Dauria transboundary rivers - adaptation to climate change

达乌尔地区跨界流域及气候变化适应

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RIVERS WITHOUT BOUNDARIES

See web-sites: arguncrisis.ru dauriarivers.org
CONTENTS:
1. Geographic location
2. Climate and biodiversity
3. Wetland Change Study
4. Protected areas network development
5. Water infrastructure development
6. Suggestions

Work Supported by:

RIVERS WITHOUT BOUNDARIES – РЕКИ БЕЗ ГРАНИЦ

WWF Russia and Dauria international Protected Area (DIPA)

Conservation Leadership Programme
В Амурском Бассейне расположено 15 водно-болотных угодий международного значения, 5 из них - в Даурии.

Amur Basin has 15 designated Ramsar wetlands, 5 of them in Dauria.
Geographic location of Dauria is well known to birds.

Intracontinental branch of the Eastern-Asian-Australian bird flyways in Dauria: at least 2 million birds stop at Argun River Wetlands.
Argun River Basin - Headwaters of Amur River, principle river of Dauria steppe

Amur River Basin – 2 million sq.km
Argun River Basin – 0.3 million sq.km
Average temperature for the last 55 years has risen up for 1.5-2.0°C that led to an increase of the period with positive temperatures in northern part of Daurian steppe from 165-167 to 173-179 days.
Drought cycles and flooding dynamics are important factors shaping regional biodiversity.
Dauria Drying and Reviving

- The complex natural climate cycle resulting in temporal diversity and variability in connectivity of freshwater habitats is possibly the most important driver behind ecosystem wealth and diversity in Dauria. In the course of a typical climate cycle with a 25-40 year span, ecosystems of the Daurian ecoregion are subject to drastic changes. During humid periods the steppe with large lakes and multiple small shallow pools becomes optimal habitat for most wildlife, while in dry periods most of steppe becomes highly inhospitable area and the forest-steppe and river floodplains habitats sustained by permanent flow provide smaller, sub-optimal but stable habitat.

Циклические колебания водности – важный фактор динамики экосистем Даурии.
Cyclical succession in steppe lakes

Колебания уровня великих озер Даурии
Change of water level in Dalai and Torey Lakes

Dalai Water level (m amsl)
Torey Water level (m amsl)
Ecosystems of pulsating lakes undergo dramatic cyclical successions in which the same area hosts drastically different communities and species. Dalai Lake for example can cover up to 2300 sq km and reach a depth of 7 m during a wet cycle while it was reduced to a small chain of shallow 1m deep pools during the last severe dry cycle in 1904.
Torey Lakes
(Uldz river basin) dynamics:
Change of the shore line and water volume.

In 1999 Torey lakes yielded thousand tons of fish annually, and in 2009 meadow at Barun-Torey lake bottom is a favorite pasture for Mongolian Gazelle....
Coastal plant communities change
Changes in numbers and species composition of waterbirds.
Intensity and structure of human activity depends on phases of the climate cycle.

If only the modern society could adapt to the local climate cycle, there would be no problem adapting to any changes in climate...
The Argun river at high flow

Flooding is the most important ecological process sustaining riverine wetlands.

The Argun river at low flow

Регулярные паводки – важнейший процесс поддержания экосистем Аргунской поймы.
Long-term cycles vs seasonal dynamics of river flow

ARGUN MONTHLY WATER LEVELS
May through September 1980-2005
Regular flooding sustains wetlands of Argun River.

- Flooding dynamics is different from fluctuation of lake levels. Some flooding happens even in dry years, thus sustaining for stable wetland habitat for many species. However, there is general 30-year climate cycle.
Wetland Change patterns and processes in 2000-2007 drought
Изменения сообществ водно-болотных угодий в засуху

CHANGE CLASSES BETWEEN 2000 AND 2007:

