

### Ecological character

**Koibagar** Lake is situated in a deep hollow with high cut ravines and shoreline precipices – along the western and the southern shores their height is 5-6 m, at some places up to 10 m, along the eastern and the northern shores it is 3-4 meters. The maximal length of the lake from the North to the South is 17.8 km, width – 9.1 km, the length of the coast line is 49.2 km, the area is 96 km<sup>2</sup>. The bottom of the lake is flat with prevailing depths of 1,3-1.5 m, maximum 2.2 meters. Along the shore line the lake is surrounded by thick reeds (*Phragmites australis*) of mosaic type stretching up to 400-500 meters. There are also thick *Typha angustifolia*, *T. laxmanii*, *Scirpus lacustris*, *Sc. tabernaemontani*, areas of reeds and areas with prevalence of *Typha angustifolia*, *Bolboshoenus maritimus*, *Alisma plantago-aquatica*, *A. gramineum*, *Butomus umbellatus*, and also reeds with *Scolochloa festucaceae* in the coastal part and with *Saussurea amara* and *Sonchus arvensis* along the shore. Groups of *Senecio arcticus* are typical. The shallowest areas are overgrown with *Alisma plantago-aquatica* and *Butomus umbellatus*. The central stretch is open, with curtains of sparse *Phragmites australis*, and a number of islands appear in the middle of it at considerable drying up.

The water surface of small inner stretches in reeds is covered by groups of *Potamogeton pectinatus*, *P. lucens*, *P. perfoliatus*, *P. pusillus*; also *Ceratophyllum demersum*, *C. submersum*, *Polygonum amphibium*, *Myriophyllum spicatum*, *Utricularia velgaris*, *Stratiotes aloides* grow there. When the water level is high, *Lemna trisulca* develops rapidly at well warmed places. Thick *Chara intermedium*, *Ch.contraria* *Ch. Vulgaris* are common there.

A narrow low terrace of the lake hollow is occupied by meadows, mainly with various *Elytrigia repens* and *Calamagrostis epigeios*, at drier places there are usually *Leymus ramosus* meadows. At some places thick *Artemisia procera* grow there. The upper terrace is characterized by complex steppe vegetation with *Festuca valesiaca*, *Galatella villosa*, *Festuca valesiaca*, *Artemisia schrenkiana*, *Tanacetum achilleifolium*, *Psathyrostachys juncea*, *Kochia prostrata* associations. On the slopes of the original shore there are fragments of thick bushes of *Rosa cinnamomea*, *Lonicera tatarica*, *Rubus caesius* with cereal grass cover of *Calamagrostis epigeios*, *Elytrigia repens*, *Poa stepposa*, groups of *Glycyrrhiza uralensis*, *Artemisia dracunculul*, *Fragaria viridis* and with meadow-steppe and steppe mixed-grasses.

**Tyntyugur** Lake has an area of 54.3 km<sup>2</sup>. The northern shore of the hollow is precipitous with the height of 4- 5 m, the western and the eastern shores - 1- 1.5 m, in the south the shores are low and sloping. The lake is surrounded by thick reeds from 40 to 100 m. The whole water area is characterized by rarely located mosaic thick reeds, only in the northeastern part of the lake there is no water-surface vegetation. Associated plants are the same like at Koibagar Lake: *Typha angustifolia*, *Scirpus lacustris* and *S. tabernaemontani*, *Alisma plantago-aquatica* and *Butomus umbellatus*. Shallow waters in the southern part of the lake are overgrown with *Stratiotes aloides*, *Potamogeton lucens* and *P. perfoliatus*, which form vast thick vegetation areas, at low depth of 0.2 – 0.3 m the area is occupied by *Potamogeton pusillus*, *Myriophyllum spicatum*, *Ceratophyllum submersum*, *Lemna trisulca* (Zelinskiy, 1910). Between thick air-water vegetation *Polygonum amphibium* *Sparganium stoloniferum* grow. Plunged water vegetation – *Potamogeton lucens* and *P. perfoliatus* often form vast floating surface, on which grebes and turns make their nests. In the southern part of the lake there is a number of large bays and coastal spits of land that creates comfortable sheltering conditions for birds. A considerable part of the coast line, especially at drying up, is characterized by mud shallows places, and

there are small islands.

The shoreline of reeds is characterized by moisture plants *Typha angustifolia*, species of Genus *Juncus*, *Bolboeshoenus*. Reeds are alternating with curtains of *Scirpus lacustris* and often they are edged with associations with domination of *Heleocharis*. Further there is a belt of low *Juncus gerardii* and *Carex secalina* meadows. Closer to the shore there is a strip of *Artemisia procera*.

Great areas around Tyuntyugur and in a low flood plain area between the lakes are occupied by coach meadows, sometimes with plenty of *Glycyrrhiza uralensis* and with *Artemisia procera*. In the southwestern part of the hollow meadows are represented by *Alopecurus pratensis*, *Carex disticha*, *Juncus gerardii*, *Calamagrostis epigeios* with reeds. An edge part of a low flood plain area is occupied by *Puccinellia hauptiana* associations with spots of *Artemisia nitrosa*. At the edge of the original shore there are complexes of *Artemisia nitrosa*, *typchak* and *Psathyrostachys juncea* associations.

**Zhanshura** Lake, with the area of 1,570 ha and the depth up to 1.6 m 80-90% is covered by border-mosaic thick reed and *Typha angustifolia*, at drying up it is completely overgrown with reeds. The shallowest lakes are **Alabota** (3,639 ha) and **Biyesoigan** (2,194 ha) – their depth does not exceed 0.8 m, when there is no high spring water, they rapidly dry up. 90 % of the water area and more is covered with thick reeds. The lakes are surrounded by a belt of meadows, mainly by coach ones.

On the plains surrounding the Tyuntyugur depression, before the development of virgin lands there were mainly mixed-grass – feather-grass – red-feather-grass steppes (*Stipa zaleskii*, *St. lessingiana*, *Festuca valesiaca*, *Salvia stepposa*, *Seseli ledebourii*). Currently, they are practically completely plowed for wheat crops, where geese and some duck species feed in autumn. This is an additional factor attracting ducks and especially geese to the lakes in the periods of migration.

In the area of the wetland in radius of 30 km from Koibagar and Tyuntyugur lakes, there are 18 populated areas with the population of 13,941 people, 2 of them with the population of 818 people are located at the shore of Koibagar and Tyuntyugur lakes.