15. Information Sheet on Ramsar Wetlands

Categories approved by Recommendation 4.7 of the Conference of the Contracting Parties.

NOTE: It is important that you read the accompanying *Explanatory Note and Guidelines* document before completing this form.

1. Date this sheet was completed/updated:
June 1997

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DD MM YY

Designation date

Site Reference Number

2. Country: Russian Federation

3. Name of wetland: Tobol-Ishim Forest-steppe

4. Geographical coordinates (extreme points)**:** 55°55'N, 67°05'E; 55°50'N, 70°30'E; 55°00'N, 70°25'E; 55°15'N, 69°00'E.

5. Altitude: c. 100 m a.s.l. (maximum 158 m) **6. Area:** 1,217,000 ha

7. Overview: The Tobol-Ishim forest-steppe comprises a region of birch and aspen forests interspersed with areas of meadow and steppe, most of which are ploughed, as well as 'solonchak' meadows, fens and reeds. In the lower parts of the area, there are many lakes and marshes overgrown with emergent, floating and submerged aquatic plants (*Phragmites, Typha, Carex, Scirpus, etc.*). The area is important for migrating and breeding populations of wildfowl and colonial shore birds. It lies at the northern edge of the breeding area of a number of species such as Dalmatian pelican *Pelecanus crispus*, cormorant *Phalacrocorax carbo*, white-headed duck *Oxyura leucocephala*, avocet *Recurvirostra avosetta*, and black-winged pratincole *Clareola nordmanni*. The mammals of the area are characterised by wild boar *Sus scrofa*, roe deer *Capreolus pygargus*, lynx *Felis lynx*, wolf *Canis lupus*, red fox *Vulpes vulpes*, muskrat *Ondatra zibethicus*, steppe polecat *Mustela eversmanni* and great jerboa *Allactaga major*. Fishes include indigenous populations of *Carassius carassius, C.auratus gibelio* and *Phoxinus* sp.

8. Wetland Type (please circle the applicable codes for wetland types as listed in Annex I of the *Explanatory Note and Guidelines* document.)

marine-coastal: A · B · C · D · E · F · G · H · I · J · K

inland: L · M · (N) · (O) · (P) · (Q) · (R) · Sp · Ss · Tp · Ts
U · Va · Vt · W · Xf · Xp · Y · Zg · Zk

man-made: 1 · 2 · 3 · 4 · 5 · 6 · 7 · 8 · 9

Please now rank these wetland types by listing them from the most to the least dominant: Q,O,R,P,N

9. Ramsar Criteria: (please circle the applicable criteria; see point 12, next page.)

(1a) · (1b) · 1c · 1d ³ 2a · (2b) · 2c · 2d ³ (3a) · (3b) · 3c ³ 4a · 4b

Please specify the most significant criterion applicable to the site: 3a

10. Map of site included? Please tick *yes* ✓ -or- *no*
(Please refer to the *Explanatory Note and Guidelines* document for information regarding desirable map traits).

11. Name and address of the compiler of this form: V.I. Azarov, V.A. Lezin
Hunting Management Office; 31 Dzerzhinsky Street, Tyumen, Russia

12. Justification of the criteria selected under point 9, on previous page: 3a - the site is an important waterfowl habitat.

13. General location: The site is located in the Ishim province of the forest-steppe zone on the Western Siberian Plain, 190-250 km south of the city of Tumen. The area includes the southern part of Tumen Region (Armizonsky, Berdyuzhsky, Kazansky and Sladkovsky administrative districts) and also part of Ishim District, Tyumen Region.

14. Physical features:

Relief and hydrography

The Tobol-Ishim forest-steppe is a flat plain with an average elevation of c. 100 m above sea level. Characteristic features of the landscape include enclosed lakes, linear formations such as gently sloping ridges or old dry river-beds, suffosion depressions and wide river valleys. As a result of suffosion, paddings often develop in the watershed areas. These depressions are usually highly inundated and contain extensive wetlands. The wetlands consist mainly of lakes and small rivers with marshy catchments. The largest rivers, the Ishim and Emets, belong to the catchment area of the Irtysh River. These are typically plain meandering rivers with low stream velocities, low gradient, wide floodplains and a great number of oxbow lakes. The lakes are predominantly freshwater, and are generally small, with littoral belts of reeds and marshy shores. Bogs cover extensive areas, especially in the northern part of the forest-steppe. To the south, the peatlands become smaller in area, the mosses giving way to communities dominated by sedges and, further south, to communities dominated by herbs and reeds.

