

ESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE BIOSPHER NOSPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE RE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE BIOSPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RES HERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE RVE BIOSPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RI SPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE SERVE BIOSPHERE RESERVE BIOSPHERE RESERVE OSPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE ESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE ERESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE RIOSPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE



National Commission Republic of Kazakhsian



Kazakhstan National Committee

KAZAKHSTAN NATIONAL COMMITTEE FOR THE UNESCO PROGRAMME "MAN AND BIOSPHERE"

MAB, Institute of Zoology, 93 al-Farabi Str. Almaty, 050060 KAZAKHSTAN



BIOSPHERE RESERVE NOMINATION

```
PHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE
SERVE BIOSPHERE RESERVE BIOSPHERE RESERVE
DSPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE
RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE
BIOSPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE
E RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE
 BIOSPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE
ERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE
VE BIOSPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RES
SHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE
ERVE BIOSPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE
SPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE
ESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE
310SPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE
 DIOSPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE
```



PART I: SUMMARY

PROPOSED NAME OF THE BIOSPHERE RESERVE:

Alakol Biosphere Reserve

COUNTRY:

Kazakhstan



SERVE BIOSPHERE RESERVE BIOSPH

FULFILLMENT OF THE THREE FUNCTIONS 3. OF BIOSPHERE RESERVES

«Conservation - contribute to the conservation of landscapes, ecosystems, species and genetic variation»

Biosphere Reserve includes Alakol-Sasykkol lake system and is situated in the limits of Alakol depression, limited by Tarbagatai ridge in the North, Dzhungarian Alatau in the South, Barlyk ridge in the East and South-East. There is a narrow pass between Barlyk ridge and Dzhungarian Alatau mountains called Dzhungarian Gates. The territory of biosphere reserve is located on the Central Asian – Indian bird migration route and is a wetland of world significance as waterbirds' habitat and aggregation site. This territory, listed in Ramsar Convention's Internationally Important Wetlands List on November 25, 2009, is nesting habitat for 203 bird species out of 342 registered here. More that half of nesting species (110) are waterbirds, 22 species of which are rare and endangered and listed in the Red Data Books of Kazakhstan and IUCN: Dalmatian Pelicanus crispus, Eurasian Spoonbill *Platalea leucorodia*, Flamingo *Phoenicopterus roseus*, Ferruginous Duck *Aythya nyroca*, etc.). There are 269 bird species recorded for the main and buffer zones, 110 of them are waterbirds which prevail in numbers in the season of spring and especialy autumn migrations.

Fish fauna of biosphere reserve's water reservoirs, including all important reservoirs of Alakol depression, consists of 22 species of 6 families. Native ichthyofauna is represented by 9 species, others were added artificially in 20th century; many of them are now most numerous in Alakol lakes and rivers flowing into them. One of the native

species – Balkhash Perch *Perca schrenki* – is listed in the Red Data Book of Kazakhstan and IUCN. Core and buffer zones of biosphere reserve are inhabited by 17 species.

Amphibians are represented by 2 species, and reptiles – by 24 species, 1 species of which – Variegated Toadhead Agama *Phrynocephalus versicolor* – is listed in the Red Data Book of Kazakhstan.

There are 44 mammal species in biosphere reserve which belong to 6 orders: Insectivores – 4 species, Cheiroptera – 3, Predators – 10, Artiodactyls – 3, Rodents – 23 and Lagomorphs – 1 species. All mammals are subdivided in 2 groups: residents – 21 species and migrating (or locally migrating) – 23 species. Resident mammals include, first of all, rodents and insectivores, and representatives of cheiropterans, lagomorphs, predators and ungulates carry out seasonal migrations of different distance. In quantitative relation the majority of mammals are considered common or numerous species (predators, rodents). According to habitat type the mammals inhabiting this territory are divided into 2 groups: semi-aquatic and terrestrial. The first group includes only Muskrat, the second – all other mammals. Of all the teriofauna of biosphere reserve one species – Zhitkov's Jerboa *Pygerethmus zhitkovi*– is endemic of Kazakhstan, and 15 species are resource species, including 10 important hunting species (wolf, fox, badger, wild boar, muskrat, stoat, steppe polecat, African wildcat, Siberian roe deer, Tolai hare). There are 4 species listed in the Red Data



Bufo danatensis



Book of Kazakhstan: Marbled Polecat *Vormela peregusna*, Selevinia *Selevinia betpakdalensis*, Goitered Gazelle *Gazella subgutturoza* and Pallas's Cat *Felis manul*.

Insect fauna is represented by 88 families of 13 orders, 14 species are listed in the Red Data Book of Kazakhstan and 1 species - *Bolivaria brachyptera* – is in IUCN Redlist.

Zooplakton composition of the lakes of Alakol-Sasykkol system consists of 140 taxons, and taxonomic composition of macro-zoobenthos is represented by 82 species and forms. Benthofauna of Alakol lake is the richest in species and forms – it contains 43 taxons.

The nominated territory of biosphere reserve contains 678 species of higher plants from 293 genera, 85 families and includes 6 endemic species and 10 subendemic species. Aquatic flora is represented by 25 plant species. There are two plant species listed in the Red Data Book of Kazakhstan: *Tulipa kolpakowskiana* and *Tulipa brachystemon*. About 40% of all floristic diversity is represented by economically important species. The main plant associations are represented by 5 main types: desert, meadow, marsh, tugai, under-water and fragmentally by 2 more types: shrub and large-leaved – forest.





Elaphe dione





«Development — foster economic and human development which is socio-culturally and ecologically sustainable»

Alakol Biosphere Reserve is situated on some part of the territory of Alakol district of Almaty oblast and Urzhar district of Eastern Kazakhstan oblast. Total there are 76,800 people in Alakol district, 58,800 of them are Kazakh, 16,000 are Russian, 100 Uigur, 200 German, 200 Tatar, 200 Ukranian and 1,300 of other ethnic groups. Population density of Alakol district is 3 people in 1 square kilometer. Population of Urzhar district sums up to 90,700 people, dominating ethnicities are Kazakh (87.4%) and Russian (10%), other ethnicities (2.6%) are distributed equally. Average population density is 3.9 people in 1 square kilometer. The population living in the transition zone of BR Alalkol is more than 32 thousand people. Region's economy is mainly based on agriculture.

Agriculture is represented mostly by plant growing (cereals, oilseeds) and cattle breeding and to less extent by processing of agricultural production. Both districts are large agro-industrial complexes. Urzhar district is famous for its large meat factory for a long time; even nowadays it provides meat and sausage production for the whole region. In both districts there are different companies for cattle breeding and growing of sunflower, cereals and melons, some companies produce sunflower oil and flour.

Industry of Alakol district is represented by such large companies as «Asia Sakhar» sugar factory, «Rybprom» fish factory, «Kazmunaigaz» tank farm, «Kaztransservis» tank farm, «TSC-agro» corporation, «Agropromtekhnika» joint-stock company which collaborates with «Vita-Soya» company involved in growing, investment and purchase of soybean from other agricultural production companies of the region, and other companies of republican and local level. «Asia Sakhar» sugar factory provides work for up to 600 people, and besides local raw materials the factory processes sugar cane imported from the countries of Southern America and Australia; up to 15,000 tons of raw material are processed here every year. «Rybprom Ltd.» fish factory and another one near Beskol railroad station specialize in production of fish fillet for export to European countries. Each factory can process 5 tons of fish a day, but this volume is now unachievable because of fish resources lack in the nearest lakes. The remains of the fish raw material are used for fish-bone meal production, which is exported to China and other countries.

«Atasu-Alashankou» oil pipeline construction also positively influences the economy of Alakol district: there are new jobs, increasing demand for food, accommodation, fuel, repair parts and expendables for cars and railroad services. Economy of Alakol and Urzhar districts is also positively influenced by the proximity of the border. Both districts have large customs terminals at the border with China: Bakhty customs in Urzhar district and Dostyk railroad station in Alakol district. Cargo goes through Bakhty customs to Northern regions of Kazakhstan, and transit cargo goes to Russia and other European countries. Dostyk station is the only in Kazakhstan railroad terminal at the border with China. It is the reason for ongoing construction of large railroad dead ends, transit terminals and tank farms in Alakol district.

Ecological tourism. During the last 10 years the territory of Biosphere Reserve's transit zone – Alakol lake – becomes more popular as beach and spa resort for citizens of Kazakhstan and Siberian regions of Russia. The participants of beach tourism along with large tour operators include local people of two villages – Akshi and Koktuma – of Alakol district, as well as citizens of Kabanbay village of Urzhar district. In spite of short period of beach season at

Alakol lake (2 months maximum) most part of local people's income is obtained from tourist services and accommodation. There are more than 20 tourist bases on Alakol's coast from the side of Alakol district, which welcome from 10 to 130 people a day. Considerable part of the tourists live in private guest houses. In 2004 the Southern coast of Alakol provided services for 11,000 tourists, and in 2005 this number rose to 12,000 people. Expected total number of tourists in 2012 is 25,000 people, taking into consideration that many of them prefer to reach the resort zone by their own transport and live in camping sites. At the present time Alakol lake is the most developing summer tourist center of Kazakhstan.

In the present time the potential of ecological tourism with educational purpose is insufficiently developed, although Alakol-Sasykkol lake system is one of the well-known sites for birdwatching tourists of the whole world. There are 5 tourist routes in the buffer zone of Biosphere Reserve developed with support from GEF/UNDP Project on Wetlands Conservation. Besides, the staff of ecological education department of Alakol Biosphere Reserve also developed an ecological path route equipped with observation towers. It allows schoolchildren, students, nature admirers and other tourists to get acquainted with local nature at specially designed routes.



3.3

«Logistic support — support for demonstration projects, environmental education and training, research and monitoring related to local, regional, national and global issues of conservation and sustainable development»

At the present time the main scientific and technical support of Biosphere Reserve's territory is carried out by the staff of Alakol state nature reserve, as well as participants of GEF/UNDP many-year Wetlands Project. In the limits of GEF/UNDP Project material-technical base was developed and educational seminars were held. Alakol nature reserve administration organize annual festivals and contests (Parks March, Birds Festival, children art contests, etc.). From 2000 there is Nature Museum, which occupies several exhibitional halls with 234 museum exhibits (more than 200 stuffed animals, entomological and botanical collections). A dendropark was opened in 2004 with 439 specimens – 55 tree and shrub species and 18 species of flowering plant. Besides, there is winter garden opened in 2003, with 210 plants of 80 species.

In order to increase the technical base a part of GEF/UNDP Project's equipment (cars, computers and other office equipment, water quality control equipment, photo cameras, video camera, binoculars and tubes, GPS,

echo-sounder, etc.) was given on a gratis basis. In 2004-2011 different educational seminars were held concerning a variety of topics: management plant development, biodiversity monitoring, inspectors' training in report compilation procedure, compliance with the safety rules and fire-fighting techniques; business trips for experience exchange were organized to Korgalzhin Biosphere Reserve, Aksu-Dzhabagly Nature Reserve, Karatau Nature Reserve (Kazakhstan), Berezin Nature Reserve (Belorussia), Po River Delta Park (Italy), as well as attendance of scientific-practical conferences in Kazakhstan (Almaty, Astana) and abroad (Minsk, Belorussia; Ravenna, Italy).



CRITERIA FOR DESIGNATION AS A BIOSPHERE RESERVE 4.

«Encompass a mosaic of ecological systems representative of major biogeographic regions, including a gradation of human intervention»

The territory of Alakol Biosphere Reserve is located in Sahara-Gobi desert region in Northern-Turan province in Eastern-North-Turan subprovince. A small part of the territory in South-East belongs to Dzhungar province. Biosphere Reserve as a whole is situated in transition zone between Dzhungar and Northern-Turan desert types, and this is the cause of unique vegetation associations with peculiar floristic composition and different geographic orientation (Dzhungar, Dzhungar – Northern-Turan and Northern-Turan botanic-geographical types). Zonal spectrum of foothill plains is characterized by the change of ephemeroid-Artemisia deserts on sierozem soils, steppified cereal-Artemisia deserts on brown soils and genuine deserts on gray-brown soils (Eastern part of Biosphere Reserve adjacent to Dzhungar gates). Central lowest part of Alakol depression is occupied by lakes surrounded by hydromorphous vegetation (meadow and marsh vegetation). Besides, hydrophilic vegetation types grow in Tentek river valley and delta. There is sparse desert vegetation on Alakol lake islands. Small areas of sor solonchak are characterized by Salsola vegetation.

There are 58 ecosystems in the limits of Biosphere Reserve's territory, grouped in 3 orders: terrestrial natural (35 types), aquatic (10 types) and terrestrial anthropogenically transformed (13 types) ecosystems. The largest area is occupied by terrestrial natural ecosystems (49.45%), followed by aquatic ecosystems (44.37%) and anthropogenically transformed ecosystems, which are registered for comparatively large area (13.43%). Terrestrial natural ecosystems are merely touched by human activity and occupy large spaces mainly on the territory of the core and buffer zone of Alakol Reserve, as well as Eastern and South-Eastern parts of the transition zone. Full classification of ecosystems is given in the Appendix (19 Supporting documents(suppl)/08 Additional documents/Classification of ecosystems of Alakol BR.doc).

There are 5 types of vegetation on the territory of Biosphere Reserve: desert, meadow, marsh, tugai, aquatic and fragmentally 2 more types: shrub and broad-leaved – forest (vegetation classification is given in the Appendix- 19 Supporting documents(suppl)/08 Additional documents/main types of vegetation of Alakol BR.doc): 1. Desert vegetation type with domination of Artemisia, cereals, annual and perennial (dwarf semi-shrubs, semi-shrubs) includes 5 subtypes: *Artemisia*; perennial *Salsola*, ephedra, saxaul, *Nitraria*, psammophyte shrubs and *Salsola*. 2. Meadow vegetation type consists of 3 subtypes: marshy meadows, genuine meadows, halophyte meadows. 3. Marshy vegetation type – grass marshes are formed on the soils of marshy type (silt-marshy) with domination of large hydrophyte and hygrophyte rhizomatus cereals; 4. Tugai vegetation type includes flood-land forests, tree-shrub and shrub thickets; besides typical species (willows, oleaster) this unique tugai tree-shrub associations of foothill river valleys include such species as hawthorn, rose hip, various grassy and tree-like liana; 5. Submerged-water vegetation of the water reservoirs is themain component of lithoral complexes of Alakol intermountain depression, it is widely represented at shallow waters of the lakes and in delta streams of Tentek river. 6. Shrub vegetation type is observed in fragments and includes the areas of *Atraphaxis*

(*A. replicata, A. frutescens, A. compacta*) groups. 7. Broad-leaved forests with unique apple (*Malus sieversii*) forests is also recorded in fragments. Besides, there is a special vegetation type – vegetation of fallow lands and anthropogenically disturbed areas, where weeds prevail in fallow lands in place of arable and rainfed croplands; according to vegetation associations' dominant composition they may be in three stages: wild weeds, gradually rehabilitating and rehabilitated zonal quasi-native.



«Be of significance for biological diversity conservation»

Alakol Biosphere Reserve is an extremely important natural complex of Alakol-Sasykkol lake system in the transition zone between Dzhungar and North-Turan desert types and is one of the key bird migration sites of global significane is Eurasia. Tentek river delta and lakes' aquatory of Alakol depression are internationally important sites and are nominated for the water reservoirs' list of Ramsar Convention for criteria la, lb. These spacious water reservoirs attract huge amounts of waterbirds.

The number of bird species registered for this territory is 342, and 203 of them are nesting. There are 269 bird species in the core and buffer zones (78.7%), 133 of which (65.5%) nest here: 263 bird species (119 of them are nesting) are recorded for Tentek river delta, and 87 species (with 50 of them nesting) are registered for 2 islands of Alakol lake. Out of all this variety of birds 22 species are included in IUCN Redlist and in the Red Data Book of Kazakhstan, and 16 of them are proven to nest in the core and buffer zone: Dalmatian Pelican, Eurasian Spoonbill, Black Stork, Whooper Swan, Ferruginous duck, White-headed duck, White-tailed eagle, Short-toed eagle, Common crane, Demoiselle Crane, Great bustard, Houbara Bustard, Little bustard, Great black-headed gull, Relict Gull, Eagle Owl. Nine more species (European pelican, Steppe Eagle, Imperial Eagle, Golden Eagle, Saker Falcon, Black-bellied sandgrouse, Pallas' sandgrouse) nest in Alakol depression in Biosphere Reserve's transition zone. During seasonal migrations another 6 Red Data Book species may be observed here: Bewick's swan, Velvet scoter, Osprey, Peregrine falcon, Barbary (red-capped) falcon andPallas' sea eagle. There are 8 more Red Data Book species which may be rarely recorded at Alakol lake and may be observed in Biosphere Reserve in some years: Little egret, Glossy ibis, Flamingo, Pied-billed scoter, Siberian white crane, Slender-billed curlew, Little curlew andAsiatic dowitcher. Alakol lake is the most important place in Central Asia not only for reproduction, but also for mass molt and migrational aggregations of waterbirds.

Biosphere Reserve's water reservoirs contain 22 fish species of 6 families, only 9 of which are native; the rest was artificially introduced by people in order to increase fish productivity of the lakes. One of the native fish species – Balkhash Perch *Perca schrenki* – is listed in the Red Data Book of Kazakhstan and IUCN. The core and buffer zone of Biosphere Reserve is inhabited by 17 fish species (85%).

Herpetofauna of Biosphere Reserve is represented by 26 species (2 amphibian species and 24 reptile species: 1 turtle species, 8 snake species, 14 lizard species), one of which – Variegated Toadhead Agama *Phrynocephalus versicolor* – is listed in the Red Data Book of Kazakhstan. There are only 10 reptile species (4 lizard species and 6 snake species) and 2 amphibian species in the core and buffer zones of Biosphere Reserve.

Theriofauna is represented by 44 mammal species of 6 orders (insectivores – 4 species, cheiropterans – 3, predators – 3, ungulates – 3, rodents – 23 and lagomorphs – 1 species). One of the mammal species of Biosphere Reserve (Zhitkov's Jerboa *Pygerethmus zhitkovi*) is endemic of Kazakhstan. There are four species (Marbled Polecat *Vormela peregusna*, Selevinia *Selevinia betpakdalensis*, Goitered Gazelle *Gazella subgutturoza* and Pallas's Cat *Felis manul*) listed in the Red Data Book of Kazakhstan. Animals of economical importance include 15 species (wolf, fox, badger, wild

boar, muskrat, stoat, steppe polecat, African wildcat, Siberian roe deer, tolai hare, etc.). Delta part of Tentek river, which is in the core zone of the Reserve, is the most important habitat for conservation of the majority of economically important and game animals of Alakol depression, especially wild boar, roe deer, muskrat, fox, corsac fox, stoat and steppe polecat.

Entomofauna is yet insufficiently studied, at the present time insects, registered for the Biosphere Reserve's territory, belong to 88 families of 13 orders: Odonata, Mantoptera, Phasmoptera, Orthoptera, Dermaptera, Plecoptera, Homoptera, Hemiptera, Coleoptera, Hymenoptera, Lepidoptera, Diptera, Neuroptera. Fourteen insect species are included in the Res Data Book of Kazakhstan, one of them — *Bolivaria brachyptera* — is also listed in IUCN Redlist. Endemic species of insects in Biosphere Reserve include representatives of Coleoptera: *Callistenes karelini*, *Cicindela lacteolabrodskii*, *Dorcadion cephalotes*, *D. alakolense*, *Xylotrechus arnoldi*, *Stenocorus minutus*, as well as Orthoptera: *Tropidopola turanica iliensis*, *Sphingonotus eurasius kazakus*, *Mesasippus kozhevnikovi robustus*, *Eremippus pusillus*, *Damalacantha vacca*.

The composition of zooplankton in Biosphere Reserve's lakes consists of 140 taxons, including widely distributed in all lakes rotifer *Keratella quadrata quadrata* and crustaceans *Diaphanosoma lacustris* and *Arctodiaptomus salinus*. The category of key species includes 12 zooplankton taxons: *Arctodiaptomus salinus*, *Diaphanasoma lacustris*,

Thermocyclops crassus, Mesocyclops leuckarti, Ceriodaphnia reticulate, Megacyclops viridis, Bosmina longirostris, виды рода Brachionus, Hexarthra fennica, Keratella quadrata, Asplanchna brightwelli, Filinia longiseta.

Taxonomic composition of macro-zoobenthos organisms of Alakol-Sasykkol lake system water reservoirs is represented by 82 species and forms of four groups, including insects – 60 species, molluscs – 12 species, worms – 9 species and crustaceans – 1 species. Alakol lake is the richest in species and forms of benthofauna – 43 taxons. Recorded benthos organisms are widely distributed in water reservoirs of Palaearctic, excluding endemic mollusc species *Bithyniia caerulans*, which at the present time inhabits Balkhash lake and lakes of Alakol Biosphere Reserve (Koshkarkol, Sasykkol and Alakol lakes).

Flora of the higher plants of Biosphere Reserve consists of 678 species of 293 genera, 85 families; among those 6 species are endemic (Astragalus ornithorrhynchus, Euphorbia blepharophylla, Tulipa brachystemon, Tragopogon scoparius, Artemisia scopiformis, Microcephala sublogosa) and 10 species are subendemic (Scutellaria albertii, Artemisia saissanica, Turaniphytum eranthemum, Zygophyllum semenovii, Z. macropterum, Paraeremostachys



dchungarica, Scutellaria albertii, Astragalus brachypus, A. cognatus, A. karakugensis). Aquatic flora is represented by 25 plant species, with pondweed being one of the most numerous in species composition genus (5 species). All aquatic species are submerged in water macrophytes distributed in aquatory of lakes, rivers and streams among reeds. Species listed in the Red Data Book of Kazakhstan incude two species of tulips: *Tulipa kolpakowskiana* and *T. brachystemon*. About 40% of Biosphere Reserve's flora have economical importance, the majority of them are medicinal (24 species), nectariferous (27 species) and wild relatives of cultural plants (24 species).

«Provide an opportunity to explore and demonstrate approaches to sustainable development on a regional scale»

Region's potential mostly relies on development of cattle-breeding and plant production, as well as on fishery and ecologic-recreational tourism. In the regional scale the experience of ecologic-recreational tourism development on the territory of Biosphere Reserve may be successfully used in Southern and Eastern Kazakhstan (lakes of Southern Kazakhstan, Balkhash lake, Zaisan lake, etc.). At the present time the territory of Alakol Biosphere Reserve is used for



the development of Kazakhstan-China economic projects related to oil-gas pipelines construction, railroad and road construction. There is a project being realized on the use of alternative energy sources – wind electricity stations in the region of Dzhungar Gates natural aerodynamic tube (which is narrow natural pass between Northern part of Dzhungar Alatau and Southern reaches of Tarbagatai).

It is very perspective to develop ecologic-recreational tourism on the basis of Biosphere Reserve. Proximity of the Reserve to oblast's capital (Taldy-Korgan city) and Kazakhstan financial-economic and cultural center (Almaty city) with well developed tourist infrastructure (international airport, auto- and railroad stations, hotels, tourist companies, restaurants, etc.) gives a potential opportunity for Kazakhstan and foreign tourists to have positive, comfortable experience when coming to South-Eastern Kazakhstan region and further to Alakol Biosphere Reserve. In the future tourist services on the Biosphere Reserve's territory (villages in transition zone) will also be developing as private guest tourism with providing additional services from the local people (rent of the boats, horse-riding, fishing, etc.) and sale of self-grown food and local souvenirs which are very popular among the tourists.





«Have an appropriate size to serve the three functions of biosphere reserves»

Total area of Alakol Biosphere Reserve's territory is 193 089.9 ha (with water areas – 529 300 ha). The core zone (which is strict reserve zone of Alakol State Nature Reserve) is 19 712,9 ha, buffer zone–26 667 ha (2 km stripe along nature reserve's perimeter), transition zone – 146 710 ha (with water areas about 511 300 ha).

Through appropriate zonation: long term protection, according

«(a) a legally constituted core area or areas devoted to long term protection, according to the conservation objectives of the biosphere reserve, and of sufficient size to meet these objectives»?

The core zone of Biosphere Reserve is strictly protected nature reserve zone of Alakol State Nature Reserve, which represents wetland natural complex of Tentek river delta, also including a part of Sasykkol lake waters and three islands of Alakol lake with their coastal territories, which are very important nesting areas for many rare bird species. According to article 39 chapter 7 of the Law of RK «About specially protected natural territories», state nature reserve is a specially protected natural territory with the status of nature-protective and scientific institution, the main goal of which is conservation and research of the natural processes, objects of plant and animal world, separate species and associations of plants and animals, typical and unique ecological systems and their rehabilitation. It is permitted to create excursion paths and routes for regulated ecological tourism at specially provided areas which don't include especially valuable ecological systems and objects, in the order stipulated by the authorized body (article 42). Alakol State Nature Reserve corresponds with the highest category (1A) of natural territories of International Union for Conservation of Nature.

