

World Heritage Sites

Protected Areas and World Heritage



SARYARKA - STEPPE AND LAKES OF NORTHERN KAZAKHSTAN KAZAKHSTAN

The area preserves two large lake systems in a diverse and barely altered dry central Eurasian steppe, an ecosystem much reduced since its reclamation for agriculture in the 1950s. Northern pine forest overlaps semi-arid desert flora at Naurzum; and the Korgalzhyn-Tengiz lakes, on a major migratory crossroads, support the largest breeding, moulting and resting waterbird populations in Asia, including relict, endemic and rare species.

COUNTRY

Kazakhstan

NAME

Saryarka - Steppe and Lakes of Northern Kazakhstan

NATURAL WORLD HERITAGE SERIAL SITE

2008: Inscribed on the World Heritage List under natural criteria ix and x.

STATEMENT OF OUTSTANDING UNIVERSAL VALUE

The UNESCO World Heritage Committee issued the following Statement of Outstanding Universal Value at the time of inscription

Values

Saryarka - Steppe and Lakes of Northern Kazakhstan protects substantial, largely undisturbed areas of Central Asian steppe and lakes in the Korgalzhyn and Naurzum State Nature Reserves. The property's wetland areas are of outstanding importance for migratory waterbirds, including substantial populations of globally threatened species, as they are key stopover points and crossroads on the Central Asian flyways. The property's steppe areas provide a valuable refuge for over half the species of the region's steppe flora, a number of threatened bird species and the critically endangered Saiga antelope.

Criterion (ix): Ongoing biological and ecological processes: The property contains substantial areas of steppe and lakes with largely undisturbed associated biological and ecological processes. The seasonal dynamics of the hydrology, chemistry and biology of the lakes, with the diverse flora and fauna of the wetlands have evolved through complex wetting and drying cycles, and are of global significance and scientific interest. The wetlands of Korgalzhyn and Naurzum State Nature Reserves are key stopover points and crossroads on the Central Asian migratory bird flyways and are of outstanding importance for migratory waterbirds on their way from Africa, Europe and South Asia to their breeding places in Western and Eastern Siberia. The property also contains over 200,000 ha of Central Asian steppe, more than half of which is pristine, and which is part of the temperate grassland biome.

Criterion (x): Biological diversity and threatened species: Korgalzhyn and Naurzum State Nature Reserves protect large areas of natural steppe and lake habitats that sustain a diverse range of Central Asian flora and fauna and support vast numbers of migratory birds, including substantial populations of many globally threatened species. The Korgalzhyn-Tengiz lakes provide feeding grounds for up to 15-16 million birds, including flocks of up to 2.5 million geese. They also support up to 350,000 nesting waterfowl, while the Naurzum lakes support up to 500,000 nesting waterfowl. The property's steppe areas provide a valuable refuge for over half the species of the region's steppe flora, a number of threatened bird species and the critically endangered Saiga antelope, a once abundant species much reduced across its range by poaching pressure.

Integrity

The property contains high quality steppe and lake habitats that are essential for the long term conservation of the region's biological diversity and each of its two component areas is of sufficient size to maintain associated biological and ecological processes. Korgalzhyn and Naurzum State Nature Reserves have benefited from long-term legal protection as strict nature reserves. Korgalzhyn is completely surrounded by a buffer zone, while

2000: The Korgalzhyn -Tengiz Lakes became a member of the Living Lakes international network of the Global Nature Fund;

2008: The two reserves inscribed on the World Heritage List as a serial site.

LAND TENURE

State Government. Naurzum is in Kustanay province; Korgalzhyn is in Akmola and Karaganda provinces. All the reserves are administered by the Forestry and Hunting Committee of the Ministry of Agriculture.

AREAS

	Core areas	Buffer zones:
Naurzum: 308,106.7 ha:	Core: 191,381 ha	Buffer: 116,725.7 ha
- Naurzum-Karagay:	Core: 139,714 ha	Buffer: 36,287.7 ha
- Sypsyn-Aebu:	Core: 38,720 ha	Buffer: 11,624 ha
- Tersek-Karagay:	Core: 12,947 ha	Buffer: 37,655 ha
- Corridor:		Buffer: 31,159 ha
Korgalzhyn: 353,368 ha:	Core: 258,947 ha	Buffer: 94,421 ha.
Total area: 661,474.7 ha:	450,328 ha*	211,146.7 ha

*450,344 ha (UNESCO, 2009)

ALTITUDE

Naurzum-Karagay:	120m to -220m
Sypsyn-Aebu:	180m to 230m
Tersek-Karagay:	305m to 320m

PHYSICAL FEATURES

The reserves lie in the 500-900 km-wide strip of temperate Eurasian steppe grassland, which runs from the Black Sea to the Chinese border between pine forests to the north and semi-deserts to the south, covering the entire northern half of Kazakhstan. They include two groups of fresh and salt water lakes lying in unaltered short-grass steppe: Naurzum (within an area approximately 65 km by 65 km) in the upper Turgai Depression which runs north-south for hundreds of kilometers towards the Aral-Irtysh basin; and Korgalzhyn (an area of approximately 80 x 45 km) with Lake Tengiz, in a depression with no outlet, in the Kazakh Rolling Hills. They both lie in the *Melkosopchnik* (small hills) belt which crosses central Kazakhstan east to west.