- Class 13 Wetland - no change
- Class 12 Water in place of wetland vegetation
- Class 9 Water covering grasslands
- Class 8 Water covering previously bare substrate / sparse vegetation
- Class 7 Water bodies colonized by wetland plants/ dense vegetation
- Class 2 Insignificant increase in grass cover (humidity)
- Class 10 Wetland vegetation replacing grassland and bare soil
- Class 1 Insignificant decrease in grass cover (humidity)
- Class 14 Grassland no change
- Class 11 Grassland developed in place of bare soil/sparse vegetation
- Class 5 Grass overgrowing former watercourses
- Class 6 Abrupt/strong decrease in grass density
- Class 4 Water retreats-exposure of open substrate
- Class 3 Dessication. Meadows change to bare surface
- Class 15 Bare land no change
Argun and Dalai site comparison

• In 2000-2007 Dalai and Argun wetland sites both have similar 30% of wetlands area undergoing drying. The leading change process for lakes is dropping water level with halophytic vegetation colonizing new bare substrate. For floodplains the leading process is desiccation of dense meadows and reed beds, reinforced by fires and overgrazing. In 15-20 years period drying trend is also prevalent, but habitats in areas most affected by flooding and meandering processes often shift to more humid conditions. Argun has similar degree of change during drought as Dalai Lake, but persistence of its floodplain ecosystem is more dependent on flooding dynamics, which could be altered if water infrastructure projects continue.
Cyclical re-distribution of bird populations.

It makes little sense to protect one single wetland cluster in the Daurian Ecoregion, since most of the area’s wildlife migrates among the steppe’s scattered wetlands according to 30-year drought cycle patterns.
Protected areas network development

Map of Existing PAs- 保护区 地图
Dauria International Protected Area (DIPA) was created by Mongolia, China and Russia in 1994 to protect and study biodiversity of the region. At present all the three reserves comprising original DIPA have Ramsar status (Dalai Lake (Ch), Mongol-Daguur (Mn), Daursky (Rus)).
Planned Russian Protected Area (PA) In Argun River floodplain

Transboundary ecological network – three PAs in China match planned Argun PA in Russia

Erguna Wetlands PA

Huliyetu PA

Erka PA
Northeast CHINA “Revitalization of Old industrial Bases” Policy: In projected water balance for 2030 supply does not meet demand

Chinese authorities plan:

- Increasing water supply from transboundary watercourses (Ussuri-Wusuli, Amur-Heilong, Argun-Eerguna).
- Developing water transfer schemes within the Amur-Heilong River Basin and to adjacent basins, where already achieved water deficit is much worse.
- Ten-fold increase of water consumption in Argun-Erguna River basin.
Российско-китайское соглашение об охране и использовании трансграничных вод-2008

Sino-Russian Agreement on Transboundary Waters 2008

Рабочие группы:
• по управлению водными ресурсами
• по мониторингу и охране трансграничных вод.

Agreement is not focused on basin-wide coordination and river ecosystem conservation.
Planned and implemented water infrastructure

- Hailaer-Dalai water transfer – 1.05 cubic kilometers annually

- Water consumption from new reservoirs upstream -1.0 cub. km. annually

- Mean annual flow of Argun-Hailaer 3.5 cub. km.
Водохозяйственные проекты и крупные ООПТ в средней части бассейна р. Аргунь

Переброска вод из р. Хайлар в оз. Далай

• http://arguncrisis.ru/

Планируемая переброска вод р. Халхингол на южные угольные ТЭС
Влияние проекта переброски Хайлар-Далай

Natural flow of Hailaer to Argun river

Hailaer River-Dalai Lake water transfer
Water diversion canal

Hailaer River-Dalai Lake water transfer
Hailaer River-Dalai Lake water transfer
Protected areas that could be affected by the water diversion in China – occupy 1 000 000 ha.

水利工程对自然保护区影响：
自然保护区面积 > 1000000 公顷，得到影响湿地的面积 > 380000 公顷

Seriously affected wetland ecosystems occupy 380 000 ha
Downstream impacts on riverine wetlands

- controlled river flow disrupts flood cycle, causing regional wetlands to shrink and dry up;
- decreased wetland area threatens migratory bird populations, including 19 internationally recognized endangered species;
- altered wet-dry cycle disrupts migration patterns for all species adapted to the fluctuation;
- halted flood cycle prevents soil nutrient replenishment on the floodplain, decreasing grazing pastures and hayfields downstream;
• increased drying of the local climate, causes desertification of the grasslands and croplands;
• further increase pollution levels in Argun river;
• shrinking water supply forces communities in China and Russia to use polluted water, dig deeper wells, purchase water from elsewhere, or migrate to other areas.
Alteration of flooding regime with 1.05 cubic kilometer withdrawal.