The area of the core zone of Alakol Biosphere Reserve is 19 712.9 ha. Core zone is compiled of four areas — Tentek river delta, Ulken Araltobe island, Sredniy and Kishkene Araltobe islands. The border of the main Reserve's territory in Tentek river delta begins from the coastal line of Sasykkol lake, Burgon bay, goes through marshy area in South-Eastern direction for 7 km to Togyztubek tract along the border of Kabykbayev's farm. Then it turns strictly to the West to Miyaly tract. Then the border continues in Southern direction until Kaskyrzhota tract for 12 km. From Kaskyrzhota tract to Kokpekty tract the border also goes through wetlands along Alakol forestry farm border in South-Western direction to the bridge over a channel to Shiryayev island for 19 km, turns North along delta water reservoirs: Kugumbay, Intymak, Safron and until Alyokhin's farm. Then it changes direction to the West until Baibala tract, around channel in South-Eastern direction is comes back to the bridge to Shiryayev island with total length of 20.2 km. The distance between the borders is 1.5 km, and then the border goes to South-West along the borders of Baizhumanova's farm, Tolgambay's farm, Filimonov's farm to Karamoyin tract along the border of Shumenov's farm to Zharsuat tract for 15.4 km. The border of nature reserve goes through the waters of Sasykkol lake to Zharsuat tract on the South-Western side of Sasykkol lake to Burgon bay with length of 40 km.

Total area of the core zone on Tentek river delta part is 17 422.9 ha. The area of the islands: Ulken Araltobe - 2 119 ha, Kishkene Araltobe - 148 ha and Shednyi - 23 ha. The territory of cre zone of Tentek river delta parts and two islands - Ulken Araltobe and Kishkene Araltobe - are located in Alakol district of Almaty oblast on the total area os 19 564.9 ha, and Srednyi island - in Urzhar district of Eastern-Kazakhstan oblast (23 ha).

4. 4

«(b) a bufarea or are place...» According to the Law of specially protophabilitation of withdrawn from organizations carried out by of the Repubareary is but for scientific to (including 4.4).

«(b) a buffer zone or zones clearly identified and surrounding or contiguous to the core area or areas, where only activities compatible with the conservation objectives can take place...»

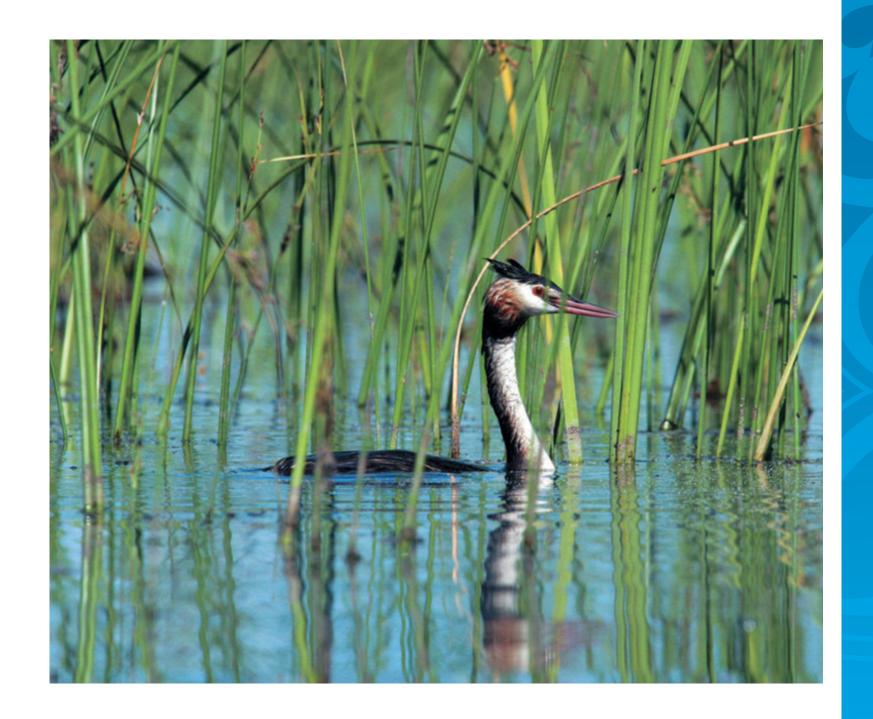
According to the legislation of Kazakhstan, the buffer zone of Alakol Biosphere Reserve is a protective zone of nature reserve which embraces twi-kilometer stripe along the nature reserve's core zone perimeter. According to Article 43 of the Law of RK «About SPNA», protective zones are created for protection from unfavourable external impacts around specially protected natural territories with prohibition of any activity that would negatively influence the condition and rehabilitation of the given territory's ecosystems. On the territory of Biosphere Reserve the lands of the buffer zone are not withdrawn from the main land users, they consist of the lands of agricultural purpose and are administered by agricultural organizations and private owners. Economic activity at some parts of the protective zone (haymaking, cattle pasture) is carried out by agreement with state authorized body (Forestry and Hunting Committee under the Ministry of Agriculture of the Republic of Kazakhstan) and under the control of state nature reserve's administration. The territory of Biosphere Reserve's buffer zone is the place for conduction of activities in ecological education, recreation, ecotourism, as well as for scientific research. The area of the buffer protective zone is 26 667 ha. In Tentek delta the buffer zone is 21 547 ha (including 4 400 ha of Sasykkol lake waters), and around Ulken Araltobe, Srednyi and Kishkene Araltobe islands – 5 130 ha.

«(c) an outer transition area where sustainable resource management practices are promoted and developed»

The transition zone (zone of development, collaboration) of Alakol Biosphere Reserve is located on the territory of two administrative districts of two oblasts: mainly in Alakol (Almaty oblast) and partly in Urzhar district (Eastern-Kazakhstan oblast). Total area of transition zone's territory is 146 710 ha (with water areas – 511 300 ha).

The biggest land users of Alakol and Urzhar districts are agricultural complanies with 251 885 ha of the territory (18 416 ha are arable). Other large land users include organizations working with industry, transport, communications and defense. These organizations, the largest of which are Atasu-Alashankou oil pipeline, Ministry of Defense of RK and Border Service of the Committee for National Security of RK, use the lands of non-agricultural purpose with total area of 49 882 ha. Areas occupied by settlements and their lands for the use of local people (pastures, cattle routes) – 59,363 ha. Besides, large territories belong to the State Office of Forests and Animal World Protection of Alakol district.

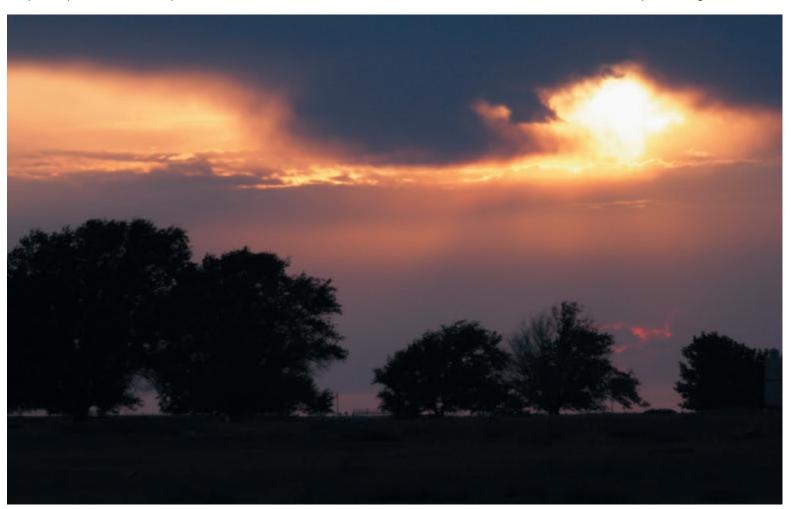
The territory of transition zone is occupied by pastures, numerous wetlands and villages. It is situated mainly in the regions where people live and use the land for a long time. It is important to organize rehabilitation procedures for natural resources at these territories. First of all, it concerns sustainable fishing and hunting activities.



4.6

«Organizational arrangements should be provided for the involvement and participation of a suitable range of inter alia public authorities, local communities and private interests in the design and the carrying out of the functions of a biosphere reserve»

For organization of partner relations a special Coordinational Council of Alakol Biosphere Reserve was created; its participants include representatives of state nature reserve, nature users, local authorities and public organizations.



Mechanisms for implementation Does the proposed biosphere reserve have:

"(a) mechanisms to manage human use and activities in the buffer zone or zones»?

According to the legislation of RK, economic activities management in some areas of the Reserve's buffer zone (haymaking, cattle pasture) is carried out by agreement with state authority (Forestry and Hunting Committee under the Ministry of Agriculture of RK) and under the control of state nature reserve's administration, all disputes are solved at the meetings of Coordinational Council of Biosphere Reserve. During the preparation of Resolution of Akims of Eastern-Kazakhstan oblast and Akim of Alakol district of Almaty oblast about 2-km protective zone establishment along the border of state nature reserve all matters of cooperative activities on the buffer zone lands were discussed with all nature users. Lands of the buffer zone in private possession were not withdrawn from the owners.





«(b) a management plan or policy for the area as a biosphere reserve»?

At the present time there is the Management Plan for Alakol State Nature Reserve, which relates to the management of the core and buffer zones of Biosphere Reserve. Nature users have their own management plans which are in accordance with Nature Reserve's Management Plan. Thus, simple uniting of all these plans would result in an Integrated Management Plan of the whole Biosphere Reserve's territory. There is no special management plan for Biosphere Reserve which would include the transition zone, because there is no need in it at the modern stage of Reserve's development. All disputes are solved at the meetings of Coordinational Council of Biosphere Reserve.

«(c) a designated authority or mechanism to implement this policy or plan»?

Biosphere Reserve's managment is conducted through Coordinational Council of Alakol Biosphere Reserve created in 2012. Before that the territory was managed through Scientific-technical Council of nature reserve (until July 2012). Coordinational Council is a collegiate public organ and is created for introduction of the policy of effective management and resources' sustainable use, introduction of alternative activity types, resource-conserving and resource-renewing technologies. Biosphere Reserve's Coordinational Council, with its members consisting of state agencies representatives (territorial office of forestry and hunting and territorial office of fishery), state nature reserve, Akimats, local NGO and land users, is also necessary for establishing collaboration and decreasing contradicitons between all nature users.

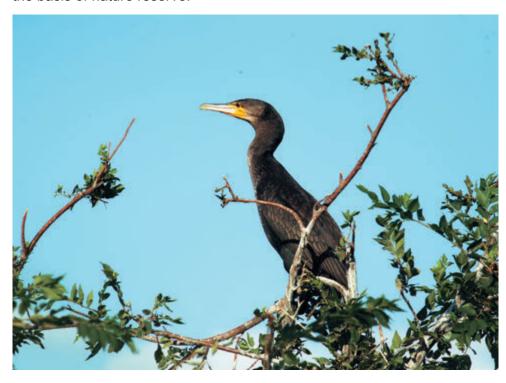
«(d) programmes for research, monitoring, education and training»?

On the territory of Biosphere Reserve there is an ongoing monitoring of condition and conservation of natural complexes, as well as rare and endangered species monitoring in order to clarify populations' condition, research peculiarities of plant and animal rare species' ecology; this would give an opportunity to evaluate the perspectives of these species' conservation and rehabilitation. The goal of the monitoring is to obtain regular objective data on the condition of plants and animals on the territory of Biosphere Reserve, as well as their habitat condition. Based on the monitoring data, it is necessary to carry out routine evaluation of populations' and ecosystems' condition, biosphere reserve's effectiveness, as well as elaboration of methods for prevention (elimination) of critical and unfavourable situations. In the frame of monitoring «Nature Chronicles» are recorded, as well as population countings of large waterbirds (swans, flamingo, pelicans, etc.), mammals and invertebrate animals.

According to the perspective thematic plan of scientific research, the work on the territory of SPNA in 2011-2015 is carried out for 7 scientific themes: 1) Observations of natural phenomena and processes on the territory of the Reserve

and their study for the «Nature Chronicles» program, 2) Alakol Nature Reserve's flora and vegetation inventorizaiton, 3) Rare and endangered birds of Alakol Nature Reserve, 4) Cadastre of background and rare mammals of Alakol Nature Reserve, 5) Characteristics of modern condition of ichthyofauna of Alakol Nature Reserve and creation of the system for its long-term monitoring, 6) Biodiversity evaluation of the main invertebrate groups of Alakol Nature Reserve, 7) Monitoring of hydrobionts of delta water reservoirs of Alakol Nature Reserve. Perspective thematic plan of scientific research is given in Appendix 19 (Supportingdocuments(suppl)/05 List of land use and management plans/ Scansand docs/ 09 Perspective Scientific-Technical Plan for till 2015/RUS/*.*).

The department of ecological education (consisting of 4 people) of nature reserve is responsible for organization and conduction of cultural-educational activities. Cultural-educational work is also done by the staff the department of science, information and monitoring. The goal of this department's work is forming ecological literacy, understanding of the key role of the protected territory, importance of unique nature's conservation, public support gaining, as well as raising patriotism and responsibility for the environment and, as the result, decrease of anthropogenic press on region's biodiversity. The main activities include work with mass media, publishing, museums, ecological excursions and educational tourism, interactions with teachers and educational bodies. Besides, staff of this department develops posters, leaflets and other agitational means, and also take part in organization of practice for students of nature protective courses on the basis of nature reserve.



With the support from UNDP/GEF Wetlands Project staff of state nature reserve had a chance to raise their qualifications and prepare new staff members in trips for experience exchange to Korgalzhin Biosphere Reserve, Aksu-Dzhabagly Nature Reserve, Karatau Nature Reserve (Kazakhstan), Berezin Nature Reserve (Belorussia), Zapovednik Ecological Center (Moscow, Russia), Po River Delta Park (Italy), as well as to scientific-practical conferences in Kazakhstan (Almaty, Astana) and abroad (Minsk, Belorussia; Ravenna, Italy). In 2009-2011 different educational seminars were held for Reserve's staff concerning a variety of topics: management plant development, biodiversity monitoring, inspectors' training in report compilation procedure, compliance with the safety rules and fire-fighting techniques.

ENDORSEMENTS

Signed by the authority/authorities in charge of the management of the core area(s):

Name: Maden Zhumankulov

Position: Director of Alakol State Nature Reserve

Date: 17.08.2012

Signed by the authority/authorities in charge of the management of the buffer zone(s):

Name: Maden Zhumankulov

Position: Director of Alakol State Nature Reserve

Date: 17.08.2012

Name: Alibek Zhakanbayev
Position: Akim of Alakol District of Almaty Oblast
Date: 21.08.2012

Name: Bauyrzhan Zhanakov

Position: Akim of Urzhar District of East-Kazakhstan Oblast

Date: 21.08 2012

Signed as appropriate by the National (or State or Provincial) administration responsible for the management of the core area(s) and the buffer zone:

Name: Erlan Nysanbaev

Position: Chairman of the Forestry and Hunting Committee of Ministry of Agriculture of Kazakhstan

Date:

Signed by the authority/authorities, elected local government recognized authority or spokesperson representative of the communities located in the transition area.

Name: Renat Kurmaev

Position: Chairman of NGO "Alakol-Kamkor"

Date: 17.08.2012

Def

Name: Keleskhan Butunchinov

Position: Chief of Alakol Division of Balkhash-Alakol Basin Interregional Fishery Inspection

Date: 17.08.2012

Dipperezzarani)

Name: Nurzhan Orazalinov

Position: Head of the farm "Orazalinov N. S."

Date: 17.08.2012

Name: Erzhan Kazhinov

Position: Head of the farm "Adil"

Date: 20.08.2012

Name: Klavdia Vlasenko

Position: The Chairman of NGO "Alakol-Society-Dialogue"

Date: 22.08.2012

k. Budesey

Signed on behalf of the MAB National Committee or focal point:

Name: Roman Jashenko

Position: Chairman of Kazakhstan National Committee

Date: 03.09.2012



5. 5



PART II: DESCRIPTION

6. LOCATION (LATITUDE AND LONGITUDE):

Geographic coordinates of the central point of Biosphere Reserve – N $46^{\circ}11'$ / E $81^{\circ}46'$, all the territory is limited between coordinates N $45^{\circ}22'$ - N $46^{\circ}45'$ and E 80° 29' - $82^{\circ}25'$. Core zone is located on the territory with coordinates: Tentek river delta – N $46^{\circ}24'$ - $46^{\circ}30'$ and E $81^{\circ}01'$ - $81^{\circ}08'$, islands: Ulken Araltobe–N $46^{\circ}11'$ / E $81^{\circ}46'$, Srednyi – N $46^{\circ}07'40''$ / E $81^{\circ}51'35''$, Kishkene Araltobe – N $46^{\circ}06'20''$ / E $81^{\circ}53''$

7 AREA (see map):

Total: 193 089.9 ha (with water areas – 529 300 ha).

JIOSPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE BIOSPHERE RESERVE RESERVE BIOSPHERE RESERVE Size of terrestrial Core Area(s):

19 712,9 ha;

Size of terrestrial Buffer Zone(s): 7. 2 26 667 ha:

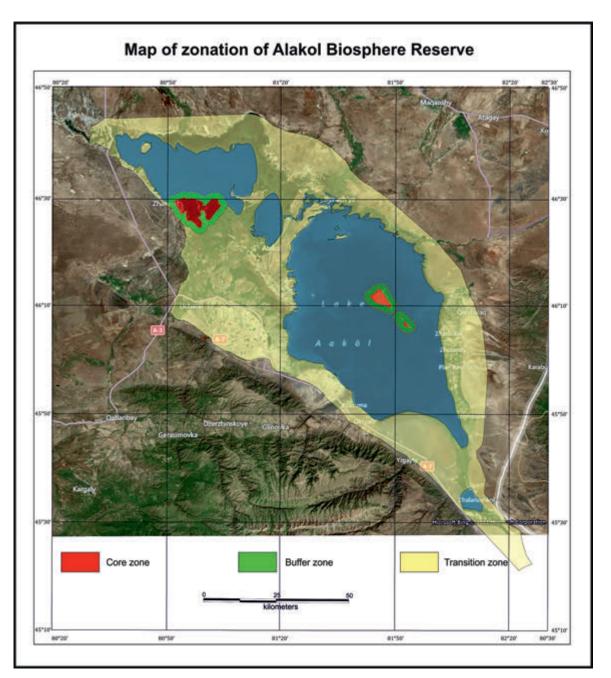
Approx. size of terrestrial Transition Area(s) (if applicable): 146 710 ha:

General location



Alakol Biosphere Reserve







Brief rationale of this zonation (in terms of the various roles of biosphere reserves) as it appears on the zonation map. In the cases where a different type of zonation is also in force at the national level, please indicate how it can coexists with the requirements of the biosphere reserve zonation system:

Kazakhstan land legislation defines zoning of territories as identification of the lands and their purpose and usage regime. Purpose of the territory is the main (primary) activity type, which the territory is dedicated for. According to Article 39 of the Law "About specially protected natural territories", "State Nature Reserve is a specially protected natural territorywith the status of nature protective and scientific institution, its activities' goal is in conservation and research of natural processes on its territory, objects of plant and animal world, separate species and communities of plants and animals, typical and unique ecological systems and their rehabilitation" (paragraph 1). The main activities of state nature reserves include: "1) provision of protection regime and restoration of biological diversity of state nature reserve and its protective zone; 2) organization and conduction of scientific research and monitoring of ecological systems, objects of state nature reserve fund, including Nature Chronicles; 3) expertise of the projects and distribution schemes of economic and other objects which may negatively influence ecological systems of state nature reserve;, 5) regulation of the use of state nature reserve's territory and its protective zone in ecologic-educational, scientific and limited tourist purposes" (paragraph 2)

Functional zones' identification in Alakol Biosphere Reserve was conducted with goal of conservation of typical, rare and unique natural complexes of Alakol-Sasykkol lake system and foothill plains of Northern part of Dzhungar Alatau and Southern reaches of Tarbagatai with all the entity of their components, as well as with the goal of decrease of negative anthropogenic influence on nature condition with provision of conditions for stable social-economic development of the territory without infringement of the rights and freedoms of local people.

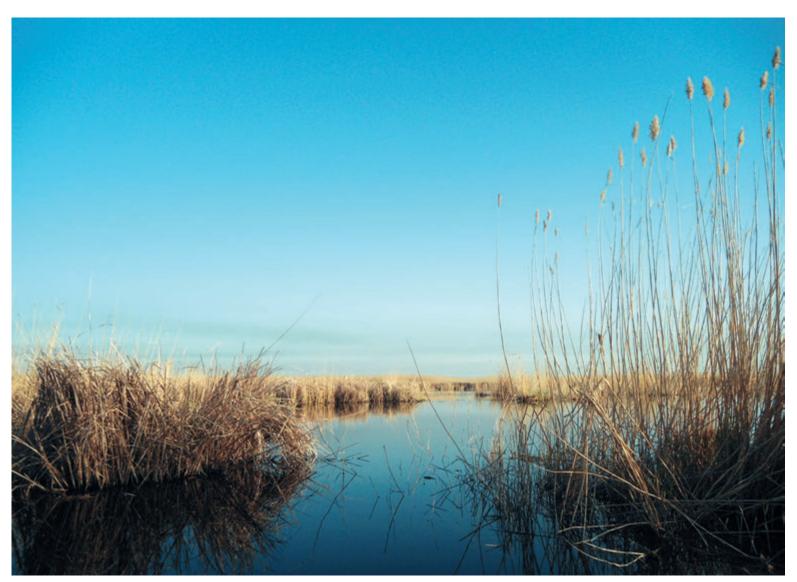
For this purpose field biologic-geographical and social-economic research was carried out in 2006-2008 in the frame of UNDP/GEF Wetlands Project. Factors taken into consideration during zoning included modern condition and importance of territory's natural components, as well as modern and potential use of the land for social-economic development of the territory.

In the result of this work 3 functional zones were identified for Alakol Biosphere Reserve:

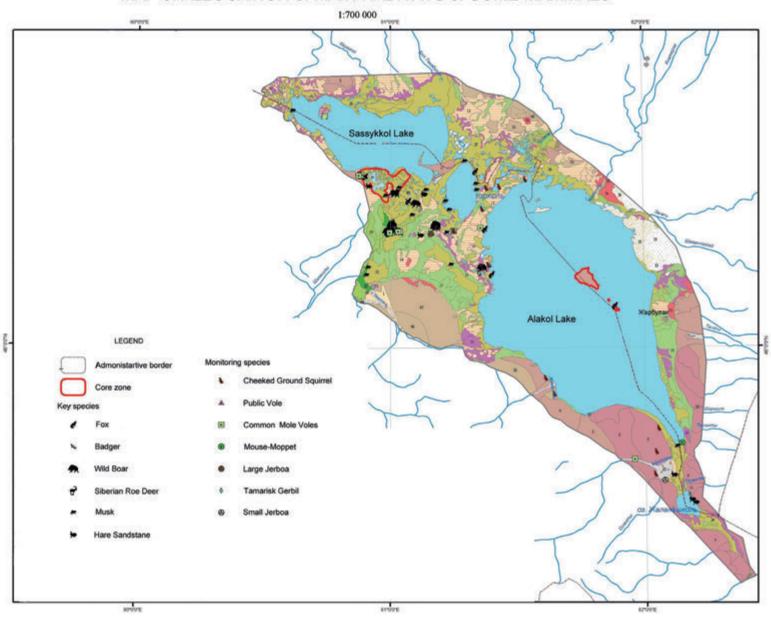
- 1. Core zone (main zone). According to the legislation of Kazakhtan, this territory includes the zone of nature reserve's regime of Alakol State Nature Reserve, which prohibits any economic activity and provides strict protection regime.
- 2. Buffer zone, which consists of the protective zone of Alakol State Nature Reserve, established according to the legislation of Kazakhstan. This territory is designed for the protection of Nature Reserve's core from unfavourable external influence. Any activity that would negatively influence the condition and rehabilitation of the given territory's ecosystems is prohibited haere. The territory of buffer zone of Biosphere Reserve permits only activities of ecological education, recreation, ecotourism, and scientific research. Any limited economic activity in some areas of buffer zone (haymaking,

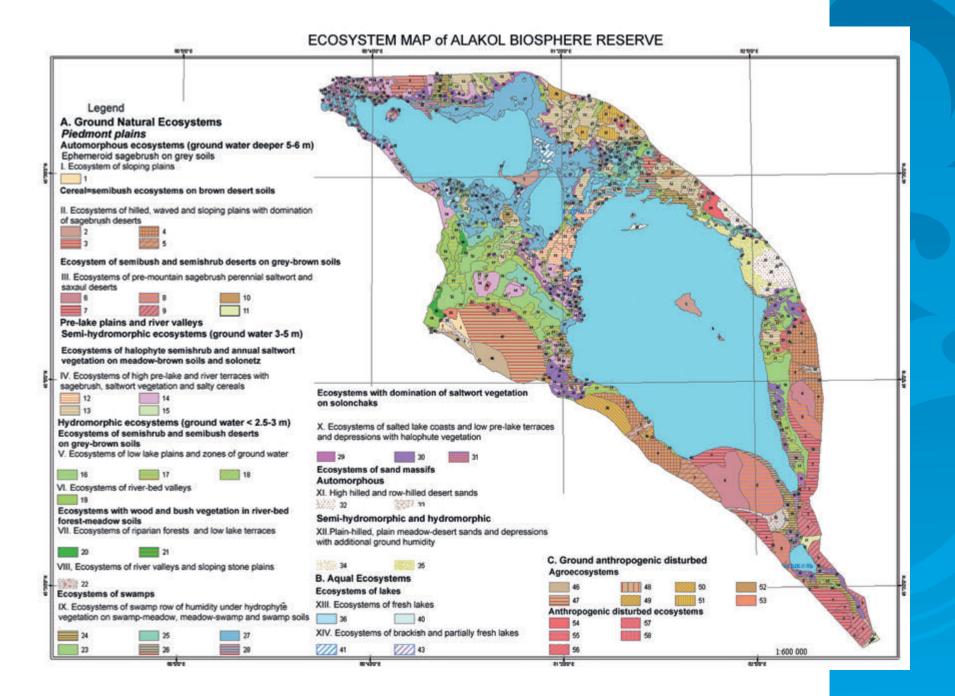
cattle pasture) is carried out only by agreement with governmental authority (Forestry and Hunting Committee) and under the control of administration of Alakol State Nature Reserve.

