CHAPTER 2
DRAINAGE BASINS OF THE SEA OF OKHOTSK AND SEA OF JAPAN

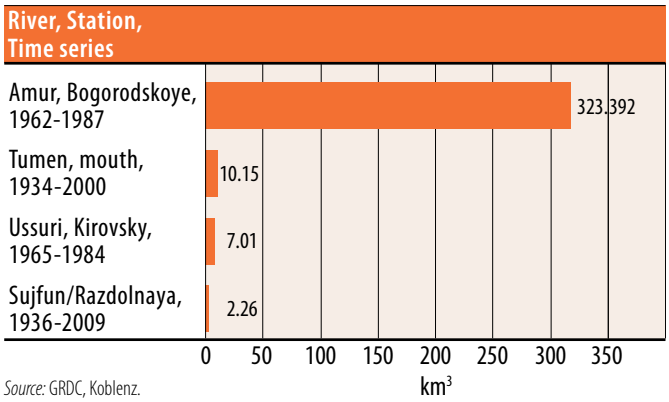
This chapter deals with the assessment of transboundary rivers, lakes and groundwaters, as well as selected Ramsar Sites and other wetlands of transboundary importance, which are located in the basins of the Sea of Okhotsk and the Sea of Japan.

Assessed transboundary waters in the drainage basins of the Sea of Okhotsk and the Sea of Japan

Basin/sub-basin(s)	Recipient	Riparian countries	Lakes in the basin	Transboundary groundwaters within the basin	Ramsar Sites/wetlands of transboundary importance
Amur	Sea of Okhotsk	CN, MN, RU		*Middle Heilongjian-Amur River Basin (CN, RU)*	
- Argun/Hailaer	Amur	CN, RU			Daurian Wetlands: (CN, MN, RU)
- Ussuri/Wusuli	Amur	CN, RU	Lake Khanka/ Xingkai		Xingkai Lake National Nature Reserve — Lake Khanka: (CN, RU)
Sujfun/Razdolnaya	Sea of Japan	CN, RU			
Tumen/Tumannaya	Sea of Japan	CN, KP, RU			

Note: Transboundary groundwaters in italics are not assessed in the present publication.

Long-term mean annual flow (km^3) of rivers discharging to the Sea of Okhotsk and the Sea of Japan



Source: GRDC, Koblenz.

AMUR RIVER BASIN[1]

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

The most important transboundary tributaries of the Amur are the Argun/Hailaer and the Ussuri/Wusuli. 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 in the basin; among them the transboundary Lake Xingkai/Khanka (in the sub-basin of the Ussuri/Wusuli River) and Buirnuur/Beier (in the sub-basin of Argun/Hailaer River). In the Russian part of the Amur Basin, lakes and reservoirs make up some 0.6% of the area.

Basin of the Amur River

Country	Area in the country (km^2)	Country's share (%)
China	902 300	43
Mongolia	195 263	9
Russian Federation	1 003 000	48
Total	**2 100 563**	

Note: The share of the Democratic People's Republic of Korea of the basin in the Lake Tianchi watershed at the source of the Sungari/Songhua is extremely small (0.005%).
Sources: Chinese Academy of Engineering (2007); Statistical Yearbook of Mongolia 2010 (preliminary), Office of National Statistics, Mongolia.

