World Heritage Sites

Protected Areas and World Heritage

United Nations Educational, Scientific and Cultural Organization

In cooperation with UNESCO's World Heritage Centre

IUCN

LAKE BAIKAL
RUSSIAN FEDERATION

Lake Baikal is in south central Siberia close to the Mongolian border. It is the largest, oldest by 20 million years, and deepest, at 1,638m, of the world's lakes. It is 3.15 million hectares in size and contains a fifth of the world's unfrozen surface freshwater. Its age and isolation and unusually fertile depths have given it the world's richest and most unusual lacustrine fauna which, like the Galapagos islands', is of outstanding value to evolutionary science. The exceptional variety of endemic animals and plants make the lake one of the most biologically diverse on earth.

Threats to the site: Present threats are the untreated wastes from the river Selenga, potential oil and gas exploration in the Selenga delta, widespread lake-edge pollution and over-hunting of the Baikal seals. However, the threat of an oil pipeline along the lake's north shore was averted in 2006 by Presidential decree and the pulp and cellulose mill on the southern shore which polluted 200 sq. km of the lake, caused some of the worst air pollution in Russia and genetic mutations in some of the lake's endemic species, was closed in 2009 as no longer profitable to run.

COUNTRY
Russian Federation

NAME
Lake Baikal

NATURAL WORLD HERITAGE SERIAL SITE
1996: Inscribed on the World Heritage List under Natural Criteria vii, viii, ix and x.

STATEMENT OF OUTSTANDING UNIVERSAL VALUE
The UNESCO World Heritage Committee issued the following statement at the time of inscription.

Justification for Inscription
The Committee inscribed Lake Baikal the most outstanding example of a freshwater ecosystem on the basis of: **Criteria (vii), (viii), (ix)** and **(x)**. It is the oldest and deepest of the world´s lakes containing nearly 20% of the world´s unfrozen freshwater reserve. The lake contains an outstanding variety of endemic flora and fauna, which is of exceptional value to evolutionary science. It is also surrounded by a system of protected areas that have high scenic and other natural values. The Committee took note of the confirmation of the revised boundaries of the site, which correspond to the core areas defined in the Baikal Law (excluding the five urban developed areas). It also noted that the special Lake Baikal Law is now in its second reading in the Duma. Finally, it noted concern over a number of integrity issues including pollution, which should be brought to the attention of the Russian authorities.

INTERNATIONAL DESIGNATIONS
1986: Barguzinskiy Zapovednik (358,600 ha) and Baikalskiy Zapovednikv (200,524 ha) declared parts of the Lake Baikal Region Biosphere Reserve under the UNESCO Man & Biosphere Programme;
1994: The Selenga Delta in Kabanskiy Zakaznik (12,100 ha) designated a Wetland of International Importance under the Ramsar Convention:
2000: Barguzinskiy and Baikalskiy recognised as separate Biosphere Reserves.

IUCN MANAGEMENT CATEGORY

Baikalo-Lenskiy Zapovednik	Ia Strict Nature Reserve
Barguzinskiy Zapovednik	Ia Strict Nature Reserve. MAB Biosphere Reserve
Baikalskiy Zapovednik	Ia Strict Nature Reserve. MAB Biosphere Reserve

Zabaikalskiy National Park	II National Park
Pribaikalskiy National Park	II National Park
Frolikhinskiy Zakaznik	IV Habitat/Species Management Area
Kabanskiy Zakaznik	IV Habitat/Species Management Area. Ramsar Site

BIOGEOGRAPHICAL PROVINCE
Lake Baikal (2.44.14)

GEOGRAPHICAL LOCATION
In southern Siberia, near the Mongolian border, on the boundary between central and eastern Siberia. The site comprises Lake Baikal with reserves and a coastal zone of land from 5 km - 70 km in width surrounding it. The nearest cities and airports are Irkutsk 60 km to the west and Ulan Ude to the east, both on the Trans-Siberian railway. Located between 51° 27' to 55° 46'N and 103° 43' to 109° 56'E.

