IUCN Conservation Outlook Assessment 2014 **(archived)**
Finalised on 07 November 2014

Please note: this is an archived Conservation Outlook Assessment for Lake Baikal. To access the most up-to-date Conservation Outlook Assessment for this site, please visit https://www.worldheritageoutlook.iucn.org.

Lake Baikal

SITE INFORMATION

Country:
Russian Federation
Inscribed in: 1996
Criteria:
(vii) (viii) (ix) (x)

Site description:
Situated in south-east Siberia, the 3.15-million-ha Lake Baikal is the oldest (25 million years) and deepest (1,700 m) lake in the world. It contains 20% of the world's total unfrozen freshwater reserve. Known as the 'Galapagos of Russia', its age and isolation have produced one of the world's richest and most unusual freshwater faunas, which is of exceptional value to evolutionary science. © UNESCO

SUMMARY

2014 Conservation Outlook

Good with some concerns

The conservation outlook of Lake Baikal is of concern because of ongoing pollution from the Selenga River and the industrial corridor of the Angara River as well as new emerging threats, such as large scale tourism development, nearshore eutrophication, and climate change. The decision to close the Baikalsk Paper and Pulp Mill is a positive step, but its implementation and mitigation of past negative impacts will require time and significant efforts. At the same time, the overall protection and management regime of the property remains insufficient due to an inadequate legal framework and a fragmented and overcomplicated institutional setup for the management of the site. The site's values are still well preserved and largely intact; however their long-term conservation depends on the successful closure of the mill and the overall improvement of management effectiveness, as well as measures undertaken to address the new emerging threats, particularly nearshore eutrophication. The potential of hydroelectric developments on the Selenga and Orkhon Rivers in Mongolia is of concern; however, both projects are currently at the feasibility study stage only.

Current state and trend of VALUES

Low Concern
Trend: Deteriorating

In spite of pollution, unsustainable resource use and uncontrolled tourism development, the regulatory capacity of the offshore Lake Baikal ecosystem has thus far maintained overall ecosystem status in a relatively intact state. However, this is changing for the worse in nearshore localized areas where human pressure is most intense.

Overall THREATS

High Threat

Although the sheer size and self-purification potential of Lake Baikal have so far confined the impacts of anthropogenic threats such as pollution, uncontrolled tourism development and unsustainable resource use to relatively small areas, the combined impact of persisting threats such as pollution, increasing pressure from tourism and climate change remain of significant concern. The decision to close the Baikalsk Paper and Pulp Mill is a very important step to secure the conservation of the site in the long term; however, concrete actions need to be developed to also mitigate the impacts of past industrial operations and to address new problems regarding nutrient pollution from untreated sewage in nearshore areas. The potential of hydroelectric developments on the Selenga and Orkhon Rivers in Mongolia is of concern; however, both projects are currently at the feasibility study stage only.

Overall PROTECTION and MANAGEMENT

Some Concern

The current protection and management regime of the property is ineffective in relation to the main current and emerging threats (mainly water pollution, uncontrolled development of tourism infrastructure and potentially unsustainable natural resource use). This ineffectiveness is primarily caused by the fragmented and complicated institutional setup for management, lack of integrated legal framework, as well as a number of secondary weaknesses, such as low levels of funding and differences is human resources capacities of component protected areas that make up the property.

FULL ASSESSMENT

Description of values

Values

World Heritage values

- **Oldest, deepest and largest (by volume) freshwater ecosystem in the World**
  Criterion:(vii)

  The Baikal Lake ecosystem has existed for 20 million years. It is the deepest lake in the world (1,638 m deep) and contains 23,600 km3 of freshwater (ca. 20% of the global freshwater reserves) (UNEP-WCMC, 2011; Justification for inscription, 1996). A globally unique ecosystem with 2,630 species of animals (65% endemic) and 1,000 species of plants (15% endemic) and unique features (e.g. freshwater sponge reefs and freshwater hydrothermal vent fauna), foodwebs and system properties (including an exceptional self-purification capacity, high oxygen concentration throughout the water column and exceptionally low particulate matter concentrations) have evolved here.

