density of more than 20 inhabitants/km^2. DDT and other groups of pesticides have been found in the Russian part but only the COD value has seriously exceeded the accepted standard. Despite the reduction nitrogen and phosphorus concentrations the lake is still eutrophic.

58. For more information, see the separate assessment of the Ramsar sites related to Khanka/Xingkai Lake.

VII. Lake Khanka/Xingkai wetlands (China, Russian Federation)[11]

General description of the wetland

59. Russia and China have designated parts of Lake Khanka/Xingkai[12] as well as surrounding areas as Wetlands of International Importance under the Ramsar Convention[13]. The lake has tectonic origin, and 70 per cent of it is located within Russian boundaries and 30 per cent in China. The lake is situated at 69 m a.s.l., with a water depth varying from 4.5 m to 6.5 m. The Ramsar sites include around one third of the total water area of Khanka/Xingkai Lake and surrounding lowland forests, swamps, marshes, and small freshwater lakes as well as rice paddies and managed meadows. In China, Xingkai Lake consists of greater Xingkai Lake and Lesser Xingkai Lake. The two lakes are separated by narrow forested sand dunes, with a maximum width of 1 km in dry season. In summer, the two lakes are connected with each other. The Lake Khanka/Xingkai has 23 inflowing rivers (8 from China and 15 from Russia) draining the basin area of 16,890 km^2. The Song'acha River is the only outflow river from the lake, and is subsequently connected with the Ussuri River and the Amur (Heilong) River system.

Main wetland ecosystem services

60. The area is important in terms of its functions in groundwater recharge and discharge as well as in flood regulation. Furthermore, it plays an important role as a source of drinking water, and irrigation for 20,000 ha of rice paddies in China. Both sides of the lake are important for fisheries, in particular for the white fish *Chanodichthys erythropterus* one of the most appreciated fish species in China. Every year, the site supplies 2,000 tons of white fish to the market. The lake is also an important resort on the Chinese side, attracting at least 1 million people annually. Ecotourism is being developed on the Russian side where recreational fishing is an important activity.

Cultural values of the wetland area

61. Some 6,000 years ago, the ancient ethnic people of "Man" thrived around Xingkai Lake, and had created a special fishing and hunting culture. In Qing Dynasty the entire lake had been set as non-hunting/non-fishing area for 200 years.

Biodiversity values of the wetland area

62. Xingkai Lake is one of the key staging sites for migratory birds along the East Asian – Australasian Flyway in spring and autumn. Especially during late March and early April, more than 35,000 migratory birds roost at the outlet of the lake, while the lake and

[11] *Sources*:
Wang, F. International cooperation in Xinkaihu. (in Chinese and in Russian). Xinkaihu National Nature Reserve 2007.
Andronov. V.A. State of nature reserves in Russian Far east Federal District in 2004-2005. Report and presentation at a Conference dedicated to 15th anniversary of Khankaisky Zapovednik. Spassk Dalny. 2006.
Simonov, E., Dahmer, T. Amur-Heilong River Basin Reader. Ecosystems LTD, Hongkong. 2008.
Li, X. M. Wetlands of Heilongjiang basin and their protection (in Chinese). Monograph. North East Forestry University Publishers, Harbin, Heilongjiang, China. 2006.
Dahmer, T. Review of Wetland Biodiversity Conservation Management in the Sanjiang Plain. Project report, Sanjiang Plain Wetlands Protection Project, Asian Development Bank and Global Environment Facility, September 2003
http://khanka.zapoved.ru/

[12] The lake is known as Lake Khanka in the Russian Federation and as Lake Xingkai in China.

[13] The total water area within the Ramsar sites makes up 1247 km^2 in China and 59.5 km^2 in Russia.

associated wetlands can host about 500,000 individuals of waterfowl (*Anseriformis*) during mass migration in autumn. The wetlands are also important breeding habitats for endangered and vulnerable species, such as the Red-crowned Crane (*Grus japonensis*), Oriental Stork (*Ciconia boyciana*), White-naped crane (*Grus vipio*), Lesser White-fronted Geese (*Anser erythropus*), Chinese Egret (*Egretta eulophotes*) and White-naped Crane (*Grus vipio*). Other species include the Black-crowned Night Heron (*Nycticorax nycticorax*), White Spoonbill (*Platalea leucorodia)*, Whistling Swan (*Cygnus colmbianus*) and Mandarin Duck (*Aix galericulata*).

63. Additionally, the site hosts rare mammal species such as the Mountain Weasel (*Mustela altaica*) and is occasionally visited by the Amur (Siberian) Tiger (*Panthera tigris altaica*). The most vulnerable species are the Chinese soft-shell turtle (*Trionyx sinensis)* for which Lake Khanka/Xingkai is the main breeding habitat within the Amur basin and the Mountain Grass Lizard (*Tachydromus wolteri*) – for which it is the only habitat in Russia.

64. At least 68 fish species have been recorded, among them Amur Whitefish *Coregonus ussuriensis* and Burbot (*Lota lota)* and the Amur Pike (*Esox reicherti)*. Many ancient fish species occur in the area, such as the Common Carp (*Cypinus carpio*), the Golden Carp (*Carassius auratusgibelio)* and 13 other species.