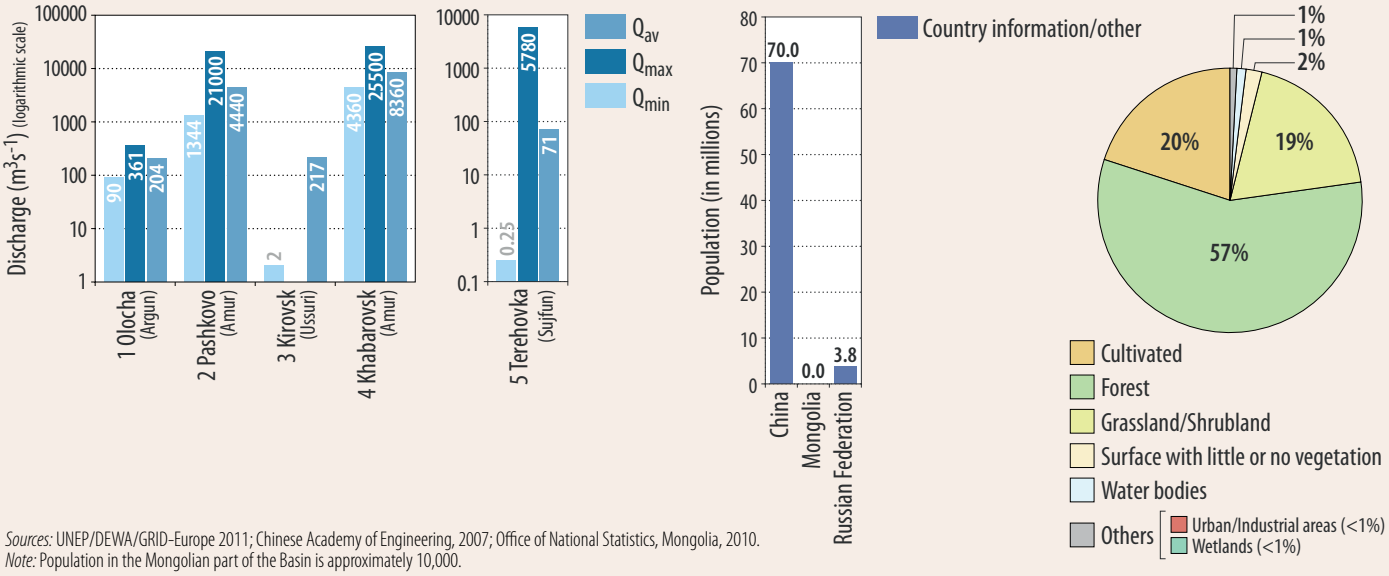
Hydrology and hydrogeology

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% of this amount to flow from outside its territory.

Groundwaters are in alluvial aquifers connected to the river which forms the State border; there is consequently little transboundary flow.

[1] Based on information provided by the Russian Federation and the First Assessment.

DISCHARGES, POPULATION AND LAND COVER IN THE AMUR RIVER BASIN



Sources: UNEP/DEWA/GRID-Europe 2011; Chinese Academy of Engineering, 2007; Office of National Statistics, Mongolia, 2010.
Note: Population in the Mongolian part of the Basin is approximately 10,000.

Pressures and status

In China part of the main pressures on the basin are from agriculture (affecting both quality and quantity), industrial pollution, flow regulation by hydropower dams, mining, sewage and waste management in cities, wetland degradation and water withdrawals in dryer western part of the basin. Pressures are most developed in the Sungari/Songhua sub-basin.[2]

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

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

Responses

Management measures related to 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 as key in achieving good status of waters in the Amur Basin. River bank protections are being built on the Amur in 2011 in the town Blagoveshchensk.

In the Russian area of the Amur Basin, there are 651 protected areas — including ones for water protection purposes — with a total area

[2] *Source:* On Some Strategic Questions in water and land resource allocation, environment and sustainable development in North East China. Summary Report. Shen Guo Fang, et al. (eds) Chinese Academy of Engineering. Chinese Academy of Engineering Publishing, Beijing.), 2007. Volume: Water Resources pp 7-8.

Total water withdrawal and withdrawals by sector in the Amur Basin

Country	Year	Total withdrawal $\times 10^6$ m^3/year	Agricultural %	Domestic %	Industry %	Energy %	Other %
China	2003	35 500	69	10	21	[a]	-
	2030	53 180	74[b]	9	17	[a]	-
Russian Federation	2010	1 179	21.6	26.8	46.3	38.6[a]	5.3

[a] Included in industry.
[b] Expected increase in water for agriculture in China partly related to plans to convert much of upland cropland into irrigated paddy-fields.
Note: The share of groundwater of the total water use in the Russian Federation's part of the basin is about 37%.
Source (information on China): Chinese Academy of Engineering. On Some Strategic Questions in water and land resource allocation, environment and sustainable development in North East China. Summary Report. Shen Guo Fang, et al. (eds) Chinese Academy of Engineering. Chinese Academy of Engineering Publishing, Beijing.), 2007. Volume: Water Resources pp 7-8.

of 117,224 km^2 (11.7% of the Russian area of the basin). In Mongolia protected areas occupy 24,560 km^2 and in China 142,630 km^2 (about 13% and 16% of the Mongolian and Chinese areas of the basin, respectively).[3]

Since 2005, when a major accidental spill in the upper Sungari/Songhua River[4] draw attention to pressing problems, China has implemented a comprehensive programme to reduce industrial and municipal pollution, with considerable investment from central and local governments. However, up to 2005, a significant share of water pollution in the Sungari/Songhua came from non-point sources.[5]

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

Trends

Improvement of the ecological and chemical status of the river depends heavily on pollution control in China.