- **Freshwater invertebrate fauna**
  Criterion:(x)

  The freshwater invertebrate fauna of Lake Baikal counts ca. 2,600 species, ca. 65% of which are endemic and highly adapted to this cold, deep and oxygen rich freshwater ecosystem. Invertebrate groups with particular high endemism include the sponges, amphipods, copepods, snails and flatworms (UNEP-WCMC, 2011).

► Freshwater vertebrate fauna
Criterion:(x)

There are 53 species of fish in Lake Baikal, 27 of which are endemic. Notable examples include two endemic sturgeon species (Acipenser schrenskii and A. baeri baicalensis) the Omul Coregonus autumnalis migratorius, and two species of Baikal Oilfish (Comephorus spp.). A highly iconic vertebrate species of the lake is the endemic Baikal Seal Pusa sibirica.

► Freshwater flora
Criterion:(x)

15% of the 1,000 species of aquatic plants of the lake are endemic. The same is true for a third of its 560 species of algae (UNEP-WCMC, 2011).

► Geological features
Criterion:(viii)

The formation of the geological structures in the basin took place during the Palaeozoic, Mesozoic and Cenozoic eras and there are a number of significant geological features (Justification for inscription, 1996). Continental scale active rift valley system that has been existing since the Mesozoic. There are a wide range of specific geological features associated with this system, including extinct volcanoes, relict landslide circuses, abrasion caverns, hot and mineral springs (WHC, 2006).

► Freshwater, terrestrial and littoral ecosystems
Criterion:(ix)

The evolution of aquatic life that has taken place over this long period has resulted in an exceptionally unique and endemic fauna and flora (Justification for inscription, 1996). Lake Baikal is situated at the intersection of three bio-geological areas: east Siberian Taiga to the North and West, trans-Baikal coniferous forests to the East and Altay-Sayan Mountain forest to the South (UNEP-WCMC, 2011). This and the considerable altitudinal gradients surrounding the lake (445-2,840 m a.s.l.) support a wide range of different ecosystem types around the lake, with corresponding differences in fauna, flora and vegetation. There are also important littoral wetland ecosystems,

such as the Selenga Delta, parts of which form a Ramsar Wetland of International Importance.

Other important biodiversity values

► Terrestrial flora

There are 800 species of vascular plants in the Lake Baikal area, including 20 species of flowering plants. Most of the terrestrial flora is associated with various forest ecosysytems, such as Scots Pine Pinus sylvestris forest to the East, Dahurian Larch Larix gmelina forest along the northern shore, and Stone Pine Pinus sibirica and Siberian Larch Larix sibirica forests along the western shores (and parts of the eastern shores). Some plant species are associated with wetlands and tundra systems of higher altitudes (UNEP-WCMC, 2011). Endemism is not as pronounced as among aquatic flora of the lake. The area slightly overlaps with a global Centre of Plant Diversity (Davis & Heywood, 1994).

► Terrestrial fauna

The terrestrial fauna of the Lake Baikal area is less distinctive than its freshwater fauna, but also significant. Both the southern and the northern shore have between 35 and 40 species of mammals, including a number of globally threatened species such as Musk Deer Moschus moschiferus VU, Altai Weasel Mustela altaia NT, Otter Lutra lutra NT, and Pallas’s Cat Ocotolobus manul (NT) (UNEP-WCMC, 2011, IUCN, 2012b). The avifauna of both the northern and the southern shore of Lake Baikal numbers ca. 260 species including globally threatened species such as the Siberian Crane Leucogeranus leucogeranus (CR), Swan Goose Anser cygnoides (VU), Eastern Imperial Eagle Aquila heliaca (VU), Saker Falcon Falco cherrug (EN), Great Bustard Otis tarda (VU) and Asian Dowitcher Limnodromus semipalmatus (NT) (UNEP-WCMC, 2011, IUCN, 2012b).