Upper Argun river Kuti Village. Modelling ordered by Amur Water Authority 2009

Моделирование влияния отбора 1,05 кубокилометра воды (по заказу АБВУ 2009)

1. Without water withdrawal

2. After water withdrawal

1. Water level dynamics in 2004 (P=50%) - 50 days of flooding – Гидрограф в д.Кути в год 50% обеспеченности (2004)

2. Water level after withdrawal – no flooding – Год 50% обеспеченности при проектном отборе воды
Impacts on Dalai Lake Ecosystem

• increased pollution from Hailaer/Argun River concentrated in the lake threatens public health and security, fisheries, and tourism.

• disrupted natural wet-dry cycle degrades lake biodiversity and productivity, converting it into a brackish reservoir.

• Excuse to start industrial water supply to mines from this Ramsar wetland
NEW THIRSTY MINING AND PROCESSING FACILITIES
(Image below: May 6, 2010, courtesy of Transparent-World NGO, Moscow)

Dalai (Hulun) Lake
Illegal water pipeline built in 2008

Wumugetushan Copper mine of China Gold Corporation with growing reservoir

Illegal water pipeline built in 2008

Dalai (Hulun) Lake
Halkh (Halahahe) River water transfer to Xilingoule coal mines – project undergoes EIA in 2010
NEW RESERVOIRS
to supply another **1.0 cub. km** annually:
1 in operation, 2 under construction, >10 planned
Example: In 2009 Huaneng Corporation started filling Honghuaerji Reservoir on Yiminhe to supply coal-fired thermal power plants
(Photo below: April 27, 2010, courtesy of Transparent-World NGO, Moscow)
Water withdrawal will further severe already acute pollution levels in transboundary Agrun river.

Высокая загрязненность реки Хайлар-Аргунь – сильно увеличится в результате уменьшения стока.
Argun Transboundary Watercourse Alteration:
Embankments built to constrain natural river meandering in a bilateral attempt to “protect Motherland” from being naturally annexed to the other side by river processes.
Costly and harmful practice, gaining popularity in China and Russia

“Защита Родины» путем берегоукрепления нарушает пойменные экосистемы трансграничной Аргуни. КНР активно ведет такие работы, Россия –планирует.

К включению Стратегию Сибири предложен сомнительный проект берегоукрепления - в пойме Аргуны на 250 миллионов рублей.
СОГЛАШЕНИЕ
МЕЖДУ ПРАВИТЕЛЬСТВОМ РОССИЙСКОЙ ФЕДЕРАЦИИ
И ПРАВИТЕЛЬСТВОМ КИТАЙСКОЙ НАРОДНОЙ РЕСПУБЛИКИ
О РЕЖИМЕ РОССИЙСКО-КИТАЙСКОЙ
ГОСУДАРСТВЕННОЙ ГРАНИЦЫ

Статья 7

...Ни одна из Договаривающихся Сторон не может без согласия другой
Стороны искусственно изменить положение русла пограничной реки

Статья 10

Вопросы, связанные с возведением, реконструкцией или сносом каких-
либо сооружений или объектов на пограничных реках, могущих повлиять на
изменение водного режима этих рек, или вопросы водопользования будут
регулироваться по согласию между Сторонами.

Вместо дорогостоящего и неэффективного
бережоукрепления следует лучше использовать механизм
взаимного контроля предусмотренный Соглашением о
режиме государственной границы

Agreement of 09.11.2006 on the regime of the Russian-Chinese border prohibits
unilateral construction of embankments, etc.

Agreement could be used to prevent undue interference with river processes
Mongolia – changing pattern of development – growing water demand for industry, irrigation and “preventing desertification”.

Развитие горнодобывающего сектора в Гоби – необходимость водоснабжения и “улучшения среды”
Самообеспечение продовольствием за счет ирригации
План переброски северных рек - Селенги, Керulen, Ульдзы и др.