ARGUN/HAILAER SUB-BASIN[6]

The 1,620-km long Argun/Hailaer River originates in China. The upper part of the Argun in China is called Hailaer. After the Mutnaya Channel connects it to the Dalai/Hulun Lake, for 940 km the river act as the Sino-Russian border and finally, after confluence with the River Shilka, forms the Amur River.

The basin has a hilly character, with the mean elevation in the range from 530 to 600 m a.s.l.

Hydrology and hydrogeology

Groundwaters are in alluvial aquifers connected to the river which makes up the State border, consequently there is little transboundary flow.

Pressures

The Russian Federation assesses as severe the pollution of the river from industrial discharges to the river in the Chinese area of the basin, which occur regularly during wintertime between the villages of Molokanka and Kuti.

Sub-basin of the Argun/Hailaer River

Country	Area in the country (km^2)	Country's share (%)
China	164 304	69
Russian Federation	49 100	21
Mongolia	23 443	10
Total	**236 847**	

Sources: On Some Strategic Questions in water and land resource allocation, environment and sustainable development in North East China. Summary Report. Shen Guo Fang, et al. (eds) Chinese Academy of Engineering, Chinese Academy of Engineering Publishing, Beijing. 2007 Volume: Water Resources pp 7-8; Statistical Yearbook of Mongolia 2010 (preliminary), Office of National Statistics, Mongolia.

In 2008, a canal was built in China for transferring some 1.05 km^3/year from the river into Dalai/Hulun Lake (see box on the Daurian wetlands for details on pressures).

Status and responses

Compared with the mid-1990s, deterioration of water quality in the Russian Federation downstream from the border with China is demonstrated by increased concentrations of copper, zinc, phenols and oil products in the river.

The overall water quality in the river downstream from the border with China has been classified according to the Russian classification as "polluted" or "very polluted".

In 2006, an agreement was signed between adjacent provinces of the Russian Federation and China on cooperation related to the protection of water quality and the ecological status of the Argun/Hailaer River, and a plan for joint water quality monitoring was approved.

Trends

As described in the box on the Daurian wetlands, new water infrastructure projects are planned for the river in China.

The Russian Federation predicts its water withdrawal to decrease less than 4% 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.

Total water withdrawal and withdrawals by sector in the Argun/Hailaer sub-basin

Country	Year	Total withdrawal $\times 10^6$ m^3/year	Agricultural %	Domestic %	Industry %	Energy %	Other %
China	2003	200	40	20	40	-	-
	2030	970	60	10	30	-	-
Russian Federation	2010	63.44	0.02	30.8	66.2	4.1	3.0

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

[3] *Source:* WWF-IUCN database on protected areas.
[4] *Source:* The Songhua River Spill, China, December 2005 - Field Mission Report. UNEP.
[5] *Source:* ADB Technical Assistance Project on Songhua River Water Quality and Pollution Control Management 2005.
[6] Based on information provided by the Russian Federation and the First Assessment.

DAURIAN WETLANDS IN THE ARGUN/HAILAER SUB-BASIN[7]

General description of the wetland area

The Argun/Hailaer River in the Dauria Steppe supports a globally significant network of wetlands. The network includes the following transboundary wetlands: 1) Argun/Hailaer River transboundary floodplains[8] (200,000 ha, shared by the Russian Federation and China, 40% and 60% 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[9] (104,000 ha, of which the lake covers 61,500 ha).

The Transboundary stretch of the Argun/Hailaer from the confluence of the Mutnaya River[10] to Priargunsk includes 2,000 km^2 of wide floodplain, rich in biodiversity.