Assessment information

Threats

Current Threats

High Threat

Although the current threats to Lake Baikal from water pollution, uncontrolled tourism and unsustainable resource use are considerable, and although its ecosystem carries a burden from more extensive past unsustainable resource use, the sheer size of the lake has thus far buffered adverse impacts in offshore waters. The decision to close the Baikalsk Paper and Pulp Mill is a very important step to secure the conservation of the site in the long term; however, concrete actions need to be developed to also mitigate the impacts of past industrial operations and to address new problems regarding nutrient pollution in nearshore areas from untreated human sewage.

► Water Pollution

High Threat
Inside site
Outside site

The Baikalsk Paper and Pulp Mill (BPPM) has lead to a localized (reaching 16-17 km into the lake) increase of key pollutants including phenol and mercury to 10 times the maximum permissible concentrations (Rosabal & Rao, 2011). In 2013 a decision was taken to permanently close down the mill. All facilities were shut down as of December 2013 (SP report, 2014). . However, no information is available on specific actions planned to mitigate the impact from the past operations (e.g., sludge ponds near the lake shore) and the timeframe for closure is unclear (SOC report, 2014).
Two other major sources of pollution of Lake Baikal are industrial and mining activities associated with the regions of the Angara River and the Selenga River, respectively. Air pollution (chlorinated hydrocarbons; PCB’s, dioxins) generated within the industrial corridor of the Angara River enters the water

of the South basin and these chemicals biomagnify in animals at the top of the lake's food chain (e.g., golomyanka and seal) with potential human health effects (Mamontov et al. 2000; Kuzmin et al. 2005). The Selenga River, draining 447,000 km2 (ca. 50%% of L. Baikal's watershed), includes the city of Ulan-Ude and Ulaanbaatar (Mongolia). Discharges of heavy metals and aromatic hydrocarbons along this river system exceed maximum concentrations by a factor of 10 in several locations (Anenkhronov & Pronin, 2008), and heavy metal concentrations in the water flowing into the lake were reported to exceed maximum allowable concentrations in 2008 (Khazheeva et al., 2008). Lake water heavy metal concentrations in the vicinity of the Selenga delta are detectable but within maximum allowable concentrations, and Mongolia reportedly contributed "57% of pollution sources" in 2005 (Rosabal & Debonnet, 2005). A Russian-American scientific team is reconstructing an 80-year history of metal contamination in the lake's food web using an archival collection of Baikal seal teeth (Wellesley College, 2014), and a British scientific team is investigating mercury contamination in the sediments of the lake including the Selenga Delta region ("Back to the Selenga Delta", 2014). Publications from these research projects will be available within the next 2 years.
There is also some water pollution from settlements and tourism installations around the lake, ships, sunken cars etc., airborne pollutants (UNEP-WCMC, 2011), and a risk of pollution from accidents along the railways skirting the lake (Rosabal & Debonnet, 2005).

► Household Sewage/ Urban Waste Water

High Threat
Inside site

Localized nearshore eutrophication due to nutrient pollution from untreated sewage is occurring in the South basin (Listvianka) (Kravtsova et al. 2014) and North basin (e.g., Severobaikalsk). Kravtsova et al. (2014) describe the first scientifically documented case of eutrophication in Lake Baikal. Eutrophication in Severobaikalsk area is related to the release of sewage with high concentration of phosphates and nitrogen most likely caused by insufficient capacity of treatment facilities (http://newsbabr.com/?IDE=124291).

► Tourism/ Recreation Areas

Low Threat
Inside site
Outside site

Uncontrolled and irresponsible tourism development has had a considerable localized impact on parts of the property around the lake's southern shore and particularly Maloe Morye (e.g. construction, including illegal, near the lake's shore, operation of large yachts without appropriate infrastructure), and parts of Olchon Island. In 2010 visitor numbers reached 674,300, which equals a 30% increase from 2003 (Rosabal & Rao 2011).