DATES AND HISTORY OF ESTABLISHMENT
1916: Barguzinskiy Zapovednik, the first nature reserve, established on the northeast coast of Lake Baikal;

1969: Baikalskiy Zapovednik Nature Reserve established in the south;

1974: Kabanskiy Zakaznik Management Area established in the south-east;

1976: Frolikhinskiy Zakaznik Management Area established in the north;

1986: Baikalo - Lenskiy Nature Reserve in the north-west, Zabaikalskiy National Park in the east and Pribaikalskiy National Park in the west established;

1986: Baikalskiy and Barguzinskiy Zapovedniks designated parts of the Lake Baikal Region UNESCO Biosphere Reserve; in 2000: these were declared separate Biosphere Reserves;

1987: Lake Baikal Coastal Protection Zone established by Decree 434 of the USSR Council of Ministers to protect lakeshore forests: the site coincides with this Coastal Protection Zone;

1989: The Territorial Comprehensive Scheme for the Protection of Nature in the Area of Lake Baikal was adopted by the Federal Ministry of Environmental Protection & Natural Resources;

1994: The central government created the Comprehensive Federal Programme for the Protection of Lake Baikal and Rational Use of its Natural Resources by Resolution 1306;

1994: The Selenga River delta (in Kabanskiy Zakaznik) recognised as a Ramsar Wetland site;

1999: The federal law for the protection of Lake Baikal passed;

LAND TENURE
Government, in the Irkutsk and Chita regions, and the Buryat Autonomous Republic. Administered under the Ministry of Natural Resources, the Russian State Heritage Committee of Environmental Protection and the Federal Forestry Service, coordinated by the Baikal Commission. There are some long-term leases to organisations and private individuals.

AREAS
8,797,100 ha: Lake Baikal, 3,147,100 ha, Coastal Protection Zone 5,650,000 ha. Within this, the area of protected lands totals 1,949,000 ha:

Baikalo-Lenskiy Zapovednik:	659,919 ha	Baikalskiy Zapovednik	165,724 ha
Pribaikalskiy National Park:	418,000 ha	Frolikhinskiy Zakaznik	68,000 ha
Barguzinskiy Zapovednik:	374,423 ha	Kabanskiy Zakaznik	18,000 ha
Zabaikalskiy National Park:	245,000 ha		

ALTITUDE
From 1,182m underwater to 2,840m in the Barguzinskiy mountains. The surface of the lake is at 445m.

PHYSICAL FEATURES
Lake Baikal is the deepest, and at 31,500 ha, the seventh largest lake in the world, containing over a fifth of the world's unfrozen surface fresh water (23,600 km³). It is 636 km long by 27 to 80 km wide,

has 2,100 km of coastline and a mean depth of 730m. The bottom, 1,638m down, is 1,182m below sea level. Up-welling currents and vertical water movements oxygenate the water at depth. It is walled in by 2,000m mountains: the narrow Primorskiy and Baikalskiy ranges to the west, the Barguzinskiy and Ulan-Burgasy ranges on the east and the Khamar Daban mountains in the south. 365 main tributaries flow in from these, the largest rivers being the Selenga, Turka, Barguzin and Upper Angara. Only the Angara, a tributary of the Yenesei, flows out; a dam on this has raised the level of the lake and altered its ecology. The lake has exceptionally clear water with up to 40-meter visibility, and a mineral content 25-50% lower than most other freshwater lakes. The unusual purity of the water is due to the presence of zooplankton which consume the debris, and because most of its watershed is rocky and unfarmed so that inflowing waters have relatively low mineral or chemical content. The headwaters of the Lena river rise in the Baykalskiy Mountains only 25 km from the lake.

The lake is of tectonic origin, situated in an active rift complex system of block-faulted depressions and consists of three deep basins resting on 6 km of sediments. It is 20 million years old, the oldest large lake in the world, its formation having taken place during the Palaeozoic, Mesozoic and Cenozoic periods. Hydrothermal vents 400m deep at Frohlika Bay, more than 30 hot springs and 300 mineral water springs of every kind are evidence of the ongoing tectonic activity of the area. Scenically the area is varied, with its background of high mountains, steep, green shorelines, glaciers, waterfalls, healing mud sites and both deciduous and coniferous forests.