The large, shallow Dalai/Hulun Lake is the most prominent natural feature of the Argun/Hailaer River Basin in China. It receives the waters of the Kherlen and Wuershun rivers from Mongolia.

Buir Lake shared by Mongolia and China is fed by the Khalkh River, with headwaters in China.

The Dauria Steppe's natural climate cycle, with a span of 25-40 years, is the major force shaping regional ecosystems and lifestyles. The pulsating Dalai/Hulun Lake body 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 as the increase in number of ecological niches as well as diversity in water bodies is of key importance in sustaining biodiversity and productivity of the ecosystems.

Main wetland ecosystem services

The Daurian wetlands provide the following main ecosystem services: water retention in a semi-arid region; cyclical change in water levels, which sustains river floodplains and supports productivity and dynamic diversity of successional lake habitats; faunal refuges in times of drought; bird migratory routes and stop-over sites; high biological productivity, breeding areas for aquatic fauna; groundwater recharge and discharge; flood control, storm protection, flow regulation; sediment retention and nutrient cycling, accumulation of organic matter; and climate regulation.

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

The Upper Argun/Hailaer River is the source of municipal water supply for southeast Zabaikalsky province in the Russian Federation and Hulubeier in China, as well as a water source for industry, mining enterprises and agriculture. Local farming communities heavily depend on the Argun/Hailaer 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/Hulun and Buir lakes sustain important fishing enterprises, with just Dalai Lake Fishing Farm producing up to 10,000 tons of fish per year. The lake supports numerous tourist camps and resorts. The grasslands on the lakeshores support a total of 2 million livestock. Both lakes are important sources of water for livestock farms and mining enterprises. The Khalkh River supports municipalities and irrigated agriculture in both China and Mongolia. Altogether approximately 2 million people directly depend on wetlands of the Argun/Hailaer River Basin.

Cultural values of the wetland area

The nomadic lifestyle of Mongolian tribes is the key cultural value of the Dauria – and for centuries has been the most effective socio-economic adaptation to climate fluctuations. Lakes and river valleys have many sacred places where locals worship deities and organize religious festivals. Many areas are associated with Genghis Khan, and there are several archeological sites. Buir Lake's shores contain important memorials of the Kahlkhin-Gol Battle of 1939.

Biodiversity values of the wetland area

The wetlands in the Argun/Hailaer sub-basin host the nesting sites of rare birds, as well as several million migrating waterbirds. Almost 300 bird species have been recorded. There are 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.

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.

Pressure factors and transboundary impacts

Wastewater from upstream industries in China makes the Upper Argun/Hailaer highly polluted. Wildfires annually affect vegetation in most of the Argun/Hailaer valley. In both lakes, over-fishing results in exhaustion of resources. Over-grazing is resulting in desertification in the area surrounding Dalai/Hulun Lake. During the dry phases of the climate cycle, populations of rare species have been especially vulnerable to human pressure.

Since 1960 the mean annual temperature in Dauria has already increased by 2° C and more prolonged and severe droughts are predicted, resulting in low grass productivity, higher evaporation, a greater competition for remaining water between humans, cattle and wildlife.

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 adapted to the naturally occurring changes in the availability of water, but this is rapidly changing, with increasing numbers of stationary settlements and demand for water.

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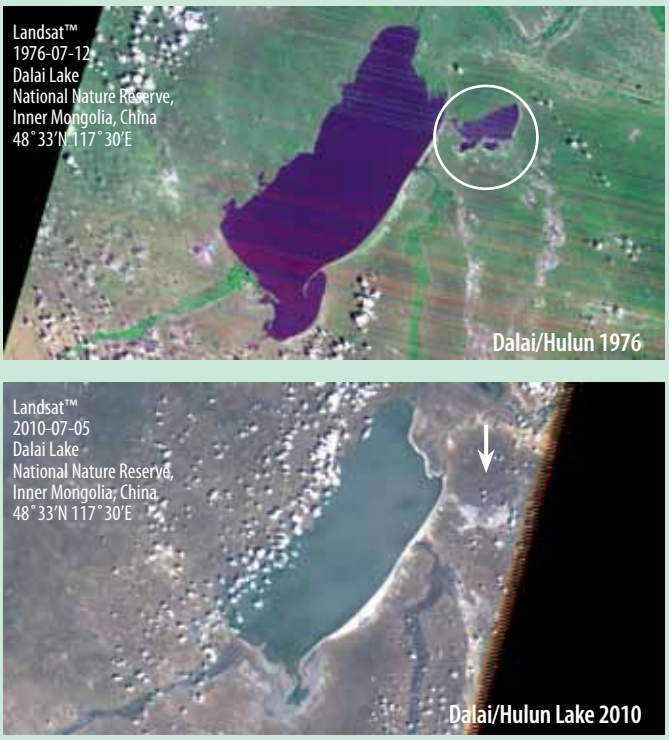
[7] *Sources:* Kiriliuks, V., Goroshko, O. DIPA -10 years of cooperation. Express, Chita. 2006; Simonov, E., and others, Transboundary conservation of wetlands in Dauria and adaptation to climate change. International Congress for Conservation Biology. Beijing, July 2009. Report at Wetlands Conservation Section; 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.