► Solid Waste

Low Threat
Inside site

Large open pits of rubbish left by boaters and campers along the lakeshore in the national parks (e,g., Zabaikalsky National Park) need containment, capping or removal to prevent pollution of the lake and the development of human health problems (Personal communication, 2014).

► Fishing / Harvesting Aquatic Resources, Commercial hunting

Low Threat
Inside site

The population of the Baikal Seal is currently at an all time high and appears stable in spite of some commercial hunting (Rosabal & Debonnet, 2005, Rosabal & Rao, 2011). Fish populations have been reduced by unsustainable exploitation in the 19th and 20th Centuries and are reportedly stable at a low level, as a consequent of fishing quotas (UNEP-WCMC, 2011). Relatively little information is available about the status of fish stocks.

► Temperature changes

Data Deficient
Inside site
Outside site

Water temperature and ice cover have been responding strongly to climate change in the recent past, with a trend towards warmer and wetter winters.

This is likely to have multiple consequences on ecosystem dynamics, the extent of which at this stage is difficult to predict (Moore et al., 2009).

Potential Threats

High Threat

The planned extensive additional tourism developments (both in terms of new areas included and envisaged visitor numbers) pose a significant potential threat to the site's values. Ore mining Kholodninskoe deposit remains suspended for the time being, but actions are required to prevent negative impacts of the deposit on the sites' values. The potential of hydroelectric developments on the Selenga and Orkhon Rivers in Mongolia is of concern; however, both projects are currently at the feasibility study stage only.

► Mining/ Quarrying

High Threat
Inside site

Ore mining at Kholodninskoye deposit remains suspended until 31 December 2014 and no exploration of mineral resources on the territory of the Central Environmental Zone of Baikal is permitted. A noteable budgetary allocation has been made in order to propose actions to prevent negative environmental effects of the Kholodninskoye deposit on the property's values (SOC report, 2014).

► Tourism/ Recreation Areas

High Threat
Inside site
Outside site

In addition to the existing tourism developments around the lake, there are plans for several large Special Economic Zones for tourism development in several areas, including the Olkhon Tourism complex on the already stongly affected Olkhon Island with 590 hotels and 154 cottages (Rosabal & Rao, 2011), the "Baikal Harbour" Special Economic Zone in Buryatia (Republic of Buryatia, 2012) covering 94 km of the property's shore, and including a skiing area, a large marina (IUCN, 2012a), and five additional mountain skiing resorts, which will overlap with the property to varying degrees (Rosabal & Rao, 2012). The recent changes in the Federal Law on Strict Nature Reserves

will make it easier to develop tourism activities there. This may also affect the property and particularly Barguzinskiy Biosphere Reserve on its northeastern shore (a hitherto relatively little developed area), for which a list of permissible infrastructure developments (including guesthouses and supporting infrastructure) has already been drawn up by the Government of the Russian Federation (Government of Russian Federation 2012). The 2014 SOC report notes that “no further development within the SEZ should be allowed prior to the completion of a comprehensive Strategic Environmental Assessment of tourism development options within the property and in its vicinity, in order to identify alternatives that do not negatively impact on its OUV” (SOC report, 2014).

► Dams/ Water Management or Use

Data Deficient
Outside site

Concerns have been expressed regarding potential hydroelectric developments on the Selenga and Orkhon Rivers in Mongolia. Both projects are currently at the technical and economic feasibility studies stage only which will be completed in 2015. If these studies come to a positive conclusion, a detailed environmental impact assessment will be carried out as require by the legislation (SOC Report, 2014).