CLIMATE

The Baikal basin has a continental climate with profound fluctuations of both annual and daily temperatures. Winters are long, dry and cold. Mean daily temperatures range from -25°C in January to +18°C in July. However, Lake Baikal itself creates a distinct microclimate within 25 km of its shores: the water being slow to warm up and slow to cool, it moderates coastal conditions where temperatures may be 5°C higher in winter and 5°C lower in summer than further inland. Annual rainfall at the north end of the lake averages 200-350mm, at the south end, 500-900mm, falling mainly in summer storms. Fogs occur in spring and autumn. The surface of the lake freezes for four months during winter, and holds ice until June. The wind regime is coastal: north-westerly winter winds blow from the cold land to the lake; summer winds blow from the lake to the warmer land. Winds from the mountains can be sudden and violent, creating high waves (Galaziy, 1993).

VEGETATION

The Baikal region is on the frontier between the east Siberian taiga, to the west and north, the trans-Baikal coniferous forest to the east and the Altai-Sayan montane forest to the south. The great variety of plants in the basin is determined by climatic asymmetry: the southwestern part of the basin is covered by light coniferous forests and mountain steppes; in the east, Scots pine *Pinus sylvestris* forest predominates and the north is covered by deciduous forests. Terraces near the shore in the north are dominated by Dahurian larch *Larix gmelina* with *Rhododendron dahuricum*, grading on the eastern and western shores into forests of Siberian cembra or stone pine *Pinus sibirica* with Siberian larch *Larix sibirica*. Associated broadleaf species are the willow-like *Chosenia arbutifolia,* aspen *Populus tremula*, birches *Betula pendula,* and *B.alba,* Siberian rowan *Sorbus sibirica,* Siberian almond *Amygdalys pedunculata*, bird cherry *Prunus asiatica,* Siberian apricot *P.sibirica* with an understorey of honeysuckle *Lonicera periclymenum* and currants *Ribes rubrum*, *R. nigrum.* At higher altitudes are pure stands of fir *Abies sibirica* and *Pinus sibirica* forest with Korean pine *Pinus koraiensis* and black spruce *Picea obovata*, followed still higher up by thickets of dwarf pine *Pinus pumila*. The highest level is tundra dominated by Siberian bog sedge *Kobresia sibirica* and peaty meadows of sedge *Carex* spp. with stone birch *Betula ermanii* on stony talus, and lichen *Cladonia-* or *Cetraria*-covered rocks and cliffs. 800 species of vascular plants have been recorded including 20 species of flowering plants (Borodin, 1983).

In the southern part of the basin, a well-marked altitudinal zonation also occurs. *Sphagnum* bogs and forests of poplar *Populus suavolens* and the monotypic willow *Chosenia arbutifolia* occupy low-lying areas, with a relict species, the Siberian apple *Malus pallasiana*, while river valleys contain bird cherry *Prunus padus*, rowan *S. sibirica* and alder *Alnus fruticosa*. The northern slopes of the mountains have taiga of Korean pine *P. koraiensis*, black spruce *Picea obovata* and *Pinus sibirica*, with Siberian fir *Abies sibirica* dominant in places. The southern slopes are covered in mixed larch *L.sibirica* and pine *P. sylvestris* forest, which gives way to steppe vegetation on the foothills. At higher altitudes there is *Pinus sibirica* elfin woodland and mountain tundra shrubs such as *Rhododendron parvifolium*. The high altitude meadows support thickets of dwarf Siberian pine *P. pumila* and birch *Betula middendorfii*. Some 1000 species of aquatic flora are said to exist, 15% of them endemic (GlobalNature, 2002); of

the 560 species of algae, a third are endemic. The vegetation of the Selenga delta is of reedbeds, regularly flooded sedge meadows and shrub willow.

FAUNA

Some 2,630 species live in the lake, 65% of them endemic, having evolved in isolation from ancient species, and there is twice that number of species in the surrounding taiga (UNESCO/IUCN, 2006; GlobalNature, 2002). The aquatic fauna of Lake Baikal is one of the most diverse and unusual in the world, including sponge reefs with 255 species of shrimp-like amphipods, 147 species of snail and 80 species of flatworm. About 80% of the world's fresh water amphipods live in the lake. One, *Macrohectopus branickii* is a pelagic predator on mesozooplankton which migrates vertically (UNESCO/ IUCN, 2006). Dense clouds of millions of the tiny freshwater shrimp *Epischura baicalensis* which forms 96% of the zooplankton, filter the water of algae and bacteria, keeping it clear. (Galaziy, 1988). The deep hydrothermal vents of oxygenated water also attract an unusual range of species including sponges. The most noteworthy aquatic species is the unique *nerpa,* the freshwater Baikal seal *Pusa sibirica*. The population is said to number 70,000-100,000 individuals, though fewer than expected have been seen recently around the Ushkani Islands, their main habitat (UNESCO, 2010).

