Detailed Ecological character description

The wetland is situated in the zone of moderately cold deserts, in the subzone of real middle deserts. 3 ecosystem groups are recognized within its borders in close connection with the origin of relief and dynamic of water regime: 1) ecosystems of abrasion-accretion plain on the southern shore of Balkhash Lake, 2) ecosystems of modern delta of Ili River, 3) ecosystems of the ancient delta. Ecosystems of lower section of flood plains and delta of Aksu and Lepsa rivers and adjacent sand massifs make up a separate group. In total hydromorphic and, to a lesser extent, half hydromorphic ecosystems predominate on the territory.

On abrasion-accretion plains of the southern shore of Balkhash Lake rows consisting of a belt of reed, cattail and cattail-reed bogs and reed waterlogged meadows with dominance of reeds and cattails (*Phragmites australis, Typha angustifolia*) are widespread. Further, reed and halophilic bushes (*Phragmites australis, Tamarix ramosissima, Nitraria sibirica, N.schoberii, Lycium ruthenicum, Climacoptera obtusifolia, Suaeda foliosa, Suaeda prostrate*) predominate at the parts of drained bottom of the lake, while halophytic vegetation (*Nitraria sibirica, Halostachys belangeriana, Tamarix hispida, Suaeda physophora, Kalidium foliartum*) and annual halophytic communities dominate on lake solonchaks and sors (salt lakes).

Modern delta of Ili River is represented by a complex of landscapes mainly consisting of wide network of channels, tugai bushes along them, lake systems, vigorous reed shores and typical desert areas between channels and on islands. Besides inter-barkhan, rather small and usually closed lakes delta basins include also numerous running and half running overflows of lakes of various configurations overgrown with solid vast reed bushes (Zhatkanbayev, 1991).

Flood plain or tugai forests consist of wood species including Asiatic Poplar (*Populus diversifolia, P.pruinosa*), Oleaster (*Elaeagnus oxycarpa*), White Willow (*Salix alba*). Other species lke (*Salix songorica, S.wilhelmsiana)*, Tamarisk (*Tamarix ramosissima, T. laxa*), Common Salt Tree/Chingil (*Halimodendron halodendron*) are common, Lianas (*Clematis orientalis), Cynanchum sibiricum,* Larger Bindweed (*Calystegia sepium*) are also typical. Grass cover is formed by cereal-mesophytes including *Leymus multicaulis, Calamagrostis pseudophragmites,* Couch Grass (*Elytrigia repens*) and mesophyte herbs including Chinese liquorice (*Glycyrrhiza uralensis*)*,* Yellow Sweat Clover (*Melilotus officinalis*)*,* and *Lycopus exaltatus*.

In upper and middle delta, plants such as the Common Salt Tree/Chingil (*Halimodendron halodendron*), Tamarisk (*Tamarix ramosissima*), Wolfberry (*Lycium ruthenicum*), Eurotia/Pamirian winterfa (*Krascheninnikovia ceratoides*) and Oleaster (*Eleagnus oxycarpa*) are often found. Halophytic shrubbery is typical for lower part of delta, i.e. *Nitraria sibirica, N.schoberii*, Kashgar Tamarisk (*Tamarix hispida*), Karabarak (*Halostachys belangeriana*) etc.

Inter-channel plains depending on the character of watering include a number of ecosystems: grass marshes, waterlogged meadows, real meadows, meadows in combination with meadow-desert (churotnie) sands, eurotia communities on old tugai soils in combination with shrubbery and meadows.

Meadow type of vegetation is represented by several subtypes. Swamp meadows are usually monodominant: Reed family: Common Reed, (*Phragmites australis*), Cattail family: Narrowleaf Cattail, (*Typha angustifolia*), sometimes Tuberous bulrush family: Alkali Bulrush, (*Bolboschoenus maritimus*). These grow in alluvial-meadow soils. For flat elevations of inter-channel spaces of delta that experiences regular flooding, plants that exist include: CouchGrass (*Elytrigia repens*), Reedgrass (*Calamagrostis epigeios*), *Calamagrostis epigeios, Elytrigia repens,* Common Reed (*Phragmites*