► Erosion and Siltation/ Deposition

Low Threat
Inside site

Shoreline erosion (Kozhova & Silow 1998) will increase substantially if water discharge from L. Baikal through the Irkutsk hydroelectric dam is increased per recent proposals. Maintaining a discharge regime similar to the ‘natural regime’ (rise and fall of the level of the lake) will minimize ecological effects on the lake (Zohary & Ostrovsky 2011)

Protection and management

Assessing Protection and Management

► Management effectiveness

Some Concern

No management effectiveness assessment of the entire property or parts thereof has been published. IUCN has received reports that since 2009, poaching, unauthorized development, and environmentally irresponsible tourism have much worsened. These reports note the illegal lease of land plots in the Reserve Zone of the national park, where all activity is forbidden (IUCN, 2012a).

► Relationships with local people

Some Concern

No specific measures have been taken to involve local people in the management of the property (WHC, 2006). There is also a conflict of interest between the development priorities of local and regional governments and the protection of the OUV of the property.

► Research

Mostly Effective

Considerable research has been conducted at Lake Baikal. The Limnological Institute of the Siberian Branch of the Russian Academy of Sciences and Irkutsk State University have been active there since 1928, under various names (LI SB RAS, 2012; Kozhova & Izmest’eva 1998) and numerous international research teams have worked at the lake since 1991. A Web of Knowledge search of “Lake Baikal” yields almost 8,500 scientific articles for the period 1927-2012 (WoS, 2012). However, there is a lack of coordination of scientific and monitoring activities (Rosabal & Debonnet, 2005; Moore et al. 2009).

► Monitoring

Mostly Effective

There are several monitoring programmes for pollutants, species, land use, and forest fires implemented within the property, under the auspices of the Ministry of Natural Resources and Ecology (WHC, 2006), and involving Rospirrodnadzor, the Main Department of Natural Resources of the Republic

of Buryatia, the East-Siberian Research Institute of Geology, the Biology Institute of Irkutsk State University (Moore et al. 2009), Geophysics and Mineral Resources, and other organizations (Rosprirodnadzor, 2011).

► Tourism and interpretation

Serious Concern

Although the property has strong tourism potential, and tourism is developing rapidly, this is not happening in a sufficiently planned and sustainable way, leading to considerable threats to the property's OUV (Rosabal & Debonnet, 2005). A sustainable tourism development strategy for the property is missing (IUCN, 2009). Development of interpretation facilities including reference to the WH status of the property is reportedly not keeping pace with overall tourism development (WHC, 2006).

► Education and interpretation programs

Data Deficient

The awareness of the World Heritage site and its values among visitors, local communities and local authorities was characterized as "adequate" in 2006, but no details about education and interpretation programmes are available.

► Sustainable use

Data Deficient

A draft "Complex Scheme for the Protection and Use of Natural Resources in Baikal Natural Territory" was reportedly pending approval in 2005 (Rosabal & Debonnet, 2005), but its fate since then is unclear. It is not clear how quotas for natural resource use are defined in the area, and how licenses are distributed.

► Staff training and development

Mostly Effective

Staff numbers of all component PAs except Selenga Delta Ramsar site (7) and Pribaikalskiy National Park (ca. 200) are unknown. Staff training levels of the various PAs are likely to vary. In general, access to specialist staff for education, conservation management/promotion/interpretation and visitor management has been characterized as good, average and bad, respectively

(WHC, 2006).

▶ Sustainable finance

Some Concern

Funding is insufficient (WHC, 2006). Funding comes in general from the federal and state budgets, which provided only one third of the funds needed in 2005 (Rosabal & Debonnet, 2005). In addition, the two National Parks gain some funds from tourism income (UNEP WCMC, 2011). No detailed figures are available.

▶ Boundaries

Data Deficient

The boundaries of the property, and particularly of its central ecological zone, appear to be poorly defined and/or documented.

▶ Implementation of Committee decisions and recommendations

Serious Concern

Key recommendations and information requests of the World Heritage Committee, as well as commitments of the State party, particularly of Decisions 32.COM 7B.24, 34.COM 7B.22 and 35.COM 7B.23, have not been met by the State Party thus far, such as regarding the closure of the Baikalsk Paper and Pulp Mill or its upgrading with a closed-loop water system, legal measures for the protection of the property, implementation of the recommendations of the 2005 reactive monitoring mission, and clarification of tourism development plans. The reasons for this lack of response are not clear. Other recommendations, such as on Baikal Seal monitoring, have been met by the State Party.