The terrestrial fauna is less distinctive. The northern lake shores, as in Barguzinskiy Zapovednik, has a faunal diversity characteristic of the taiga, with 39 recorded species of mammal recorded, including pika *Ochotona hyperborea*, Siberian chipmunk *Eutamias sibiricus*, marmot *Marmota baibacina*, Siberian flying squirrel *Pteromys volans*, fox *Vulpes vulpes*, brown bear *Ursus arctos*, ermine *Mustela erminea*, and mountain, common and Kolinsky weasels *Mustela altaia*, *M. nivalis* and *M. sibirica*, Eurasian otter *Lutra lutra*, large numbers of sable *Martes zibellina princeps,* noted for its exceptionally valuable fur, wolverine *Gulo gulo*, Pallas's cat *Otocolobus manul*, a local race of musk deer *Moschus moschiferus* (VU), Siberian red deer *Cervus elaphus sibiricus*, elk *Alces alces,* reindeer *Rangifer tarandus* and Siberian ibex *Capra sibirica.* The avifauna includes 261 bird species, among them the Siberian crane *Grus leucogeranus* (CR), swan goose *Anser cygnoides* (VU), eastern imperial eagle *Aquila heliaca* (VU), Asian dowitcher *Limnodromus semipalmatus*, corncrake *Crex crex,* white-tailed eagle *Haliaeetus albicilla* and capercaillie *Tetrao urogallus*. Numbers of breeding *Anatidae* can reach 138,000. On migration, 5-7 million waders and waterbirds pass through the Selenga delta (Ramsar, 1997). The clouds of summer insects are as nourishing as the invertebrate life of the water.

To the south, in the Baikalskiy Zapovednik, there are 37 mammal species and 260 species of birds. Many of them are the same species found in the northern part of the basin but also include long-tailed gopher *Citellus undulatus,* steppe polecat *Mustela eversmanii* and Siberian weasel *M. sibirica*, lynx *Lynx lynx*, wild pig *Sus scrofa* and roe deer *Capreolus capreolus*. Birds include black stork *Ciconia nigra,* Bewick's swan *Cygnus columbianus bewickii,* swan goose (VU), eastern imperial eagle (VU), golden eagle *A. chrysaetos,* white-tailed eagle *Haliaeetus albicilla*, peregrine falcon *Falco peregrinus,* gyrfalcon *F. rusticolus*, saker falcon *F. cherrug* (VU), oriental honey buzzard *Pernis ptilorhyncus*, black kite *Milvus migrans*, hawk owl *Sunia ulula*, rock ptarmigan *Lagopus mutus*, hazel grouse *Tetrastes bonasia*, capercaillie *Tetrao urogallus,* Siberian crane (CR), great bustard *Otis tarda* (VU) and Asian dowitcher (VU) (Borodin, 1983; LakeNet, 2004).

There are 53 species of fish, most of them edible. 27 are endemic, including Baikal sturgeon *Acipencer schrenskii* and *A. baeri baicalensis*, the omul salmon *Coregonus autumnalis migratorius*, Baikal black grayling *Thymallus arcticus baicalensis,* 32 species of bullhead *Ictalurus* spp. and the viviparous large and small oilfish *golumyankam, Comephoridae baicalensis* and the transparent *gobi, C. dubowski* (Global Nature, 2002). The *golumyanka* forms the main diet of the Baikal seal.

CONSERVATION VALUE

The Lake Baikal Basin is an outstanding example of the evolutionary development of a rift zone of global scale. It includes contrasting landscapes of mountains, forests, steppes, tundra and lake. It contains the oldest and largest reservoir of freshwater on earth, 60% of the aquatic fauna of which is endemic. The surrounding area is also rich in biological diversity, landscape values and cultural and scientific values. The Park lies within a WWF Global 200 Freshwater Eco-region, in a WWF/IUCN Centre of Plant Diversity and is one of the world's Endemic Bird Areas. Two of its National Parks are UNESCO MAB Biosphere Reserves and the Basin contains a Ramsar wetland site.