Naurzum Reserve, comprises Naurzum-Karagay, a group of small shallow lakes, with two smaller and slightly higher outliers, Sypsyn-Aebu 10km west and Tersek-Karagay, 20km northwest lying in the upper catchment of the Turgay depression. This lowland, of tectonic origin, cuts through a plateau of Triassic to Tertiary continental and marine sediments in a 25-30 km wide valley with intermittent scarp slopes, floored by former river and lake terraces, lake sediments, aeolian deposits, and winter-flooded chains of lakes. The main reserve has pine forests and is divided by a belt of hummocky fixed sand dunes which also run through the Sypsyn-Aebu reserve, an area of high quality steppe. The Tersek-Karagay reserve has low clay hills on a sandstone and gravel plateau above the scarp. The two main lakes are L.Aksuat (22,000ha) and L. Saramoin (12,600ha). They average 2.5-3m deep on 12-25-year flood/drought cycles which create a white crust of sodium and sulfate salts - *solonchak*, and less saline winter-flooded areas of *sor solonchak*. Tributary streams are intermittent. The soils of the meadows are hydromorphic and in lake depressions, halomorphic, which dry to saline *solonchak* or become sterile wet alkaline *solonetz* soils. Outside the valley bottom the dry but fertile dark chestnut soils of the humus-building gramineous steppe predominate.

Korgalzhyn Reserve is 300km to the east in the Tengiz-Korgalzhynskiy depression in the Kazakh Rolling Hills, which lies on a denuded plain over Tertiary sediments, lacustrine and alluvial, clays and loess, above Palaeozoic rocks. It contains an inward-draining labyrinth of marshes and over sixty fresh and saltwater lakes fed by the permanent Nura and intermittent Kon and Kulanut Pes rivers. When flooded, these merge in shallow Lake Korgalzhyn (47,100ha and -1.6m deep after floods), and drain to Lake Tengiz. The total water area is about 260,000ha. Lake Tengiz ('sea' in Kazakh) is much the largest at 156,000ha and 6- 7m deep, but can shrink to 113,600ha after drought and is lifeless, being

high in sulphate and chloride salts, floored by thick silt and surrounded by wide mudflats. Most of the freshwater is in the Nura river delta. This flows in a dynamic network of 0.5 to 2.5 metre water channels of fluctuating water levels and varying salinity. Most of these watercourses and lakes are shallow, brackish and seasonal, creating when dried saline areas of *solonchak* and *sor solonchak* and deposits of salt and medicinal muds. The groundwater is salt but there are some freshwater springs. The soils are alluvial meadow and halomorphic *solonetz* soils, saline to 30 cm deep, less saline below that level. The delta is situated in a steppe landscape with little relief and covered by an ocean of grass which stretches to the horizon. The land west of Lake Tengiz is not strictly protected but may added to the nominated area later.

CLIMATE

Kazakhstan has an arid strongly continental climate dominated by arctic air masses, with hot summer winds, blizzards and constant shortage of water which causes droughts, duststorms and low snowfall. In the Turgay Depression reserves the average and minimum January temperatures are -18°C and -45°C, rising to 24.4°C and a mean maximum of 42°C in July. Spring and autumn last only a month. Frost persists between late October and early April when the lakes are frozen over. The average rainfall is 250mm a year, mostly in June and July. Winters are dry. The waters come mainly from winter snowmelt in the Kysyltas Hills to the southeast. Evaporation is very high and on average there are 34 days of drought. Strong and frequent south-north winds are channeled by the valley, in winter from the south and southwest bringing snowstorms, in summer from the north. Summer cyclones from the south bring dust storms and hot winds that regularly cause fires which are an intrinsic part of the steppe and forest ecosystems.

Korgalzhyn temperatures are very similar though cooler by 4-5°C in summer. The rainfall is irregular, mostly in summer, and averages 280mm a year. Annual evaporation is ~1000mm. Winters are long with strong and frequent winds from the southwest and west; the ground freezes to one meter deep. Spring and autumn are short and temperatures can change 20-25°C within hours. Over recent decades the average annual temperature in the region has increased by 0.6°C.