▶ Management system

Serious Concern

The property lacks a unified management system and a central management authority. It consists of 3 Nature Reserves, 2 National Parks, 2 Managed Reserves, as well as poorly defined (also in terms of management regime) coastal protection central ecological zones (UNEP-WCMC, 2011). These appear poorly coordinated. A management plan aimed at protection of the

OUV of the entire property is missing (Rosabal & Rao, 2011, WHC, 2006)

▶ Integration into regional and national planning systems

Some Concern

The development of several other Special Economic Zones for tourism show that the objective “conservation and management of the OUV of the property” in accordance with the WHC Operational Guidelines is not integrated and mainstreamed into regional and national planning systems.

▶ Legal framework and enforcement

Serious Concern

Although there is a special Law for the Conservation of Lake Baikal, the legal framework is ineffective overall as it allows development of major tourism infrastructure inside the property, with potentially serious consequences for its OUV (Rosabal & Rao, 2011). Implementation of environmental legislation in the case of Lake Baikal has not stopped harmful operations and activities (such as those of the BPPM). The Russian Federation lacks a framework law to define the unified management of World Heritage sites, which often consist of several protected areas of various designations. The recent Federal Law No. 365-FZ on “special economic zones in the Russian Federation” and the Order of the Government of the Russian Federation on development of infrastructure within Barguzinskiy Biosphere Reserve further weaken the legal basis for effective conservation of the OUV of the property (IUCN, 2012a).

Overall assessment of protection and management

Some Concern

The current protection and management regime of the property is ineffective in relation to the main current and emerging threats (mainly water pollution, uncontrolled development of tourism infrastructure and potentially unsustainable natural resource use). This ineffectiveness is primarily caused by the fragmented and complicated institutional setup for management, lack of integrated legal framework, as well as a number of secondary weaknesses, such as low levels of funding and differences is human resources capacities of

component protected areas that make up the property.

▶ **Assessment of the effectiveness of protection and management in addressing threats outside the site**
Some Concern

The main threats originating outside the property are water pollution along the Selenga River including its Mongolian headwaters (UNEP-WCMC, 2011) and air pollution generated within the industrial corridor of the Angara River (Moore et al. 2009). A “Complex Scheme of Protection and Use of Water Resources of the Selenga River Watershed between Russia and Mongolia” was started to be developed in 2002 (Rosabal & Debonnet, 2005). This included a simple monitoring scheme, establishment of water treatment plants in the Republic of Buryatia, and bi-governmental consultations. A gradual improvement of the water quality of the Selenga River (see section on threats above) may partly be attributable to this, but the Selenga River remains a major source of pollution of the property (UNEP-WCMC, 2011). Air pollutants from the Angara R. industrial corridor, including PCB’s and other chlorinated hydrocarbons, have entered the lake’s food chain, particularly in the South basin (Mamontov et al. 2000; Kuzmin et al. 2005).

State and trend of values

Assessing the current state and trend of values

World Heritage values

▶ **Oldest, deepest and largest (by volume) freshwater ecosystem in the World**
Low Concern
Trend:Stable

The ecosystem of lake Baikal has thus far largely withstood the considerable anthropogenic pressures acting upon it (Rosabal & Debonnet, 2005), but this is now changing in near shore areas where this are visible signs and scientific evidence of localized eutrophication.

▶ Freshwater invertebrate fauna

Low Concern
Trend:Stable

There have been some changes in the invertebrate fauna of the property, which have been attributed to climate change impacts, but overall community structure and food webs appear intact (Hampton et al., 2008).