CULTURAL HERITAGE

The region has a rich heritage of nature-revering Mongolian, Buryat and Evenk cultures. Some 1,200 archaeological remains of past cultures have been found around the lake shores: 1,000 such

monuments have legal protection: rock drawings, stone walls and the ruins of ancient settlements. Lake Baikal and the Selenga River are mentioned in ancient Chinese chronicles, Muslim historical manuscripts and old Russian books. The Huns, Kaganates of the Zhouzhanhs, ancient Turks, Uighurs and Kidanhs, who maintained broad international relations with both the East and the West lived around the Lake. The 13th century Mongolian leader Genghis Khan is popularly supposed to have been born on Ol'khun island where there is a revered shamanic shrine. Buddhist and Russian Orthodox churches and a number of Old Believers also co-exist there

LOCAL HUMAN POPULATION

The local population is composed of several ethnic groups: Buryats, the largest indigenous race in Siberia, Evenks and Russians who first colonised the region in the mid 18th century. The population living permanently in the Lake Baikal basin is about one hundred thousand people, and two million live in its catchment area. About half of the population is urban, the remainder live in villages. The main occupations are forestry, agriculture, fisheries, hunting and tourism. The chief towns in the area are Severobaikalsk, Selenginsk, Babushkin, Baikalsk and Sludyanka. The territories of these five towns are excluded from the World Heritage property.

VISITORS AND VISITOR FACILITIES

Lake Baikal is much visited by local, national and international tourists. In 1994 840,000 visitors were recorded (IUCN, 1997). Visitor facilities include visitor centres, museums, libraries, exhibitions, tourist guides and a botanic garden. There are several camping and tourist bases on the lake shores. The more inhabited southern and eastern parts have better developed facilities and infrastructure. The Khamar Daban ranges of the eastern Sayan and Barguzin mountains attract climbers. Irkutsk and Ulan Ude provide services and facilities for tourists and visitors. A late winter sports festival has been established at Irkutsk and a 1,800 km track is proposed around the lake's shores (LakeNet (2004). Private development is being encouraged on the island of Ol'khun (Anon., 2005b).

SCIENTIFIC RESEARCH AND FACILITIES

Owing to its age, isolation and the diversity of its deep water life, the lake is, like the Galapagos islands, a natural laboratory. An exceptional volume of research has been undertaken on the ecology of the lake, and the Limnological Institute of the Russian Academy of Sciences originally based near Listvyanka in 1916, is the major research body which records more than 10,000 scientific papers and has been monitoring the Baikalsky mill for over 40 years. The Limnological Scientific Institute is well equipped and maintains relations with many other national and international scientific centres such as the Siberian Institute of Physiology and Biochemistry of Flora, the Institute of Geography of the Siberian Department of the Russian Academy of Sciences, the Institute of Geochemistry of the Siberian Dept of the Russian Academy of Sciences, the Institute of Epidemiology and Microbiology of the East Siberian Centre of Medical Ecology and the Baikal Regional Information and Analytical Centre There is also the Baikal station of the Biological Research Institute of Irkutsk State University. There have been several researches on risk preparedness, the mitigation of natural disasters, the effects of pollution; also an inventory and evaluation of the socio-economic conditions, land-use management and natural components of the Olkhon District (UNESCO/IUCN, 2006).

MANAGEMENT

The reserves are administered by the Russian State Heritage Committee for Environmental Protection and the Federal Forestry Service, coordinated by the Baikal Commission. However, there is still a lack of adequate management, and uncertainties concerning their legal protection. Existing protected areas preserve the most important terrain surrounding the lake. All strict nature reserves, *zapovedniks,* in the area are managed by the Russian State Committee of Environmental Protection, all national parks and nature reserves, *zakazniks,* are managed by the Federal Forestry service. No information is available about the management plans of the protected areas. However, a Commission for the coordination of all matters affecting Lake Baikal, to be known as *Baikalpriroda,* was set up (in UNESCO, 2003).