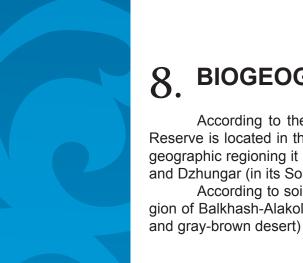
3. Transition area (zone of collaboration)represents lands settled and developed a long time ago used for hayfields, fallow lands, pastures, hunting and fishing farms and settlements.



MAP of ALLOCATION of MAIN HABITATS of SOME MAMMALS







8 BIOGEOGRAPHICAL REGION:

According to the scheme of physical-geographical regioning of Kazakhstan, the territory of Alakol Biosphere Reserve is located in the limits of Balkhash-Ili-Alakol province of Semirechye desert region, and according to botanic-geographic regioning it is situated in Sahara-Gobi desert region, Northern-Turan (Eastern Northern-Turan subprovince) and Dzhungar (in its South-Eastern most part) provinces.

According to soil-geographic regioning the territory of Biosphere Reserve is in the desert zone of Alakol soil region of Balkhash-Alakol province, the soil cover is represented by automorphous zonal soils (sierozems, brown desert and gray-brown desert) and intrazonal soils (meadow brown, meadow, marshy meadow, marshy, solonetz, solonchak).

9 LAND USE HISTORY:

Alakol depression occupies intermountain lake depression with the area of about 10,000 square kilometres between mountain systems of Dzhungar Alatau and Tarbagatai in South-Eastern part of Kazakhstan. Mountain pass between Alakol lake and Dzhungar Alatau, also called "the Dzhungarian Gates", connects Alakol depression with Ebi-Nor depression in China. This pass was used in the past for the caravan roads of Silk Road which played very important strategic role in Central Asia starting from II century BC till XIII century AD. There is a note in the description of French traveller William of Rubruck stating that on the coast of Alakol, which he calls "stormy lake", in 1253 there was "the main city of Mongol province", and famous mountain pass was called "Kantagai gorge". Genghis Khan led his army through Dzhunagian Gate. Some sources say that Alexander the Great stayed in foothills of Dzhungar Araltau when he was travelling to India. During the times when Dzhungar tribes invaded Kazakhstan, the largest battle led by Kazakh military chief Karakerey Kabanbai batyr took place on the territory of Alakol region. Dzhungar tribes lost in this battle; its name is stayed in the history as Anrakai battle.

The first description and schematic map of Alakol depression was compiled in 1722 by Russian officer N.Unkovskiy. Later Alakol depression was visited by many famous geographers of XIX – early XX centuries: Sh. Valikhanov (1840), G. Karelin (1840), A. Shrenk (1840), A. Vlangali (1849), Semyonov-Tienshanskiy (1857), A. Tatarinov (1864), A. Golubev (1867), O. Finsha and A. Brem (1876), G. Romanovskiy (1878), I. Polyakov (1877), V. Obruchev (1905, 1906, 1909), etc.

The majority of modern settlements of Biosphere Reserve's transition zone were created in the second half of XIX – early XX century when Cossacks were organizing military settlements and peasants were moving from European part of Russia and Western Siberia. Local Kazakh people practiced mainly cattle-breeding, while European migrants grew plants and made gardens. Thus, they occupied different ecological and economical niches, helping in avoiding contradictions between native citizens and immigrants and in establishment of economical and cultural collaboration between them.

In 1871-1872 the first immigrants (242 families) came from Voronezh province and established Stepanovka village (modern Usharal town). Stepanovka was a district center and was included in Lepsinskiy county, which united modern Sarkand, Uygentas, Alakol and Urzhar districts. In 1890 the first 3-grade school for boys was opened in Stepanovka village, followed by church school for girls. After 1917 both schools were reorganized into 4-grades complex school. Russian people in Stepanovka grew plants and partly practiced cattle-breeding, while Kazakh people were mainly involved in cattle-breeding and partly grew plants. Land was ploughed by plows pulled by oxen, wheat was collected by hands with the help of sickles. Hay was collected by scythes, later changed by mowers and horse rakes. The life of a peasant in Stepanovka in the beginning of XX century was monotonous and rhythmical. Peasants brought local merchants' production to Sergiopol (modern Ayaguz), Semipalatinsk and other places and then – to Yining City (Gulja). There was more than 20 merchants' shops in Stepanovka. In 1909 a construction of the channel began under the administration of ingeneer Postnikov. In 1912 the channel was put into operation. It allowed improvement of arable agriculture. There were five forges and one shoe shop at that time in Stepanovka. In 1915 the first post was opened. In 1921 Stepanovka was renamed to Uch-Aral village, and in 1927 Stepanovskaya county was renamed to Uch-Aral county. District center – Uch-Aral village. Alakol district with ditrict center in Ucharal village was established on January 17, 1928.

In the early Soviet period during collectivization cooperative farms were formed (so called kolkhoz), part of which was then reorganized into state common farms (sovkhoz). For example, on the basis of Ucharal village "Put Lenina" cooperative farm was organized. The main direction of economic activity of local people was cattle-breeding, plant growing and fishery. In early 1930s the first hospital (10 beds) was opened, in 1933 it was equipped with 15 beds and in 1934 hospital building for 25 people was built. In 1930 Russian and Kazakh schools of Uch-Aral village became secondary schools. In 1935 the first kindergarten was established. In 1938 the first district library started working. In 1937 district union of consumers consisted of 12 village consumer organizations. In 1964 boarding school (320 places) for children of cattle-breeders was built, and in the same year musical school is opened. In November 1967 the first typical school for 960 populs is formed in Usharal. On Septemeber 19, 1984 the status of Uch-Aral is changed to town, according to the Decree of Presidium of Supreme Soviet of Kazakh SSR.

In 1980 All-Union Scientific Institute of Nature under the Ministry of Agriculture of USSR and Academy of Sciences of Kazakh SSR gave recommendations on the creation of nature reserve with total area of 120,000 ha. The territory was to embrace Tentek river delta, Eastern coast of Sasykkol lake, North-Western coast of Koshkarkol lake, marshy pass between these two lakes, and also Alakol lake's islands. The creation of nature reserve was planned for 1986. In 1993 according to the Resolution of Government of the Republich of Kazakhstan as of July 14 "About the measures of development of state nature reserves and national parks of the Republic of Kazakhstan until 2005" Alakol State Nature Reserve was one of five nature reserves and one national park due to high priority organization. In a year, on May 5, 1994, Taldykorgan oblast Akimat agreed to give the land for nature reserve creation and project works conduction. It was decided to include all not suitable for agriculture lands with total area of 9200 ha in Tentek river delta, and also include the lands of "Reliktovaya chaika" state reserve on Alakol lake's islands with total area of 3,320 ha. Thus, the project plan of future nature reserve contained only 12,520 ha. In March of 1996 a temporary executive direction was createdbased on the initiative of Taldykorgan oblast Ecology and Bioresources management. It was funded by local nature protection fund, and stopped its activity on January 1, 1998 because Taldykorgan oblast was reorganized and included in Almaty



oblast. But 4 months later, on March 21, 1998 the Government of the Republic of Kazakhstan issued the Resolution "On organization of Alakol State Nature Reserve on the territory of Almaty and Eastern-Kazakhstan oblasts". This day is the date of establishment of Alakol Nature Reserve.



HUMAN POPULATION OF PROPOSED 10.

permanently / seasonally

Core Area(s):

NO / About 10-30 nature protectionists (staff of State Nature Reserve)

Buffer Zone(s):

About 10-30 nature protectionists (staff of State Nature Reserve) / NO

Transition Area(s):

About 33 000 people / 25 000 tourists

Brief description of local communities living within or near the proposed Biosphere Reserve

Alakol Biosphere Reserve is located mainly in Alakol district of Almaty oblast and partly in Urzhar district of Eastern-Kazakhstan oblast. There are more than 32,000 people. The main types of economic activity are cattle-breeding, plant-growing and fishery, which is mainly practiced in production cooperatives. In private sector local population practice breeding of cows, sheep and horses. The majority of the houses on Biosphere Reserve's territory is made of adobe and bricks. All houses have heating systems for winter based on coal or gas, many houses have central water system. The main religions of the local people are Islam and Christianity. Indigenous population usually supports religious practices, as well as national traditions (respect for the older, increased status of men, growing children in religious and national traditions).

In the last 10 years an active development of ecologic-recreational tourism is observed in Biosphere Reserve's transition zone. Alakol lake is a popular recreation site for citizens of Kazakhstan and neighboring regions of Russia as beach and spa site. Tourist business is practiced mostly by local people of two villages – Akshi and Koktuma – of Alakol district, as well as Kabanbay village population of Urzhar district; they provide tourist services. Considerable part of visitors live in private quest houses. Now Alakol lake is a very quickly developing recreational tourist center of Kazakhstan.

10. 1

10.2

10.3

10.4

10. 5

Name(s) of nearest major town(s):

Taldykorgan – oblast center (282 km Western from Biosphere Reserve's border) ²

Cultural significance:

In close proximity from Biosphere Reserve there are known sites of prehistoric cattle-breeders, as well monuments of Bronze and early Iron Ages. A lot of Saki burial mounds is conserved, as well as many monuments of cult Muslim architecture of past centuries: ancient necropolis, underground mosques, etc. In 1991, for the 300-anniversary of national hero Karakerey Kabanbai who guarded Kazakhstan lands from Dzhungar tribes' invasions from Western China, a historic-ethnographic museum named after Kabanbay batyr was founded. Museum's exhibits (about 800 of them) presented in its halls help people to get acquainted with the history, culture, lifestyle of Kazakh nation and representatives of other ethnicities living in this region.

11 PHYSICAL CHARACTERISTICS

General description of site characteristics and topography of area:

Alakol Biosphere Reserve is situated in the Central part of Alakol depression, which is limited by Southern reaches of Tarbagatai ridge from the North, Dzhungar Alatau ridge from the South, and there is a mountain pass between these two mountain systems in the Eastern side called the Dzhungarian Gates. The territory of Biosphere Reserve is ephemeroid-*Artemisia* deserts on sierozems and steppified cereal – *Artemisia* deserts on brown soils and genuine deserts on gray-brown soils (Dzhungarian Gates area). Central part of Biosphere Reserve is occupied by lakes with hydromorphous meadow and marshy vegetation on the periphery and marshy lowland with a whole system of delta channels.

Highest elevation above sea level:

723 metres

Lowest elevation above sea level:

348 metres

Climate:

The climate in Alakol Biosphere Reserve area is extremely continental with dry summer and comparatively cold windy winter with little snow, characteristic for extratripical deserts. There are three main air masses types – Arctic, Polar and Tropic – which are present in the depression in a year. The main peculiarity of the climate of the plain part is its extreme aridity and increased continentality. The most typical situation is cold winter with little snow in combination with hot and dry summer. Spring is a kind of exception – depression's climate is characterized by moderate air temperatures, increased precipitation and considerable moistening of the soil by meltwater.

Average annual air temperature is in the limits of +6.2 + 9.2°C with absolute maximum of +42° and absolute minimum of - 46°C. Average monthly air temperature in January at Druzhba meteostation is – 16.6°, in Usharal – 14.0°C, in July air temperature in Dzhungarian Gates is +25.3°C, in Usharal area +24.1°C. Total annual radiation is 125-135 kcal/cm², and soil surface gets 168 kcal/cm² annually. The average annual relative air humidity in Dzhungarian Gates is 58% (maximum in November - March – 71-85%), in Usharal area – 63% (77-81%). The climate of Alakol depression considerably warmed up in the last 25 years, accompanied by often winter thaws and rains, which was not typical before. The duration of phenological seasons in the plain is: spring March 25 – May 15 (52 days), summer May 16 – September 30 (138 days), autumn October 1 – November 15 (45 days), winter November 16 – March 24 (130 days). The duration of warm period with average temperature above 0°C is 8-8.5 months. Because of improvement of agro-climatic characteristics it became possible to grow grapes, pears and other heat-loving plants. Climatic conditions of Alakol depression are favourable for many agricultural plants, but in some periods of their vegetation there may be frosts which may be very harmful.

Average long-term date of the first autumn frosts in Alakol Biophere Reserve is the middle of second – third decade of September. Their end observed in average long-term period is in the second decade of late April or second-third decade of May. Average duration of frost-free period is in the limits of 114-184 days.

Plain territory of Alakol depression is characterized by distinct aridity. The cause of this lies in its location almost in the center of Eurasia where it is almost unavailable for moist Atlantic air influence, which is the main source of moisture. It comes from Atlantic to Alakol depression significantly dehydrated and, depending on the level of soil's warmth and dryness, gives different amount of precipitation. Atmospheric precipitation is unevenly distributed in year's seasons.

11. 2. 1

11. 2. 2

11.3



First snow is recorded in late October – early November, stable snow cover is established in the second half of November. Snow cover's height is 8-20 cm, in some years precipitation reaches 100-135 cm. Snow cover comes off plain surface in late March – early April. Snow cover is the highest in the second decade of February. In March the height of snow cover decreases. It is destroyed in the end of second decade of March – early April. Average depth of soil freezing under the natural snow cover varies in the limits of 25-47 cm, maximal depth in some years reaches 70-71 cm, it is usually observed in late February- early March.

Relative air humidity varies in different districts of Alakol depression in the limits of 52-67%. In cold year season from November till March its average monthly index for long-term period is the highest and is in the limits of 73-82%. It reaches the lowest numbers in June, August (33-56%). This corresponds with the time of the highest temperature, least precipitation and highest soil dryness. In hot dry days relative humidity may increase to 5-10%. Average number of days with relative humidity during the day ≤30% varies in the limits of 104-149. In the summertime low air humidity, high temperatures and low precipitation level are favourable for weathers of the arid types, sometimes transforming into harmful for plants droughts and dry winds that are registered periodically in the districts of Alakol depression.

Table. Average monthly and annual relative humidity, %.

Station	1	2	3	4	5	6	7	8	9	10	11	12	annual
Usharal	82	83	77	58	46	48	54	49	51	61	82	85	64
Alakol	84	85	80	68	59	55	53	49	50	56	76	86	66
Zhalanashkol	86	86	72	51	42	48	53	52	55	57	73	85	63

Atmosphere aridity is most often expressed in the form of short sharp bursts of aridity characterized by very high day temperatures and harshly decreased relative air humidity. About 9-12 bursts of atmosphere droughts is recorded in Alakol depression throughout the warm season. In very dry years this number raises to 15-18, in moist and relatively cool years goes down to 3-5. In most cases the duration of these drought bursts is 3-5 days (60-70%), sometimes6-10 (20-30%) and very rarely 11-15 days (4-8%). Atmosphere drought is most powerful in July, when air temperature reaches maximum, and precipitation is minimal (average of 30-350 and 14-22% of relative humidity). The number of days with atmosphere drought reaches 50, maximal – more than 80, minimal – up to 18-20.

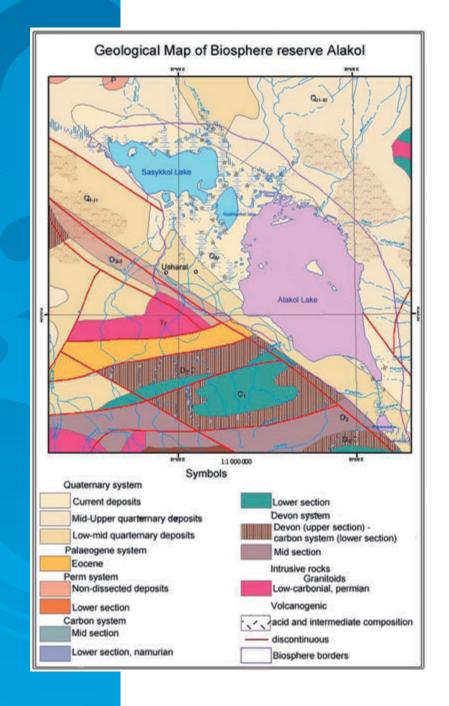
Fogs are one of climate's peculiarities. They are formed as the result of interaction of near-ground atmosphere level with earth surface. Fogs may be radiational and advective. Frequency of the first in Eastern part of the Republic reaches 40-65%; in the area of large lakes they are observed more rarely (less than 30%). The number of days with fog on the territory of Alakol depression varies in the limits of 10-20 in a year, the highest frequency of their occurance is observed in the cold season (November – March) with maximum in December.

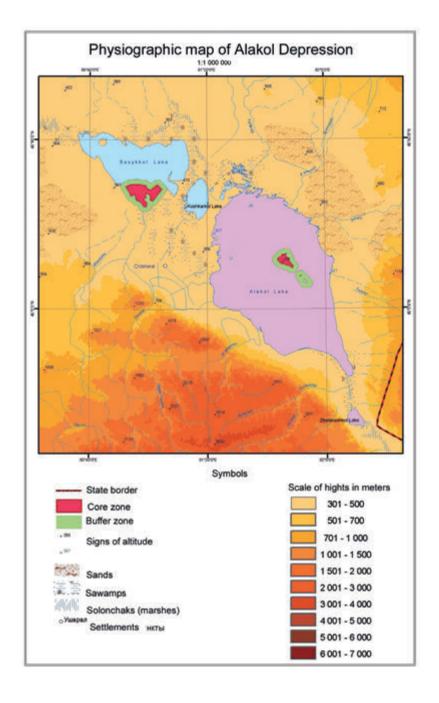
Another peculiarity of the depression in dominance of winds of Northeastern and related directions. In the winter time (October – March) their dominance is caused mainly by the baric spur of the Siberian maximum, axis of which goes through Altai, Semipalatinsk, Astana and then to Western Kazakhstan. In summer time wind's regime changes. At this time dominating Northeastern winds are slightly expressed, which is explained by blurred baric field. Average annual wind velocity varies in the limits of 1.7-6.6 m/sec.

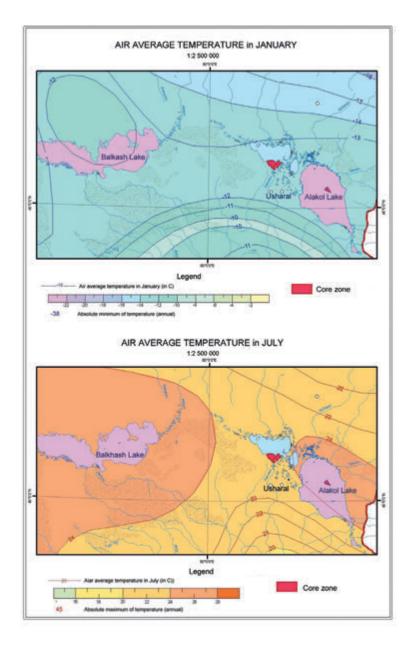
Table. Average monthly and annual wind velocity, m/sec.

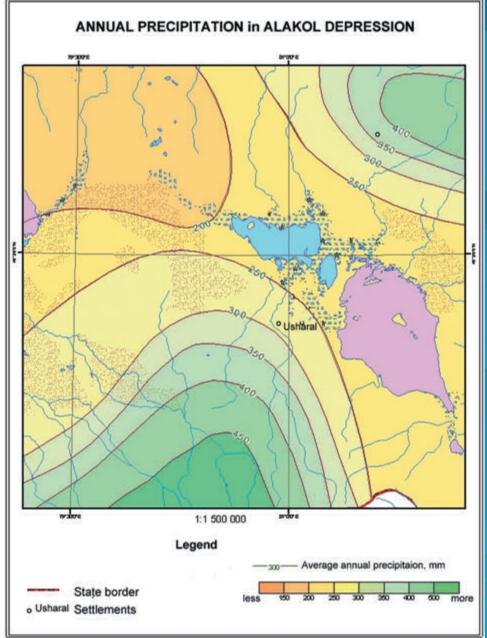
Station	1	2	3	4	5	6	7	8	9	10	11	12	annual
Usharal	2,1	2,7	2,9	3,1	3,1	2,8	2,7	2,0	2,2	2,1	2,4	2,2	2,5
Alakol	1,8	2,2	2,7	2,5	2,7	2,6	3,1	3,6	3,9	3,3	4,8	3,6	6,1
Zhalanashkol	14,8	12,1	6,9	5,4	3,8	3,1	3,3	4,0	4,2	7,1	11,1	10,6	7,2

The strongest winds are Western and Southwestern. One of the strong winds is Ebi, which goes from Dzhungarian Gates, and Saikan, which goes in the opposite direction. Ebi is Eastern and Southeastern wind with the highest velocity in cold season. In winter it causes strong snowstorms. In summertime, when warm continental air











11. 3. 4

primarily in summer and first half of autumn, cause dust storms. Number of days with dust storms in plain part of the depression reaches 4-22, most often they are registered in case of South-Western and south-Eastern winds and are accompanied usually by high air temperatures (27-280).

Average temperature of the warmest month:

+24,5 °C

Average temperature of the coldest month:

-12,5 °C

Mean annual precipitation:

146-279 mm, recorded at an elevation of 380 metres

The amount of precipitation is small, their average annual number does not exceed 200 mm. On all the territory precipitation in the form of rain dominate over precipitation in form of snow.

dominates in the given region, this wind is rare (1-2 times a month), and most often it is completely absent. In Alakol depression Ebi is wavy because of orographic peculiarities of the territory, particularly by the presence of Dzhungar Alatau mountain system. Ebi brings warmth, which is especially obvious in wintertime. Strong winds in warm season.

If a meteorological station is in or near the proposed Biosphere Reserve, indicate the year since when climatic data have been recorded:

a) manually:

Meteostation of Usharal town, from1948, Meteostation of Druzhba village, from1956, Meteostation of Akshi village, from 1978 to 2008, later - automatic.

b) automatically:

Meteostation of Akshi village, automatic from 2008

c) Name and location of station:

Meteostation of Usharal town from 1948, Meteostation of Druzhba village, from 1956, Meteostation of Akshi village, from 1978 to 2008, later - automatic.

Geology, geomorphology, soils:

Geology. In prehistoric times – end of *Palaeozoic* – there was a mountain country on the given territory. Plakors, conserved in Dzhungarian Alatau, Barlyk and Tarbagatai, show than later – in *Mesozoic* – as the result of intensive erosion-denudation processes the mountain country was levelled and transformed into peneplain. In the *Tertiary*, this flat-undulating plain with outcrops of *Paleozoic* rocks experienced inconsiderable uplifts which led to erosion of accumulated weathering crust and deposition of red deposits in the conditions of hot and dry climate. In the end of *Tertiary* and beginning of *Quaternary* Alakol depression's bottom was depressed along with powerful uplift of Dzhungar Alatau and Tarbagatai. Erosion processes led to establishment of alluvial-proluvial trails at the foothills of Dzhungar Alatau and Barlyk. In the central part of the depression from the surface there is a quite powerful level of loose alluvial, proluvial lake and aeolian deposits of *Quaternary*. According to the data of geological chronicles, in the *Tertiary* the lakes of Alakol depression were in one basin with Balkhash lake. Later in geological history this one basin gradually split apart – at first Balkhash lake separated, then one water reservoir in the central part of Alakol depression split into separate lakes: Alakol, Sasykkol and Koshkarkol. At the present time Alakol, Sasykkol and Ebinor (Western China) lakes are the remnants of ancient tertiary sea.

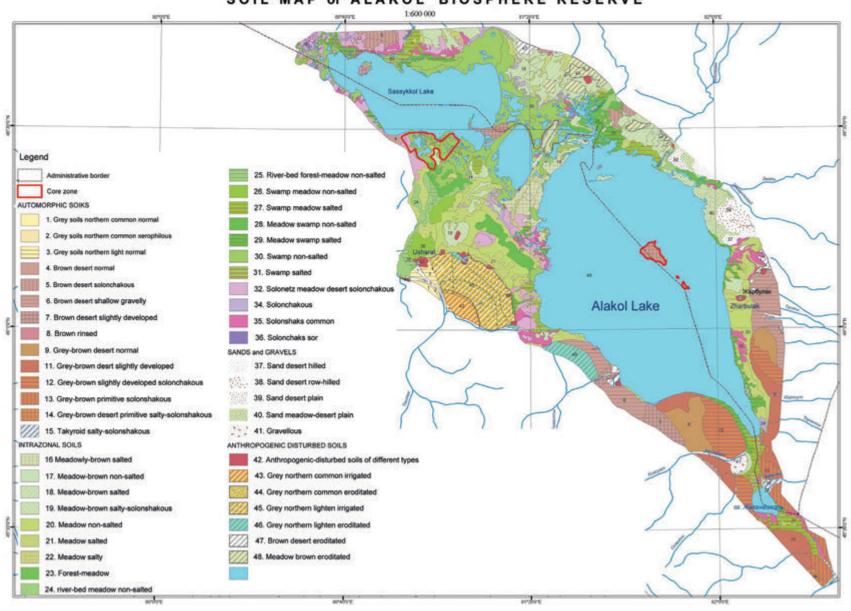
Relief. The dominant relief type is accumulative plains, undulating and flat.