Hydrology

The hydrological regime of lakes is characterised by cyclical changes in inundation which are determined by variations in climate. The highest levels of inundation occur at intervals of 20 to 50 years. Against the background of these prolonged 'intra-century' cycles, shorter cycles of five years develop (LEZIN 1972). These cyclical changes in hydroclimatic conditions result in marked changes in water level, hydrochemical composition, size and shape of lakes.

The lakes are fed by surface runoff, underground water and precipitation (SHNITNIKOV 1950; LEZIN 1972, 1982). During periods of low inundation and high summer temperatures, the water level in the lakes falls and conductivity rises. Freshwater lakes sometimes become brackish; medium-sized and small lakes dry out or become transformed into marshes, solonchaks or meadows. As the humidity increases, the reverse occurs. Increasing inundation together with a high groundwater level favour wetland formation.

The lakes vary in salinity from freshwater lakes with a salt concentration of up to 1 g/l, through brackish lakes (up to 25 g/l), to saline water bodies (over 25 g/l). Ionic concentrations increase in a southeasterly direction as climatic conditions become more arid and continental. The concentrations of sodium and magnesium ions exceed those of calcium, while chloride concentrations are higher than those of sulphate. Most of the lakes are chloride, although some bicarbonate lakes are present. Lakes showing the highest salinity are sodium chloride. The chemical composition of the water depends on the surrounding mineral soils.

Climate

The area has a temperate continental climate with a mean annual air temperature of 0,5-0,7°C (-18,9°C in January, +18,6°C in July). Sudden changes in weather are quite frequent, especially in spring and autumn, due to the unobstructed passage of cold air masses from the north, and hot, dry air masses from Central Asia and Kazakhstan. The summers are warm and short, and the winters are severe, with strong winds. The growing period lasts for about 160 days. Annual precipitation is between 450 and 475 mm, with

more than half of this falling during the summer months. The area is subject to drought, with extremely dry periods occurring one to three times each decade.

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15. Hydrological values: The mosaic of wetlands within the forest-steppe supports a rich and significant diversity of habitats and species. Lakes and other water bodies are very important reserves of fresh water. The storage of floodwaters helps to regulate the flow of water in the rivers. A specific micro-climate has formed in the area under the influence of extensive water surfaces and wetland vegetation, and this helps to reduce the effects of droughts and dry winds.

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16. Ecological features: The wetlands of the Tobol-Ishim forest-steppe, as well as the floodplains, meadows, agricultural fields, and areas of steppe and forest, support a great number of waterbirds which use these habitats at different times of the year, or at different stages in their life cycle. Lake habitats, which cover 95,000 ha, are the most important for waterfowl and are presented by three major types.

Subglacial channel lakes

These lakes are usually arranged in a chain, and often have a linear shape with high levees and terraces. There are several such chains of lakes in the forest-steppe, which, in turn, present six habitat types:

- Floodplain meadow-type lakes. These lakes are shallow, with fresh or brackish water, and largely overgrown with reeds *Phragmites australis*. *Typha* spp. and *Scirpus lacustris* are also present. Lakes of this type covver about 38,500 ha (40.3% of the total area of lakes). The largest and most important lakes of this type are: Bolshoye Kabanye, Maloye Kabanye, Travnoye, Tavolzhan, Yarovskoye, Tundrovo, Cheremukhovo, Chernoye, Zverinoye and Bolshoye Beloye.
- Lakes with extensive littoral belts of reeds. These include both deep freshwater lakes and brackish lakes, and cover a total area of 33,900 ha (35.5% of the lake area). *Phragmites australis* dominates, although *Typha* and *Scirpus lacustris* also occur. Lakes of this type include B.Kurtal, Ubiennoye, Bezrybnoye, Mergen, Okunevskoye, Pastukhovo, Uktuzskoye, Istoshino, Toropovo, Stanovoye, Bolshoye Karkovo, Dankovo, Vyalkovo, Sekachevo, Yarovoye, Goryunevo, Bolshoye Kalmakskoye, Pesyannik, Bolshoye Solovoye and Nyashino.
- Barrier-type lakes. These occur in the southern part of the area, and are represented by small brackish and saline water bodies, with a total area of 2,400 ha (2.5% of the lake area). The vegetation in these lakes is poor. Sparse reedbeds develop at some distance from the lake shores, which are rich in minerals. The largest lakes of this type are Maly Kushluk, Akkul, Snigirevo, Zaboshino and Lebyazhye.
- Lakes with mats of vegetation developing along the shores. These small and medium-sized lakes which cover 7,000 ha (7.3% of the lake area), are widely distributed throughout the area. The hydrochemical composition of the water varies considerably between lakes. The dominant plants are *Phragmites, Typha, Carex, Potamogeton, Sagittaria sagittifolia*, and *Ceratophyllum*.
- Lakes with drifting islands of vegetation located in their central portions. These water bodies have a total area of 2,400 ha (2.5% of the lake area), and are predominantly small, freshwater lakes with uneven bottoms and well developed floating and submerged vegetation.
- Temporary lakes. These develop in spring in low sites and dry out by the middle of summer, except during extremely cold and wet years. Reeds, herbs, grasses and quackgrass meadows are present along the edges of the lakes. In years of high inundation, dense reedbeds and shallows with subaqueous meadows develop. These habitats vary considerably in area from year to year.

Lakes of all types (except the barrier-type lakes) support a rich vegetation including *Phragmites australis, Typha angustifolia, T.latifolia, Scirpus lacustris, Carex sp., Alisma plantago-aquatica, Butomus umbellatus, Equisetum, Nymphaea candida, Nuphar luteum, Lemna minor, L.trisulca, Stratiotes aloides, Poligonum amphibium, Sparganium polyedrum, Potamogeton pectinatus, P.perfoliatus, P.lucens, P.crispus, Ceratophyllum demersum, Myriophyllum spicatum, Utricularia vulgaris* and other wetland-dependent plant species.

Endorheic lakes

Lakes of this type are located in flat-bottom depressions which have developed on the plains between the river channels. They are round or oval in shape, with low, gently sloping shores, and are up to 4 m deep

and up to 200 ha in area. There are two types of endorheic lakes: freshwater lakes and bitter-saline lakes (with high concentrations of sulphates). The former cover 2,300 ha (2.4% of the total lake area), and are characterised by a series of concentric zones of vegetation. A zone of sedges along the shoreline is replaced by a zone of tall emergent plants dominated by *Phragmites, Typha* and *Scirpus lacustris*, and this in turn is replaced by a zone floating and submerged plants such as *Potamogeton pectinatus, P.perfoliatus, P.lucens, P.crispus, Myriophyllum spicatum, Ceratophyllum, Lemna, Utricularia vulgaris, Stratiotes aloides, Sagittaria sagittifolia, Nymphaea candida* and *Nuphar luteum*. The deepest waters in the central part of the lakes support algae. The bitter-saline lakes cover 8,100 ha (8.4% of the lake area) and support little vegetation, which consists mainly of *Chara* and sparse reeds. The principal endorheic lakes include Yakush, Siverga, Bolshoy Kushluk, Vorobyevo and Ploskoye.

Floodplain lakes

These cover about 900 ha (0.9% of the total lake area). They are represented by oxbow-lakes and other water bodies located in the lower parts of the floodplains, and are inundated by river floods.