In 1989 the *Territorial Comprehensive Scheme for the Protection of Nature in the Area of Lake Baikal* was adopted (Ministry of Environmental Protection, 1994b). It is devoted primarily to the protection of Lake Baikal by creating a central protection zone around the lake and buffer zones in the watershed basin, by control of industrial and urban waste disposal, bank protection, cleaning the beds of minor rivers, and a complete ban on logging in the sub-coastal zone. A Baikal Commission was established in 1993 to be the key administrative body co-ordinating the efforts of the federal and three regional governments as well as NGOs and scientific experts. By Resolution 1306 of 1994 the Government of the Russian Federation created the *Comprehensive Federal Programme for the Protection of Lake*

Baikal and Rational Use of its Natural Resources. This was prepared by the Ministry of Environmental Protection and Natural Resources of the Russian Federation in Moscow, the Council of Ministers of the Buryat Republic in Ulan Ude and the administrations of the Irkutsk and Chita regions. It contains measures to implement an environmental protection strategy in the context of sustainable development. The legal basis for management is provided in a Federal Law on the Protection of Lake Baikal passed in 1999, but this has not yet been put into effect. There are also many local laws and regulations to protect the lake

However, there is a lack of political will to protect the property from the threats of development pressure; and insufficient funding. An integrated management and comprehensive monitoring plan for the region based on the definition of a Central Ecological Zone for the Baikal Natural Area is still needed, as is the basis for adequate implementation of any such plan (UNESCO/IUCN, 2006). There are strong commercial pressures opposing such measures. The IUCN has requested that there should be clearer delineation and mapping of the boundaries of protected zones; that there should be a schedule of measures taken to mitigate adverse environmental impacts with annual reports on the state of conservation; that there should be a single Management Plan for the whole site and that the mandate and organisation of the Federal Commission for Lake Baikal proposed by the Russian Ministry of Natural Resources and its relation to other conservation agencies should be more clearly defined, and the Commission itself be established (IUCN, 2002). In August 2007, membership of the Interdepartmental Commission for the protection of Lake Baikal was finally approved and a Work Plan for 2007-2008 adopted (IUCN, 2008).

MANAGEMENT CONSTRAINTS

The resolution of conflicts between the conservation and development of the Lake's resources is difficult. The major issue of the recent past has been pollution from the Baikalsk Paper and Pulp mill which, despite opposition, was closed down by economic pressures in 2009. Other main issues are the new lakeside oil pipeline to China, potential exploitation of resources in the Selenga delta, the decline of the seal population and continued logging of the protected area. The main source of both air and water pollution in the basin was the Baikalsk mill at Baikalskiy on the southern shore, which employed 3,500 people since 1966. It polluted 200 sq.km of the lake with dioxin among other poisons, created some of the worst air pollution in Russia with the poisons poured into the lake causing genetic mutations in some of the lake's endemic species: in 1987 a discharge of factory waste caused a mass death of Baikal seals. It had been due for conversion to other uses for several years but for lack of funds and lack of consensus on the seriousness of its impacts, progress was slow. To many, its curtailment was seen as a threat to the economy of the region and a 2003 proposal to declare it an endangered site was opposed by the State Party. However, that year the Russian Prime Minister admitted that the pulp mill should stop production and in 2005 crucial World Bank support for improvement to its waste treatment by installing a closed water treatment cycle was withdrawn (Anon., 2005c; Van Marrewijk *et al*., 2003). In 2009, despite opposition which cited the 2,000 jobs that would be lost, the outdated factory was closed down as no longer profitable to run; but in early 2010 in response to a decree lifting a ban on its operation, it re-opened but still without the closed-loop water system which would contain pollution (Whitton, 2008; Eikel, 2009; UNESCO, 2010).

A second paper and pulp production complex at Selenginsk, built in 1973, has been converted to a closed water-cycle system and no longer dumps waste into the lake. But there is now concern about the granting of extraction rights to oil and gas in the Selenga delta, The Irkutsk hydropower dam by increasing the level of the lake by a meter, also threatened the ecology of the delta. The second major source of pollution is the Selenga river which drains Ulan Ude and several cities in Russia and Mongolia. It is the source of 40% of the lake's pollution which includes heavy metals, despite the installation of more than 100 wastewater treatment plants during the past decade. Other sources have been wind-borne smoke and inadequately treated wastes from the northern city of Severobaikalsk, and coal-fired plants in the southern city of Slyudyanka which continue to pollute the lake and the quality of its air. 16 surrounding towns and more than 50 industries along the lake shores especially on the north side contribute even worse air pollution. 150 kilometers of the south shore are also polluted and more factories 7are established downstream on the Angara river. A concession to mine zinc and lead at Kholodninskoe for which an obligatory EIA has been requested by UNESCO. There is also concern about recent legislation allowing housing and recreational developments around the shores which could bring huge pressures on Baikal's shoreline, especially on Ol'khon island where this has already begun (Anon., 2005b). The growing threat of waste from houses illegally built on the lake's shores was said by the assistant head of the Federal Service for the Inspection of Natural Resource