Pressure factors and transboundary impacts

65. About 80 per cent of the wetlands around Khanka Lake have been converted into rice paddies and grain fields resulting in heavy pollution of water and soil in both countries. Furthermore, the lakeshore in China undergoes intensive tourist development and has been altered by the construction of long embankments. The remaining wetlands are threatened by the fast development. Especially the restoration of rice-paddies on the Russian side (supported by China), which had mostly been abandoned 20 years ago will have an impact on the ecosystem. Human-made fires lead to the degradation of ecosystems and further deforestation of the area, especially in Russia. The over-harvesting of fish leads to extirpation of valuable species and cross-border poaching is a major concern for border guards. There has been local extinction of at least one species of bird (Asian Crested Ibis *Nipponia Nippon*). Despite these problems, Lake Khanka/Xingkai is not covered by the Sino-Russian bilateral agreement on aquatic biological resources conservation in the Amur and Ussuri Rivers.

Transboundary wetland management

66. Xinkaihu National Nature Reserve in China (established in 1986) is managed by the "Committee for Khanka Lake Nature Reserve". The management of the Chinese reserve has recently been improved due to local demands for legislation and its involvement in a number of international and national programs including Global Environment Facility – Asian Development Bank "Sanjang" Wetlands Project, Northeast Asia Crane Network, among others.

67. The Russian Khankaisky Zapovednik (Strict Scientific Nature Reserve; established in 1990) consists mainly of pristine wetlands surrounding the lake. It is managed by an administrative body which reports to the federal level. It has relatively strong enforcement capabilities and a very efficient environmental education unit conducting region-wide public-outreach activities.

68. A Joint Commission was established for the implementation of the 1996 agreement between China and the Russian Federation by which the Lake Khanka/Xingkai transboundary nature reserve was created to ensure the mutual benefit of the two reserves as well as regular communication. Both reserves conduct coordinated annual birds surveys, water quality monitoring (facilitated since 2006 by a Sino-Russian Joint Monitoring Program on Water Quality of Transboundary Water Bodies) and various joint education

and awareness-raising activities. In 2006-2007, both the Russian and Chinese reserve received biosphere reserve status.

VIII. Sujfun Basin[14]

69. The Sujfun River[15] rises in China in the East-Manchuria highlands and flows through the Russian Federation's territory before discharging to the Sea of Japan. The Granitnaya River is a transboundary tributary.

70. The average elevation of the basin is 434 m .a.s.l.

Table 7
Area and population in the Sujfun Basin

Country	*Area in the country (km^2)*	*Country's share %*	*Population*	*Population density (persons/km^2)*
Russian Federation	6 820	40.5		
China	10 010	59.5		
Total	**16 830**			

71. Surface water resources in the Sujfun Basin are estimated at 2.252 km^3/year (average for the years from 1936 to 2006) at the Terehovka gauging station. Of this amount, 1.514 km^3/year (67 per cent) is estimated to flow to the Russian Federation's territory from China.

Pressures

72. Annual flooding is severe in the basin.

73. In the Russian part of the basin, water withdrawals for domestic and industrial uses are the biggest.

Table 8
Total withdrawal and withdrawals by sectors

Country	*Year*	*Total withdrawal $\times 10^6$ m^3/year*	*Agricultural %*	*Domestic %*	*Industry %*	*Energy %*	*Other %*
Russian Federation	2009	24.7	0.2	43.4	37.7	0	18.7
China							

[14] Based on information provided by the Russian Federation and the first Assessment of Transboundary Rivers, Lakes and Groundwaters

[15] In the Russian Federation the river is known as the Razdolnaya.

Future trends

74. Total water withdrawal in the Russian part of the basin is predicted to increase by almost 30 per cent in 2011 compared with 2009. The shares of withdrawals by different sectors are expected to stay unchanged.

IX. Tumen Basin[16]

75. The 549-km long Tumen forms the border of the Democratic People's Republic of Korea with China and further downstream with the Russian Federation[17].

Table 9
Area and population in the Tumen Basin

Country	*Area in the country (km^2)*	*Country's share %*	*Population*	*Population density (persons/km^2)*
China	23 660	70		
Democratic People's Republic of Korea	10 140	30		
Russian Federation	26	0.01		
Total				

Notes: The figures for China and the Democratic People's Republic of Korea are estimates.

Hydrology and hydrogeology

76. The surface water resources are estimated at 10.1 km^3/year (essentially the discharge at the mouth; the average for the years from 1934 to 2000).

77. The river bed changes in its downstream part because of the light soils.

78. In the Russian part of the basin, transboundary groundwaters occur in alluvial aquifers linked to the river and consequently there is little transboundary flow.

Pressures and status

79. Industrial wastewaters exert pressure on the water resources. The main sources are in the Democratic People's Republic of Korea, including iron mining in Musansk and industries at Undoksk (production of chemicals, paper and sugar). Industrial pollution in China has been decreasing. Discharges of municipal wastewaters in the Democratic People's Republic of Korea and in China are another major pressure factor. There is almost no anthropogenic pressure in the very small part of the basin that is Russian territory; the area consists of wetlands of the Hasansky natural park. Erosion of the left riverbank, shifting the riverbed further into the Russian Federation, causes problems.

[16] Based on information provided by the Russian Federation and the first Assessment of Transboundary Rivers, Lakes and Groundwaters

[17] The river is also known as the Tumannaya.

Response and future trends

80. Fortification of the river bank, especially on the border between the Democratic People's Republic of Korea and the Russian Federation, was initiated in 2004. Preparing a trilateral agreement between China, the Democratic People's Republic of Korea and the Russian Federation which would provide for joint measures on monitoring and assessment as well as water-quality targets, is very important for improving water quality in the Tumen River.

81. Urbanization and the destruction of wetlands threatening the important breeding grounds of birds in the basin and adjacent areas in the Democratic People's Republic of Korea call for wetland protection and restoration measures.