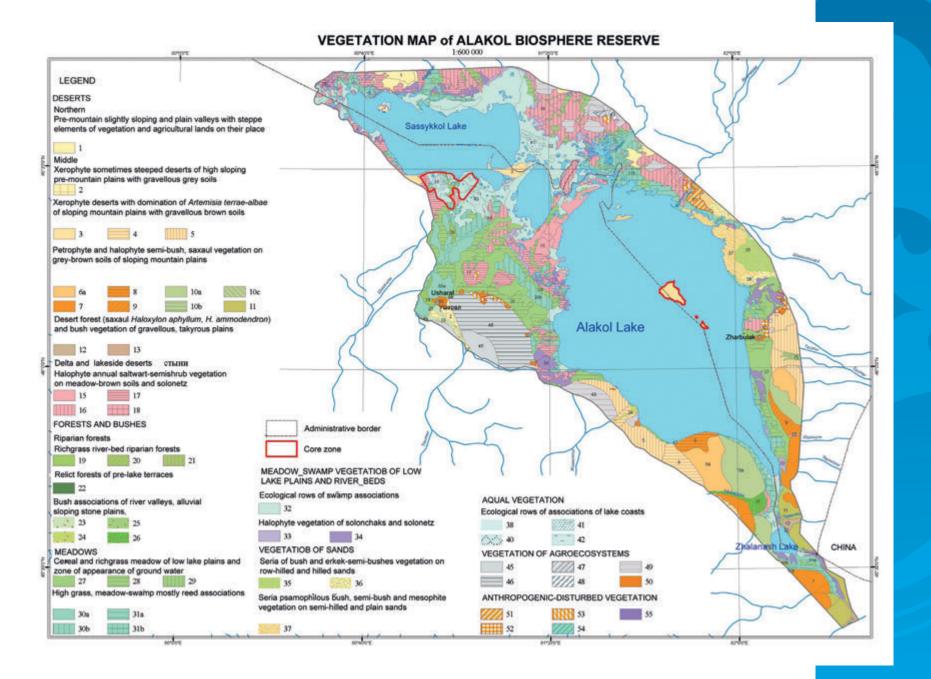
Flat-undulating foothill plain of Northeastern slopes of Dzhungar Alatau is formed by close alluvial fans of large rivers (Tentek, Shinkhaly, Yrgaity) and merged alluvial fans of temporary streams. They are formed in the altitudinal limits from 350-400 to 600-650 m. The slope of the plain is inconsiderable, and foothill trail quickly becomes flat when going away from the mountains, changing into adjacent plains. At the mountain foothills undulating plain is usually pierced by the system of small gulls, sometimes by river-beds of temporary streams. Old deltas of Tentek and Shinkhaly rivers are cut by modern wide flood-land with the depth of 3-4 m. Foothill plains are the area of young accumulative relief, and are mostly formed by boulders and pebbles (sometimes rubbly) deposits overlapped by loess-like loams cover of various power.

Alluvial flat-undulating plain of Tentek and Shilikty rivers and complex of lake terraces of Shinkhaly river. Alluvial plain is developed Eastern and Southern from Arkharly Mountains and in the lower stream of Tentek river. It was formed on the deposits of Tentek and Shilikty rivers, which changed the position of their river bed in the limits of the plain many times. Plain's surface is perfectly straight with rare flat sandy mounds 3-4 m high and riverbeds of temporary rivers just slightly cutting the plain's surface. The plain is slightly sloped to the North. There is distinct erosion of the edges of Sary-kum and Karakum sand massifs made by the river.

11.4

SOIL MAP of ALAKOL BIOSPHERE RESERVE







Aeolian plains. According to the dominating forms of sandy formations there may be high-hilly, ridge-hilly and plain sands. Sand massifs on the project territory have limited distribution mostly in Eastern part in Emel river delta, in North-East at the edges of lake plain and locally, in small areas, along the Western coast of Alakol and Sasykkol lakes.

Ridge – cellular sandy relief is presented in Southwestern part in the limits of Karakum and Sarykum sand massifs, which are in close proximity to the project territory. They were formed in the middle of Quaternary in the result of strong accumulation and relatively stable tectonic regime and preceding downlift. Later it was touched by Aeolian processes, resulting in ridge-cellular relief of lake plain.

Flat lake plain occupies all South-Eastern part, with bays going into sand massifs. It was formed as the result of inconsiderable accumulation and ongoing tectonic movements. It is almost perfectly flat lake plain slightly undulating towards the lake. Altitudinal range of the plain does not exceed 1-1.5 m in 1 km.

Alluvial and lake-alluvial plain of river flood-lands and low terraces. River flood-lands of the region are described by inconsiderable width. Even Tentek river flood-land, which is the largest river in the region, rarely exceeds 1-1.5 km in width. There are 2 terraces at Shinkhaly river. The height of the lower one is 1-1.2 m, the upper one is from 2 to 2.5-3 m; terraces' surface is flat, no signs of river wandering or oxbow is recorded. Plain's relief is flat;the difference does not exceed 1-1.5m. Modern dry delta above Usharal village is characterized by steeper slope and less marshiness. Absolute altitude of the surface is 35-520 m.

Plains of lake accumulation are widely distributed around lake depressions. The main type of lake depressions is depressions of tectonic origin (Alakol and Sasykkol lakes). Their establishment is dated back to Quaternary, and they were filled with water in the middle of Quaternary. Sediments laying under lake deposits are represented mainly by deluvial-alluvial complex.

According to geophysical data, Alakol depression has a complex foundation's structure, characterized by the presence of sharp ledges related to young fractures. This ledge goes in Northwestern direction, and the edge of the boulder that is raised above the rift goes out to the day surface in the form of islands on Alakol and Sasykkol lakes, and hill at the isthmus between Uyaly and Sasykkol lakes. Numerous terraces (h - 2-3, 6, 19, 27, 62 and 67 m) in their establishment are related with the mobility of the rift to the ridge of which they are embedded.

The most widely developed processes in the limits of Biosphere Reserve's territory are physical weathering, salt accumulation, erosion and deflation. Physical weathering is widely expressed on the development plains of Palaeozoic, Palaeogene and Neogene rocks in their destruction and establishment of inconsiderable level of eluvial and deluvial formations consisting of gruss, crushed stone, boulders and clay loams. Products of destruction are carried out in stone flows and deposited in the form of small alluvial fans. Areal removal of loose sediments, which form the slopes, is often registered at the sites of ridgy relief development. Salt accumulation means salt concentration in depressed areas, where solonchaks and sors are formed. This process is especially intensive on flat lake plain and in the limits of alluvial flat-undulating plains. Erosion processes are recorded in Tentek, Shinkhaly river valleys and other smaller rivers, where in the side valley parts river-beds are washed out and deepened. These processes are most intensive in the period of spring floods and rains.

Hydrology. Alakol lake basin occupies the territory with total area of 68,700 km², the main part of which (48,600 km²) is in the limits of Kazakhstan, the rest (30%) is in the bordering regions of China. The largest part of the depression

(56%) is represented by desert plain, depressed part of which is occupied a group of lakes: Alakol (2 650 km²), Sasykkol (736 km²), Uyaly (120 km²), Zhalanashkol (38 km²), forming a large wetland system with reed thickets (1 100 km²) where more than 100 small lakes are located with total area from 0.5 to 600 ha. The first three lakes are connected by channels. At the isthmus of Alakol and Koshkarkol there are 2 marshy lakes – Korzhinkol and Beskaska.

Alakol lake (348 m above sea level) – undrainable salty lake, stretching from Northwest to South-East. The water area changes from 2076 km² during the minimal decrease of water level to 2650 km² (2696 km² with the islands) in the time of its maximal volume. Lake's length is 104 km, maximal width is 52 km (average 25.5 km), the length of the coastline is 384 km, maximal depth – 54 m (average 21 m). Volume of the water mass is 58.56 billion m³, average Amplitude of water level is 82 cm. Drainage area is 47859 km². Water clarity changes from 0.6-0.8 m in shallow waters and up to 6 m in the central part of the water reservoir. There are 3 rocky islands in the central part of the lake – Ulken Araltobe (24 km²), Srednyi (0,7 km²) and Kishkene Araltobe (2 km²), in the Western part there is a group of sandy-pebbly islands – Chubar Tyubek. Alakol is a salty lake, water mineralization is from 1.2 to 11.6 g/l. Water salinity is almost twice higher than in Balkhash lake. Mineralization is higher in central deep part of the lake, and near river mouths the water is desalinated. Water is salty or bitter-salty, very hard (19-32 mg-eq/l) and has chloride – sulphate – calcium – sodium composition. The index of pH changes during the year from 7.2 to 9.2. Alakol Lake is characterized by cycle of water level increase and decrease. Analysis of lake level amplitude in geological and historical aspects showed that the minimal level was recorded in 1845-1850 and to 1940 it filled 3-4 m of water, at the same time periodic increase were accompanied by decrease of water level. From 1974 to 1979 the water level was gradually decreasing, resulting in establishment of Chubar-Tyubek island group (Peschanyi, Yuzhnyi) in the Western part of the lake, as well as Karakum island in Zayachya Guba bay, which is now the most important nesting site of Relict Gull and other colonial birds. In 1980 water level inconsiderably increased resulting in disappearance of the colonies on Yuzhnyi island, leaving only small sandy spit. To 1986 at the Southern coast of the lake the streets of Koktuma village close to the water were flooded. Because of further shallowing of Chubar-Tyubek island it connected with the land in 1986. In 1992-1994 new water level increase was recorded (1 m annually) which led to flooding of the islands leaving only sandy spits. From 1996 a gradual decrease is observed; in 1999 water level in Zayachya Guba bay decreased in 1 m.

Sasykkol lake (in Kazakh it means Rotten Lake) is situated in the Northwestern part of Alakol depression, 36 km Northern from Usharal town and has an elongated shape from West to East. Modern length of the lake is 50 km, width – 15 km, average depth is 3.3 m (maximal – 4.7 m), coastline length is 182 km, total area is 736 km². Water mass volume – 2 434 million m³. Bottom relief is straight, slightly undulating, bottom ground – gray and sandy silts, sand. Coasts are low, marshy, with thickets of reed, cattail and reedgrass. The lake is surrounded by more than 45,000 marshes. Coastal cliffs may be observed only in some areas of Western and Northern parts between Zharsuat and Sagat villages. The main part of the drainage (Tentek river) is formed in the highland part of Dzhungar Alatau and is characterized by spring-summer floods, which depends on the ice glaciers' melting. Average annual water discharge in Tentek is 42.2 m³/sec, consisting of 6.8% in winter, 39.3% in spring, 41.4% in summer and 12.5% in autumn. In comparison with Alakol, Sasykkol Lake has comparatively stable water level. Average annual water level amplitude is 60 cm. Sasykkol is fresh-water flowing lakes, its mineralization is 200-500 mg/l. Water is moderately hard (2-5.5 mg-eq/l), of good drinking quality, according to its ion composition belongs to hydrocarbonate class with domination of calcium and magnesium in summer period and magnesium in winter; pH varies in the limit of 7.6-8.2. Water clarity is in the limits of 2-2.5 m.



Tentek river delta is located at the Southern coast of Sasykkol lake and is formed by overflowing Tentek river which in its lowe part in Rossypi tract diversifies into many channels forming a spacious delta with the sizes of 25-20 km. Absolute altitude of Sasykkol lake coastal zone is 350-353 m, uplands in the delta are 354-363 m above sea level. Delta wetlands are a complex system of channels, lakes and marshy depressions with reed thickets forming lithoral landscape. During high-water period of 1991-1992 Tentek divided into 7 channels, from 1995-1996 the main stream went in 2 riverbeds: Tuyuksu and channels leading in the direction of Baybaly and Karamoyin. At the present time there are 5 lake systems formed in the delta: 1) Baybala, Karamoyin, Chagyrly, Sviridovskiye lakes (connected to Sasykkol), 2) system of Kugumbay, Intumak, Safron, Malaya and Bolshaya Baklanya Kurya, Pelikanya Kurya, Dolgaya Kurya (connected to Opytnoye lake) lakes; Miyalinskaya system (Tastyube, Miyaly) going from Tuyuksu (Chulak tract) to Opytnoye lake; 4) Karatentek system (Bolshoy Karatentek, Malyi Karatentek, Kugovye lakes, Togyztubek), ending in Krugloye lake in the protection zone; 5) Tuyuksu system (Rossypi, Cholak-ozek, Onagash, Zhalykol, Osoki, Tastyube). The most valuable areas for waterbirds' nesting in the Eastern part of the delta are the lake system between Onagash and Zhalykol lakes, and in Western part – Baybala and Karamoyin lakes.

Soils. Soil cover of Alakol Biosphere Reserve is represented by automorphous zonal (sierozem, brown desert and gray-brown desert) with various intrazonal (meadow-brown, meadow, marshy meadow, marshy, solonetz, solon-chak) soils.

Automorphous soils. In foothill plains of Southwestern part of Biosphere Reserve depending on the climatic peculiarities and rock deposits there are Northern common normal sierozems, Northern common xeromorphous sierozems and Northern light normal sierozems.

Northern common normal sierozems are characterized by medium power of humus horizons (A+B=40-50 cm), gray slightly brown humus-accumulative horizon (A=15-20 cm), in its upper part (A=5-10 cm) quite sodded, lumpy, sometimes stratified. Below there is a gray-brown, lumpy transition humus horizon (B=25-30 cm). Humus content in these soils in the upper horizons varies in the limits of 1.5-2%, nitrogen- 0.1-0.15%. Northern common xeromouphous sierozems, in comparison with normal sierozems, are formed on the two-component deposits of different genesis (alluvial-proluvial, deluvial-proluvial, etc.) possessing small in power loamy horizon from the above, at the depth of usually 50-80 cm underlayed by pebbles – small rocks or other easily draining rocks. Due to this the soils are characterized by less power of humus horizon (A+B=30-40 cm), gray color of upper humus horizon (A), increased brown color of transitional more dense horizon (B), very expressed carbonate-illuvial horizon, laying in the contact with underlaying rock. Northern light normal sierozems are formed on not saline, relatively powerful loamy deposits of different genesis. They are characterized by ususally lighter soil-forming strata (light loams, sandy loams), poorer vegetation, less humus content and power of humus horizons, less expressed carbonate-illuvial horizons, and by worse profile differentiation and poorer natural fertility than common sierozems.

Brown soils are distributed on the outcrop surfaces of Southern coast of Sasykkol Lake, foothill plains of Dzhungar Alatau and Barlyk ridges, as well as on foothill plains of Tarbagatai ridge, connected with lake-alluvial plains of Alakol and Sasykkol lakes on the North of Biosphere Reserve's territory. **Brown desert normal soils** are formed on the rocks of different origin with primarily loamy mechanical composition. **Brown desert solonchak soils** are registered exclusively on high lake-alluvial plains in the North of the territory. Their structure of soil profile is similar to brown normal soils. Humus

Table. The main morphometric characteristics of the lakes.

Characteristic	Alakol	Sasykkol	Koshkarkol	Zhalanashkol
Lake length, km	104	49,6	18,3	8,8
Maximal width, km	52	19,8	9,6	6,3
Average width, km	25,5	14,8	6,5	4,7
Coastline length, km	384	182	57,3	26,2
Area of water surface, km²	2650	736	120	40,6
Maximal depth, m	54	4,7	5,8	3,4
Average depth, m	22,1	3,3	4,1	2,4
Water volume, mil m³	58560	2434	489	99,5



and nitrogen content in these soils is not high (0.7-0.8 % and 0.07-0.10 % correspondingly). *Brown desert not powerful rubbly soils* are distributed on the foothill rubbly plains of Dzhungar Alatau and Barlyk ridge. They have short profile and at the depth of 35-60 cm are underlayed by rubbly or sandy loamy deposits. *Foothill brown desert underdeveloped soils* also form exclusively on foothiil plains of Dzhungar Alatau and Barlyk. They are established on 2-component sediments, lightly loamy from the above, and from the depth of 25-30 cm hard well drained rubbly – pebbles. Close deposits of hard sediments creates harder hydrothermal regime in these soils They have less power of humus horizon than brown normal soils.

Gray-brown soils are found in foothill plains of Dzhungar Alatau and Barlyk and in Dzhungarian Gates area on rather powerfull 2-component loamy-rubbly deluvial-proluvial deposits. Gray-brown desert normal soils are usually covered by rubbly or pebbly cover, often with desert tan, covering 60-80% of the surface. These soils are characterized by low humus content (0.8-1.3%), nitrogen (0.07-0.11%). Gray-brown desert solonetzic soils are located mainly in microdepressions of the relief (bottoms, sides of interhill depressions, microrelief saucer-like hollows). Their main morphological featureas are similar with gray-brown desert normal soils, but they differ by more expressed differentiation of genetic horizons and structure of illuvial horizons. Salt outcrops in the form of veins are often observed in sub-solonetz horizons. Gray-brown desert underdeveloped soils are formed on closely deposited (less than 25-30 cm) hard structure eluvium of dense rock and is characterized by profile's high rubbliness. Soil surface is usually covered by rubbly cover with characteristic desert tan. Gray-brown desert underdeveloped solonetzic soils in their chemical and physical-chemical feature are analogs of gray-brown underdeveloped soils. In contrast to them, a heavier hard structure or fused illuvial solonetz horizon (Bc+=10-15 cm) is formed in soil's profile at the small depth (10-25 cm). Gray-brown desert primitive solonchak soils are distributed in extreme South-Eastern part of Biosphere Reserve. These soils are formed under very sparse (Saxaul) vegetation. Soil surface is completely covered by rocky (poorly rounded gravel or pebbles) shell (Ach=1-3 cm) with dark brown desert tan. This shell is merged into not powerfull porous loose lightly loamy light yellow crust (A^k= up to 10-12 cm). Gray-brown desert primitive solonetzic-solonchak soils are recorded in the same area among the soils mentioned above. They are similar in the main chemical and physical-chemical features. Takyr-like solonetzic – solonchak soils are formed in the conditions of automorphous regime on layered Quaternary alluvial and lake deposits of ancient delta plains and dried lake terraces. These soils are distributed in Eastern coast of Zhalanashkol lake. Establishment of takyr-like soils is caused by desertification processes of flood-land soils and solonchaks. Soil profile is characterized by presence of lightly gray porous cover on the suface, with power of 5-8 cm, with transition to loose leaf-scale under-cover horizon (from 5-10 cm), changed by brown dense illuvial-solonetzic horizon (10-25 cm) with characteristic cloddy and nuciform structure.

Intrazonal soils. They include meadow-brown, meadowish-brown and meadow-desert solonetz.

Meadow-brown soils are formed in the condition of additional surface or capillary-ground moistening, caused by close to the surface (3-5 m) deposits of ground waters; their mineralization causes salinity of soil profile. *Not saline meadow-brown soils* in their formation are associated with soil-forming rocks of light mechanical composition (sands, loamy sands). Meadow-brown soils are subdivided in the genera of not saline, saline and solonetzic-solonchakish. **Meadow-brown saline soils** are formed under the influence of mineralized ground waters, providing periodic removal of soluble

salts into the upper horizons of soil profile. All the layers of the soil are saline. *Meadow-brown solonetzic-solonchakish soils* are distributed in the same areas as described earlier meadow-brown not saline and saline soils, but they occupy less draining surfaces. *Meadowish-brown soils* are formed on high drying lake terraces (isthmus between Alakol and Uyaly lakes) mainly on loamy deposits. Soil-forming processes occur here according to the desert type, but the features of previous hydromorphity are still present.

Among **hydromorphous soils** the widely distributed types are meadow soils, marshes and solonchaks. **Meadow soils** are observed in marshy level on foothill plains, on low river flood-land terraces, on lake terraces, and in the depressions between ridgy-hilly sands. Soil forming rocks include various in their genesis and composition deposits – from eluvium of dense rock to lake alluvium and Aeolian sands. Despite of extreme variety of geomorphological conditions of these soils' establishment, the main factor defining the direction of soil-forming process is ground water. They include meadow not saline soils, meadow saline soils, meadow solonetzic soils, forest-meadow flood-land not saline soils, forest-meadow soils and flood-land – meadow soils.

Marshy soils are represented by marshy-meadow, meadow-marshy and marshy soils.

Marshy-meadow soils are formedmainly on the lakes' coasts, in river deltas and in the ground water outcrop zones when ground waters lay close to the surface (1-2 m) and in spring after the snow has melted join the surface for a short time. Marshy-meadow not saline soils have not powerful turfy humus horizon of dark gray color (30-50 cm). Marshy-meadow saline soils in contrast to not saline soils are formed under the influence of mineralized ground waters and are characterized usually by near-surface salt concentration.

Meadow-marshy soils are observed on the foothill plains in the zone of ground water outcrops, in flood-lands of mostly large rivers, in coastal sides of the lakes. They represent transition from meadow soils to marshes, thus combining features of buth at different levels. These soils are formed under the influence of ground waters of different mineralization, mostly fresh and slightly mineralized. The level of ground waters varies a lot. In spring waters are in the limits of 1 m, in the autumn their level is decreased to 2 m. Ground water level decrease usually leads to increase of salt concentration in them. Meadow-marshy soils, formed in river flood-lands, are periodically flooded by surface waters. Loamy and clay usually layered deposits usually serve as soil-forming rock. Meadow-marshy soils are divided into saline and not saline soils.

Marshy soils are formed in the same conditions as meadow-marshy soils, forming stable combinations with them. They are usually registered in depressed elements of the relief in the condition of more or less constant excessive moisture under hydrophyte vegetation.

Solonchaks are recorded in the depressions with saline rock outcrops, in ancient and modern river valleys, in low lake terraces, in interhill depressions in the sands and around arable massifs. These soils are formed under the influence of capillary frame which ascends from the surface of mineralized ground waters, or on the saline soil-forming rocks, and contain more than 1% of water-soluble salts in the surface horizon.



BIOLOGICAL CHARACTERISTICS 12.

DISTRIBUTION

Regional

First type of habitat/land cover:

Terrestrial hydromorphous ecosystem of meadow vegetation on meadow soils / pastures

Ecosystems of meadows on meadow soils are widely distributed on the territory of Biosphere Reserve and are recorded in marshy level in foothill plains, low river terraces above flood-lands, lake terraces, as well as in depressions between ridgy-hilly sands. In spite of the extreme diversity of geomorphological conditions of meadow soils establishment, the main factor defining the direction of soil-forming process is ground water. Meadow soil profile is under constant influence of ground waters deposited at the depth of 1.5-3 m. The group of meadow soils in this region subdivides into not saline, saline and solonetzic. There are 2 groups in this class of ecosystems: true and halophyte meadows in the zone of water outcrops and true meadow in river flood-lands. These ecosystems are presented on the map of ecosystems of Alakol Biosphere Reserve and in the list of ecosystems (numbers 16-19).

Characteristic species:

The vegetation of the group of *true halophyte meadows in the zone of water outcrops* is represented by both true (reedgrass, *Elytrigia* and cereal – motley-grass) and halophyte (*Achnatherum*, *Puccinellia*, *Aeluropus*) meadows.

The vegetation of this group is often meadow cereal – rich in herbs (*Inula caspica, Leonurus glaucescens, Festuca regeliana, Agrostis gigantea, Puccinellia distans*) and reed – reedgrass (*Calamagrostis epigeios, Phragmites australis*), and vegetation associations usually change in season thanks to the high number of blooming in summer "gigantic" herbs (*Inula caspica, Sium sisaroideum, Althaea officinalis, Angelica decurrens*). The halophyte meadows are also characterized by *Achnatherum splendens, Aeluropus littoralis, Leymus angustus*, often with *Limonium (L. gmelinii, L. otolepis, L. suffruticosum*), *Halimodendron halodendron* annual seepweeds (*Suaeda acuminata, S. linifolia, S. prostrata*). Among needlegrass typical associations include *Achnatherum splendens - Limonium gmelinii - Puccinellia distans - Halimione verrucifera* meadows. In low lake plains dominant species are *Elytrigia repens*and *Puccinellia (P. distans, P. dolicholepis, P. hauptiana, P. tenuissima*) and sometime *Aeluropus littoralis*. Halophytes are typical in vegetation associations (*Chenopodium album, C. rubrum; Atriplex aucheri, A. tatarica; Limonium gmelinii*). This group of ecosystems in quite rich in floristic diversity (168 species). The group of fodder plants is very numerous, although with less representativeness of

12.1

12. 1. 1

medicinal, melliferous and aromatic species: *Inula helenium, Sanguisorba alpina* (medicinal), *Stachys palustris*, *Angelica deccurens* (aromatic), *Alcea nudiflora, Cirsium alatum, Scrophularia umbrosa, Stachys palustris* (melliferous), *Persicaria hydropiper, Bidens tripartita* (dying). Active participation of resource species in plant associations (more than 110 species) is characteristic here. The group of fodder plants is very numerous, although medicinal, melliferous and aromatic species are poorly presented. Maximal diversity belongs to wild relatives of cultural plants (26 species). Their list contains rare for the territory species such as *Phalaroides arundinacea, Festuca regeliana, Trifolium pratense* and *Daucus carota*.