Use in Buryatia, to be already more polluting overall than the Baikalskiy mill (Boykevitch, 2005). In 2010 a 5,000-7,000-bed marina was planned for the Buriatian coast (UNESCO, 2010).

A third threat was the controversial long-planned construction of an oil trunk pipeline from western Siberia north of the lake to the Pacific coast or south of the lake to China. The World Heritage Committee requested that all pipelines avoid the site and be subject to an Environmental Impact Assessment of international standard (UNESCO, 2002; 2003; Van Marrewijk *et al.*, 2003). However, in late 2004, the President authorised a route from Taishet 600 km northwest of Irkutsk to a new terminal at Perevozhnaya on the Sea of Japan. It was to run through the nearby seismically active Severomuisky mountains, through 130 km of the World Heritage site and within 800 meters of the north coast of Lake Baikal. Transneft had already illegally begun surveying and building along the route which parallels the existing railway. Environmentalists in the Government and local NGOs were overruled despite the potential threat to the last Amur leopard population on the route and to the Pacific coastline (Greenpeace Russia, 2004 & 2005; Anon., 2005a). However, the potential environmental disaster to the lake was averted by a presidential decision in April 2006 to site the line further north (BBC, 2006) avoiding the lake's watershed, though the route would be 500 km longer.

Clear-cutting in the Coastal Zone officially ceased in 1986, as did the harmful practice of log transport on the lake, but satellite imaging shows that illegal logging continues long after inscription of the site in 1996 (IUCN, 2002). There are lesser threats from the over-hunting of seals, poaching, over-fishing, the release of fuel from sunken cars, taiga forest fires and damage from tourism. The sturgeon population never recovered from 19th century over-fishing and the omul salmon catch must now be rigidly controlled. Outside the core zone there is still heavy exploitation of the region by illegal hunting and fishing, habitat destruction and soil contamination. If a combination of these all various pressures continues, it may become impossible to reverse the tide of development in favour of conservation (LakeNet, 2004).

STAFF

The Selenga delta Ramsar site has 6 rangers and a hunting manager. The Pribaikalskiy National Park has a Director, Chief Ranger and about 200 employees in 10 ranger districts (Birnbaum, 1998). No information is available on the staffing of other reserves.

BUDGET

Funding comes from the federal and state governments especially for the Protection of Lake Baikal and Baikal Natural Area program but remains inadequate. The national parks gain some revenue from tourism and recreation. In 2001 more than 90 million roubles (US$ 3 million) was granted by the government for protection of the lake through enforcement of the federal law. In 1999 UNF granted US$30,000 for training. In 2003 Royal Dutch Shell pledged support for the lake. The GEF-funded Global Ecological Fund has resulted in the implementation of more than 380 conservation sub-projects (UNESCO, 2005). In 2008 US$63,528 was provided from international sources for preparatory assistance and training (IUCN, 2008).

LOCAL ADDRESSES

Ministry of Natural Resources, 4/6, Bolshaya Gruznskaya, 123812 Moscow, Russian Federation.

The Chairman, State Committee of Environmental Protection, 8/1, Kedrova St., Moscow, 117874, Russian Federation.

The Chairman, Irkutsk Regional Committee of Environmental Protection and Natural Resources, 16, Parkovaya St., Irkutsk, 664012, Russian Federation.

The Chairman, State Committee of the Buryat Republic for Environmental Protection and Natural Resources, 21a, Solnechnaya St., Ulan Ude, 670031, Mongolia.

The Director, Baikal Institute of Nature Management, Yerbanova Str.,12, Room 304, Ulan-Ude, Buryatia, 67000 Russian Federation.

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