VEGETATION

The Turgay Plateau and Depression and the Kazakh Rolling Hills are in the Zauralsko (east-of-Ural) Turgay sub-province of the Eurasian steppes which cover 44% of Kazakhstan. It is a fertile ecosystem which has been much modified by man. The reserves protect a 200,000 ha swath of natural steppe, 60% of which is quite unaltered, in an unusually complete sequence of undisturbed ecosystems which support the highest biodiversity in the region. The vegetation is adapted to drought, fire, grazing, high winds and long frosts. At Naurzum the northern pine forest reaches its southernmost point alongside the northernmost flora of semi-arid desert. The ecosystems of the Kazakh Hills are described as being larger and better preserved than those of the floristically richer Crimean steppe. In all, the proposed sites have nearly 770 species of plants - a third of Kazakhstan's plant species and over half of all the region's steppe and halophyte floras.

Naurzum has 687 plant species in six distinct biomes: dry steppe, semi-arid sandy scrub steppe, boreal forest, meadows, halophytic and aquatic. The dry steppe is dominated by feathergrass *Stipa lessingiana*, *S. capillata*, and sheep's fescue *Festuca sulcata* communities and in spring is brilliant with flowers; rare species such as Schrenk tulip *Tulipa schrenkii*, *Ornithogalum fisherianum* and *Stipa tirsia*. The sandy steppe has psammophytic herb and feathergrass vegetation: *Stipa capillata*, *S. zaleskii*, *S. pennata*, *S. parviflora* and xerophytic motley-grass species: *Helichrysum*, *Artemisia*, *Silene* and *Centaurea*. The forests grow on sandy and rocky soils. They are of pine *Pinus sylvestris* and birch *Betula pubescens*, *B. pendula* and the endemic Kirgiz birch *B. kirghizorum* with aspen *Populus tremula* and associated herbs. The related scrub steppe has almond *Amygdalus nana*, cherry *Cerasus fruticosa*, some *Juniperus sabinea* with *Salix*, *Tamarix*, *Rosa*, *Spiraea* and *Cytisus* species. The steppe and forest ecosystems are adapted to regular fires. The meadows have several meadow grasses with rush *Juncus gerardii* mixed with halophytic wormwoods and saltworts *Puccinellia tenuissima* and *Limonium gmelinii*. A pink tamarisk *Tamarix ramosissima* grows on lake edges. Aquatic species are dominated by reed *Phragmites australis*, cat-tail *Typha angustifolia* and club-rush *Scirpus lacustris*. The halophytes of the saline semi-desert include wormwoods *Artemisia shrenkiana*, *A. nitrosa*, *A. pauciflora*, *A. lessingiana*, and desert saltworts *Atriplex cana*, *Anabasis salsa*, *A. aphylla*. Where soils are very saline, hyper-halophytic species grow: *Halocnemum strobilaceum* and seablite *Suaeda corniculata*.

Korgalzhyn has about 350 plant species, a quarter of the Rolling Hills flora and a half the area's halophytes. Within the nominated site area there is little steppe flora except for a fringe on the lakesides

of *Stipa lessingiana*, and *Festuca sulcata* feathergrass communities. One species endemic to the Kazakh hills is the Kazakh milkvetch *Astragalus kasachstanicus*. The rare Schrenk tulip *Tulipa schrenkii* and many species of Liliaceae and Cruciferae occur, and relict species such as yellow and white water lilies *Nuphar lutea* and *Nymphaea candida*. But most of the vegetation consists of halophytic and hyper-halophytic plant communities. The *solonetz* soils and *solonchaks* support halo-xerophytes such as communities of black sagebrush *Artemisia pauciflora*, grey sagebrush *Atriplex cana* and *Halocnemum strobilaceum* associations. Salty meadows have quackgrass *Elytrigia repens* and alkali grass *Puccinellia dolicholepis* communities. Aquatic margins have vast areas of common reed *Phragmites australis*. The channels of Lake Korgalzhyn support rich aquatic vegetation and meadows of pondweed *Potamogeton pectinatus* and *P. perfoliatus*. The interaction of fresh, brackish and saline waters produces a rich variety of habitats for fish and invertebrates.

FAUNA

The wetlands of the northern Kazakh lakes are a crossroads of central Asian migratory flyways between northern Scandinavia and the far east, and between the Arctic, Siberia, and the southern hemisphere, of great importance for breeding, moulting and resting migratory waterfowl. The Korgalzhyn-Tengiz lakes are capable of feeding 10-15 million birds, among them migratory flocks of 2-2.5 million geese. After rains, these lakes support 350,000 nesting waterfowl, and the Naurzum lakes, 200,000. The four sites are on the border between the circumboreal forest and middle latitude deserts, and are a mixture of northern forest, steppe and semi-desert with life-forms representative of each. Many species are rare or endangered, but overall, the populations, which include those typical of the Kazakhstan grassy steppes, remain undisturbed and stable. Because of the large-scale conversion of steppe to arable in the 1960s, 70-80% of the original steppe species have been reduced in numbers. The records list 341 birds, 112 breeding and 239 migratory or vagrant species, and 53 mammals, 10 reptiles and amphibians, 16 fish and over 1,000 invertebrate species.