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

[9] The establishment of a nature reserve is planned by the Mongolian Government.

[10] The Mutnaya River is also known as Xinkaihe Canal.

FIGURE 1: Two satellite images of the Dalai/Hulun Lake demonstrating the drying and filling dynamics of water bodies with the climatic cycle. "New Dalai" — a shallow depression in the West of Lake Dalai/Hulun (circled) — dries up very regularly (2-3 times during the 20th century).



The following developments are known to threaten wetlands in the Argun/Hailaer sub-basin:

- Transfer of some 1.05 km^3 of water annually from the Argun/Hailaer River to Dalai/Hulun Lake (already in operation since 2009). This causes concern about pollution concentrating in the lake, threatening 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 the ecological character of the site, and threatening to degrade the biodiversity and productivity of the lake.
- Disruption of the flow regime in the Argun/Hailaer River caused by Hailaer-Dalai water transfer will be further exacerbated by growing water consumption from 10 new reservoirs on tributaries in China — some already built, some planned — all together providing for withdrawal of more than 1.0 km^3 annually.
- Illegal water pipelines from Dalai/Hulun Lake to mining sites (the project was stopped after a Ramsar Secretariat inquiry in 2008).
- Water transfer scheme from the Kherlen River to the 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 (a growing pressure).
- Expansion of polluting industries along some tributaries in China.
- Discharge of municipal sewage from Hailaer and Manzhouli cities in China (growing).
- Irrigation schemes along the Hailaer and Khalkh rivers.
- Planned Khalkh (Halahahe) River – water transfer to Xilingol coal mines in China to develop thermal power generation (under an Environmental Impact Assessment in 2010).
- Massive embankment construction along Argun/Hailaer River in China and the Russian Federation.

Cumulative impacts may be significant, thus several projects in China may reduce the flow of the river along the Russian-Chinese border at Mutnaya by 50 to 60%, drastically reducing the flooding on which the well-being of wetlands depends.

Most serious, the traditional capacity for adaptation to climate fluctuations decreases rapidly, and risky projects such as stabilizing the level of Dalai/Hulun Lake, or massive tree-planting in grasslands and wetlands are being presented as valid "adaptation to climate change".

Transboundary wetland management

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

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.

The Dauria International Protected Area (DIPA) was created by Mongolia, China and the Russian Federation in 1994 to protect and study the biodiversity of the region. It includes Dalai nature reserve as well as two Ramsar Sites of adjacent transboundary Torey Lakes-Uldz River Basin with similar ecological character (protected by Daursky Biosphere Reserve in Russia and Mongol-Daguur Biosphere Reserve in Mongolia). While all major lakes of Dauria are Ramsar Sites, floodplains receive little protection.

In 2006, the trilateral Joint Committee of DIPA approved a plan to expand and upgrade the nature reserves, including expansion to the Argun/Hailaer floodplain and Buir Lake. In late 2009 the government of the Zabaikalsky Province and the Daursky Biosphere Reserve agreed to establish a wide cooperation zone of the Biosphere Reserve in 6 districts of Zabaikalsky Kray, along the national border between Mongolia and China.

Bilateral agreements on transboundary waters between all three riparian countries do not contain provisions for joint measures for wetland conservation, sustaining environmental flows or adapting to climate change. Dialogue on transboundary waters has very limited scope and faces great difficulties, which will lead to drastic and perhaps irreversible deterioration of the Dauria environment. Unilaterally-decided water diversion and reservoir projects serve as worrying precedents stimulating the growth of water consumption in this arid region.

