

Cold Mountains

Mongolia's largest lake. Some of the purest water on Earth. Snow-capped peaks. Alpine tundra. Lush forests. Wildlife including argali, ibex, brown bear, and wolf.



Photograph—Ted Wood

Khovsgol's landscape, dominated by permafrost and rock, reflects its cold, harsh climate.

Khovsgol is Mongolia's Great Lake—a cold, clear body of water ringed by forested mountains and reflecting the often clear sky in constantly shifting shades of blue. Like an inland fjord, it stretches long and narrow, from north to south. To Mongolians, it is the Dalai Ej, or "Mother Sea." Its water is among the purest on Earth, cleaner than the more famous Lake Baikal, into which it drains. Both lakes are part of the Baikal Rift System, a split in the earth's crust resulting from the distant, ongoing collision of the Indian subcontinent with Asia—the same massive event that gave rise to the Himalaya

Mountains far to the south. Tectonic activity continues; four earthquakes in the region over the past century have exceeded 8.0 on the Richter scale.

The lake is located in the transition zone between the vast northern forest of Siberia and the steppes of Central Asia. On its western shore, the Khoridol Saridag Range forms an imposing, snow-capped rampart with many peaks topping 3,000 meters in elevation. The highest point in the watershed, 3491-meter Munkh Saridag, is at the north end of the lake in the Sayan Mountains, which form the border between Mongolia and Russia. The eastern shore is a more gentle, rolling landscape of mixed forest and steppe grassland. Streams on this side of the lake meander through ponds and shrubby wetlands, some of them ending at isolated bays with sand beaches. The steep mountains to the west are uplifted dolomite; the gentler terrain to the east resulted from volcanic activity.

West of the park sprawls the beautiful Darhat Valley, a broad expanse of open steppe and low forested hills roughly the size of Lake Khovsgol. Once the site of a large lake, it remains a wet place with abundant ponds, bogs, and tree-lined rivers. The main river is the Shishged, which drains northwest to join the Yenisey River in Russia.

The area's human history dates back at least 7,000 years and probably far longer, to a time before people kept domestic animals, or dreamed of riding horses. The artifacts of ancient inhabitants, including ritual mounds called *kherekurs* and delicately carved deer stones, are widespread throughout the region. The ancient people are gone, but their beliefs linger, mirrored by practices that remain current—shamanism, the honoring of ovoids, and belief in a sacred landscape.

It is a landscape filled with life, including 291 species of birds, and more than 800 species of terrestrial plants. The park's large animals include ibex, argali, musk deer, roe deer, red deer, brown bears, gray wolves, lynx, wolverine, and moose. In total, 68 species of mammals have been observed in the park.



Moose (*Alces alces*), the largest of the deer family, prefer deep forest and wetlands. Khovsgol is near the southern end of their range, and they are rarely seen in the park. Artwork—September Vhay

This can be compared with the 39 species found in the much larger area around Lake Baikal, and is another reflection of the unusual diversity of the Khovsgol environment.

Lake Khovsgol spreads its luminous surface at an altitude of 1645 meters. It measures 135 km in length, with an average width of 20 kilometers. Its deepest point, which occurs roughly midway north-to-south, is 262 meters. The surface area is 2760 square km. It contains 383.3 cubic kilometers of water. In terms of volume, it is the 16th largest lake in the world. It holds 70% of Mongolia's fresh surface water, equivalent to the total flow of all Mongolia's rivers for 11 years. The water is exceptionally pure. To measure clarity, scientists lower a white disk into the lake until it can no longer be seen. In Khovsgol, the disk remains visible at a depth of 31 meters.

Forests



Siberian larch trees mix with fireweed, a flower adapted to survive in areas burned by wildfire.

around the south end of the lake to join the Selenge River on its way to Lake Baikal in Siberia. Baikal is larger, older, and deeper—but not as pure. Khovsgol is higher and colder, rich in oxygen but far less productive. Its overall biomass, per unit of available space, is one-fourth that of Baikal. The density of bottom-dwelling creatures such as worms, snails, insects, and small crustaceans is even lower, with populations measuring a

Ninety-six tributary streams supply the lake, all of them rising in the adjacent highlands. Its outlet is the Egin Gol river, which loops

around the south end of the lake to join the Selenge River on its way to Lake Baikal in Siberia. Baikal is larger, older, and deeper—but not as pure. Khovsgol is higher and colder, rich in oxygen but far less productive. Its overall biomass, per unit of available space, is one-fourth that of Baikal. The density of bottom-dwelling creatures such as worms, snails, insects, and small crustaceans is even lower, with populations measuring a



Fireweed (*Chamaenerion angustifolium*) Artwork—Hannah Hinchman

mere tenth of densities found in Baikal.