The **Naurzum** reserves have 47 species of mammals. Its forests harbour elk *Alces alces* and lynx *Lynx lynx*, both at their southern limits, Siberian roe-deer *Capreolus pygargus*, western hedgehog *Erinaceus europaeus*, red squirrel *Sciurus vulgaris*, mountain hare *Lepus timidus*, badger *Meles meles*, ermine *Mustela erminea*, weasel *Mustela nivalis*, raccoon dog *Nyctereutes procyonoides* and European pine marten *Martes martes*, listed on the national Red List. Wild boar *Sus scrofa* live in the reedbeds. Over half of its steppe species are rodents, many living on the northern or southern margins of their range. Characteristic animals are bobak marmot, ground squirrels or *souslik*, two of which, the little and yellow *Spermophilus pygmaeus* and *S. fulvus* are locally endemic, two jerboa, several voles *Microtus* spp. and lemmings *Lagurus* spp., long-eared hedgehog *Hemiechinus auritus*, European hare and predators Siberian polecat *Mustela sibirica*, corsac fox *Vulpes corsac*, common fox *Vulpes vulpes*, and wolf *Canis lupus*. Desert species are lesser and dwarf fat-tailed jerboas *Pygeretmus platyurus* and *P. pumilio* and the rare Mongolian saiga antelope *Saiga tatarica* (CR).

There are 6 reptile species and 4 amphibians: moor frog *Rana arvalis*, spadefoot toad *Pelobates fuscus*, an isolated population of green toad *Pseudepidalea viridis*, Renard's meadow viper *Vipera ursinii ursinii* (VU), sand lizard *Lacerta agilis*, steppe and rapid racerunners *Eremias arguta* and *E. velox*. Of the 10 fish species, those adapted to fluctuating water levels are commonest: Crucian carp *Carassius carassius*, goldfish *C. auratus*, also tench *Tinca tinca*, perch *Perca fluviatilis*, pike *Esox lucius*, roach *Rutilus rutilus* and common carp *Cyprinus carpio*. There are over a thousand invertebrate species: 180 ground beetles Carabidae 88 lamellicorn beetles Scarabaeidae, over 100 weevils Curculionidae and 39 ants Formicidae. Rare insects listed in the Red Data Book of the USSR are predatory bush cricket *Saga pedo* and steppe hairy flower-wasp *Scolia hirta*. Seven others are listed on the Red List for Kazakhstan.

The birds are far the most varied and unusual wildlife of the area. 279 species (57% of Kazakhstan's avifauna) are found among the forests, steppes and lakes of Naurzum, 158 being breeding species. 22 species are listed on the IUCN Red List and 33 on the Kazakhstan Red List: 18 breeding, 8 migratory and 7 vagrant. The extension of pine forest so far into the dry steppe with its plentiful rodent prey has led to a concentration of 28 raptors. Endangered species on the IUCN list for the reserves as a whole are the saker falcon *Falco cherrug* (VU; 16-20 pairs), Siberian white crane *Grus leucogeranus* (CR), slenderbilled curlew *Numenius tenuirostris* (CR), white-headed duck *Oxyura leucocephala* (EN: 5,000 - 40% of the world total) and the endemic sociable plover *Vanellus gregarius* (CR). There are also nine vulnerable species: lesser white-fronted goose *Anser erythropus* (VU: 1,000, 4% of world population), red-breasted goose *Branta ruficollis* (EN: 6,000 - 5% of world total), Pallas's fish eagle *Haliaeetus leucoryphus* (VU), greater spotted eagle *Aquila clanga* (VU) and imperial eagle *A. heliaca* (VU: 30+

pairs), lesser kestrel *Falco naumanni* (VU), great bustard *Otis tarda* (VU) The black and whitewinged larks *Melanocorypha yeltoniensis* and *M. leucoptera*, are also local endemics.