Ecosystems' group of *true meadows in river flood-lands* is represented in large rivers' flood-lands (Tentek, Emel, Urzhar), and some small rivers. These ecosystems usually are alternated by the ecosystems of tugay forests. The vegetation is represented by reedgrass (*Calamagrostis epigeios, C. macrolepis, C. pseudophragmites*), motley-grass – reed – reedgrass (*Calamagrostis epigeios, Phragmites australis, Clematis orientalis, Glycyrrhiza uralensis, Lactuca tatarica, Pseudosophora alopecuroides*) meadow associations, forming ecologic changes in the associations of flood-lands and flood-land terraces above rivers. In some places meadows are combined with tugay forests (*Elaeagnus oxycarpa*) or shrub thickets.

Floristic diversity is huge and is represented by wide diversity of life forms (biomorphs). They include ephemers and ephemeroids, perennial long-vegetating high grasses (cereals, legumes), summer – autumn annuals, dwarf semi-

shrubs and semi-shrubs, shrubs and separate trees. The percentage of resource species is high – about 76% of total species number. Their basis is formed by fodder (mostly meadow cereals, legumes) plants; although the role of melliferous (alfalfa, Melilotus, Eleagnus oxycarpa, Lavatera thuringiaca, Lythrum salicaria, Cirsium arvense, Epilobium velutinum) is also considerable, as well as medicinal species (Althaea officinalis, Achillea millefolium, Thalictrum flavum), aromatic species (Mentha asiatica, Sium sisaroideum, Tripleurospermum perforatum) are less represented. Wild relatives of cultural plants are represented by 15 species with the majority of fodder relatives (cereals, legumes) and food plants (Daucus carota, Cichorium intybus, Elaeagnus oxycarpa).



Important natural processes:

Periodic spring floods on the rivers, especially on Tentek, leading to flooding of the lake sides and animal habitats. Hard snowy winters, periodically leading to death of important hunting-game animal species (wild boar, pheasant, roe deer, partridge).

Flooding or drying of coastal territories as the result of cyclical increase and decrease of water level.

Main human impacts:

Unsustainable use of biologic resources.

Considerable water withdrawal in Tentek, Zhamanty, Karakol, Yeginsu rivers for arable fields, leading to destabilizing influence on hydroecosystems and animal world, especially in delta water reservoirs of Tentek.

Cattle pasture in flood-land and lake ecosystems, leading to degradation of soil-vegetation cover.

Relevant management practices:

Nature protective regime and propaganda among local population.



12. 1. 2

12. 1. 3

12. 1. 4



DISTRIBUTION

Regional

Second type of habitat/landcover:

Aquatic ecosystem of saline lakes / hunting and fishing lands

By their vegetation and biodiversity aquatic ecosystems belong to reed island – lithoral order of water and near-water associations which form primary coenoses of hydromorphous overgrowing ecological series in the systems lake—land, river—land. Instability of structure and species composition of the vegetation is typical here, especially in case of swimming "islands" of reed (*Phragmites australis*), fat duckweed (*Lemna gibba*), common duckweed (*Spirodela polyrhiza*), etc. Reed usually survives well on this "islands", creates anchor root system and serves as an excellent medium-former for the biotic organisms. Islands are common refuges for the nesting. This type of ecosystem is observed at Alakol, Zhalanashkol, Urmanovskiye lakes, lakes of Tokty spills, Beskol lake system at the irrigation channels. These ecosystems are presented at the map of Alakol Biosphere Reserve ecosystems and in the list of ecosystems (numbers 41-43).

Characteristic species:

Ecosystems of shallow coastal line of Alakol lake is characterized mostly by reed (*Phragmites australis*), reed – cattail (*P. australis*, *Typha angustifolia*, *T. latifolia*, *T. laxmannii*) overgrowth in North and North-West. Fragments of swimmingreed islands are observed; they are distributed in the area of Rybachye village, Zayachya Guba tract (on the Western coast of Alakol lake). Among water macrophytes one should note groups of pondweed (*Potamogeton pectinatus*, *P. pusillus*, *P. natans*) in shallow waters. On the powerful periodically drying silt sediments of the lagoons sinusia of typically water plants are alternated with marshy plants, and in the periods of lagoons' drying a cover of *Carex riparia* is formed with abundant participation of *Xanthium strumarium*. Shallow parts of Zhalanashkol lake in the East is overgrown by reed (*P. australis*) with submerged plants; overgrowth is periodical, of marshy type; open water surface is registered in the North and South-West. Floristic diversity (32 species) of this group is not rich. There are no Red Data Book, endemic or key species. There are relatively big number of resource species (about 75%). A big role is played by many of the species mentioned in the previous group of species, which possess fodder and protective features. Those are reeds, cattails

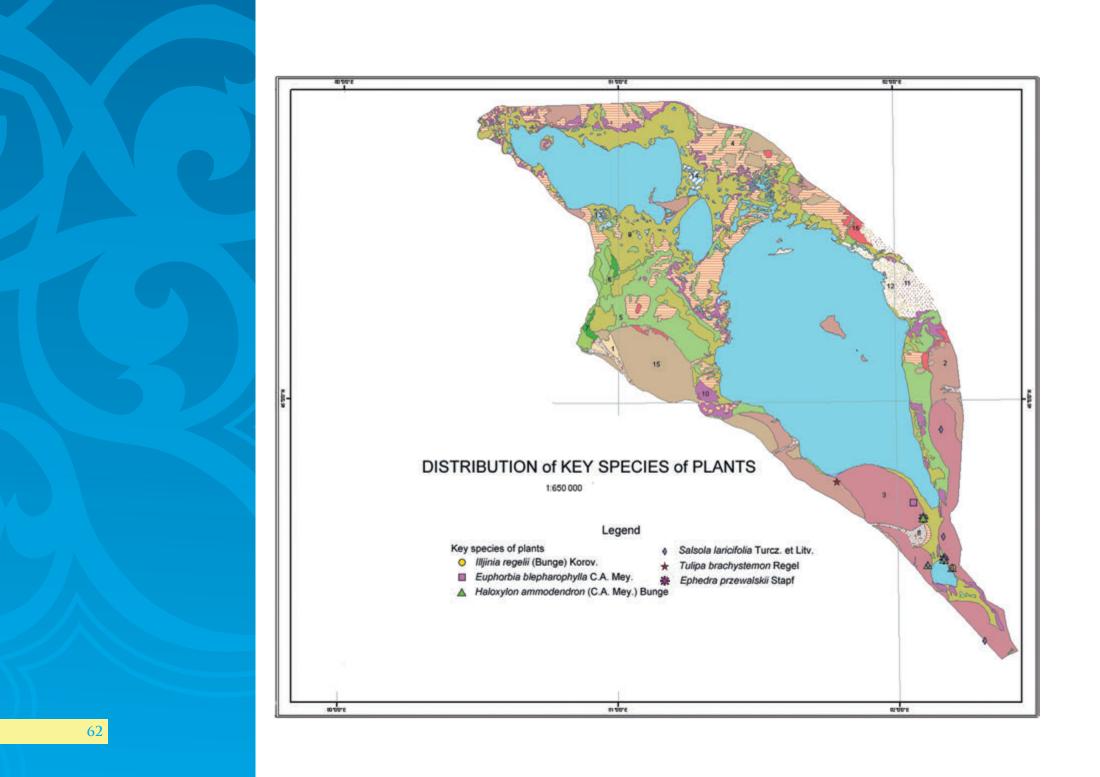
12. 2. 1

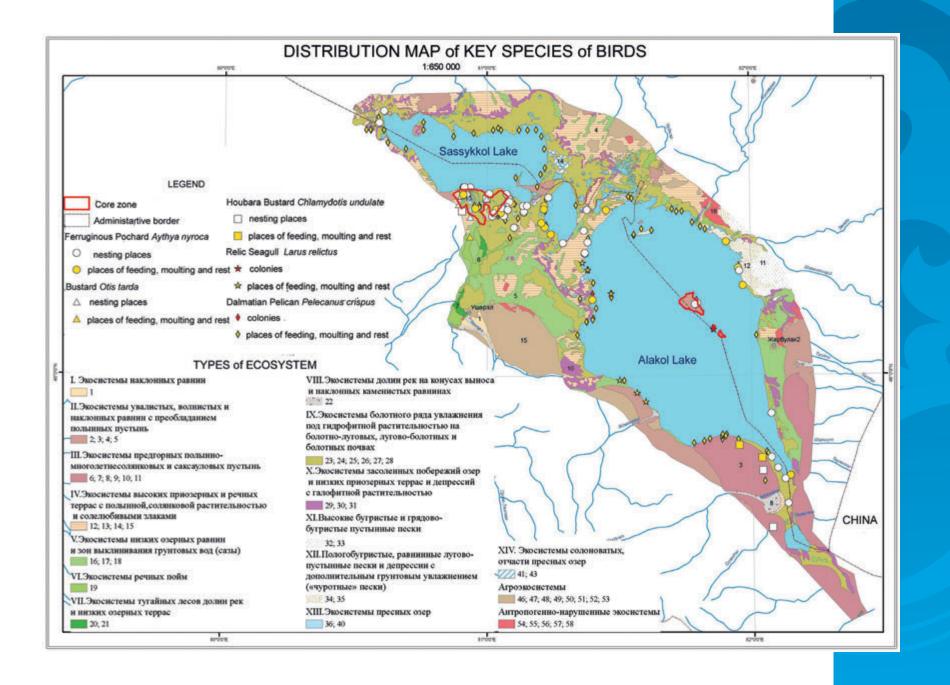
(*T. angustifolia*, *T. latifolia*), *Scirpus* (*S. lacustris*, *S. litoralis*, *S. setaceus*, *S. tabernaemontanii*), pondweeds (*Potamogeton perfoliatus*, *P. pectinatus*, *P. pusillus*), *Najas marina*, *Caulina minor*, *Utricularia vulgaris*. The majority of listed species play an important role in the ecosystems as natural biofilters – water filters from different pollutants.

There are 317 bird species, 162 of them are nesting. Dominating species are Common coot and Common tern, numerous - Great cormorant. The category of common species lists Herring gull, Red-crested pochard, Great black-headed gull, Mallard, Great crested grebe, etc. Absolute dominant of Alakol islands in the summertime is Common tern, common species include Great cormorant, Gull-billed tern, Herring gulland Great black-headed gull. In late August dominating species include Common tern (24.3%), Common coot (21.3%), Sand martin (10.6%), Great cormorant (10.5%), Red-crested pochard (9.2%) and Herring Gull (4.8%). One of the mammal species inhabiting mouths of the rivers flowing into Western and Northern coast of Alakol and Zhalanashkol lakes is characteristic species – muskrat (*Ondatra zibethicus*), which inhabits shallow waters overgrown by reeds and cattails. In zooplankton of mineralized Alakol lake dominating faunistic complex is *Arctodiaptomus salinus - A. brigthwelli - Hexarthra fennica*, and at Zhalanashkol Lake it was the complex *A. salinus - Ceriodaphnia reticulate - Bosmina longirostris*.









 $12. \ \overline{2. \ 2}$

Important natural processes:

- 1. Flooding or drying of coastal territories as the result of cyclical decrease or increase of the water level at the lakes, leading to long-term change in the spawning sites location, habitats of wild boar, muskrat, waterbirds.
- 2. Storms at Alakol lake, resulting in flooding and washing out of low islands and death of birds' colonial settlements.
- 3. Reeds are burnt from the storms, this is especially dangerous in spring, because wild animals are harmed.

12. 2. 3

Main human impacts:

Unsustainable use of biological resources, mostly excessive poorly controlled fishing, especially at Sasykkol and Koshkarkol lakes; considerable death of waterbirds in the nets, reaching 150-200 thousand birds every year.

Increasing recreational press on the lake coast due to development of beach tourism, especially in the area of Kabanbay, Koktuma, Akshi, Alakol and Rybachye villages.

Fires. Periodically steppe fires may happen on the territory of transition and buffer zone of Biosphere Reserve caused by hunters and fishermen, as well as after burning of old grass by local people.

12. 2. 4

Relevant management practices:

Nature protective regime and propaganda among local population.

DISTRIBUTION

Regional

12. 3

Third type of habitat/land cover:

Terrestrial automorphous cereal-Artemisia deserts / agricultural lands

Ecosystems of this group are distributed on the outcrop surfaces of Southern coast of Sasykkol lake, foothill plains of Dzhungar Alatau, Barlyk ridge, as well as in foothill plains of Tarbagatai ridge, adjoining with lake-alluvial plains of Alakol and Sasykkol lakes in the North. They occupy 4.57% of the territory and are formed on brown desert soils.

These ecosystems are presented at the map of ecosystems of Alakol Biosphere Reserve and in the list of ecosystems (number 2-5).

Characteristic species:

12. 3. 1

Depending on the relief, soil-ground conditions and floristic composition of plant associations, there are 4 types of ecosystems here:

bulbous - Poa - Artemisia (A. terrae-albae A. sublessingiana) associations (№ 2),

Anabasis aphylla – Artemisia (A. sublessingiana, A. terrae-albae, A. schrenkiana, Anabasis aphylla), often with Stipa sareptana and Krascheninnikovia ceratoides (№ 3),

Artemisia terrae-albae with ephemeroids and Stipa (A. terrae-albae, Phlomoides iliensis, Carex pachystilis, S. sareptana, S. orientalis) (№ 4) and

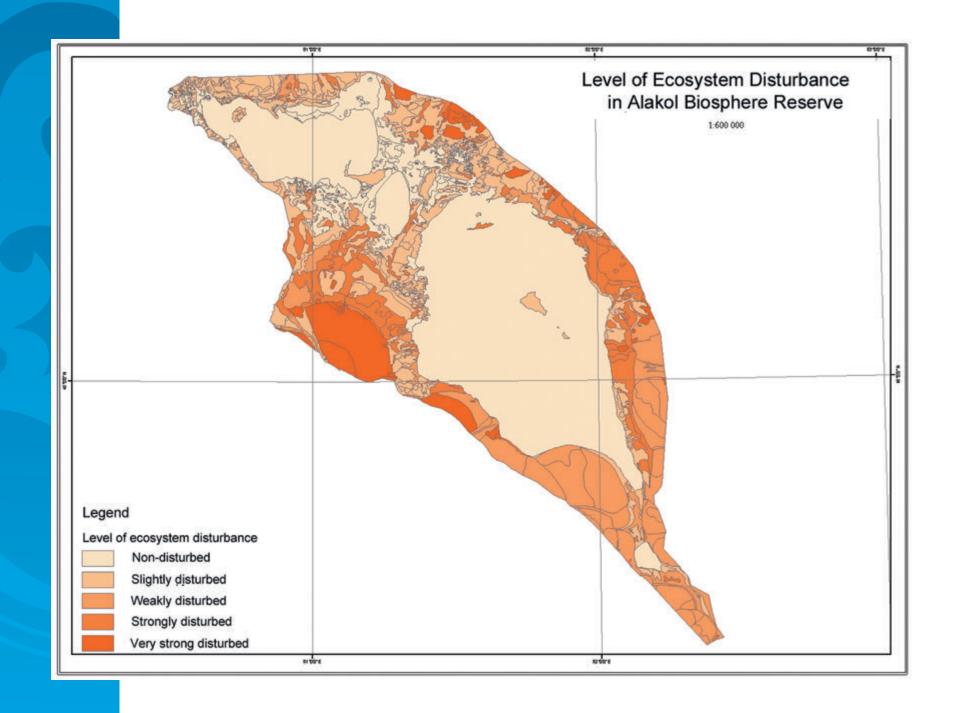
shrub – *Artemisia* (*A. terrae-albae*, *A. juncea*, *Atraphaxis replicata*, *At. frutescens*, *Spiraea hypericifolia*) with Eragrostis minor, Poa bulbosa and Stipa (S. caucasica, S. lessingiana) (№ 5).

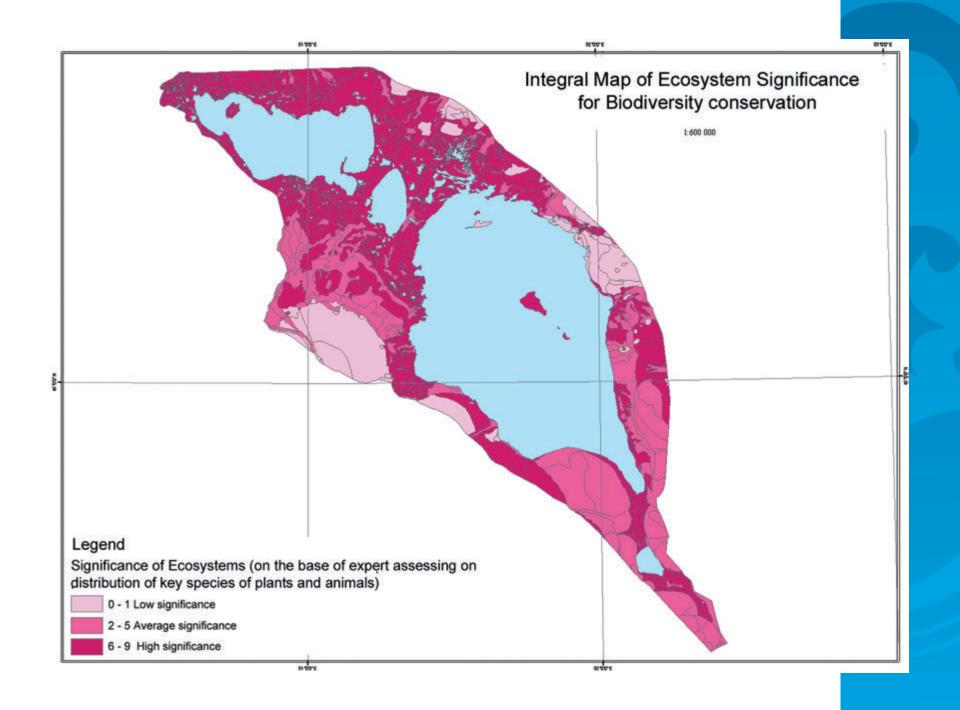
As a whole, the vegetation here is characterized by domination of semi dwarf-shrub *Artemisia* (*A. terrae-albae, A. sublessingiana*). The presence of ephemers and ephemeroids (*Poa bulbosa, Eremopyrum triticeum, E. distans, Lepidium perfoliatum, Lappula spinocarpos, Gagea bulbifera, G. fedtschenkoana, G. ova*) is characteristic, but they are less abundant than on sierozems. Among herbacious perennials the characteristic species include *Allium decipiens, Ferula teterrima, F. syreitschikowii, F. tatarica*. It is necessary to point out the presence of autumn annuals (*Ceratocarpus utriculosus*) in these associations, as well as *Suaeda* species (*S. acuminata, S. crassifolia, S. linifolia*), *Petrosimonia* (*P. litwinowii, P. sibirica*), *Salsola* (*S. nitraria, S. paulsenii, S. tamariscina*), *Climacoptera* (*C. brachiata, C. lanata, C. obtusifolia*) and *Atriplex tatarica*.

Important natural processes:

12. 3. 2

Hard snowy winters leading to periodical death of important hunting-game animals. Periodical spring floods on the rivers, especially Tentek, causing floods.





12. 3. 3

12. 3. 4

Main human impacts:

Unsustainable use of biological resources. Overpasture and haymaking. Fires.

Relevant management practices:

Nature protective regime and propaganda among local population.



conservation function 13.

Contribution to the conservation of landscape and ecosystem biodiversity

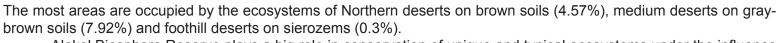
From the geobotanical and ecosystem approach point of view Alakol Biosphere Reserve is of special value, because it is located in the desert zone of Eurasia and is situated in intermountain depression. Alakol intermountain depression is limited by ridges of Dzhungar Alatau and differs by rare combination of various types of landscapes and ecosystems at comparatively small territory. Ecosystem diversity is made of different zonal and intrazonal types, such as: reed swimming islands of the lakes of Alakol group and Tentek river delta, tugay forests of river flood-lands, solon-chaks, sors, plains (sandy, clay, pebbly - gravel) and melkosopochniks. In botanic-geographical concern this territory is located in the transition zone between Dzhungar and Northern-Turan desert types, which explains existence of unique plant associations and their combinations (Dzhungarian, Dzhungarian-Northern-Turan and Northern-Turan). There are 58 ecosystem types registered for the territory of Biosphere Reserve. Classification of their diversity with 58 numbers is given in the special file in the Appendix (19 SUPPORTING DOCUMENTS (suppl)/08 Additional documents/Classification of ecosystems of Alakol BR.doc).

There are 3 orders of ecosystems on the territory of Alakol Biosphere Reserve: terrestrial natural, terrestrial anthropogenically transformed and aquatic ecosystems. The most area is occupied by terrestrial natural ecosystems (49.45 %), the percentage of anthropogenically transformed ecosystems is considerable (13.43 %), aquatic ecosystems occupy 37.12% of the area. Terrestrial natural ecosystems are almost not touched by human activity and occupy large spaces. First of all, those are the territory of core and buffer zone, as well as Eastern and Southeastern parts of Biosphere Reserve's transition zone. They are characterized by the higher level of ecosystem type diversity (№ 1-35).

The following classificational level is uniting ecosystems according to macrorelief forms: foothill plains, lake and river plains, and sand massifs. Plain territories are diverse in relief forms (undulating, wavy, flat) and have different genesis. Plain ecosystems in Biospher Reserve are represented by 31 types. Ecosystems of sandy massifs occupy small areas (2.2%) and are represented by 4 ecosystem types.

According to the division of terrestrial ecosystems into categories of water regime there are auromorphous (14.03%), semi-hydromorphous (9.12%) and hydromorphous (26.3%) ecosystems. Distribution of automorphous ecosystems is caused by latitudinal-zonal and inversion-foothill laws characteristic for depressions and defining the main conditions of biotic organisms' life. On the territory of Biosphere Reserve in automorphous ecosystem category there are 3 zonal types of ecosystems (ecosystem classes): foothill ephemeroid – semi-dwarf-shrub deserts on sierozem, foothill Northern cereal – semi-dwarf-shrub deserts on brown soils and zonal semi-dwarf-shrub deserts on gray-brown soils.

13. 1



Alakol Biosphere Reserve plays a big role in conservation of unique and typical ecosystems under the influence of degradation of different level. Dominating part of non-disturbed or slightly disturbed ecosystems is located on the territory of core and buffer zone of Alakol Biosphere Reserve and in the areas of transition zone where human activity is almost absent. Due to this the lands of core and buffer zones of Biosphere Reserve may serve as standards of the most valuable ecosystems with the main habitats of rare mammals, nesting sites for bird species listedin the Redlist of IUCN and Red Data Book of Kazakhstan, and unique plant associations. These ecosystems are very important for conservation of huge amount of Eurasian waterbirds during nesting, molt, seasonal migrations and wintering.

Slight disturbance is observed in 35% of ecosystem types. They differ by stability of dominating coenopopulations and positive age spectrum. Processes of inconsiderable disturbance in these ecosystems are reversible. These ecosystems include:

- 1) automorphous ecosystems of undulating, ridge and wavy plains with domination of *Artemisia* deserts and (*Nanophyton erinaceum*) (№ 1, 2, 3),
- 2) semi-hydromorphous ecosystems of high lake and river terraces with *Artemisia*, *Salsola* vegetation and salt-loving cereals (№12, 13, 14, 15), where inconsiderable cattle pasture and linear constructions' building (electric cables, gravel roads) is observed,
- 3) hydromorphous ecosystems of low lake plains with domination of meadow cereals (№ 18), where slight disturbance appears from haymaking and natural self-regulation of dominant species composition takes place.
- 4) ecosystems of marshy moistening type (№ 25, 26, 28), which are hard to access for haymaking and reed construction material collection, but sometimes is used for piers' organization during fishing,
- 5) aquatic ecosystems, which because of their hard accessibility are rarely anthropogenically disturbed (№ 44, 45) and experience only indirect effect of hunt, fishing and recreation.

All harm in this ecosystems is reversible, this is why in order to rehabilitate natural environment here it is necessary in the conditions of Biosphere Reserve to establish ecologically based regulation of natural resources use. Medium disturbed ecosystems are 15% of the total number of ecosystems. On the territory of Biosphere Reserve they include:

- 1)ecosystems of ridgy-hilly and undulating plains with domination of Artemisia deserts (Ne 4, 5) on alluvial fans. Here the cattle pastures and there are fires, as well as sometimes clearly expressed pasture network of underpasses. If pasture littering is slight 5% the degradation process is reversible, productivity dynamics varies depending on the weather conditions;
- 2) ecosystems of foothill perennial *Salsola* and Saxaul desert, where the last specimens of Saxaul are destroyed; it was widely distributed in this region before. These desert forests may be lost without special nature protective measures;
- 3) flood-land meadows (№19), where haymaking and cattle pasture occur, accompanied by the change of dominants and vegetation (weed domination), drying and salinization of the soils;

- 4) ecosystems of river-beds with shrub vegetation (№ 22), with anthropogenic influence of cattle pasture and cattle trails appearance, as well as construction of numerous roads;
- 5) group of aquatic ecosystems of fresh lakes (№ 36-40) is influenced by transport used by hunters and fishermen.

Other ecosystems located on almost all Southern and South-Western Biosphere Reserve's territory, as well as parts of sandy massifs in North-East, are subject to rather heavy anthropogenic influence. There are the main settlements, cattle breeding, large areas of ploughed lands in some parts presented as fallow lands, and desert pastures in different state of degradation. They include very disturbed and highly disturbed ecosystems.