Wetlands of other types

There are approximately 173,200 ha of other wetlands in the Tobol-Ishim forest-steppe, including five types of habitat which are of particular importance for waterfowl:
- peatlands vegetated with *Carex* and *Hypnum* (1,100 ha);
- forested peatlands with communities dominated by hypnum and birch (13,000 ha), sedges and willows in small insular groves of birch with solod soils (22,200 ha) and hillock bogs with birch (15,800 ha);
- sphagnum bogs with pine trees (2,700 ha);
- lowland marshy areas with communities dominated by *Phragmites* (30,100 ha), *Carex* and *Phragmites* (41,700 ha), *Carex* (10,000 ha), *Carex* and *Calamagrostis* (17,100 ha) and *Calamagrostis* (12,000 ha);
- salt marshes (7,500 ha).

Forested areas, which have a total area of 243,800 ha, are important for breeding waterbirds. Three main habitat types can be distinguished: pine forests; pine-birch forests with *Calamagrostis* and various herbs; and birch and aspen-birch forests with grass layer.

Dry meadows

Dry meadows provide important staging, nesting and feeding sites for birds, and are presented by two types:
- dry meadows with dense herb and grass cover in combination with wet shrub meadows and sedge-willow mires (65,400 ha);
- dry meadows with dense herb and grass cover in combination with reedbeds and lowland sedge mires (114,700 ha).

Steppe meadows

Steppe meadows are used by migrating birds as staging areas and feeding sites. There are two main habitat types: meadow steppes and steppe meadows (152,400 ha), and fields (339,200 ha).

River valleys and floodplains

River valleys and floodplains are important for breeding and migrating waterbirds, especially during the spring migration season. There are two habitat types:
- birch forests with a grass layer and grass-herb meadows in the valleys of small rivers (1,600 ha); and
- floodplain herb-grass meadows and floodplain grass-shrub meadows (12,400 ha).

Other habitats, totalling 18,800 ha (1.5% of the total area) include areas with significant human modification of the environment. These are of less importance for waterfowl.

17. Noteworthy flora: Species listed in the Red Data Book of the Russian Federation include *Cypripedium calceolus, C. macranthons, Epipodium aphyllum, Liparius loeselii, Neottianthe euculata, Orehis militaris, Stipa pennata, S.pulcherrima, S.zalesskii* and *Lobaria pulmorania.* The diverse communities of wetland plants in the Tobol-Ishim area act as breeding centres for the distribution of many species to water bodies in the adjacent arid regions.

18. Noteworthy fauna: The commoner mammals include elk *Alces alus* (120-400 individuals), roe deer *Capreolus pygargus* (700-4,000), wild boar *Sus scrofa* (400-2,000), muskrat *Ondatra zibethicus* (40,000-160,000), Alpine hare *Lepus timidus*, red fox *Vulpes vulpes*, Siberian weasel *Mustela sibirica* and stoat *Mustela erminea*. The Eurasian badger *Meles meles*, least weasel *Mustela nivalis*, steppe polecat *Mustela eversmanni*, racoon dog *Nyctereutes procyonoides*, pine marten *Martes martes*, lynx *Felis lynx* and wolf *Canis lupus* are also present in small numbers. Other mammals recorded in the area include corsac fox *Vulpes corsac*, brown hare *Lepus europaeus*, wolverine *Gulo gulo* and European beaver *Castor fiber*. Thirty of the 50 species of mammals occurring in the area are dependent on the wetlands.

The avifauna is dominated by wetland species (100 species out of 190; see below).

Amphibians include frogs, the common toad *Bufo* sp., common newt *Triturus vulgaris* and Siberian salamander *Salamandrella*. The most typical reptiles are common lizard *Lacerta vivipara* and sand lizard *Lacerta agilis*; common viper *Vipera berus* and grass snake *Natrix natrix* occur in the northern part of the area.

The native fish fauna is dominated by *Carassius carassius, C.auratus gibelio, Phoxinus percnurus, Perca fluviatilis, Rutilus rutilus, Gobio gobio* and *Esox lucius*. Introduced species include *Cyprinus carpio, Coregonus peled* and *Hypophthalmichthys molitrix*.

23.1. Birds

(a) Migrating species

The Tobol-Ishim Forest-steppe is situated on a major migration route used by millions of water birds each spring and autumn. These birds breed in Western Siberia and winter in Western Europe, Africa, the Mediterranean region, Central and Southwestern Asia and the Indian subcontinent.