In addition to the above, five further species are listed in the Kazakhstan Red Data Book as endangered, and 11 further species as vulnerable. Listed as endangered are the white pelican *Pelecanus onocrotalus*, ferruginous duck *Aythya pyroca*, osprey *Pandion haliaetus*, steppe eagle *Aquila nipalensis*, peregrine *Falco peregrinus*, red-footed falcon *Falco vespertinus*, pallid, western marsh and Montagu's harriers *Circus macrourus*, *C. aeruginosus* and *C. pygargus*. Nationally vulnerable species are nesting Dalmatian pelican *Pelecanus crispus* (VU), squacco heron *Ardeola ralloides*, glossy ibis *Plegadis falcinellus*, spoonbill *Platalea leucorodia*, greater flamingo, whooper swan *Cygnus cygnus*, white-tailed eagle *Haliaeetus albicilla* (18 pairs), short-toed snake-eagle *Circaetus gallicus*, corncrake *Crex crex*, little bustard *Tetrax tetrax*, houbara bustard *Chlamydotis undulata* (VU), greater black-headed gull *Larus ichthyaetus* and eagle owl *Bubo bubo*.

Korgalzhyn reserve has 41 mammal species, including the endemic steppe pika *Ochotona pusilla* (VU) and the pond bat *Myotis dasycneme*. Rodent species predominate on the steppe, being 55% of the total, including bobak marmot *Marmota bobak schaganensis*, the endemic steppe lemming *Lagurus lagurus*, Dzhungarian hamster *Phodopus sungorus*, black-bellied hamster *Cricetus cricetus* and southern birch mouse *Sicista subtilis*. A steppe carnivore is the steppe polecat *Mustela eversmannii*. Semi-desert species include long-eared hedgehog *Hemiechinus auritus*, northern mole-vole *Ellobius talpinus*, two jerboas and the the Betpak-Dala population of Mongolian saiga antelope *Saiga tatarica* (CR), which calves on the steppe southwest of Lake Tengiz, the only time when it is not on the move. This is the most threatened population of saiga, at the northernmost limit of its very extensive range but it is considered endemic to the region. It was much hunted in the recent past, and numbers plummeted during the 1980s. Forest species include four shrews, four voles, blue hare, badger, ermine, weasel, corsac fox and wolf. 180-200 wild boars live in the reedbeds. The invertebrates are incompletely studied. Many species of beetles, dragonflies and freshwater molluscs are recorded.

There are only two species of amphibians: moor frog *Rana arvalis* and an isolated population of green toad *Pseudepidalea viridis*. Reptiles include Renard's meadow viper *Vipera ursinii ursinii* (VU), steppe ratsnake *Elaphe dione*, sand lizard *Lacerta agilis* and steppe racerunner *Eremias arguta* which are rare and at the northern edge of their range. The freshwater Korgalzhin Lake has 14 species of fish; the saline lakes have none. Crucian carp *Carassius carassius*, perch *Perca fluviatilis*, and roach *Rutilus rutilus* are common; pike *Esox lucius*, goldfish *Carassius auratus*, dace *Leuciscus leuciscus*, ide *L. idus* and ruff *Acerina cernua*, less so. This lake has large populations of zooplankton and phytoplankton.

The avifauna of the Korgalzhin-Tengiz lakes is extremely rich in waterfowl and wading birds and in wet years 500,000 nest on the site. 314 species are found, 126 being breeding species. Fifteen million migrating birds of 219 species, moulting and resting, pass through each year: 150,000 pochard *Aythya ferina*, 50,000 red-crested pochard *Netta rufina*, 40,000 widgeon *Anas penelope*, 20-40,000 mallard *A. platyrhynchos*, 40,000 coot *Fulica atra*, 100,000 ruff *Philomachus pugnax*, 50-80,000 red-necked phalarope *Phalaropus lobatus*, red-breasted goose *Branta ruficollis* (EN), vagrant Siberian white crane *Grus leucogeranus* (CR), slenderbilled curlew *Numenius tenuirostris* (CR) and great bustard *Otis tarda* (VU). Summer visitors include 2,000 globally threatened white-headed duck *Oxyura leucocephala* (EN) and the common and ruddy shelducks *Tadorna tadorna* and *T. ferruginea*.

Lake Tengiz is globally significant as the northernmost breeding site in the world for greater flamingo *Phoenicopterus ruber*: 10-14,000 pairs gather on islands in the lake, a number which can rise to 60,000. Other breeding birds include relict maritime species: relict gull *Larus relictus* (VU), black-headed gull *L. ridibundus* (2,000 pairs), mew gull *L. canus* (8-900 pairs), Pallas's gull *L. ichthyaetus* (350 pairs), common tern *Sterna hirundo* (1,500 pairs), slender-billed gull *L. genei*, Caspian tern *Sterna caspia*, Caspian plover *Charadrius adriaticus*, Kentish plover *Charadrius alexandrinus* and mute swan *Cygnus olor* (200 pairs); also demoiselle crane *Grus virgo* (5,000 birds), Dalmatian pelican *Pelecanus crispus* (VU: 4,000 individuals - 10% of the world total), white pelican *Pelecanus onocrotalus* and little bustard *Tetrax tetrax*. There are 31 species of *Falconiformes*, 11 on the Kazakhstan Red List and 7 in the IUCN Red Data Book, which include the greater spotted eagle *Aquila clanga* (VU), golden eagle *A. chrysaetos*, steppe eagle *Aquila nipalensis*, Pallas's fish eagle *Haliaeetus leucoryphus* (VU), pallid harrier *Circus macrourus*. and lesser kestrel *Falco naumanni* (VU), all of which breed in the area, The surrounding steppe is also the summer breeding ground for the uncommon sociable plover *Vanellus gregarius* (CR) and black-winged pratincole *Glareola nordmanni*.