In very disturbed ecosystems vegetation and soils are degrading, biodiversity and stability is lost; self-restoration of the ecosystems is impossible without special measures and meliorative works. This group includes:

- 1)desert ecosystems of foothill plains (№ 6, 7, 8, 9, 10, 11) with local disturbance of overpasture and destruction of Saxaul and shrubs:
- 2) ecosystems of true and halophyte meadows on low lake plains and ground water outcrops (№ 16, 17,54, 55), where harm is caused by unregular haymaking, pasture, fires and hydrotechnical constructions' building. The biggest influence on vegetation cover is registered in case of periodic alternation of overmoisture and drought, and grass burning practiced at not-mowed meadows. A risk of self-regulation lost of vegetation associations and increase of weed plant number is registered.
- 3) ecosystems of river valleys tugay forests (№ 20), located near the villages, also experience considerable transformation. It is connected with active tourist recreational influence (camping and recreation meadows organization), ground roads construction and fires. Also valuable species stop fruiting when the water discharge decreases in the active vegetation period.
- 4) ecosystems of sandy massifs (№ 32, 33, 34, 35), where considerable harm is connected with the attractiveness of sandy ecosystems for all-year-round cattle pasture because of fodder species diversity. Here there is a risk of floristic diversity level decrease, as well as territory's contamination with weed plant species, decrease of ecosystems' seasonal productivity, soil erosion and Aeolian transformation of relief. It is necessary to establish protective regime for these sandy massifs in the conditions of Biosphere Reserve to conserve valuable sandy biotopes, which are rare in Alakol depression.

Highly disturbed natural ecosystems of Biosphere Reserve's territory belong to the group of agroecosystems (№ 46 -53) and territories surrounding villages (№ 56, 58). These ecosystems are characterized by high level of pollution by waste and are at the stage of complete degradation. Rehabilitation of original associations without special phytomeliorative measures is simply impossible, because the territories lost its ecological and resource potential and need recultivation.



Conservation of species biodiversity

Plants. The list of higher plants registered on Biosphere Reserve's territory consists of 678 species, which belong to 293 genera and 85 families (the full list of flora is given in the Appendix).

Table. Relation of systematic groups of different rank in the flora.

Taxonomic units	Terrestrial higher plants	Aquatic higher plants
Families	85	14
Genera	293	16
Species	653	25

Very high level of floristic diversity of the territory is explained by the following reasons: the position of the territory at the merge point of North-Turan and Dzhungar deserts, diversity of plant habitats (clay, rubbly, rocky desert plains, sandy massifs, lake and river coasts, water reservoirs, solonchaks), proximity of mountain ridges causing mountain species inversion into river and river-bed lowe part, intensive anthropogenic activity which leads to the increase of adventive and ruderal species.

Composition and relations of the leading families reflects common features of the flora of the given region.

The leading role in flora composition is played by the representatives of the following families: Asteraceae (101 вид), Poaceae (65), Chenopodiaceae (62), Fabaceae (50), Brassicaceae (43), Apiaceae (23), Lamiaceae (23), Cyperaceae (21), Borraginaceae (20), Polygonaceae (19), Scrophulariaceae (19) and Rosaceae (18). Thus, 10 listed families contain the main part (65%) of species diversity and 74% of genera diversity of the flora. The other 76 families contain only 256 species and 76 genera. Big amount of species in Asteraceae (101 species), Poaceae (65), Fabaceae (50), Brassicaceae (43), Lamiaceae (23), Borraginaceae (20), Polygonaceae (19) families characterize Biosphere Reserve's

Table. Representativeness of the leading families in the flora of Alakol-Sasykkol territory.

Nº	Family	Number of	species	Number of genera		
		absolute	в %	absolute	в %	
1	Asteraceae	101	14,9	41	14,0	
2	Poaceae	65	9,6	33	11,3	
3	Chenopodiaceae	62	9,1	29	9,9	
4	Fabaceae	50	7,4	19	6,5	
5	Brassicaceae	43	6,3	30	10,2	
6	Apiaceae	23	3,4	13	4,4	
7	Lamiaceae	23	3,4	17	5,8	
8	Cyperaceae	21	3,1	6	2,1	
9	Borraginaceae	20	3,0	15	5,1	
10	Polygonaceae	19	2,8	7	2,4	
11	Scrophulariaceae	19	2,8	7	2,4	
	Total	446	65,0%	217	74,1%	
		l				

flora as arid flora of Ancient Mediterranean, and species abundance of Chenopodiaceae (62) family indicate the desert character of the territory.

The large portion of species from Cyperaceae (21),Polygonaceae (19), Rosaceae (18) families in Biosphere Reserve's flora is caused by its enrichment by mountain elements (mainly Dzhungarian) and presence of moist habitats (wetlands). Arid elements sum up to 55% of the whole flora of Biosphere Reserve, and humid – 45%. Abundance of humid flora indicates the high diversity level of moist habitat (lake and river coasts, marshy areas, water reservoirs) species.



Nº	Genus	Number of species				
		absolute	in %			
1.	Artemisia	23	3,4			
2.	Astragalus	14	2,0			
3.	Allium	10	1.5			
4.	Salsola	9	1,3			
5.	Veronica	9	1.3			
6.	Ferula	8	1.2			
7.	Suaeda	7	1.0			
8.	Stipa	6	0,9			
9.	Athraphaxis	6	0,9			
10.	Carex	6	0,9			
11.	Chenopodium	6	0,9			
12	Cirsium .	6	0,9			
13	Euphorbia	6	0,9			
14	Potentilla	6	0,9			
15	Lappula	6	0,9			
16	Lepidium	6	0,9			
	Всего	134	19,8 %			

As it is seen from the table, the largest genera include only about 20% of the flora, and 11 genera have only 5 species each. Those are mostly representatives of mesophyte, hydrophilic flora (*Medicago, Vicia, Juncus, Plantago, Calamagrostis, Rumex, Potamogeton, Potentilla, Galium, Salix* and *Tamarix*). The abundance of *Artemisia* in flora composition, including semi-dwarf-shrub species, as well as representatives of *Ferula, Salsola, Suaeda* genera indicated the presence of considerable desert coenoflora core. The majority of the species of *Allium, Athraphaxis, Astragalus* genera are also desert species. Even among mostly steppe species of Stipa there is one representative of Gobi desert coenoflora. There are a lot of ephemeral spring species in Veronica genus.

Aquatic flora is represented by 25 plant species. Pondweed is one of the most numerous genera is species composition; it contains 5 species with two species – *Potamogeton natans* and *P. perfoliatus*– being the most often recorded. All water flora species are submerged in water macrophytes distributed in the waters of lakes, rivers and channels among reed swimming islands. Another typical water plants are *Nymphaea candida* and *Nuphar luteum*, and other water macrophytes include *Myriophyllum spicatum* and *M. verticillatum*, *Hydrocharis* sp., *Najas* sp., *Ceratophyllum demersum*, *Spirodela polyrhiza* and other species.

Key species of Alakol Biosphere Reserve are 14 species given in the Table below. Table. *List of key species of Alakol-Sasykkol territory.*

Nº	Spe	cies	Species status			
п/п	Latin name	Russian name]			
	Alliques es la refleccie Var. of Vir.	П. и				
1	Allium galanthum Kar. et Kir.	Лук молочноцветный	Species with declining population; valuable food plant; wild relative of cultural varieties of onion			
2	Astragalus ornithorrhynchus M. Pop.	Астрагал птицеклювый	Rare endemic of Northern slope of Dzhungar Alatau with decreasing distribution area. Listed in the Red Data Book of Kazakhstan			
3	Ephedra przewalskii Stapf	Эфедра Пржевальского	Species with Central Asian area type at the limit o its distribution			
4	Euphorbia blepharophylla	Молочай	Narrow local endemic of Kazakhstan			
	C.A. Mey.	реснитчатолистный				
5	Haloxylon ammodendron (C.A. Mey.) Bunge	Саксаул зайсанский	Central Asian (Gobi) species at the limit of its area			
6	Iljinia regelii (Bunge) Korov.	Ильиния Регеля	Central Asian (Gobi) species at the limit of its area			
7	Malus sieversii (Ledeb.) M. Roem.	Яблоня Сиверса	Wild relative of cultural variety of apples; Red Data Book of Kazakhstan			
8	Nymphaea candida J. Presl.	Кувшинка белоснежная	Rare species for this territory with decreasing population			
9	Populus diversifolia Schrenk	Тополь разнолистный	Rare species for this territory with decreasing population			
10	Salsola laricifolia Turcz. et Litv.	Солянка лиственницелистная	Central Asian species at the limit of its area			
11	Trichanthemis karataviensis Regel et Schmalh.	Трихантемис каратавский	Dzhungarian-Pamiroalay relict species at North- Eastern limit of its area			
12	Tulipa altaica Pall. ex Spreng.	Тюльпан алтайский	Species with decreasing population at the Southern limit of its area			
13	Tulipa brachystemon Regel	Тюльпан короткотычиночный	Endemic Dzhungarian species, Red Data Book of Kazakhstan			
14	<i>Tulipa kolpakowskiana</i> Regel	Тюльпан Колпаковского	Red Data Book of Kazakhstan			



















The list of endemic species of Kazakhstan also includes Tragopogon scoparius, Artemisia scopiformis and Microcephala sublogosa, subendemic species - Scutellaria albertii, Artemisia saissanica, Turaniphytum eranthemum, Zygophyllum semenovii, Z. macropterum, Paraeremostachys dchungarica, Scutellaria albertii, Astragalus brachypus, A. cognatusand A. karakugensis.

Besides, there are several very rare species in the flora of Biosphere Reserve: Ferula teterrima (Eastern Kazakhstan – Dzungarian species with irradiations to the mountains of Eastern Pamir and Central Tien Shan), Arthrophytum balchaschense (South-Kazakhstan – North-Kashgar species), Artemisia kashgarica (Dzhungarian – Kashgar species), Lagochillus diacanthophyllus (Eastern-Kazakhstan – Dzhungarian species) and Stipa glareosa (Dzhungarian – Gobi species).

The portion of the species with economical value is rather high and is not less than 40% of all floristic diversity; their list is given in the Appendix.

In the transition zone of Biosphere Reserve there are artificial plantations of Siberian Elm (*Ulmus pumila*) in the area of forest associations of Tentek river flood-land and Poplar (Populus nigra) on the cordones and some farms, as well as forest recultivated stripes along the roads. In the past forest farms used to organize plan plantation of Siberian Elm (Ulmus pumila) and Maple (Acer negundo) on modern territory of Biosphere Reserve. Anthropogenic plantations of Siberian Elm (*Ulmus pumila*), carried out in 1960-70s, are especially noteworthy. Their growth happened according to tugay type, and stable reproduction of the trees and shrubs indicate the stability of the forest in local ecological conditions.

Invertebrates. Insect fauna of Alakol Biosphere Reserve is still poorly studied. According to preliminary evaluation, conducted by entomology specialists, species diversity of the main insect groups is probably in the limits of 2000 species. Orthoptera and Odonata are most studied. For example, out of 87 dragonfly species 33 species inhabit Alakol Biosphere Reserve, including 20 species in Reseve's core zone. Also there are 74 species of Orthoptera insects, species of Mantodea, 1 species of Phasmatodea, 2 species of Dermaptera. List of Red Data Book species includes Damalacantha vacca, Saga pedo, Ceraeocercus fuscipennis.

Fish. There are 22 fish species of 6 families on the territory of Alakol Biosphere Reserve. Before acclimatizational works local native ichthyofauna was represented by following species: Common Minnow, Balkhash Marinka, Gymnodiptychus dybowskii, Tibet Stone Loach, Nemachilus dorzalis, Noemacheilus labiatus, N. sewerzowi and Balkhash Perch. As the result of acclimatizational measures fish species composition of Alakol lakes and inflowing rivers was enriched more than in half and many of acclimatized species are now background and most numerous. Some introduced species, such as Grass Carp, Silver Carp couldn't make self-reproducing population. Native species inhabit mainly river part of the basin and deep waters of Alakol lake. The most valuable native fish species are:

Balkhash Perch Perca schrenki, listed in the Red Data Book of IUCN. It is endemic species previously widely distributed in water reservoirs of Balkhash-Alakol basin. In the present time there is only one fishing population of this species in Alakol lakes.

Balkhash Marinka Schizothorax argentatus, reproduces in spring, with one-time spawning on the rocky grown. Maturity is reached in 3-5 years. Dominating foods are plants and benthos. Initially is inhabited all Biosphere Reserve's water reservoirs, with two forms: lake and river. After carp's acclimatization the number of this species started declining. In late 1930s - early 1940s Marinka lost its fishing importance in Sasykkol and Koshkarkol, but was still

conserved in Alakol. Then it completely disappeared from fishing in 1968 at Koshkarkol lake, and in 1969 – at Alakol lake and in 1977 – at Sasykkol lake. On the territory of Biosphere Reserve in the present time only separate specimens may be caught in Sasykkol lake. It is more often recorded in lakes flowing into Alakol and Sasykkol, where there are isolated self-reproducing populations.

Noemacheilus— Noemacheilus stoliczkai; N. dorzalis. Spawns in April-June. Maturity is reached in 2 years. Food includes mostly benthos and plankton. Due to this genus weak systematics' development the data on the biology and population structure dynamics in Alakol basin are often controversial. In the present time Noemacheilus are dominant species in river part of Alakol system and are partly conserved at the saline part of Alakol lake waters. In the rivers it dominates mostly in the upper steams.

Reptiles and amphibians. Amphibians of Alakol Biosphere Reserve are represented by 2 species – Green Toad *Bufo viridis* and Marsh Frog *Rana ridibunda*, and reptiles – by 24 species. Their full list is given in the Appendix. The list of reptiles of Biosphere Reserve's territory includes: turtles – 1 species, geckoes – 3 species, agamas – 5 species, lizards – 6 species, boas – 1 species, grass snakes – 5 species, ribbon snakes – 1 species, vipers – 1 species and pit vipers – 1 species. Among the named species the most interesting species is Variegated Toadhead Agama *Phrynocephalus versicolor*, listed in the Red Data Book of Kazakhstan. In Alakol depression this species inhabits Northeastern coast of Alakol Lake.

Birds. To the present time 342 species were registered for the territory of Alakol Biosphere Reserve, 203 of them nest there. In core zone 267 species are recorded and 125 species are nesting, the most noticeable are European pelican and Dalmatian pelican, Great Crested Grebe, Ferruginous Duck, etc. In the first half of October there are migrational aggregations of Mute Swan and Whooper Swan (up to 300 specimens). In Biosphere Reserve's buffer zone 226 species are registered and 80 species are nesting. Among those Sand Martin, Rufous-crested duck, Herring Gulls, Common Terns, Gadwall, Bearded titand Common Black-headed Gulls are most often recorded at shallow waters along the edges of reed thickets. The main bird fauna of buffer zone is represented by gulls, terns and cormorants, flying there to feed. In the buffer zone around Alakol islands 12 species are observed in July, and 15 species – in late August. The main background was formed of feeding Great cormorant, Herring Gull, as well as grebes and Roody Shelducks, which came here for molt. Another 317 species (162 of which are nesting) are recorded in the transition zone, which includes Alakol, Sasykkol, Koshkarkol, Korzhinkol, Beskaska, Uyaly, Zhalanashkol lakes, Yertuyskaya lake system and their coasts and where active economic activity takes place. Dominating species: Cootand Common Tern, numerous species – Common Cormorant. The category of common bird species includes Herring Gull, Rufous-crested duck, Great Black-headed Gull, Mallard, Great crested grebe, etc. The most typical species of Alakol Biosphere Reserve are:

Great Crested Grebe *Podiceps cristatus*. Common nesting species, inhabits most lakes of Tentek and Urzhar deltas. In Alakol it nests in the bays along Northern and Western coasts, and also in lagoon lakes of Ulken Araltobe island. In summer time small groups of molting birds are recorded in the bays and near the islands.

European Pelican *Pelecanus onocrotalus*, the main colony was located in Tysyachnye lakes in the Eastern part of Sasykkol lakes. Usually not less than 500 pairs of these Pelicans nest in this colony. In summer time up to 100 feeding specimens were observed in Tentek delta lakes.



















Great Cormorant *Phalacrocorax carbo*. Numerous nesting species. The main nests are concentrated in Tentek river delta at Baklanya and Pelikanya Kurya lakes (about 1,000 pairs), and in the feeding period they are observed almost on every delta water reservoir.

Great White Heron *Egretta alba*. Common nesting species of Tentek delta, where its population number in the recent years does not exceed 30 pairs. In small amounts it nests also at Western, Northern and Eastern coasts of Alakol Lake, as well as at Koshkarkol and Uyaly lakes, and in inner water reservoirs of Urzhar delta.

Eurasian Spoonbill *Platalea leucorodia*. Rare nesting species of Tentek delta. In the only colony at Pelikanya Kurya in 1998 there were 12 known nests, in 1999 – 11 nests, but in the following years the number of nesting pairs decreased because of frequent visits of fishermen. In 2002 Eurasian Spoonbill moved to the neighboring Baklanya Kurya.

Graylag Goose *Anser anser*. The main nests are concentrated at Baklanya Kurya. Insignificant concentrations of migrating and molting geese (not more than 500) are observed in the Western part of Alakol lake in the bays between Chubar-Tyubek and Chornaya foreland, and along the Southern lake coast at Onagash peninsula and in Kishi Alakol bay. Up to 1,000 Graylag Geese inhabit Alakol in August-September. Small flocks were recorded on wheat fields at the foothills of Barlyk mountains, 20-25 km Eastern from Kabanbay village.

Mute Swan *Cygnus olor*. Common nesting species in Tentek delta lakes (10-15 pairs) and in the bays along Northern and Western coasts of Alakol Lake. There were known summer molt aggregations, but in the recent years they moved to Tentek delta water reservoirs. In the period of spring and sutumn migrations up to 350-400 swans concentrate at delta lakes.

Whooper Swan *Cygnus cygnus*. The main nests are conserved in Tentek delta, where usually up to 5 pairs are nesting, and one more pair usually nests in the Eastern part of Zhalanashkol lake. Whooper Swan does not nest at Alakol lake, but is regularly registered during migrations, and in warm winters it stays on the Southern lake parts which doesn't freeze.

Roody Shelduck *Tadorna ferruginea*. Nesting species, small in numbers. Every year several pairs nest at Ulken Araltobe and Srednyi islands of Alakol Lake; also 100-300 birds molt there. It is more often observed along the Western coast of the lake. Large feeding aggregations (200-300 specimens) are observed in Tentek delta in September and October.

Mallard *Anas platyrhynchos*. Common nesting species of Alakol and Sasykkol lakes and other water reservoirs. During molt and migration forms large aggregations on delta water reservoirs, in Alakol and Sasykkol bays. In autumn of 2005 about 2,000-3,000 Mallards stayed in Alakol-Sasykkol lake system.

Gadwall Anas strepera. Common nesting species of Tentek and Urzhar deltas. At Alakol lake the nesting is reported from the bays along the coast, and at Ulken Araltobe and Srednyi islands. Large aggregations of molting Gadwalls are observed in summer along Northern and Western coasts, and at shallow lakes of Ulken Araltobe, Piski and Kondaral (Chubar-Tyubek) islands. In autumn of 2005 Alakol-Sasykkol lake system was inhabited by 5,000-7,000 Gadwalls.

Rufous-crested duck *Netta rufina*. Numerous nesting species of Tentek and Urzhar lake deltas, Northern and Western coasts of Alakol lake; occupies dominating position among diving ducks. In autumn of 2005 about 10,000 ducks stayed in Alakol – Sasykkol lake system.

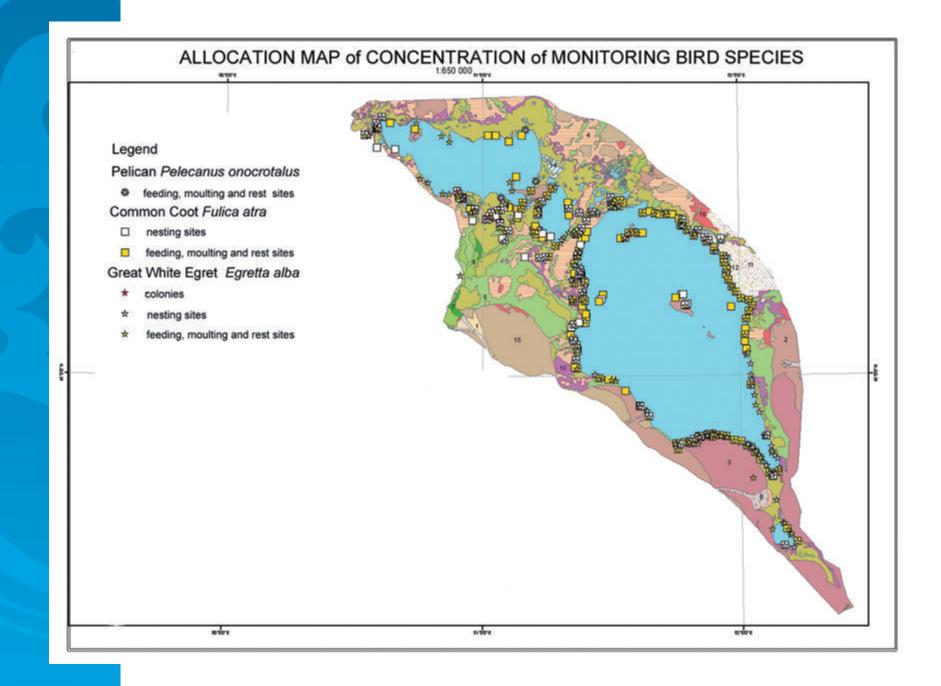
In Alakol Biosphere Reserve there are 38 bird species listed in the Red Data Book of Kazakhstan. Among those 22 species are proven to nest at this territory: Dalmatian Pelican – Pelecanus crispus; European Pelican – Pelicanus onocrotalus; Eurasian Spoonbill – Plataleal eucorodia, Black Stork – Ciconia nigra; Whooper Swan – Cygnus cygnus; Ferruginous Duck – Aythya nyroca, White-headed Duck – Oxyura leucocephala; White-tailed Eagle – Haliaeetus albicilla, Short-toes Eagle – Circaetus gallicus; Imperial Eagle – Aquila heliaca, Steppe Eagle – Aquila nipalensis, Common Crane – Grus grus, Demoiselle Crane – Anthropoide svirgo, Great Bustard – Otis tarda, Houbara Bustard – Chlamidotis undulata, Little Bustard – Otis tetrax, Great Black-headed Gull – Larus ichtyaetus, Relict Gull – Larus relictus; Eastern Stock Dove – Columba eversmannii, Black-bellied Sandgrouse – Pterocles orientalis, Pallas's Sandgrouse – Syrrhaptes paradoxus and Eagle Owl – Bubo bubo.

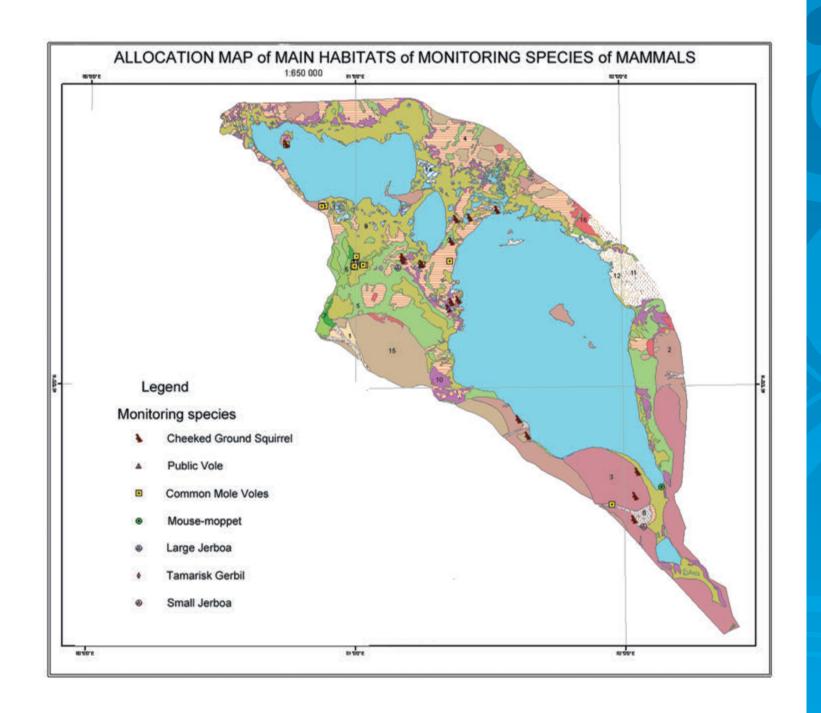
Mammals. 44 species of mammals are registered on the territory of Biosphere Reserve, which is 80% of the total number of representatives of this class, inhabiting Alakol depression (55 species). They include representatives of insectivores – 4 species, cheiropterans – 3, predators – 10, ungulates – 3, rodents – 23 and lagomorphs – 1 species.