Of the lake's nine fish species, the Khovsgol grayling (*Thymalus arcticus nigrescens*) appears to be endemic, meaning that it is found nowhere else. Another, the lenok (*Brachymystax lenok*), is the oldest member of the trout family. Lenok are beautiful, sleek fish that grow to lengths of 70 centimeters. In summer, the high gravel banks along the lake shore provide good vantage points for fish-watching. Both grayling and lenok can easily be seen as they cruise the shallows in search of food.

The lake is surrounded by continuous permafrost, a layer of permanently frozen earth that begins a meter or two below the soil surface. Normally several meters thick, it extends in some places to depths of 600 meters. Permafrost influences the lake temperature, which after the spring melt is a uniform and chilling 2.5 to 3.0°C from top to bottom—colder than other deep lakes.

To survive, native plants and animals have had to adapt to exceptionally rigorous conditions. Food and nutrients are in short supply. In general everything grows more slowly than it would in a more benign setting. Yet having made the adjustment, having learned how to survive, Khovsgol species may have gained a competitive advantage. The conditions that make life difficult for them also create a barrier against invasion by exotic species.

The national park, established in 1992, covers 838,000 hectares—the entire watershed of Khovsgol Lake. Parklands include all of the lake and its shoreline, the eastern slope of the Khoridol Saridag Mountains, and some 150 kilometers of the Sayan Mountains along the boundary between Mongolia and Russia. The highest point in the park, 3491-meter Munkh Saridag, is in the Sayan Range. In 1997, an additional 189,000 hectares of prime mountain wilderness were set aside in the Khoridol Saridag Strictly Protected Area. Established to protect dwindling populations of ibex, argali, musk deer, and other wildlife, the SPA adjoins the park on the southwest.



Photograph—Ted Wood

and a Great Lake

A Sense of the Land

People of the Khovsgol region are predominantly herders who move several times each year according to grazing conditions and weather cycles. Their nomadic movements reflect a deep-set practical understanding of the landscape, and are driven by forces not always apparent to the casual eye.

An example is the Darhat Valley, west of the national park. In the lush days of summer, grazing is good. Water and firewood are plentiful, and it might seem that the valley would make a fine year-round home. But in winter, extreme cold and bitter winds turn it into a harsh and even dangerous place for livestock and people. Many families leave every autumn, after the ground freezes hard enough to support travel over wetlands, moving east to winter camps chosen generations ago for their milder conditions. An important migration route crosses the park by way of Jigleg Pass near the lake's midpoint. Others traverse the Khoridol Saridag Strictly Protected Area. Favored winter grounds include the forested west shore of the lake, and the mountain slopes above it. Log cabins, earth-bermed sheds, and stock corrals in those areas appear abandoned and

overgrown in summer, but they are simply waiting for the return of winter occupants.

Protected areas are nothing new to Mongolians, who have long honored the connection between a good life and a healthy landscape. Their respect for the land is rooted in laws and traditions that are hundreds and even thousands of years old. In ancient days, hunting was limited to appropriate seasons. Cutting of live trees and bushes was forbidden, as was pollution of water sources. Long before the term "national park" was invented, nomadic rulers set aside large areas as nature reserves. Genghis Khan declared the Lake Baikal area (then part of his domain) the "Great Forbidden Zone," a preserve where even in that preindustrial age, development was prohibited.

In the Khovsgol region, old practices of honoring the landscape remain strong. These include shamanism, which according to some experts originated here thousands of years ago. Sacred ovoids mark mountain summits, passes, springs, and other significant landscape points. People wrap the bones of favorite horses in blue cloth, place the bundles in sacred trees, and pray for nature's blessings.



People of the Deer

The Tsaatan, or Dukha, are reindeer herders. About 30 families live in the Sayan Mountains north of the Darhat Valley. They own horses, but base their lives on reindeer. Spending summers in high valleys above the worst of the biting insects, they move into the sheltering taiga forest for the winter. They live all year in cone-shaped tents similar to the teepees used by Indians on the Great Plains of America a century ago. Once made of animal skins, tent coverings are now sewn from white canvas.