An enormous number of birds stop over in the region - on the mud islands on lake Tengiz the northernmost colony of greater flamingo (the symbol of the Korgalzhyn Nature Reserve), reaches up to 14,000 breeding pairs. The Korgalzhyn Lakes harbor big colonies of the Dalmatian Pelican (VU: with over 500 nesting pairs in the vast reed beds - 10% of the world population). The white-headed duck *Oxyura leucocephala* (EN) is breeding and resting at the fresh and brackish lakes; in autumn it can be observed in numbers of up to 4,000 birds (30-40% of the world population) in the protected area. Only 30 species overwinter there.

CONSERVATION VALUE

The nominated site combines four reserves which have a wide range of undisturbed habitats: plateau and hillside, forest, steppe, semi-desert, meadow, wetlands and extensive lakes. It lies at the crossroads of two major flyways of great importance for breeding, moulting and resting migratory waterfowl with several endangered, endemic or vulnerable species. The Reserves protect over 200,000 ha of wetlands, support the largest populations of waterbirds in Asia and are in good biological condition: some 500,000 birds of 120 species breed in the two reserves. The sites also preserve 200,000 ha of barely altered dry steppe and at Naurzum, northern pine forest overlaps semi-arid desert. They also provide habitat for the saiga antelope and locally endemic small mammals. Korgalzhyn-Tengiz is a long established Ramsar wetland.

CULTURAL HERITAGE

'Saryarka' is the term describing the endless ridges of yellow short-grass steppe. There is evidence of Palaeolithic occupation of the area, and of Neolithic farming and cattle-raising from 8000 to 3000BC. From the time the climate became drier between 3000 and 1000BC, the steppes became the summer pastures of nomadic cattle-breeders until settlers entered from the south and west in the second half of the 19th century and began to convert it to arable. During the Soviet Virgin Lands program between 1954 and 1960, the very extensive reclamation of the steppe for agriculture greatly reduced the area of the ecosystem.

LOCAL HUMAN POPULATION

The semi-arid grassland is sparsely populated. The people are almost entirely Kazakh in the Korgalzhyn area and 75% Kazakh in the Naurzum area. Under the Soviet agricultural program, settlement of the steppes was intensified though the areas of the reserves were not disturbed. They were lightly used for fishing, also for hunting and haying which are still permitted outside the Korgalzhyn Ramsar site and its buffer areas where two small villages, Abay and Nygman with 680 inhabitants remain. After 1968 only conservation-related activities were permitted within the reserves though there is some farming in the buffer zones outside the nesting season, mainly for hay. Since 1990 the whole region has depended on diminishing livestock farming and the productivity of the Naurzum area has halved. The region is one of the poorest in Kazakhstan, with very high unemployment.

VISITORS AND VISITOR FACILITIES

Since 2000 Naurzum reserve has had an average of 240 visitors per year to the small museum, and 100 to the reserve itself, 15% being foreigners. There are six excursion routes for scientific tourism but no other facilities: since it is isolated there is little call for recreational use. The museum in Korgalzhyn village east of that reserve has averaged 1,150 visitors a year since 2000. It emphasises public education and many visitors are from schools but few go on to see the reserve. In fact, only scientific and guided eco-tourism are permitted within the reserve itself, and tourism is not expected to increase greatly. But small group visits are organized and between 2000-5 some 254 visitors a year visited this way, 20% being foreigners. There are four long (1 to 3-day) routes across and around the reserve and the smaller L. Tengiz. Tracks are the only access. There is a 12-person guesthouse at Karazhar ranger station with a café and shop. Three popular scientific publications in Russian have been produced for each reserve.