australis) meadows. Halophytic meadows formed on hydromorphic saline soils and meadow solonchaks during short-term floods are mostly widespread in the lower parts of deltas. They include the following cenosis species: *Aeluropus littoralis*, *Leymus multicaulis*, *Hordeum bogdanii*, *Puccinellia distans, P.tenuiflora*, with participation of halophytic herbs: Saltmarsh Sealavender (*Limonium otolepis), L.gmelinii, Saussurea salsa, Plantago salsa* and annual glassworts: *Suaeda acuminata, S.prostrata, Climacoptera brachiata, C.lanata*. Desert meadows dominantly consist of *Alhagi pseudalhagi*, Tamarisk (*Tamarix ramosissima*), Marsh-beet (*Limonium otolepis*) and sometimes licorice (*Glycyrrhiza uralensis*), salt-resistant grasses: *Aeluropus littoralis,* Weeping Alkaligrass (*Puccinellia distans*), *P. dolicholepis, P. tenuissima*), Comon Salt Tree (*Halimodendron halodendron*), Pamirian Winterfat (*Kraschenninnikovia ceratoides*).

Swamp type of vegetation is typical of part of the southern shore of Balkhash Lake and young avandeltaic and central parts of the modern delta of Ili with lakes along Zhideli-Iir system of channels. Higher aquatic and coastal aquatic vegetation includes communities of Flowering Rush (*Butomus umbellatus*), Needle Spikerush (*Eleocharis acicularis*), Spiny Naiad (*Najas marina*), Spiked Water Milfoil (*Myriophyllum spicatum*), *Phragmites australis,* Common Reed (*Polygomum amphibium*), Marsh Fern (*Thelypteris palustris*), and other species of the following genera: *Potamogeton, Sagittaria, Scirpus, Sparganiunm, Typha.* Free-floating vegetation includes the following species: Common Duckweed (*Lemna minor*), Common Bladderwort (*Utricularia vulgaris*), and Coontail (*Ceratophyllum demersum*).

Desert type vegetation is found on takyr-like soils of dead deltaic channels, on inter-channel plains which are not affected by flooding and have lost its connection with underground water. Communities with dominance of Pamirian Winterfat (*Kraschenninnikovia ceratoides*), Black Saxaul (*Haloxylon aphyllum*), Biyurgun (*Anabasis salsa*), *Salsola orientalis*, and White Sagebrush (*Artemisia terrae-albae*) cenosises are typical.

Ephemeral bushland including *Salsola arbuscula, Calligonum aphyllum, Kraschenninnikovia ceratoides, Carex physodes,* Bulbous Bluegrass *Poa bulbosa, Anisantha tectorum,* White Saxaul *Haloxylon persicum* communities are found on peaks of ridges and grow in sandy soils. Depressions are occupied by psammophilous ephemeral sagebrush including *Artemisia terrae-albae, Carex physodes,* Oriental False Wheetgrass (*Eremopyrum orientale*) or mesophyte herb-grass including: *Calamagrostis epigeios, Vexibia alopecuroides,* Camelthorn *Alhagi pseudalhagi* communities.

Vegetation cover of cumulose and hilly sands are represented by the following species: Common Salt Tree *Halimodendron halodendron,* Salt Cedar *Tamarix ramosissima, Vexibia alopecuroides, Zygophyllum fabagoides,* Camelthorn *Alhagi pseudalhagi*, with reeds (*Phragmites australis*).

Meadow-desert (churotnie) sands are notable for their unique vegetation. Their peaks and slopes are covered with psammophyte vegetation including species of genera *Calligonum,* White Saxaul (*Haloxylon persicum), Artemisia songorica, Ammodendron bifolium*, etc., while in lower parts of the slopes and depression reeds such as *Phragmites australis*, *Karelinia caspia*, *Alhagi pseudalhagi*, Tamarisk (*Tamarix ramosissima*) and Common Salt Tree (*Halimodendron halodendron*) are widespread.