- Water demand from mining industries in Gobi Desert and “Green Belt of Mongolia” anti-desertification plan
- Proposed water transfers from Selenge, Onon, Kherlen, Uldz, Baldj Rivers to Gobi Desert.
- Achieving self-sufficientcy in grain through irrigated agriculture
- 2010 National Water Programme – massive intensification of water use

Park of Mongolian-Russian Friendship on Kherlen River at Choibalsan
Парк российско-монгольской дружбы в Чойбалсане на р.Керулен
Agreements with Mongolia

- 1994—Agreement on Dauria International Protected Area
- 1994—Mongolia-China – Agreement on Use and Protection of Transboundary Waters
- 1995--Russia-Mongolia - Agreement on Use and Protection of Transboundary Waters
400 mining operations in Mongolia part of Amur River Basin

400 золотодобывающих и прочих горнодобывающих предприятий действуют в бассейнах рек Онон, Улдза, Керулен, Халх.
Представители общественности активно боролись за создание закона “О запрещении разведки и добычи полезных ископаемых в истоках рек, в зоне охраны водоёмов, в лесном фонде” (принят в 2009).

Mongolian NGOs and local herders lobbied new law “On prohibition of mining in water protection zones” (2009). Implementation is slow.
First stage – transfer of Kherlen River flow

Переброска р.Керулен - первая фаза проекта

Kherlen River-Gobi Desert water transfer
Riverscape today and tomorrow: What do we choose???

Do we want SUCH future???

Conclusions and Suggestions
1. Strategic assessment of river management options and environmental impacts in the light of climate adaptation in the Dauria region

Use "GUIDANCE ON WATER AND ADAPTATION TO CLIMATE CHANGE." and Espoo Convention Protocol on Strategic Environmental Assessment (Kiev, 2003)
• Initiate establishment of Chinese-Russian-Mongolian intergovernmental commission on economic and ecological adaptation of management policies in Dauria to changing climate conditions with the aim to ensure favorable environmental and political situation.
Suggested activities

1. Strategic assessment of river management options and environmental impacts in the light of climate adaptation in the Dauria region

Use "GUIDANCE ON WATER AND ADAPTATION TO CLIMATE CHANGE." and Espoo Convention Protocol on Strategic Environmental Assessment (Kiev, 2003)

The assessment will identify key threatening processes to the Dauria water systems and prescribe both Russian domestic and cooperative transboundary actions to prevent and remove these threats. Preparation of such policy document will introduce modern approaches to transboundary river basin management into decision-making in the region and establish links to relevant international institutions.
2. Develop environmental flow norms for the Argun and Uldz Rivers

Scientific research will be undertaken on the environmental flow requirements of the Argun and Uldz rivers during different phases of the climate cycle. The research will be collated into a technical guidance document, and the environmental flow concept will then be promoted and instituted amongst key water management agencies. This will provide the technical foundation for harmonizing bilateral water management policies with Mongolia and China.

- Results will be used to promote the critical need for implementation of the existing Sino-Russian provincial agreement on the conservation of the Argun River Basin. The project will also develop another environmental flow case-study for model transboundary Uldz river basin, where Daursky and Mongol-Daguur Biosphere Reserves are located.
Natural flow dynamics and life phases of wildlife - basis for agreeing on environmental flow
2. Agreement on environmental flow and river alteration limits

Установить совместно с КНР и Монголией нормы допустимых воздействий (НДВ) для трансграничных участков рек Аргунского бассейна:

- экологический сток
- химическое загрязнение
- радиоактивное загрязнение
- микробное загрязнение

(возможно в рамках договора о трансграничных водах)

Create Russian-Chinese and Russian-Mongolian expert groups for development and endorsement of a common methodological approach and identification of standards of acceptable impact (SAI) for environmental flow (and possibly for chemical, thermal, radioactive and microbial pollution)
Limit embankment construction and agree on free meandering of the boundary watercourse

- Добиваться строгого выполнения сторонами Соглашения между Правительством РФ Правительством КНР о режиме российско-китайской государственной границы. Поскольку берегоукрепительные работы наносят непоправимый экологический урон, то проводить их лишь в случаях острой необходимости защиты населенных пунктов от разрушения.