▶ Freshwater vertebrate fauna

Low Concern
Trend:Stable

The population of the Baikal Seal is currently at an all-time high the populations of fish appear stable (Rosabal & Rao, 2011) but at a low level and precarious conservation state (e.g. depending on strict control and sensitive to slight deteriorations of the conservation regime) (UNEP-WCMC, 2011).

▶ Freshwater flora

Data Deficient
Trend:Data Deficient

No information about the conservation state of freshwater flora is available in the scientific literature or WH related documents. It appears intact but likely to be negatively affected by overall changes in the integrity of the Baikal ecosystem.

▶ Geological features

Good
Trend:Stable

The values associated with the rift valley system are not affected by anthropogenic pressures.

▶ Freshwater, terrestrial and littoral ecosystems

High Concern
Trend:Deteriorating

Terrestrial ecosystems within the property have so far been preserved, but are increasingly negatively affected by uncontrolled and irresponsible

tourism development along an increasing part of the shoreline (IUCN, 2012a, Rosabal & Debonnet, 2005, Rosabal & Rao, 2011). Littoral ecosystems are substantially degraded in localized areas due to benthic nearshore eutrophication (Kravtsova et al. 2014).

Other important biodiversity values

► Terrestrial flora

There are 800 species of vascular plants in the Lake Baikal area, including 20 species of flowering plants. Most of the terrestrial flora is associated with various forest ecosysytems, such as Scots Pine Pinus sylvestris forest to the East, Dahurian Larch Larix gmelina forest along the northern shore, and Stone Pine Pinus sibirica and Siberian Larch Larix sibirica forests along the western shores (and parts of the eastern shores). Some plant species are associated with wetlands and tundra systems of higher altitudes (UNEP-WCMC, 2011). Endemism is not as pronounced as among aquatic flora of the lake. The area slightly overlaps with a global Centre of Plant Diversity (Davis & Heywood, 1994).

► Terrestrial fauna

The terrestrial fauna of the Lake Baikal area is less distinctive than its freshwater fauna, but also significant. Both the southern and the northern shore have between 35 and 40 species of mammals, including a number of globally threatened species such as Musk Deer Moschus moschiferus VU, Altai Weasel Mustela altaia NT, Otter Lutra lutra NT, and Pallas’s Cat Ocotolobus manul (NT) (UNEP-WCMC, 2011, IUCN, 2012b). The avifauna of both the northern and the southern shore of Lake Baikal numbers ca. 260 species including globally threatened species such as the Siberian Crane Leucogeranus leucogeranus (CR), Swan Goose Anser cygnoides (VU), Eastern Imperial Eagle Aquila heliaca (VU), Saker Falcon Falco cherrug (EN), Great Bustard Otis tarda (VU) and Asian Dowitcher Limnodromus semipalmatus (NT) (UNEP-WCMC, 2011, IUCN, 2012b).

Summary of the Values

▶ Assessment of the current state and trend of World Heritage values

Low Concern

Trend: Deteriorating

In spite of pollution, unsustainable resource use and uncontrolled tourism development, the regulatory capacity of the offshore Lake Baikal ecosystem has thus far maintained overall ecosystem status in a relatively intact state. However, this is changing for the worse in nearshore localized areas where human pressure is most intense.

▶ Assessment of the current state and trend of other important biodiversity values

High Concern

Trend: Deteriorating

Together with their ecosystems, terrestrial and littoral flora and fauna are inferred to be increasingly negatively affected by uncontrolled and irresponsible tourism development. Several of the terrestrial species of the property are globally threatened (IUCN, 2012b).

Additional information

Key conservation issues

▶ Water pollution

Regional

The Selenga River contributes a significant part of the pollution of Lake Baikal, which in turn is partly released by polluters in Mongolia. In spite of the existence of a “Complex Scheme of Protection and Use of Water Resources of the Selenga River Watershed between Russia and Mongolia”, maximum allowable concentrations of many pollutants remain higher in Mongolia than in the Russian Federation (Rosabal & Debonnet, 2005), and funding for the implementation of water purification measures may be even more limited there.