It is possible to reverse the negative trends by:

- Establishing a Chinese-Russian-Mongolian intergovernmental task force on economic and ecological adaptation of management policies in Dauria to changing climate conditions;
- Signing an agreement on environmental flow norms for transboundary rivers of the Argun/Hailaer sub-basin and provisions for sustaining natural dynamics of water allocation to wetlands;
- Setting up a wetland monitoring system to measure the effects of climate change and human impacts;
- 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 refuges during a drought period; and,
- Implementing an awareness-raising programme on climate adaptation in transboundary Dauria.

USSURI/WUSULI SUB-BASIN[11]

The 897-km long Ussuri/Wusuli River originates in the Sikhote-Alin Mountains, forms a part of the border between China and the Russian Federation, and flows into the Amur.

Sub-basin of the Ussuri/Wusuli River

Country	Area in the country (km²)	Country's share %
China	57 000	30
Russian Federation	136 000	70
Total	**193 000**	

Hydrology and hydrogeology

Surface water resources in the Russian part of the sub-basin are estimated at 9.7 km³/year (based on observations at the Kirovsk gauging station from 1952 to 2009).

Groundwaters are in alluvial aquifers connected to the river forming the State border; there is consequently little trans-boundary flow.

Pressures and status

Catastrophic floods may occur.

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.

Trends

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

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 in 2011 is not expected to change significantly.

LAKE KHANKA/XINGKAI

Khanka/Xingkai[12] 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 km². It is connected with the Ussuri/Wusuli 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 zone of the lake basin.

The total population in the lake basin is 345,000, with a population density of more than 20 inhabitants/km². DDT and other groups of pesticides have been found in the area of the sub-basin that is Russian territory, but only the COD value has seriously exceeded the accepted standard. Despite the reduction of nitrogen and phosphorus concentrations, the lake is still eutrophic.

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

Total water withdrawal and withdrawals by sector in the Ussuri/Wusuli sub-basin

Country	Year	Total withdrawal $\times 10^6$ m³/year	Agricultural %	Domestic %	Industry %	Energy %	Other %
China	2010	6 700	85	5	10	-	-
	2030	8 000	N/A	N/A	N/A	N/A	N/A
Russian Federation	2010	58.08	27.3	21.9	49.3[a]	44.3	1.2

[a] Includes withdrawal for energy.
Source (on China): On Some Strategic Questions in water and land resource allocation, environment and sustainable development in North East China. Summary Report. Shen Guo Fang, et al. (eds) Chinese Academy of Engineering. Chinese Academy of Engineering Publishing, Beijing. 2007. Volume: Water Resources pp 7-8.

Photo by Eugene Simonov

[11] Based on information provided by the Russian Federation and the First Assessment.
[12] Based on information provided by the Russian Federation and the First Assessment.

LAKE KHANKA/XINGKAI WETLANDS[13]

General description of the wetland

The Russian Federation and China have designated parts of Lake Khanka/Xingkai as well as surrounding areas as Wetlands of International Importance under the Ramsar Convention.[14] Some 70% of the lake is located in Russia and 30% 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 the lake and surrounding lowland forests, swamps, marshes, and small freshwater lakes, as well as rice paddies and managed meadows. In China, the lake consists of Greater Xingkai Lake and Lesser Xingkai Lake, separated by narrow forested sand dunes, with a maximum width of 1 km in dry season. In summer, the two lakes connect. 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/Wusuli River and the Amur/Heilong River system.

Main wetland ecosystem services

The area is important in terms of its functions for groundwater recharge and discharge as well as 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 (2,000 tons annually). 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

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

Biodiversity values of the wetland area

Xingkai Lake is one of the key staging sites for migratory birds along the East Asian – Australasian Flyway in spring and autumn. In particular during late March and early April, more than 35,000 migratory birds roost at the outlet of the lake, while the lake and associated wetlands can host about 500,000 individual waterfowl during mass migration in autumn. The wetlands are also important breeding habitats for endangered and vulnerable species, such as the Redcrowned Crane, Oriental Stork, Lesser White-fronted Geese, Chinese Egret and White-naped Crane.