SCIENTIFIC RESEARCH AND FACILITIES

Chronicles of Nature for Naurzum Reserve were first published in 1967 and included data from as far back as 1934. From 1981 all its scientific material has been synthesized in 5-year reports. There are now more than 600 publications on the area. The most important studies include the reports for 1991-1995 (Bragina *et al.*, 1998), and 1996-2000 (Bragina *et al.*, 2000 in manuscript), on birds (Bragin, 1999a, b), fauna (Bragina, 1999), on lakes and wildlife (Bragin, 2000a) and forest soil invertebrates (Bragin *et al.*, 2000b). There was a Sanitary & Epidemiological Station at Akmola near Korgalzhyn from 1975-1998 and *Chronicles of Nature for Korgalzhyn Reserve* were published since 1974 with materials synthesized in 5-year reports. A successor Hydrometeorological and Environmental Management

Centre has been created there. There is a museum with laboratory and library in Korgalzhyn village. The Scientific and Technical Council of the Reserve programs research and training. Of the more than 300 reports on the area the most important are studies on environmental research on the lakes (Tursunov *et al.*, 1993), soils and vegetation (Ala'din *et al.*, 1996) and fish (Koshkina, 1999). There are currently eight international biodiversity projects under way concerning migratory bird habitat, wildfowl, the condition of the Korgalzhyn -Tengiz lakes, the protection of saiga, biodiversity and plant communities, and wetland networks in Kustanay province. Most of these topics are monitored annually. The bibliography in the nomination document cites 89 detailed references, mostly in Russian.

MANAGEMENT

Under the management of the Forestry and Hunting Committee of the Ministry of Agriculture the Reserves have been successfully preserved from exploitation and their condition is good, with large and healthy populations of birds, fish and steppe wildlife which have long been stable. Some farming and grazing is permitted in buffer areas but pollution from this source is decreasing as farming declines. Lake Tengiz itself is untouched because of its salinity and muddy shores. Management follows the detailed statutes for each reserve, executed through annual plans adopted by their scientific and technical councils. These allow for monitoring, research, training, education, recreation and tourism. Monitoring of lake water, fish, vegetation, waterbirds and other animal populations has been done for many years.

A management plan is being developed under a GEF/UNDP project. Development programs for nature conservation, research and tourism in Naurzum for 2000-5 and Korgalzhyn Reserve for 2004-6, proposed their extension over neighboring steppe with the eventual aim of establishing a Biosphere Reserve. An integrated management plan has been drawn up which assumes inclusion of these extensions. A 382,660 ha extension proposed mainly west of L. Tengiz around Lakes Kypchak and Kerey is partly to protect the Saiga calving grounds but also to increase the site's proportion of steppe land. An extension to the south of the Naurzum Reserve may include the Sarycopa (Sary-Kopinskiy) State Wildlife Reserve, hitherto incompletely protected. The proposed extensions are into lightly populated areas with a total of 11,000 people in 12 settlements (Korgalzhyn) and 6,000 people in six settlements (Naurzum). There should also be benefit from three large-scale conservation projects, for wetlands important to migratory birds, for environmental improvement in developing north Kazakhstan and for conservation along the Silk Road.

MANAGEMENT CONSTRAINTS

There are few constraints, except for inadequate funding, on the continued successful management of the reserves. Alien species are few and not troublesome. Poaching for saiga horn has diminished, but for subsistence is increasing. In Naurzum agricultural pollution is minimal. In Korgalzhyn pollution from farming in the large River Nura catchment could occur and there has been trouble when dams which regulate the incoming water are breached, and flooding or drying out occurs. Heavy industry which has been developed upstream in the Karaganda-Timirtou region on the Nura has caused pollution by mercury, other heavy metals, oil and chemicals. An EU-funded study has measured the extent of this pollution and discovered almost no research into the water quality of the Tengiz-Korgalzhyn system downstream (EU, 2007). A canal has been cut between the Nura and the Ishim River at Astana, the new capital of Kazakhstan, through which it is intended that 25% of the flow of the Nura will be eventually diverted for the new town. A World Bank-funded project is working to contain the effects of the pollution which could destroy the ecological balance of the nominated site.

COMPARISON WITH SIMILAR SITES

The main bases for comparison with similar existing World Heritage sites are:

- ix) The dynamic seasonal and long-term cycles of flood and drying with consequent richness of marsh and aquatic habitats in good condition make the Tengiz-Korgalzhyn wetlands a key example of these processes;
The undisturbed steppe is the opposite: an unchanging ecosystem, also in good condition; little noted in the World Heritage system, much of which has been converted into farmland because of its fertility;
- x) The vast numbers of migrating waterfowl, including endangered and endemic species, attracted to the lakes, plus the uncommon saiga antelope give the area notable biological importance.