▶ Lack of protected areas management resources and capacity

National

The staff of the various PAs that constitute the property, and particularly the two National parks, may have only incomplete resources and capacity to manage the property effectively (UNEP-WCMC, 2011). This concerns monitoring, communication and transport equipment and possible operational budgets.

▶ Lack of sustainable tourism planning

Local

The planned tourism and skiing infrastructure as well as marina developments will continue the sharp increase of visitation to the property (IUCN, 2012a). A sustainable tourism strategy is needed to ensure that this increase in tourism is managed in a sustainable way and does not increase threats to the property.

▶ Fragmented and overcomplicated management system without a functional management authority for the entire property

National

The property consists of 3 Nature Reserves, 2 National Parks, 2 Managed Reserves (zakazniks) and additional non-PA zones. It lacks one central administration that is responsible for the entire property (UNEP-WCMC, 2011).

▶ Lack of a unified legal basis for the management of natural World Heritage sites in the Russian Federation

National

There is currently no national law establishing common standards for the overall management and institutional setups for all natural World Heritage sites on the territory of the Russian Federation. This also complicates the establishment of an effective management framework at this particular property (IUCN, 2012a).

Benefits

Understanding Benefits

► Collection of genetic material

The biota of Lake Baikal comprise thousands of endemic species, among them many species with extreme cold-adapted physiologies and the corresponding biochemistry. There is therefore a significant potential for gaining genetic material for various economic uses from this biota.

► Importance for research

In addition to the rich local and traditional knowledge and the thousands of scientific articles that have been written already about lake Baikal and its biota (WoS, 2012), the property offers unique insights into evolution and into the physiology and ecology of organisms and communities at low temperature. In spite of its documented responses to climate change, the lake will probably respond to climate change more slowly than other freshwater ecosystems, and may hence become a useful reference for measuring climate change (and pollution) impacts elsewhere (Hampton et al., 2008).

► Sacred natural sites or landscapes

Lake Baikal is one of the last great wildernesses of immense iconic importance, which captures the imagination of people worldwide and inspires appreciation of natural values and beauty (UNEP-WCMC, 2011).

► Fishing areas and conservation of fish stocks

Lake Baikal provides limited but significant fisheries resources, which under sustainable management may continue to contribute to the economy and livelihoods throughout the region (Molotov, 1999).

► Access to drinking water, Commercial wells

The property is the largest liquid freshwater reservoir on earth, and is used for multiple non-commercial and commercial purposes (drinking, electrical energy production, transport etc.) (UNEP-WCMC, 2011). This use may hold

potential for extension.

▶ **Does management of the site provide jobs (e.g. for managers or rangers)?**

The Reserves contributing to the property offer more than 200 jobs (UNEP-WCMC, 2011), a number that would probably increase several times if all PAs contributing to the site would be staffed appropriately. In addition, thousands if not tens of thousands of jobs (tourism, natural resource use etc.) depend on the natural values, resources and intactness of the property.

Summary of benefits

Lake Baikal provides an extremely wide range of rich and partly as yet unutilized benefits which – provided the property is managed in a sustainable way – may contribute significantly to the livelihoods, economy, science and spiritual well-being of local inhabitants, the citizens of the Russian Federation and humankind.

Projects

Compilation of active conservation projects

№	Organization/ individuals	Project duration	Brief description of Active Projects
1	UNDP-GEF		Integrated natural resource management of Baikal Lake basin trans-boundary ecosystem
2	Global Nature Fund		Several projects on sustainable nature based tourism, Baikal Seal conservation, education etc.
3	The Great Baikal Trail		Development of hiking trail system and sustainable nature and culture based tourism

Compilation of potential site needs

№	Site need title	Brief description of potential site needs	Support needed for following years
1	N.A.	Training programme for PA staff of the property in general PA management	

№	Site need title	Brief description of potential site needs	Support needed for following years
2	N.A.	Development of a sustainable tourism strategy	

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