The spring migration is rapid, with most waterbirds passing quickly through the area, or staying for only a short time in the marshes around the lakes. The total number of migrants passing through the area in spring is estimated at three to five million individuals.

The spring migration begins in March and early April and lasts from 39 to 70 days, depending on weather conditions. The most abundant ducks, mallard *Anas platyrhynchos* and Northern pintail *Anas acuta* appear in the area in early April. Other common species, such as European wigeon *Anas penelope*, common pochard *Aythya ferina* and tufted duck *Aythya fuligula* migrate through the area between late April and mid-May. Velvet scoters *Melanitta fusca* pass through the area in late May-early June. Greylag geese *Anser anser* (mostly from the local population) appear at the end of March or beginning of April. White-fronted geese *Anser albifrons*, the most numerous of the geese, pass through the area during the first 20 days of May. The lesser white-fronted goose *Anser erythropus* and red-breasted goose *Branta ruficollis* occur in much smaller amounts. Whooper swans *Cygnus cygnus* pass through the area in large flocks between late March and early May, occasionally until 20 May.

The species composition in autumn is similar to that in spring. During the main period of migration, most birds pass through the area quickly, although whooper swan, mallard, tufted duck and sometimes white-fronted goose and goldeneye *Bucephala clangula* may remain for longer. An increase in numbers of birds is observed in the first half of September, and mass migrations usually occur during the first half of October, although in some years the largest numbers occur in late September or late October. Diurnal migration of birds through the area is characteristic for white-fronted goose *Anser albifrons*, lesser white-fronted goose *Anser erythropus* and red-breasted goose *Branta ruficollis*. The total number of migrating birds varies from year to year, from an estimated 5.0-6.5 million individuals in most years to as many as ten million individuals in some years.

(b) Breeding species

The numbers of breeding waterfowl show cyclical changes with intervals of 7 to 12 years. The maximum numbers have been observed in years with medium levvels of inundation. In the period between 1977 and 1979, when flood levels changed rapidly, the total number of waterbirds increased from 63,500 to 129,000 pairs (AZAROV 1984). However, the numbers of most waterfowl species have shown a marked decline over the past 30 years. The total number of breeding waterbirds decreased by a factor of six between 1970 and 1989. Decreases have been most noticeable in the numbers of common pochard *Aythya ferina*, velvet scoter *Melanitta fusca*, common coot *Fulica atra*, common teal *Anas crecca*, garganey *A.querquedula*, northern pintail *A.acuta* and northern shoveler *A.clypeata*. On the other hand, the numbers of breeding mute swan *Cygnus olor* and tufted duck *Aythya fuligula* have increased in the last 25 years. Also since 1970, increases have been reported in the numbers of greylag goose *Anser anser* and lesser white-fronted goose *A.erythropus*.

In the last few years, grebes (black-necked grebe *Podiceps nigricollis*, great crested grebe *P.cristatus*, red-necked grebe *P.griseigena* and sometimes slavonian grebe *P.auritus*) have nested in small numbers at lakes in the forest-steppe. However, the red-throated diver *Gavia stellata* and velvet scoter *Melanitta fusca* have become endangered species in the area.

The most important breeding habitats include subglacial channel lakes of floodplain-meadow type, lakes with extensive littoral belts of reeds and lakes with mats of vegetation developing along the shoreline. Among wetlands of other kinds, lowland mires dominated by *Phragmites* are most suitable for nesting waterbirds.

The site lies at the northern edge of the West-Siberian breeding range of Dalmatian pelican *Pelecanus crispus* and great cormorant *Phalacrocorax carbo*. These species nest in the Belozersky and Okunevsky Nature Reserves. In 1986-1987, 100 pairs of *Pelecanus crispus* were recorded at Bolshoye Beloye Lake and 130 pairs at Tundrovo Lake (AZAROV 1994). In 1984, 131 pairs of *Phalacrocorax carbo* nested at these lakes, and their numbers have increased since then.

