**Additional material**

**4.1 Ecological character**

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 MalyKushluk, 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.