Reindeer can carry heavy loads. Their hides make exceptionally warm coats, boots, and blankets. Their antlers, grown annually by both males and females, are sold for medicinal purposes. Does produce only about a cup of milk per day, but the milk is rich. It contains 16 to 18% butterfat. In comparison, cow milk has 4 to 6%.

Shamanism remains strong among the Dukha. They live in a sacred landscape where every hill, river, stone, and tree is the dwelling place of a discrete being. Among them is the spirit that provided the first reindeer. As the story is told: In Tuva long ago there lived a poor man who owned almost nothing. His life was hard. Hunting was bad. His family was starving. One day he went to the taiga and prayed for something to make his life easier. An inner spirit moved him to call out "coo, coo," and after some time, two wild reindeer, a male and a female, came walking

out of the taiga toward him. These he domesticated, and from them have come all the rest. The Dukha still call their animals that way, saying "coo, coo."

About his animals, a Dukha man once said, "Reindeer are the best livestock in Mongolia. Horses are difficult and dangerous. Reindeer are softer. They still have wild intelligence."

In fact, the domestic deer are genetically identical to the wild reindeer that live in the Sayan Mountains. Both are *Rangifer tarandus*, also called caribou in North America. In this part of the world, reindeer were domesticated before horses, perhaps 3000 to 5000 years ago. Cultures based on reindeer once spread all across northern Asia, but are now limited to a few surviving groups including several in the Sayan Mountain region—in Russia, the Todja-Tuvans and the Soyot, in Mongolia, the Dukha. There's a proud but vanishing culture threatened by changing circumstance and modern economic pressure.



Photograph—David Edwards

Diverse Habitats

Biologists use the word ecotone for places where different habitats meet—for example, where a forest meets a meadow, or where a lake meets a shore. As areas of transition, ecotones blend the habitats. Creatures of forest and meadow intermingle along the edges of their respective territories, so that more plants and animals are found in the narrow ecotone than on either side of it. Some creatures, like great gray owls, are primarily creatures of the ecotone. The owls perch on the edge of the forest, watching the meadow for prey.

Khovsgol is an ecotone on a grand scale. Located where the vast Siberian forest meets the central Asian steppe, it blends elements of both. Adding to the variety is the mountainous landscape, with its different elevations, drainage patterns, and sun exposure. The result is a wide range of habitats—wet meadows, shallow ponds, coniferous forest, steppe woodland, open steppe, alpine meadow, snow-capped mountains, lake shore, and of course the lake itself, which is far more than its shimmering blue surface. Conditions vary from the depths to the shallows, from shoreline to open water. A series of lagoons along the western shore of Lake Khovsgol are a good example of ecotone. Waves rolling across the open lake pound the shoreline, but also maintain a series of gravel bars that serve as protective barriers for the lagoons where many water birds find shelter.

Even the climate is varied. Thousands of miles from the moderating influence of an ocean, Khovsgol experiences wide fluctuations. Winters are cold and dry; the daily average in January sinks below minus 20°C, with extremes of minus 40°C and lower. Six months later, on warm sunny days, temperatures can top 30°C. In

general, however, summers are cool, with a July average of 11°C. Summer is also the wet time, with more than 80% of annual moisture falling between March and October. Precipitation amounts vary with altitude. Less than 300 millimeters falls in the park's lower regions while high elevations register more than twice as much.

Tundra vegetation, rich in wildflowers, covers the mountains above 2300 meters, in places forming lush boggy mats. A belt of taiga forest occurs below the tundra, and gives way at lower elevations to dense stands of the park's dominant tree, Siberian larch—a species particularly adapted to living on permafrost soil. Pine, birch, willow, and aspen are also present. Trees commonly grow on shaded north-facing slopes, while steppe vegetation thrives on warmer, drier, south-facing slopes. Standing on a mountain ridge looking south, you see lush green forest. Looking north, the view is filled with stony treeless ridges.

The Khoridol Saridag are primarily dolomite, a kind of limestone. In general, broad summits rise above slopes covered in loose rock, marked by occasional cliffs and outcrops. Several dramatic clusters of pinnacles cap the range, particularly on its western flank overlooking the Darhat Valley. Snow-covered for much of the year, the peaks rise above deep glacial-carved valleys whose rivers and streams flow either west to the Darhat or east to the lake. Watercourses flow strongly during the rainy season, but most of them dry up at other times of the year, and are therefore barren of fish and other aquatic life. Along the lake's western shore, there is no permanent stream north of Khar Us mineral springs.