Additionally, the site hosts rare mammal species such as the Mountain Weasel and is occasionally visited by the Amur (Siberian) Tiger. The most vulnerable species are the Chinese soft-shell turtle for which Lake Khanka/Xingkai is the main breeding habitat within the Amur basin and the Mountain Grass Lizard – for which it is the only habitat in the Russian Federation.

At least 68 fish species have been recorded, among them Amur Whitefish and Burbot and the Amur Pike.

Pressure factors and transboundary impacts

About 80% of the wetlands around Khanka/Xingkai 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 is undergoing intensive tourist development and has been altered by the construction of long embankments. The remaining wetlands are threatened by fast development, particularly the restoration of rice-paddies on the Russian side (supported by Chinese capital and workforce), which had mostly been abandoned 20 years ago. Human-caused fires lead to the degradation of ecosystems and further deforestation of the area, especially in the Russian Federation. The over-harvesting of fish leads to the disappearance 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). 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/Wusuli Rivers.

Transboundary wetland management

Xinkaihu National Nature Reserve in China (established in 1986) is managed by the "Committee for Khanka Lake Nature Reserve". Its management has recently been improved due to local demands for legislation and its involvement in a number of international and national programs.

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, with relatively strong enforcement capabilities and a very efficient environmental education unit conducting region-wide public-outreach activities.

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 bird 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.

[13] *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.

[14] The total water area within the Ramsar Sites makes up 1,247 km^2 in China and 59.5 km^2 in Russia.

SUJFUN/RAZDOLNAYA RIVER BASIN[15]

The Sujfun/Razdolnaya[16] River rises in China in the East-Manchuria highlands and flows through the Russian Federation's territory before flowing into the Sea of Japan. The Granitnaya River is a transboundary tributary.

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

Basin of the Sujfun/Razdolnaya River

Country	Area in the country (km²)	Country's share (%)
Russian Federation	6 820	40.5
China	10 010	59.5
Total	**16 830**	

Surface water resources in the Sujfun/Razdolnaya Basin are estimated at 2.3 km³/year (average for the years from 1936 to 2006) at the Terehovka gauging station. Of this amount, 1.5 km³/year is estimated to be in the Russian Federation's territory.

Pressures

Annual flooding commonly reaches a high level in the basin.

Water is mainly withdrawn for domestic and industrial uses in the part of the basin within the Russian Federation.

TUMEN/TUMANNAYA RIVER BASIN

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

Basin of the Tumen/Tumannaya River

Country	Area in the country (km²)	Country's share (%)
China	23 660	70
Democratic People's Republic of Korea	10 140	30
Russian Federation	26	0.01
Total	**33 826**	

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

Hydrology and hydrogeology

The surface water resources are estimated at 10.1 km³/year (based on the years from 1934 to 2000).

Groundwaters are in alluvial aquifers connected to the river which forms the State border, there is consequently little transboundary flow.

Pressures and status

Industrial wastewaters impact 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 impacting factor. There is almost no anthropogenic pressure in the very small part of the basin that is in 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 further problems.

Responses and trends

In November 2008, the constructions to stabilize the riverbed of the river in order to consolidate the border between the Russian Federation and Democratic People's Republic of Korea, initiated in 2004, were completed. As a result, the shifting of the left (Russian) bank ceased. Before the construction, erosion of the riverbank on the Russian side by flood waters also affected wetlands.

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 river.

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 highlight the need for wetland protection and restoration measures.

Total water withdrawal and withdrawals by sector in the Sujfun/Razdolnaya Basin

Country	Year	Total withdrawal $\times 10^6$ m³/year	Agricultural %	Domestic %	Industry %	Energy %	Other %
Russian Federation	2010	24.15	0.2	83.4	16.1[a]	5.2	0.3
China	N/A	N/A	N/A	N/A	N/A	N/A	N/A

[a] Includes the withdrawal for energy.

[15] Based on information provided by the Russian Federation and the first Assessment of Transboundary Rivers, Lakes and Groundwaters.
[16] The river is called Sujfun in China and Razdolnaya in the Russian Federation.
[17] The river is known as Tumen in China and as Tumannaya in the Russian Federation.