All mammals are subdivided in 2 groups: residents – 21 species and migrating (or locally migrating) – 23 species. Resident mammals include, first of all, rodents and insectivores, and representatives of cheiropterans, lagomorphs, predators and ungulates carry out seasonal migrations of different distance. Dominating species (by registered specimens number) are Muskrat, Red-cheeked Ground Squirrel, Small five-toed Jerboa, Tamarisk Jird, and hunting species – fox and stoat. According to habitat type the mammals inhabiting this territory are divided into 2 groups: semi-aquatic and terrestrial. The first group includes only Muskrat, the second – all other mammals. Of all the teriofauna of biosphere reserve one species – Zhitkov's Jerboa *Pygerethmus zhitkovi*— is endemic of Kazakhstan, and 15 species are resource species, including 10 important hunting species (wolf, fox, badger, wild boar, muskrat, stoat, steppe polecat, African wild-cat, Siberian roe deer, Tolai hare).

There are 4 mammal species inhabiting Biosphere Reserve's territory listed in the Red Data Book of Kazakhstan:

- 1. *Marbled Polecat Vormela peregusna*, rare animal. It inhabits deserts, semi-deserts, foothills, where it can find its prey ground squirrels and gerbils. It is most often recorded in denser slightly-hilly sands, overgrown by Saxaul and Winterfat (*Krascheninnikovia*).
- 2. Selevinia Selevinia betpakdalensis. This animal is very rare everywhere. In Alakol depression it prefers clay areas with desert vegetation.
- 3. Goitered Gazelle Gazella subgutturoza. This gazelle is recorded quite often in the South of Alakol depression, where it annually comes from China through Dzhungarian Gates for the summer. Typical inhabitant of deserts of different types, primarily with hard ground. In Alakol depression prefers areas with clay soil and sparse Artemisia Anabasis salsa with addition of Salsola arbuscula vegetation. Of all the disasters it fears cattle mortality, when many gazelles die of hunger and overcooling.
- **4.** *Pallas's Cat Felis manul.* Inhabitant of desert small mountains with flat slopes and rock outcrops. It has settled lifestyle; is active thoughout the year. Brings kittens once a year, there are 2-8, more often 3-4 kittens in the brood. Food pikas, voles and other rodents, birds. This cat's distribution is defined by snow level, because it is not used to getting rodents from the snow and move in deep and loose snow.







Conservation of genetic biodiversity:

The territory of Biosphere Reserve plays an important role in conservation of regional genetic biodiversity. Many valuable species are under strict protection in the Reserve's core zone, and in the transition zone commercial species are under the contril of nature protection inspectors. The portion of resource-important species is not less than 40% of all floristic diversity. The majority of higher plants possess valuable traits, many of them have great economic importance.

Fodder plants: they are fully represented in the limits of the given territory. They are recorded practically in all ecosystems. Most valuable species belong to Fabaceae (*Oxytropis glabra, Medicago falcata, M. coerulea, M. trautvetteri*). Besides traditional Poaceae, Fabaceae, Chenopodiaceae, *Artemisia*, it is necessary to especially note *Allium subtilissium* – its bulbs are the main food for small mammals. In all aquatic ecosystems fodder plants include pondweed (*Potamogeton natans, P. pectinatus, P. perfoliatus, P. pusillus*), cattail (*Typha angustifolia, T. latifolia*), grassweed (*Scirpus lacustris, S. litoralis, S. setaceus, S. tabernaemontanii*), watermilfoil (*Myriophyllum spicatum*), *Najasmorina, Utricularia vulgaris*), Bur-reed (*Sparganium stoloniferum, S. microcarpum*).

Medicinal plants: Ziziphora clinopodioides; Ferula ferulaeoides; Inula helenium; Sanguisorba alpine; Achillea millefolium; Althaea officinalis; Thalictrum flavum; Chelidonium majus; Cynoglossum officinale; Rhamnus cathartica; Bryonia alba; Erysimum cheiranthoides; E. canescens; Urtica dioica; Scutellaria galericulata; Hypericum perforatum; Chenopodium botrys; Patrinia intermedia; Gratiola officinalis; Peucedanum morisonii; Lithospermum officinalis; Helichrysum arenarium; Glycyrrhiza uralensis; Persicaria hydropiper.

Aromatic plants: Stachys palustris; Angelica deccurens; Mentha asiatica; Sium sisaroideum; Tripleurospermum perforatum; Ziziphora clinopodioides; Z. tenuior.

Melliferous plants: Alcea nudiflora; Cirsium alatum C. arvense; Lavatera thuringiaca; Lythrum salicaria; L. intermedium; Scrophularia umbrosa; Stachys palustris; Epilobium velutinum; Halimodendron halodendron; Echinops sphaerocephalus; Lysimachia vulgaris; Nepeta cataria; Salix songarica; S. wilhelmsiana; Trifolium pannonicum; Calligonum aphyllum; Calystegia sepiuum; Lysimachia vulgaris; Sium latifolium; Alhagi kirghisorum; Amoria repens; Elaeagnus oxycarpa; Echium vulgare; Mentha arvensis; M. interrupta; Origanum vulgare.

Dying plants: Persicaria hydropiper; Bidens tripartite; Isatis costata; Peganum harmala.

Decorative plants: Iris tenuifolia; Rhinopetalum karelinii; Tulipa altaica; T. buhseana.

Tanning plants: Rheum nanum; Limonium gmelinii; L. suffruticosum.

Valuable wild relatives of cultural plants: Cerasus tianschanica (food); Humulus Iupulus (food); Elaeagnus oxycarpa (food); Camelina sativa (food); Daucus carota (food); Allium galanthum (foodand material for selection); Camelina sativa (oilseed); Erucas trumarmoracioides (oilseed); Phalaroides arundinacea; Festuc aregeliana; Trifolium pratense; Daucus carota; Cichorium intybus; Malus sieversii (fruit and berry); Crataegus korolkowii (fruit and berry); Berberis sphaerocarpa (fruit and berry); Rubus caesius (fruit and berry); Amoria fragifera (fodder); Festuca regeliana (fodder); Echinochloa crusgalli (cereals); Setaria viridis (cereals); Abutilon teophrasti (oilseed and fiber); Hibiscus trionum (oilseed and fiber).

Among animals many species are economically valuable and important for genetic biodiversity conservation. Economically valuable animals include, first of all, fishing species, waterbirds and some mammal species. Fish: zander, bream, carp andgoldfish; birds: geese, ducks, pheasant; mammals – muskrat, wild boar, roe deer, corsac fox fox, wolf, Tolai hare. The list of resource animal species is given below.

Table. The list of resource animal species of Alakol-Sasykkol lake system.

NºNº	Species	Status
	Fi	sh
1.	Bream - <i>Abramis brama</i>	Commercial, numerous
2.	Common Roach – Rutilus rutilus	Commercial, small in number
3.	Goldfish - Carassius auratus	Commercial, numerous
4.	Common Carp - Cyprinus carpio	Commercial, small in number
5.	Balkhash Perch- Perca schrenki	Commercial, numerous
6.	Zander - Stizostedion lucioperca	Commercial, numerous
	Bird	ds
7.	Graylad Goose – <i>Anser anser</i>	Commercial, primary
8.	Bean goose– Anser fabalis	Commercial, primary
9.	Roody Shelduck – Tadorna ferruginea	Commercial, secondary
10.	Common Shelduck – Tadorna tadorna	Commercial, secondary
11.	Mallard– <i>Anas platyrhynchos</i>	Commercial, primary
12.	Common teal – Anas crecca	Commercial, primary
13.	Gadwall – Anas strepera	Commercial, primary
14.	European wigeon– Anas penelope	Commercial, primary
15.	Common pintail– <i>Anas acuta</i>	Commercial, primary
16.	Garganey– Anas querquedula	Commercial, primary
17.	Northern shoveler– Anas clypeata	Commercial, primary
18.	Rufous-crested duck– Netta rufina	Commercial, primary
19.	European pochard– Aythya ferina	Commercial, primary
20.	Tuftedduck– <i>Aythya fuligula</i>	Commercial, primary





14. 1

14. DEVELOPMENT FUNCTION

Potential for fostering economic and human development which is socio-culturally and ecologically sustainable:

Lands of Biosphere Reserve's transition zone are most suitable for cattle breeding development, and for fishing and hunting. But due to anthropogenic impact some part of these lands is degraded or lost its original value to the present date. This is why Biosphere Reserve's organization at that territory will allow conducting effective activities for fallow land restoration and nature resources use control. Besides, complex biodiversity conservation of the territory, and particularly wetlands as migrating birds' habitat, is tightly connected to the development of social-economic potential.

Preliminary research in the limits of GEF/UNDP Project on wetlands conservation of Kazakhstan showed that environmental degradation leads to dicrease of local people's standard of living and income. Three main threats were identified for Biosphere Reserve's territory:

- 1) unsustainable use of water resources,
- 2) unsustainable use of biological resources (unsustainable fishing and hunting, unsustainable forestry),
- 3) uncontrolled visits («wild tourism»).

The conception of Biosphere Reserve is aimed to improve life conditions of local people with simultaneous decrease of pressure on natural ecosystems by introducing alternative economic activity types which are not harmful for biodiversity. Biosphere Reserve's condition give an opportunity to demonstrate practices of existing and potential biodiversity threats termination or decrease. These approaches may then be used in other regions with similar conditions.

Nowadays several pilot projects are realized on the territory of Alakol Biosphere Reserve. They are aimed to introduce best practices in agriculture: sustainable pasture management and ecotourism development. One project is aimed to develop wind power sources.



If tourism is a major activity:

how many visitors come to the proposed Biosphere Reserve each year? is there a trend towards increasing numbers of visitors?

In the present time tourism is one of the most perspective activities at the territory of Alakol Biosphere Reserve and it has a great potential for development, especially recreational tourism. For example, there are more than 20 tourist bases on the Southern coast of Alakol lake (Alakol distrist), which welcome from 10 to 130 people a day, at the same time the majority of visitors live in private guest houses of local people. Many tourists prefer to come by their own transport and live in the tents in specially allocated and protected territories. In the last 10 years there is a trend of tourists number increase: in 2004 Alakol lake was visited by 11,000 people, in 2005 the number of tourists increased to 12,000 people, in 2012 there were about 25,000 tourists. Alakol lake coast in the recent years became dynamically developing summer season tourist center of Kazakhstan.

In the present time the potential of ecological tourism with educational purposes is not fully revealed, although Alakol-Sasykkol lake system is one of the well-known places of birdwatchers of the whole world. Five tourist routes were developed in the buffer zone of Biosphere Reserve with support of GEF/UNDP Wetlands Project. Besides, ecological education department staff also developed the route of ecological path, equipped with observation towers. It allows schoolchildren, naturalists and other tourists to get closer look at local nature.

In the frames of suggested Biosphere Reserve there would be conditions for stable development of ecological tourism, including:

- a) Development of ecological routes and tourist infrastructure
- development of ecological paths and routes, establishment of optimal norms of recreational press and equipment depending on ecotourism's type;
- landscaping and upgrading recreation areas;
- mini-hotels and vacation houses construction;
- organization of mini-spa on the basis of mineral water and mud springs;
- construction of beaches, saunas, aquaparks, pools, sport fields;
- creation of mini-parks;
- educational programs for population about ecotourism business development, preparation of guides and excursion leaders.
 - b) Local rural tourism
- guest houses' organization;
- horse tourism development;
- development of national traditions to show to foreign tourists, including national cuisine, etc.

14. 2

14. 2. 1

Type(s) of tourism

Tourism types practiced at the territory:

- Familiarization tourism–proximity of large cities Almaty, Taldykorgan and Oskemen, where international companies' hedquarters, embassies and consulates are situated, provides many foreigners who are interested in natural and cultural heritage of South-Eastern Kazakhstan.
- Educational tourism. Organized excursions for familiarization with Alakol Biosphere Reserve's nature and local historic monuments. Is often organized in universities, schools, companies.
- Recreational tourism beach tourism at Alakol lake coast and camping, often combined with amateur fishing.
- Birdwatchers. Groups of tourists from abroad coming to see only birds of the given territory. It has its peculiarities and specific demands for tour conduction.
- Sport fishing. This is for tourists who specially visit Alakol lake for sport fishing; this tourism type is close to bird-watching.
- Scientific tourism– especially on the territory of the main and buffer zones, because only here natural ecosystems, flora and fauna objects, typical for the given natural zone as well as rare, are conserved in their original condition. Those are scientific staff of institutions and international nature conservation organizations' representatives.

Five ecological routes and one route of ecological path with observation towers were developed for this territory.

14. 2. 2

Tourist facilities and description of where these are located and in which zone of the proposed biosphere reserve:

Five tourist routes and 1 ecological path were developed in the buffer zone of Biosphere Reserve with the support of GEF/UNDP Wetlands Project. Also there is a Nature Museum of Alakol depression, which is located in the administrative building of Alakol Nature Reserve. This is the base for educational, scientific tourism, birdwatching and partly for familiarization tourism.

All the infrastructure objects for recreational tourism, sport fishing and most part of familiarization tourism are in Biosphere Reserve's transition zone. Table with the data on tourism (from the local administration of Alakol district) is given below.

Table. Tourism in Alakol Biosphere Reserve.

Indices	Units	Report of 2007	Actual 2008	Increase, in % to 2007	2009 год	Increase, in % to 2008	2010	2011	2012
Tourist companies	units	3	3	100	3	100,0	4	4	4
Volume of paid tourist services	Million tenge	42, 9	50,6	117,9	52,5	103,7	55,2	57,8	63,0
The number of tourist infrastructure objects, total	units	56	66	117,8	76	115,1	86	88	93
Including: hotels Guest houses Hunters' houses Vacation houses Spa and health centers Recreation zones and bases		4 42 4 3	5 50 4 3	125,0 119,0 100,0 100,0 133,3	5 59 4 3	100,0 118 100,0 100,0 125,0	6 65 5 4 6	6 67 5 4	6 69 5 4
Construction, new objects of tourism	units Million tenge	7 64	10 69	142,8 107,8	10 72	111,1 104,3	10 75	2 79	2 83
The number of people according to tourist organizations of domestic tourism		17500	19250	110	20000	103,8	21000	22000	24000

14. 2. 3

14. 3

15. 1 15. 1. 1

Indicate positive and/or negative impacts of tourism at present or foreseen:

Buffer zone of Biosphere Reserve. Tourism development increases the pressure on the territory of this zone. Unfortunately, there is a lack of qualified guides, information for the tourists, educational and promotional materials, including materials in English. Unfortunately, Alakol State Nature Reserve's staff doesn't have economic incentives for ecological tourism development.

Transition zone (development zone). It is extremely important to provide conditions for ecotourism development in Biosphere Reserve's transition zone in order to decrease the pressure on the main and buffer zones, especially because there are many things to show. In the present time local people start providing additional services to the tourists; boats rent, horse riding, fishing, sale of local ecologically clean food grown at their house, and sale of local souvenir production.

It is very important to build a large visit center of Alakol Biosphere Reserve on the basis of Nature Museum, which will be built in the nearest years with funds raised from the Government and sponsors.

Benefits of economic activities to local people:

Besides direct economic activity, related to nature resources use at Biosphere Reserve's territory (cattle breeding, hunting, fishing and plant growing), local people receive sufficient benefit from ecological tourism development. As it was indicated in the previous paragraph, new working places, related to visitors services, will appear. In the future it will lead to overall improvement of local infrastructure level (building high-quality houses, roads, electronic communication means, etc.)

15. LOGISTIC SUPPORT FUNCTION

Research and monitoring

To what extent has the past and planned research and monitoring programme been designed to address specific management questions in the potential biosphere reserve?



In time of GEF/UNDP Wetlands Conservation Project complex scientific research was conducted in 2004-2005, natural-scientific justification for widening of the core and buffer zone (Alakol Nature Reserve) was elaborated. In the frames of scientific research zoning of proposed Biosphere Reserve's territory was conducted as the result of analysis of natural environment and social-economic condition.

This research allowed defining modern nature condition and level of anthropogenic influence on Biosphere Reserve's natural complexes, and developing Management Plan of the nature reserve. Programs on monitoring environmental condition, developed in 2006-2007, allow regular and systemic monitoring of territory's core zone, as well as other Biospher Reserve's zones.

Brief description of past research and/or monitoring activities

•Abiotic research and monitoring [climatology, hydrology, geomorphology, etc.]

Before the nature seserve was organized, there was a lot of research of different scientific areas: geological, soil, hydrological, chemical, botanical, zoological. A lot of ornithologic research was conducted in the perios of nature reserve's establishment; they were successfully continued afterwards as well. In 1960-80s skilled ornithologists constantly worked on this territory.

The territory of modern Alakol State Nature Reserve is regularly monitored for water reservoirs' dynamics (from 1930s), vegetation productivity and condition at the monitoring sites, population condition of rare and model species of birds and mammals (from mid -1970s). Since 1999 anthropogenic influence is reserached, including fires, different violations of nature reserve's regime, etc., as well and observations of objects' condition conducted throughout the whole year by the staff of scientific department and security service of nature reserve. Scietific research organizations of corresponding research field help in research conduction, sometimes with participation of foreign specialists.

15. 1. 2



• Biotic research and monitoring [flora, fauna]:

Monitoring and biological observations was carried out on the modern territory of Alakol Biosphere Reserve in the limits of state scientific and practicat programs of Kazakh scientific research institutes of the Academy of Science of Kazakh SSR and Ministry of water and fishing of Kazakh SSR. They included monitoring of a) condition of Alakol depression's fauna and flora, b) population of commercial, background and rare animal species (mammals, birds, fishes), c) the condition of the main fish species populations, d) hydrocoenoses condition, etc.

Since 1999 monitoring and observations are carried out in the limits of annual «Nature Chronicles» according to stantard unified program. Key indices for evaluation of natural objects conservation condition include:

- 1. Waterbird fauna condition.
- 2. Population number of background and rare protected animal species (mammals, birds, fishes).
- 3. Population condition of the main fish species.
- 4. Hydrocoenoses condition of protected lakes.
- 5. Phenologic dates of seasonal events in animal and plant life.
- 6. Species composition and vegetation associations' structure.

Besides, on the territory of hunting farms there was monitoring research on the population number of commercial and amateur hunt species: countings of waterbirds' population on the routes and from permanent observation sites, wild boar population countings, avian countings of large waterbirds and large mammals, as well as annual phenological observations of animals and plants. The population countings of small mammals and observations' of their population's condition was carried out by Taldykorgan oblast sanitary-epidemiological station and field groups of Antiplague Station.

• Socio-economic research [demography, economics, traditional knowledge, etc.]:

Social-economic research was regularly conducted by competent governmental local authorities (Executive Committees – in Soviet time, and Akimats – at present time) and corresponding governmental scientific organizations of Kazakhstan, and also were carried out in 2004-2011 in the limits of GEF/UNDP Wetlands Project.

Brief description of on-going research and/or monitoring activities:

•Abiotic research and monitoring [climatology, hydrology, geomorphology, etc.]:

In the present time the monitoring of climatic and hydrological changes is conducted by Taldykorgan department of Kazakhstan Hydro-meteorologic Service, and also (not in full) by nature reserve's staff on the cordones of Biosphere Reserve's core zone.

Biotic research and monitoring [flora, fauna]

Scientific research of Biosphere Reserve's territory is carried out according to perspective thematic plan for 2011-2015. The main task of scientific research in Alakol State Nature Reserve is monitoring of condition and conservation of natural complexes, including further fauna and flora inventarization. Besides, special attention is drawn to territorial distribution of valuable wetland mammals and their influence on conservation of biocoenoses species composition, ecologic-morphological characeristics of water reservoirs' ichthyofauna. All research is carried out taking into consideration ecologic-geographical, floristic and faunistic peculiarities, and also in accordance with the tasks of protected territories. Rare and endangered species' monitoring is a separate direction of the research. It is necessary to clarify populations' condition, identify the peculiarities of rare animal and plant species' ecology, leading to an opportunity of evaluation of these species' conservation and restoration perspective. This category includes subcatorgies on the research of rare and endangered bird species with evaluation of populaitons' condition and ecological peculiarities, research of Red Data Book and key species' condition with habitat passportization. The ongoing research also includes Nature Chronicles, because this program is in close contacts with all scientific themes. Data collection for Nature Chronicles is carried out not only by scientific department staff, but also by all inspectors' staff.

According to the perspective thematic plan of scientific research for the period till 2015 the work on the following scientific themes is conducted on the territory of Biosphere Reserve:

- 1) Observations of phenomena and processes on the territory of the Reserve and their study for Nature Chronicles program,
 - 2) Inventarization of flora and vegetation of Alakol Nature Reserve,
 - 3) Rare and endangered birds of Alakol Nature Reserve,
 - 4) Cadastre of background and rare mammals of Alakol Nature Reserve,
- 5) Characteristics of ichthyofauna's modern condition in Alakol Nature Reserve and creation of the system for its long-term monitoring,
 - 6) Biodiversity evaluation of the main invertebrate animals' groups of Alakol Nature Reserve,
 - 7) Monitoring of hydrobionts in delta water reservoirs of Alakol Nature Reserve.

•Socio-economic research [demography, economics, traditional knowledge, etc.]:

In time of GEF/UNDP Wetland Project a group of sociologists conducted socio-ecologic-economic research in rural settlements of Biosphere Reserve's territory. Modern social-economic situation in the region concerning demography and migration, agriculture, industry, fishing and hunting industries, social infrastructure was reviewed and evaluated. Proposals on territory's zoning, sustainable economic development zone development, and territory's development perspectives were elaborated. Besides, every year Akimat staff collects data – indices of social-economic development, which are entered in automated data base.







Brief description of planned research and/or monitoring activities:

•Abiotic research and monitoring [climatology, hydrology, geomorphology, etc.]:

Alakol State Nature Reserve staff will regularly conduct habitat monitoring observations on the territory of core and buffer zone, in accordance with Perspective Research Plan from 2015 which is being developed.

In the future monitoring of climatic and hydrological changes will also be continued by Taldykorgan department of Kazakhstan Hydro-meteorological Service.

•Biotic research and monitoring [flora, fauna]:

Alakol State Nature Reserve's staff will carry out regular monitoring observation of biodiversity components on core and buffer zones' territory, in accordance with the present (till 2015) and future Perspective Plan. Besides, there may be scientific research connected with the work of other scientific institutions.

•Socio-economic research [demography, economics and traditional knowledge]:

Once in 10 years sociologists from governmental organizations will conduct social-economic research in rural settlements of Biosphere Reserve's territory with current social-economic situation evaluation. Every year local Akimat staff collect data on social-economic development with further submission to automated data base.

15. 1. 5

Estimated number of national scientists participating in research within the proposed biosphere reserve on:

on permanent basis: 5on occasional basis: 10-15

Estimated number of foreign scientists participating in research within the proposed Biosphere Reserve on:

15. 1. 6

on permanent basis: 0on occasional basis: 3-5

Estimated number of masters and/or doctoral theses carried out on the proposed biosphere reserve each year:

15. 1. 7

2-3

Research station(s) within the proposed Biosphere Reserve:

15. 1. 8

Department of Science and Monitoring of Alakol State Nature Reserve

[7] = permanent [25] = temporary

Permanent research station(s) outside the proposed Biosphere Reserve:

Zhetysu State University, Taldykorgan, approximately 282 km Kazakh National University, Almaty, approximately 580 km 15. 1. 9

15. 1. 10

Permanent monitoring plots

The Management Plan of Alakol Nature Reserve contains developed programs of habitat and biodiversity components' monitoring; according to those programs monitoring observations are conducted at the specially chosen monitoring sites and routes (see Management Plan in the Appendix). In the present time the monitoring of habitat and biodiversity components is carried out annually in accordance with the dates indicated in the Management Plan. For example,







monitoring of the plant world is carried out on the basis of 35 monitoring species, 14 of which are key species (their study and conservation is a primary task) and 21 indicator species (habitat evaluation will be based on their condition). Five main profiles were chosen for long-term monitoring, where annual observations of populations' conditions, viability and restoration of key and indicator plant species, as well as average condition of the vegetation cover are registered.

Research facilities of research station(s)

In order to realize scientific activity, Biosphere Reserve possesses:

- 1. Scientific station (in the main building of Nature Reserve)
- Observation site for birdwatching 1
- Monitoring sites and routes
- 4. Vehicle (1 car «GAZ-SAZ 3507», 1 car «Chevrolet Niva», 1 Trailer «Master 540»)
- 5. Boat "Master 540" 1, canoes
- GPS– 5devices.
- 7. Optical devices: 4 microscopes, 10 binoculars, 4 optical tubes, 2 night vision devices
- 8. Laboratory equipment (furniture, chemical reagents, instruments, electronic scales, etc.)
- 9. Field equipment (scientific traps, bird nets, entomological killing jars, etc.; household tents, sleeping bags, etc.)
- 10. Computers, programs, developed automated data base system, solar generator, photo-electrostation
- 11. Scientific library
- 12. Internet connection

Other facilities

Facilities for lodging or temporary residence of specially protected natural territories' staff and visiting scientists are available at 5 cordones.

Does the proposed biosphere reserve have an Internet connection?

Internet connection is established in Alakol Nature Reserve.