Old Stones

For 7,000 years or more, people have lived in the Khovsgol region, as shown by Stone Age sites discovered south of Khatgal. Over the past several thousand years, numerous nomadic groups have moved through the area. They include Seytho-Siberians of the Bronze Age; also Hunnu, Turkic, and Uighur cultures, and finally the people of present day Mongolia—Darhat, Samoyed, Urankhai, Khalk, Dukha, and others. Primarily hunters and herders, they based their existence on native animals and the natural resources of the land. Their history spans a time from before the domestication of herding animals, before horses were ridden, and before the rise of modern religion. Moving with the seasons, they left few signs of their passing. Yet they did leave some important and unusual

artifacts—rock mounds called *kherekurs*, and deer stones, narrow slabs set upright and delicately carved with graceful, stylized animal figures and hunting scenes. *Kherekurs*, thought to date from the late Bronze Age 3000 to 4000 years ago, are widespread and numerous. A large concentration is found west of Moron City, forming what looks to have been a ritual complex stretching for kilometers along the Ushigiin Valley. Many are framed within low walls of standing stones set in squares or circles as in mandalas. The deer stones are tall, as much as 3m high. Because their images are similar to animal art common in the region from the 8th to the 5th centuries BCE, they are thought to date from that time. They seem to have been added to existing *kherekurs*, as if to enhance or modify their significance.

Generally, the monuments remain undisturbed. Few have been studied in detail, and their meaning has not been determined. Oriented toward the east, they appear to have had ritual significance and may have been based on early beliefs that survive to this day: shamanism, ovoid worship, and the concept of a sacred and spirit-filled landscape. They are not burial mounds. Although several graves have been found, these were set into the mounds at a later time.



Photograph—Ted Wood



Brown bear (*Ursus arctos*) is among the Khovsgol species listed as rare or endangered in Mongolia. The others include argali sheep, ibex, elk, reindeer, musk deer, lynx, marten, beaver, wolf, moose, wild boar, Siberian mole, and a species not observed in the park for decades, snow leopard. Artwork—September Vhay



fin, feather, and claw

The list of Khovsgol's wildlife is a distinguished compendium of north-country animals. The 68 mammal species include five species of deer: musk deer, elk, moose, roe deer, and woodland reindeer. Argali and ibex inhabit high mountain slopes during summer, and move to lower elevations in winter. There are brown bear, wolf, fox, lynx, wild boar, wolverine, sable, river otter, ermine, badger, marmots, stone marten, and multitudes of small mammals: squirrels, voles, hares, and chipmunks.

A total of 291 bird species have been reported in the area, which accounts for 62% of all bird species observed in Mongolia. Habitat plays a large role in distribution of birds. Waterbirds include black-throated loons, great cormorants, black-necked grebes, gray herons, whooper swans, osprey, white-tailed sea eagle, various ducks, and shorebirds. Ptarmigans, arctic rosy finches, golden eagles, and Altai snowcock are creatures of high tundra. Woodland and steppe species include great gray owls, kestrels, hoopoes, grouse, Daurian partridges, steppe larks, steppe eagles, upland buzzards, three-toed woodpeckers, ravens, crows, peregrine falcons, northern goshawks, and so many more.

Aquatic insects are an important element

of the lake's fauna, as are the nine species of fish found in the lake. Another three species of fish, including the magnificent taimen, live in the waters of the Darhat Valley, to the west. Taimen are also found in the Egin Gol, the river that flows out of the lake at its south end, eventually joining the Selenge River.

Protected areas are good for wildlife. For example, the ibex population of the Khoridol Saridag SPA increased from 55 to over 300 after the area was granted protected status in 1997. Yet illegal hunting remains a serious problem. Musk deer are taken for their musk pods—glands that contain a substance prized for traditional medicine in China and other countries. The gall bladders of brown bear command high prices in the same markets. Other animals, including moose, elk, roe deer, and marmot are poached simply for their meat. Without strong protection, the future of some species is at risk. Already, the park's argali population has sunk to a level from which it might not recover. Snow leopard, once present in the Khoridol Saridag Range, have not been seen there for many years. Tourists should keep in mind that buying illegal skins, horns, and other products will only increase the threat to wildlife.



Photograph—Ted Wood

Bigleaf larkspur (*Delphinium crassifolium*) Artwork—Hannah Hinchman



Taimen—Jocelyn Slack