- It is necessary to ensure proper control of implementation of the Agreement on the regime of the Russian-Chinese border, that will limit embankment construction to vicinity of a few coastal settlements.

- In future experience of Oder River agreement on preserving free meandering may be used to design new river-friendly border agreement.
3. Transboundary ecological monitoring of Argun–Erguna and Uldz river ecosystems
3. Transboundary ecological monitoring and cooperation between experts is needed to conserve Argun – Erguna and Uldz ecosystems.

Wetland monitoring in both Argun and Uldz River basins will be enhanced by developing combined remote-sensing and field-transect monitoring methods in transboundary wetlands. This will allow scientists to measure the effects of climate change and other impacts on water levels and ecosystem health, and will help improve water management for human use and economic development.
4. Improve and interconnect protected areas network to meet challenges of climate cycles

Protection of border wetlands
4. Improve and interconnect protected areas network to meet challenges of climate cycles and other climate change

- **Wetland protected area network enhancement.**
- One of obvious key adaptation measures is development of nature reserve network that provides for migration and breeding of species in all phases of region-wide drought cycle and preserves key hydrological features and all important refugia (fragmentation avoidance, promoting connectivity, and protection of climate refuge with especially resistant habitats.
- As a first step, the spatial and temporal requirements for the conservation of all Dauria wetlands throughout all phases of the climate cycle will be analyzed. This information will be essential in informing the planning and establishment of priority protected areas. In concert with expanding the PA network, co-management projects with local herdsmen, hunters, and fishermen will be designed and negotiated.
Proposed expansion of Dauria International Protected Area

Расширение Международного заповедника «Даурия»
Creation of a cluster of the Daursky Biosphere Reserve in the Upper Argun valley and proceed with Dauria Steppe World Heritage site nomination. This will create powerful arguments for the assistance from international organizations in solving problems in Argun River area. Agree on establishment of trilateral transboundary nomination (World Heritage site or Ramsar site)

• Придать Аргуне высокий природоохранный статус: включить в состав биосферного заповедника «Даурский» и вне очереди номинировать на участок всемирного природного наследия ЮНЕСКО;
• Создать ООПТ в Монголии на озере Буир-Рамсарском угодье.
• Совместная программа охраны водно-болотных угодий поймы Аргуны (или ВБУ Бассейна Аргуны) как глобально значимого объекта (Рамсарские угодья, Участок Наследия, биосферный резерват, включение в международный заповедник и т.д.
5. On-going wareness raising and public education on water and climate adaptation in transboundary Dauria

В бассейне Амура целесообразно объединение усилий трех стран, и на примере бассейна Аргуна. Коалиция “Реки без границ уже начала отрабатывать систему взаимодействия и управления общим информационным ресурсом.

ПОЛНАЯ ИНФОРМАЦИЯ НА WWW.ARGUNCRISIS.RU
MORE ON WWW.DAURIARIVERS.ORG
http://www.ergunariver.cn/
Amur Information Center- open for partnerships
общедоступный Амурский Информационный Центр
http://amur-heilong.net/vicarr/index.php

• Для информационного обеспечения всего бассейна создан Амурский Информационный центр, учрежденный по инициативе WWF и открытый для участия экспертов и заинтересованных организаций.

Амурская хрестоматия – свод экологической информации о бассейне
5. Educational program and information sharing

- The communication strategy for Dauria that makes climate cycling/climate change and limitations/advantages it brings better understood by local people and considered by governments in key planning/decision-making.

- An awareness raising program targeting regional policy makers and local communities will provide guidance on adaptation to the cyclical availability of resources while conserving the resilience of the natural steppe and wetlands. Popularization of water-saving technologies and appropriate resource-use practices will be carried out. The pilot program may initially target Zabaikalsk in Russia and Manzhouli City in China and the mining/energy industry that has rapidly developed throughout Dauria.

- Expanding trilingual web-resources and supporting services of the Amur Information Center
Inappropriate development triggers improper water management
不合理的发展导致不合适的水资源管理模式
Thanks for Your attention