Other common breeding species include Eurasian bittern *Botaurus stellaris*, little bittern *Ixobrychus minutus* and grey heron *Ardea cinerea*. The numbers of *Ardea cinerea* have been increasing.

(c) Moulting species

The Tobol-Ishim forest-steppe is an important moulting area for dabbling ducks and greylag geese breeding over an extensive area of Western Siberia. In 1970, when the maximum water levels were recorded, about a million individuals moulted in the area; in 1978, when many water bodies had dried out, only about 190,000 moulting birds were present. As the level of flooding increased, the numbers of moulting birds rose to 280,000 in 1979. In recent years, the importance of the site for moulting waterfowl has been decreasing.

(d) Rare and threatened species:

At least twenty rare and endangered species of birds occur in the area. Species listed as globally threatened in the IUCN Red Data Book include:

- Dalmatian pelican *Pelecanus crispus*: a breeding species, the population varies considerably (from 30 to 200 pairs), but the iverall trend has been an increase;
- Lesser white-fronted goose *Anser erythropus*: a rare migrant;
- Red-breasted goose *Branta ruficollis*: a rare migrant;
- White-headed duck *Oxyura leucocephala*: a rare breeding species (5 to 50 pairs);
- Imperial eagle *Aquila heliaca:* an accidental visitor;
- Lesser kestrel *Falco naumanni*: an accidental visitor;
- Siberian crane *Grus leucogeranus*: a very rare visitor during the migration seasons;
- Corncrake *Crex crex*: a rare breeding species; the population seems to be recovering;
- Sociable lapwing *Vanellus (Chettusia gregarius)*: an accidental visitor.

Other species listed in the Red Data Book of the Russian Federation include:

- Black stork *Ciconia nigra*: a very rare migrant;
- Bewick's swan *Cygnus columbianus bewickii*: a very rare migrant;
- Osprey *Pandion haliaeetus*: a very rare migrant;

- White-tailed eagle *Haliaeetus albicilla*: a rare breeding species (2 to 10 pairs); the population seems to be recovering;
- Tawny eagle *Aquila rapax*: an accidental visitor;
- Golden eagle *Aquila chrysaetos*: a rare migrant and possible breeding species;
- Saker falcon *Falco cherrug*: an accidental visitor;
- Peregrine falcon *Falco peregrinus*: an extremely rare migrant; breeding may occur in some years;
- Black-winged stilt *Himantopus himantopus*: a rare visitor; breeding occurs in some years;
- Avocet *Recurvirostra avosetta*: a very rare breeding species;
- Great black-headed gull *Larus ichthyaeetus*: recorded in very small numbers.

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19. Social and cultural values: The wetlands of the Tobol-Ishim Forest-steppe support a number of commercially valuable species, in particular fish. The recreation potential of the area is very high.

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20. Land tenure/ownership of: There are two major forms of land ownership at the site: state (state agricultural and forestry farms) and communal (collective farms, joint-stock companies, *etc*.). Small plots of land are in private ownership.

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21. Current land use:

Agriculture, including the production of cereal and fodder crops and vegetables, is well-developed. Agricultural runoff containing pesticides and fertilisers is the main cause of pollution of natural wetland ecosystems. Increasing concentrations of phosphorus and nitrogen cause rapid algal growth and deoxygenated conditions in water bodies in the area. As a result, eutrofication has become a common feature, and mass deaths of fish occur not only in winter, but also in summer.

Cattle grazing takes place in areas adjacent to human settlements, on lake shores, on floodplains and in some lightly forested areas. Grazing and the cutting of hay have a negative effect on waterbirds during the breeding period, especially during hot and dry climatic conditions. The harvesting of reeds with heavy machinery not only destroys the reeds themselves, but also disturbs breeding birds and causes the destruction of nests.