The vegetation cover of the ancient delta of Bakanas deltaic-accretion plain is made-up of psammophyte shrubs including *Haloxylon aphyllum, Calligonum leucocladum, Artemisia soongarica*, and sometimes tugai bushes including *Halimodendron halodendron, Tamarix ramosissima* and reeds (*Phragmites australis*). There is also vegetation of flat hollows and flat elevations of inter-channel plains with dominance of *Haloxylon aphyllum, Salsola orientalis, Artemisia terrae-albae, Anabasis salsa,* sometimes *Arthrophytum balchaschense* on takyrlike soils. *Salsola orientalis, Artemisia terrae-*

albae are found in areas of eolian sediments. Communities of *Kraschenninnikovia ceratoides, Calligonum leucocladum, Carex physodes, Ephedra lomatolepis, Artemisia soongarica, A.albicerata* are typical of low ridgy-hilly sands.

Ecosystems of the lower reaches of Aksu and Lepsi rivers are also notable for their originality. Here oleaster-osier (*Elaeagnus oxycarpa),* White Willow (*Salix alba),* Almond Willow (*S.triandra), S.wilhelmsiana,*) tugai bushes with cereal-herbs including Chinese liquorice (*Glycyrrhiza uralensis), Apocynum eancifolium, Calamagrostis epigeios,* Couch Grass (*Elytrigia repens*) are formed on levees. Brier-osier (*Salix triandra), S.turanica, Rosa alberti*, tugai bushes with cereal-herbs including *Glycyrrhiza uralensis, Apocynum lancifolium, Euphorbia songarica, Leymus multicaulis, Phragmites australis* and grass cover are found in inter-ridged depressions of levees. Herb-cereal (*Phragmites australis), Aeluropus littoralis,* Weeping Alkaligrass *(Puccinellia distans),* Saw-wort (*Saussurea salsa),* Sea Plantain (*Plantago maritime*) meadows including Asiatic poplar (*Populus diversifolia)*, Salt Tree and Tamarisk (*Halimodendron halodendron,* and *Tamarix ramosissima*) are widespread in the flood plain. Herb-osier (*Salix triandra, S.turanica, Glycyrrhiza uralensis, Sonchus arvensis,* Creeping Thistle (*Cirsium arvense*), tugai bushes are stretched in a way of a narrow strip along parched channels. Asiatic Poplar (*Populus diversifolia*) is also found scattered and in groups in the central flood plain and terrace near the flood plain.

Under conditions of short-term flood, oleaster tugai bushes with herb *Vexibia alopecuroides, Gipsophila perfoliata, Artemisia dracunculus, Leymus multicaulis, Hordeum brevisubulatum* grass cover, and shrubs including *Halimodendron halodendron, Tamarix ramosissima* are formed.

Unique lake systems are made up in high hilly-ridged sands where sand ridges are divided by narrow deep lakes. A strip of oleaster-osier including *Salix triandra, S.turanica, S. wilhelmsiana, Elaeagnus oxycarpa* and tugai bush is formed at the outskirts. There are small Asiatic Poplar (*Populus diversifolia*) in some areas along the slopes and on peaks of sand ridges, while Common Salt Tree (*Halimodendron halodendron*), Tamarisk (*Tamarix ramosissima*), Reed (*Phragmites australis*), herb-cereal (*Leymus multicaulis, Potentilla virgata*) communities are found in deep depressions in case of high bedding of ground waters. Many small lakes in inter-hilly and inter-ridged depressions are typical for inter-channel space limited by deltaic channels Kurosek and Tenteksu.

Aquatic ecosystems consist of lakes including flowing lakes, with Narrowleaf Cattail (*Typha angustifolia*) and Reed (*Phragmites australis*) along shores, aquatic vegetation such as species of genera *Potamogeton,* Spiny Naiad (*Najas marina),* Spikedwater Milfoil (*Myriophyllum spicatum*), Coontail (*Ceratophyllum demersum*), Dwarf Waterlily (*Nymphaea candida*) are also present. Open shallow ecosystems of Balkhash Lake with rare bushes of Reeds (*Phragmites australis*) and immersed aquatic macrophytes such as species of genera *Potamogeton,* Spiny Naiad (*Najas marina*), Spikedwater Milfoil (*Myriophyllum spicatum*), Coontail (*Ceratophyllum demersum*) also occupy large areas.