The nomination of undisturbed natural steppe land and lakes together is a combination unmatched by any World Heritage site except for Uvs Nuur in Mongolia and Tuva. There are 22 protected wetlands in the Eurasian steppe between Moldova and north China, which the nomination discusses, and which include the Volga and Ural deltas on the Caspian coast; but grasslands which are not savanna sites are little featured on the World Heritage List. Hortobágy in Hungary is a large steppe for Europe but is designated for being man-made not natural. Grassy wetland World Heritage sites attracting large numbers of migratory waterbirds are commoner. The Danube delta is Europe's largest marshland and attracts vast numbers of birds, but is not steppe, and is being developed. Doñana is a similar, smaller, coastal marsh but is Mediterranean. Waterton Lakes and Wood Buffalo Parks in Canada both have temperate grassland and bird-attracting wetlands, but are otherwise too different to be closely comparable. Lake Turkana and the Rift Valley lakes, a possible future nomination, may be compared for birds but are equatorial desert or savanna. All except Uvs Nuur and Doñana attract fewer waterfowl than the Kazakh sites. Uvs Nuur itself is a saline but non-dynamic lake and a quarter of its surroundings are similar (Mongolian-Manchurian) semi-desert steppe and wetland, although other sites in the series are much more varied.

STAFF

At Naurzum the state ranger service has 59 employees: Director, 5 researchers, 5 conservationists, 40 rangers, 7 management and 1 technical support staff. There are 7 ranger stations, a mobile patrol and a fire station. At Korgalzhyn there are 51 employees: 5 scientists, 5 management, 5 in public awareness, 32 rangers, and 2 support staff. There are 4 ranger stations and mobile 4WD and motorboat patrols. Training in monitoring, wildlife surveys, inspection routines and safety is given in both areas.

BUDGET

Funding comes from the Kazakh Ministry of Agriculture which was until 2003 insufficient for adequate maintenance. In 2004-5 Korgalzhyn was granted the equivalent of US\$380,000, Naurzum US\$300,000. New equipment has been supplied and training expanded. A little money comes from environmental tourism and museum visitors (US\$2,500 in 2002). Between 2005 and 2009 a GEF/UNEP Siberian crane project will bring in US\$3,700,000, and from 2003-2010, a GEF/UNDP Wetlands project will bring in US\$12,000,000. Ramsar, BirdLife International, the Association for the Conservation of Biodiversity in Kazakhstan, NABU Germany and the UNDP Astana helped to develop the nomination.

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REFERENCES

The principal sources for the above information were the original nomination and re-nomination submissions for World Heritage status.

Bragina, T., *et al.* (2001). *Steppe and Lakes of Northern Kazakhstan. Nomination for Inscription on the List of Cultural and Natural World Heritage of UNESCO.* Koshetaw, Kazakhstan.

Claus, S. & Lenk, M. (2004). *Outline of the Hydrological Status in the Nura River and Tengiz Lake Basin - Focusing on the Maintenance of Natural Flows in Nura River to Safeguard Long-term Water Supply of Korgalzhyn Nature Reserve.* Astana.

EU Specific Targeted Research (2007). *TWINBAS. Twinning European and Third Countries' River Basins for Development of Integrated Water Resources Management Methods. Final Project Report. Appendix 3: River Nura.* EC Research Project For EU Water Framework Directive.

IUCN (2009). *The Red List of Threatened Species.* IUCN, Cambridge, U.K.

Magin, C. (2005). *World Heritage Thematic Study for Central Asia: A Regional Overview.* Report for IUCN, Gland, Switzerland. 78 pp.

Karpowitz, Z. & Reap, J. (2002). *Mission to Almaty Kazakhstan, December 2002*. Report for IUCN, Gland, Switzerland & ICOMOCS. 33 pp.

Kustanay Regional Forests & Bioresources Administration (2000). *Regional Development Program of the Naurzum State Nature Reserve for 2000 -2005*. Naurzum.

Ministry of Agriculture, Forestry & Hunting Committee of Korgalzhyn State Nature Reserve (2003). *Program of Developing Public Institution Korgalzhyn State Nature Reserve in the Period 2004 -2006*.

----- (2002), *Management Plan for the Saryarka - Steppe and Lakes of Northern Kazakhstan*. Korgalzhyno.

Molloy, L. & Hogan, R. (2002). *World Heritage Nomination - IUCN Technical Evaluation. Saryarka - Steppe and Lakes of Northern Kazakhstan (Kazakhstan)*. Gland, Switzerland.

Sidorova, T., Bragina, T., Bragin, E., Lenk, M. & Dieterich, T. (2007). *Nomination Dossier, Saryarka - Steppe and Lakes of Northern Kazakhstan, for Inscription on the List of Cultural and Natural World Heritage of UNESCO*. Prepared for the Government of Kazakhstan. 106 pp [Contains a bibliography of 89 references, mostly in Russian. Attachments include 38 maps, 7 species lists, a Management Plan, Development Plans for Korgalzhyn and Naurzum Reserves, legal documents, photographs, slides.]

DATE

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