Fishing is carried out in most lakes in the region throughout the year. Commercially valuable species of fish, especially plankton-eating species (mostly *Coregonus*) and carps *Cyprinus carpio*, have been introduced into some of the water bodies. These introductions have caused a great reduction in the biomass of zooplankton and benthos, which are the main food resource for many species of waterbirds. The population of *Carassius carassius* (an indigenous species) has decreased, as juveniles are caught along with the carp. Frequent deaths of young birds in fishing nets have been reported. Fishing is also a major cause of disturbance of birds and other animals. Amphipods (Amphipoda) are harvested in small quantities in a few of the water bodies, and this also causes some reduction in the food resources for fish and waterbirds.

Waterfowl shooting is permitted for a period of two months in autumn and 2-3 days in spring. Despite strict limitations, shooting (especially in spring) has a considerable negative effect upon local and migrating populations of waterfowl. There is some outdoor recreation by local people, mainly on river banks and lake shores, and this causes some disturbance to birds.

Ecotourism is a new activity for the area and requires further promotion.

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22. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land use and development projects: In recent years, the trend has been towards decreasing inundation of the forest-steppe. This has resulted in a decrease in the extent of habitat suitable for breeding, moulting and migrating populations of waterbirds, which is likely to result in a considerable decline in waterbird populations. There also has been some increase in human impact from increased economic activities, sport hunting, transformation of lake shores into hay fields, and recreational pressure, and this is likely to continue. The negative effect of grazing is likely to decrease because of a reduction in stock numbers. Human activities adversely affecting wetland ecosystems also

include application of pesticides in forestry and burning of hay fields in spring. The increasing population of muskrat *Ondatra zibethicus*, which was introduced into the area in the 1940s, also has a negative effect on populations of waterbirds and their habitats.

23. Conservation measures taken: There are a number of protected areas at the site. The Belozersky State Nature Reserve ('zakaznik'), situated in Armizonsky District, has a core area of 17,850 ha and a buffer zone of 600 ha. All human activities affecting natural ecosystems, including fishery, recreation, *etc*., are prohibited or limited in the Nature Reserve. Two state nature reserves have been established in Berdyuzhsky District: Okunevsky Zakaznik (1,930 ha) and Pesochny Zakaznik (930 ha). Temporary wildlife refuges are established every year during the hunting season. In Sladkovsky District, there are two nature resrves: Kabansky Zakaznik (22,400 ha) and Tavolzhan Zakaznik (2,720 ha), and a nature monument at Brusnichnoye. Temporary wildlife refuges are also established on several lakes of this district.

24. Conservation measures proposed but not yet implemented: It has been proposed that the nature reserves in all administrative districts be extended by 30% in area. Protection is needed for lakes such as Chernoye, Tavolzhannoe, Siverga, Bolshoi Kushluk, and Yakush. A network of nature monuments and 'green' zones around towns is under development. A number of measures aimed at limiting economic activities have been proposed including, restrictions on grazing, fishing during the spawning period of *Carassius carassius* and breeding season of waterbirds, using of fishing nets which are fixed on river banks. There is a need to establish protected belts around all the lakes and to carry out measures for the restoration of trees and shrubs in these zones, as well as on river banks and levees. There is also a need to prohibit the shooting of waterfowl in spring.

25. Current scientific research and facilities: Field studies have been conducted since the second half of the 18th century, and detailed studies have been carried out on a regular basis since the 1950s.

26. Current conservation education: No data

27. Current recreation and tourism: See under 'Current land use'.

28. Jurisdiction:
Territorial: Administration of Tyumen Region (45 Volodarsky Street, Tyumen 625004, Russia).
Functional: State Committee for Environmental Protection of the Russian Federation (4/6 Bolshaya Gruzinskaya Street, Moscow 123812, Russia).

29. Management authority: Regional Committee for Environmental Protection (48 Malygin Street, Tyumen 625000, Russia).

30. Bibliographical references: Miller (1950); Pallas (1786,1788); Finsh & Brem (1882); Slovtsov (1892, 1897); Gorodkov (1916); Ruzsky 1897; Zalesski & Zalesski (1931); Nikiforov (1959); Smirenski (1950, 1952); Korsakov & Smirenski (1956); Lezin (1972,1982); Azarov (1972, 1976, 1984); Azarov, Dekov & Lezin (1986); Dekov *et al*. (1988); Krivenko *et al*. (1978).