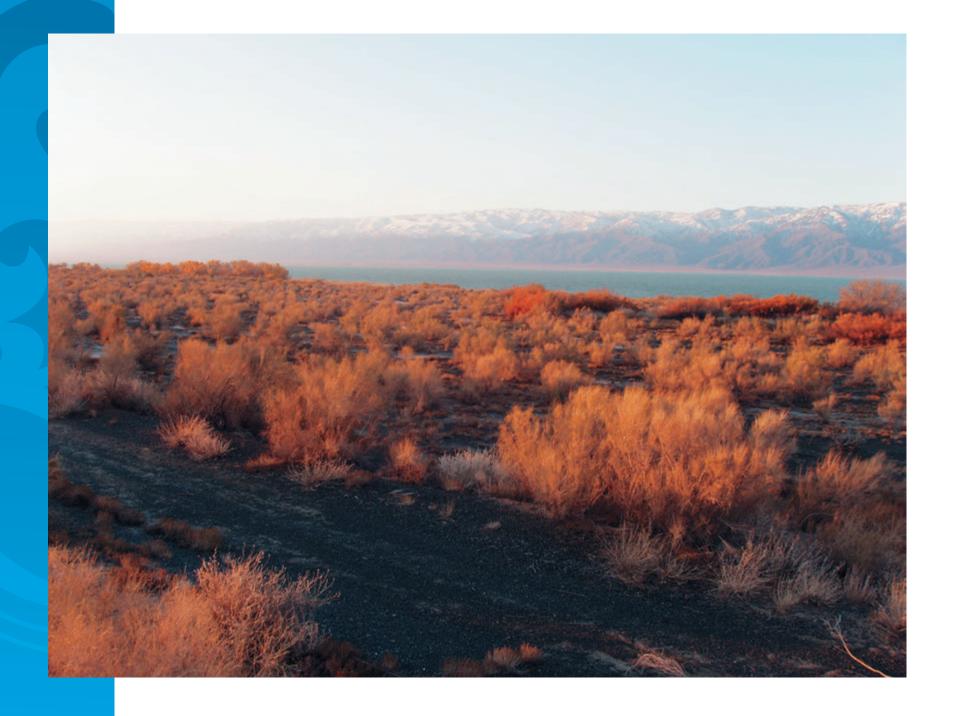
Environmental education and public awareness

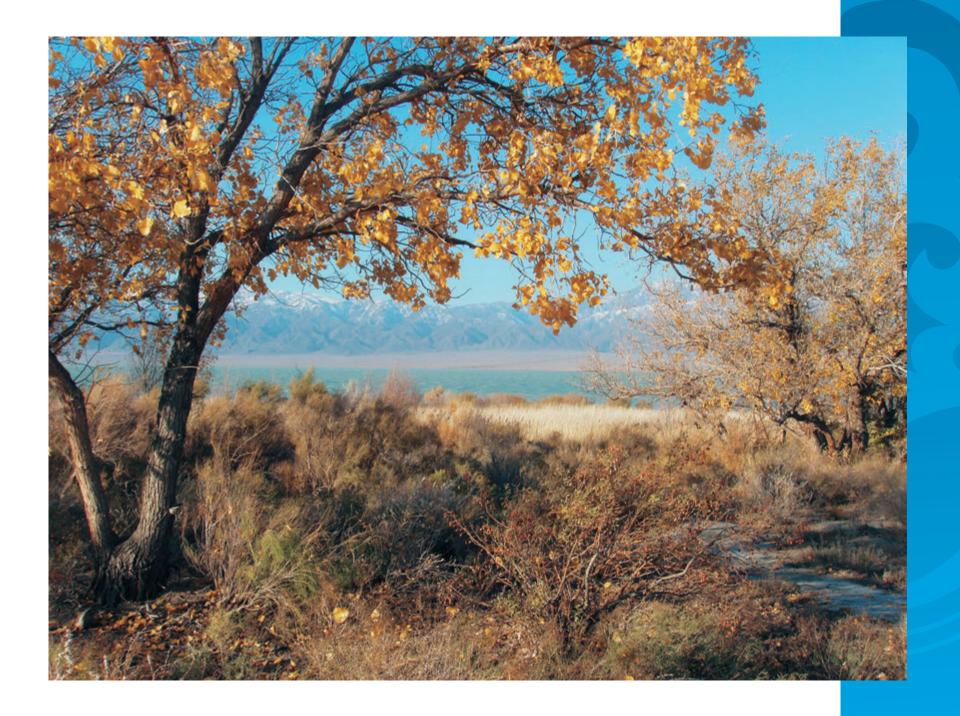
15. 2

The work of ecological education is carried out by the department of ecological education according to the special section of Management Plan – Program of effectiveness increase of eco-education department's activity, and also according to the annual Plan of cultural – educational activities, developed in the beginning of each year and approved by the administration of Nature Reserve. The staff of the Department consists of 4 specialists of the following positions: Department chief, 2 specialists of ecological education and museum chief. Cultural – educational work is partly carried out by staff from Department of Science and Monitoring. Department of ecological education organizes and conducts ecological educational activity in the following directions: work with mass media, publishing activity, museum, ecological excursions, connections with teachers and educational bodies, and also it prepares posters, leaflets and other forms of demonstrational materials and participates in practice organization forstudents of corresponding specialities on the basis of nature reserve.

According to the Program of effectiveness increase of eco-education department's activity, the goal of ecological education is in «establishment of ecological literacy of people, understanding of the key role of protected territory, importance of unique nature's conservation, public support acquisition, raising patriotism and responsibility for the environment and in the result decrease of the pressing on region's biodiversity from local people». The main actions of the Program and annual Plans are:

- work with mass media
- development of publishing activity
- creation of cinema and videoproduction
- initiation of public unions and other NGOs
- ecological tourism and educational tourism using ecological trails
- ecological festivals and activities
- work with schoolchildren
- interaction with teachers and educational bodies
- designing works in arboretum and winter garder, growth of the plant colleciton
- qualification increase of eco-education department's staff
- improvement of material-technical base of eco-education department
- development of Visit-center





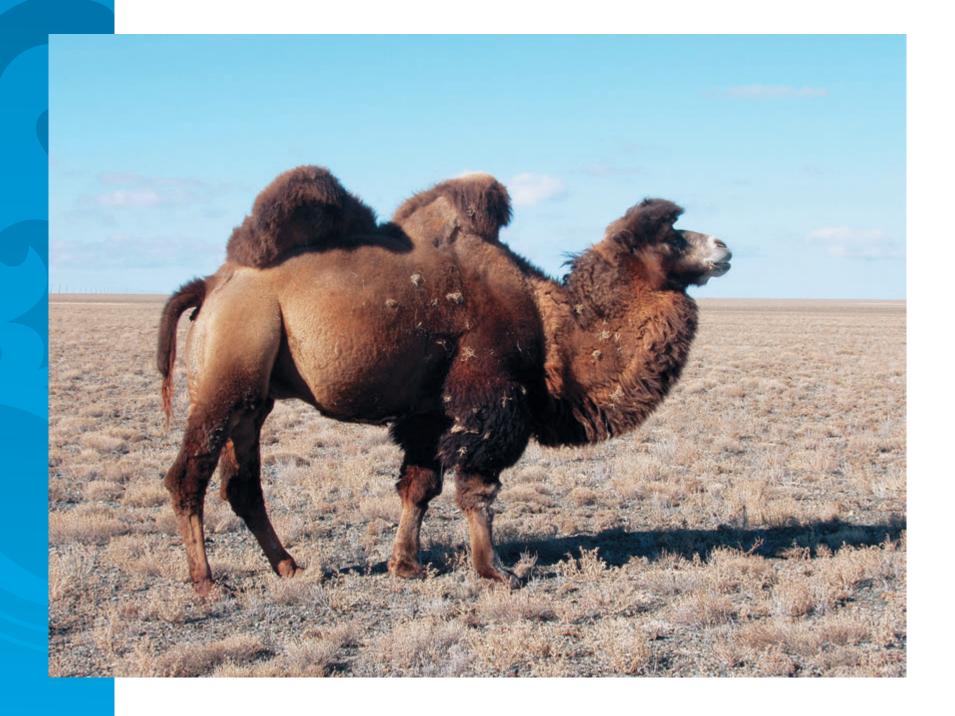


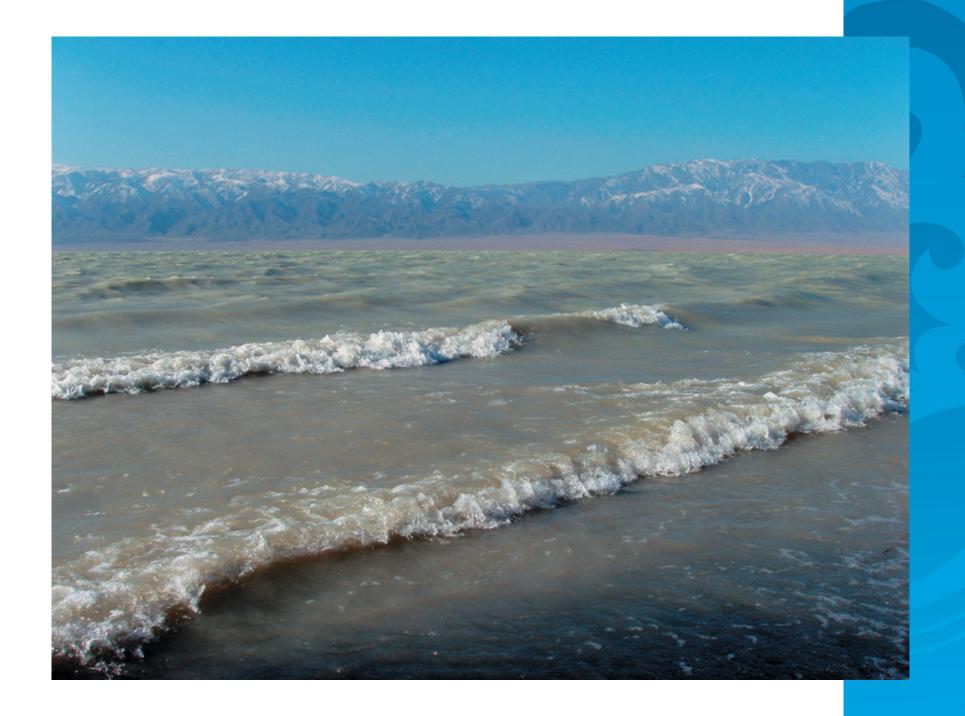
Describe environmental education and public awareness activities, indicating the target group(s):

The measures of ecological education, conducted in Alakol Biosphere Reserve, are the following:

- 1) Work with mass media. Goal: Propaganda of SPNA problems among the people. Target group mass media journalists, etc. Key actions:
- Participation in mass media campaigns and briefings organization;
- Invitation of mass media to annual activities «Open doors day», ecological activity «Park March», festivals «Tulips», etc.
- Organize regular presentations of Reserve's staff in regional and local press and in other mass media types;
- Participate in social TV and radio shows (round table discussions, etc.).
 - 2) Development of publishing activity. Goal: distribution of the information on SPNA and establishment of positive image of SPNA. Target group broad audience. Key actions:
- Development of advertisement poster of A-3 format (1000 pieces). It should contain color illustrations. The text should provide description, its main goals and tasks.
- Cinema and videoproduction's creation
 - 3) Attraction and initiation of public unions and other NGO. Goal: Attraction of NGO to ecotourism works' organization. Target group –national and international NGO. Key actions:
- Create a community of Reserve's friends for SPNA support and help in biodiversity conservation efforts;
- Establish collaboration with public organizations of environmental protection and ecological directions, working in the region.
- 4) Ecological excursions and ecological education. Goal: Opportunity to explore and touch the world of living nature. Target group -local adult population, local and foreign tourists, schoolchildren, students, etc. Key actions:
- Ecotourism concept development;
- Detailed inventory of existing routes;
- Inventarization of necessary resources for existing routes' development;
- Evaluation of necessary investments in infrastructure's development of the existing routes;
- Ecological routes and trails' equipment;
- Description of every route (brochures' publication);
- Publications about tourist routes;
- Routes' advertisement for individual visitors and tour operators.

- 5) Ecological festivals and activities. Goal: Attracting people's attention to modern problems of nature protection. Target group -schoolchildren, students, local adult population, local and foreign touristsetc. Key actions:
- Parks March;
- Wetland Day;
- Birds Day;
- World Environmental Day;
- Childrens' ecological festivals.
- 6) Work with schoolchildren. Goal: establishment of system views of nature reserves as objects of national heritage; positive attitude to all nature's diversity, and widening ecological knowledge scope; establishment of practical ecological skills; raising interest of schoolchildren in nature protective activities by their participation in Reserve's practical activities. Target group –schoolchildren. Key actions:
- Lectures about unique value of SPNA for schoolchildren;
- Organization and conduction of the contests: photography, pictures, posters, theatre, crosswords, articles;
- Support of scintific research and works;
- Organizaiton of round tables and discussions among schoolchildren;
- Creation and organization of school teams' work;
- Introduction of school ecological programs;
- Field practice or excursions on SPNA territory;
- Schoolchildren participation in ecological festivals and activities.
- 7) Interaction with teachers and educational bodies. Goal: Improvement of eco-educational work effectiveness in state nature reserve. Target group –teachers. Key actions:
- Organization of thematic seminars for teachers, first of all for biology and geography teachers;
- Participation in organization and conduction of professional development courses for teachers;
- Creation of study programs and projects with teachers' participation and their further realizaiton;
- Supplying schools with reference and other special literature on the problems of nature protection, conservation
 of biological and landscape biodiversity and historic-cultural heritage, and different demonstrational materials:
 photographs, video films, etc.;
- Methodic consultations for teachers;
- Help in equipment of thematic school classroom;
- Organization of roundtables for school teachers on the modern problems of ecological educational work with the children;
- Development and realization of collaborative ecological educational projects and activities.
- 8) Designing works in arboretum and winter garder, growth of the plant colleciton. Goal: Attract attention and teach local people to create artificial «nature corners» at home and in organizations. Target group -schoolchildren, students, local adult population.







Key actions:

- Support, development and design of arboretum and winter garden;
- Educational seminars on organization and development of «nature corners» on the basis of arboretum and winter garden;
- Plant collection's growth.
- 9) Qualification increase of eco-education department's staff. Goal: Increase effectivenes of eco-education department's work. Target group –Reserve's staff. Key actions:
- Educational seminars, trainings;
- Experience exchange with other SPNA, internships in the best domestic and foreign nature reserves;
- Analysis of foreign experience;
- Improvement and constant renewal of methodic base;
- Promotion of further graduate education of staff.
- 10) Improvement of material-technical base of eco-education department. GoalIncrease effectivenes of eco-education department's work. Target group —Reserve's staff. Key actions:
- Purchase of the equipment.
- 11) Work on the development of Visit-center on the basis of Nature. Goal: Creation of the base for active ecologic educational work with local population and SPNA visitors. Target group -schoolchildren, students, local adult population, local and foreign tourists, etc. Key actions:
- Provide creation of Visit-center and renewal of its expositions:
- Attract potential sponsors for Visit-center construction;
- Provide scientific support of the cetner;
- For nature protection ideas' propaganda among broad audience to organize exhibitions: stationary (photos), temporary (children's paintings, etc.) and mobile.

Indicate facilities for environmental education and public awareness activities [visitors' centre; interpretative programmes for visitors and tourists; nature trails; ecomuseum demonstration projects on sustainable use of natural resources]:

1. Visit-center on the basis of Nature Museum plays an important role in propaganda, informing people about the need to conserve all the diversity of regional ecosystems, and especially Biosphere Reserve's wetlands.

Nature Museum was opened in 2000, it is a place where visitors may get all the information about unique territory of Biosphere Reserve. It is an ecologic educational center not only for local people, but also for tourists. Educational excursions are held there, and popular films about region's nature are shown. In the children's room ecological lessons for schoolchildren are held.

- 3. Arboretum was organized in 2004 for educational activities with pupils and other nature reserve's visitors. There are 439 tree specimens and 55 species of shrubs planted on the territory of arboretum, including endemic species and the ones listed in the Red Data Book of Kazakhstan; also there is a collection of flowers (18 species).
- 4. Winter garden was organized in 2003, in the present time the collection consists of 210 plants of 80 species.
- 5. At the present time there are 5 active ecological routes (water and hiking) and 1 ecological trail on the territory of Biosphere Reserve. Ecological routes (buffer zone) are equipped with one observation tower and several observation sites for birdwatching.

Specialist training

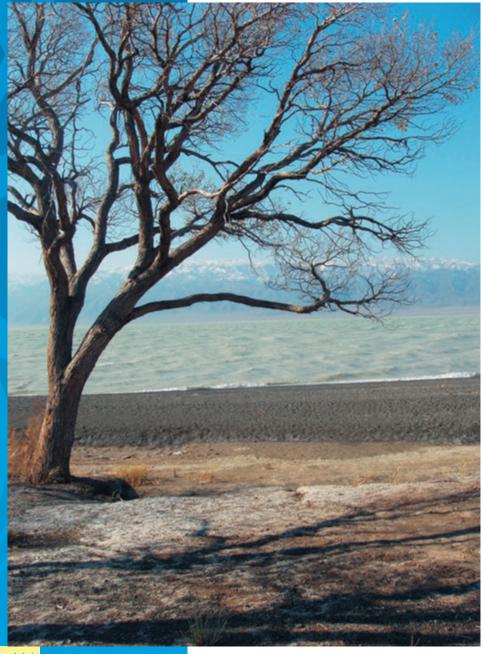
In the last 6 years in the limits of GEF/UNDP Wetlands Project with assistance of «Zapovedniki» Ecocenter (Russia) and Kazakh-Italian Project «Ural River Delta Park» a big work was carried out in training of specially protected natural territory staff. Educational seminars and trainings, work trips for experience exchange were conducted on local, regional and international (Russia, Italy) levels.

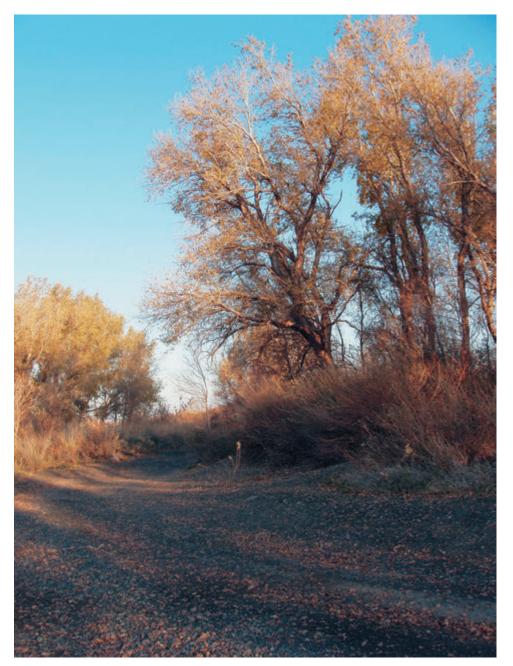
Nature Reserve's staff development. For the period of 2006-2011 staff of specially protected natural territory took part in educational trainings of management plan preparation, biodiversity monitoring, state inspectors were taught to fill out protocols; some seminars were dedicated to fire fighting techniques and safety rules. Besides, nature reserve's staff exchanged experience with Astrakhan Reserve (Russia), Aksu-Dzhabagly Nature Reserve, Karatau Nature Reserve and Korgalzhyn Biosphere Reserve (Kazakhstan). Professional preparation is conducted in order to develop management capacity, work effectiveness in all departments. Every year Department of Science holds its own seminars for inspectors on material collection for Nature Chronicles and mammals and birds counting.

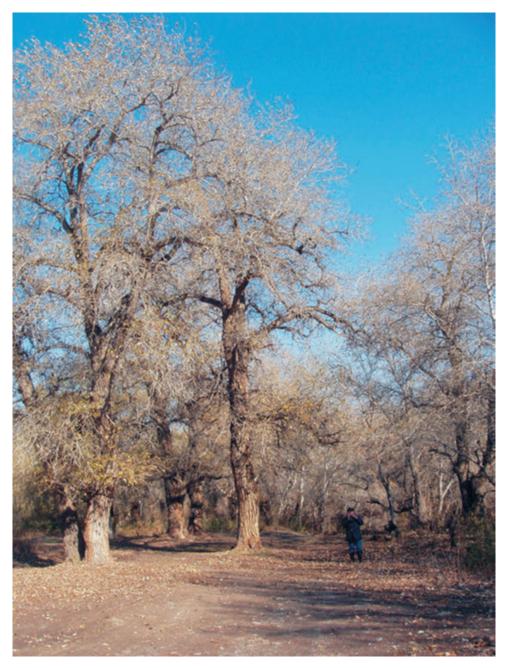
Student education. In the last several years undergraduate and graduate student of Kazakhstan universities carried out their scientific research at the territory of Biosphere Reserve.

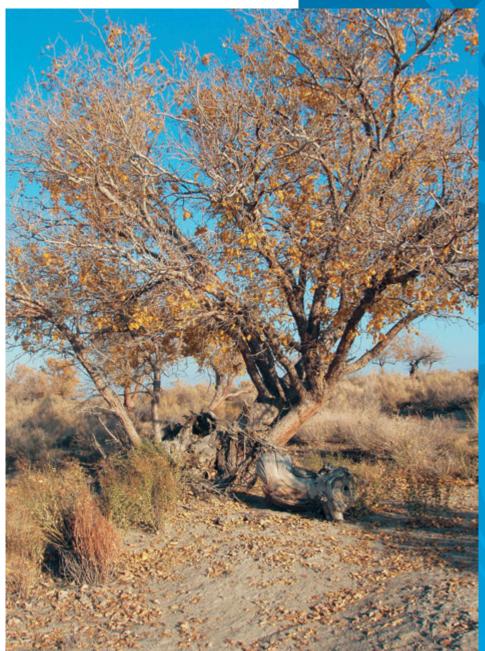
Professional training and seminars for managers and resource planners. In the last 4 years in the frame of GEF/UNDP Project and Kazakh-Italian Project several seminars and experience exchange trips were organized between Alakol Nature Reserve, «Zapovedniki» educational center (Moscow, Russia), Bologna University and Po River Park Reserve (Italy). With the help of Italian company ENI heads of several Kazakh Nature Reserves, representatives of Forestry and Hunting Committee and Ministry of Agriculture had a chance to get acquainted with the peculiarities of nature protective activities in Italy.

15. 3









15. 4

Potential to contribute to the World Network of Biosphere Reserves

On the national level collaboration is established with the first biosphere reserve in Kazakhstan – Korgalzhyn, and at the regional level – with Almaty Nature Reserve, Ile-Alatau National Nature Park (Almaty oblast) and Aksu-Dzhabagly Nature Reserve. On the global level contacts were established with Italian Po River Park Biosphere Reserve in 2011. In this collaboration experience is exchanged, educational excursions and trainings are held.

It is noteworthy that Alakol Biosphere Reserve has very close scientific and organizational connections with other state nature reserves of Kazakhstan, which in the future may also achieve the status of biosphere reserves. On the regional level (Central Asia) it is possible to collaborate with 4 biosphere reserves, such as Sary-Chelek and Issyk-Kul in Kyrgyzstan, Repetek in Turkmenistan and Chatkal in Uzbekistan. IN 2010 administrations of these reserves participated in a workshop in Almaty and duscussed the ways to collaborate at the regional level. In 2011thanks to the work of MAB National Committee Kazakhstan became a member of Eastern Asian (EABRN), South-Asian — Central-Asian (SACAM) and European (EuroMAB, from 2012) networks of biosphere reserves, which allows close contacts' establishment with the nearest biosphere reserves of Russia, Iran, Pakistan, India, China, Mongolia, Korea, Japan and countries of the European Union.

Collaboration with existing biosphere reserves at the national level (indicate on-going or planned activities):

In Kazakhstan collaboration at the national level is carried out with Korgalzhyn Biosphere Reserve, and with other state nature reserves of Kazakhstan.

Collaboration with existing biosphere reserves at the regional or subregional levels, including promoting transfrontier sites and twinning arrangements (indicate on-going or planned activities)

In the present time no collaboration agreements are signed between Alakol Biosphere Reserve and other biosphere reserves at the regional level; the most perspective plan is to sign a collaboration agreement with Chinese biosphere reserves of Xinjiang (bordering territory of Western China), and with biosphere reserves located on the Central-Asian – Indian birds migration route. In the future it is possible to organize transboundary biosphere reserve with Chinese SPNA situated in near-birder Ebi-Nur depression of the same region.

15. 4. 1

15. 4. 2

Collaboration with existing biosphere reserves in thematic networks at the regional or international levels (indicate ongoing and planned activities)

Alakol Biosphere Reserve plans to establish collaboration with all steppe biosphere reserves of Eurasia for exchange of scientific information and experience, and collaborative activities organization. The territory of Alakol Biosphere Reserve is situated at the crossroads of Central-Asian – Indian and Siberian – East-African birds' migration routes, so Biosphere Reserve plans to establish work contacts with all biosphere reserves located on these migration's way which also are sites of migrating birds' aggregation.

Collaboration with existing biosphere reserves at the international level (indicate ongoing and planned activities:



In the present time Alakol Biosphere Reserve has contacts with Italian Biosphere Reserve «Po River Park» in the limits of Kazakhstan – Italian Project supported by Bologna University and ENI company. Since 2010 in the frames of this collaboration meetings of wetland reserves' directors are held both in Kazakhstan and in Italy (about twice a year) for experience exchange and education.

Biosphere Reserve plans to carry out collaborative scientific research of birds' migration with other biosphere reserves connected by migrating bird species in Asia and Africa, and, possibly, in Europe (there were cases when birds ringed in Kazakhstan were caught in Africa and then in Europe).

15. 4. 3

15. 4. 4



16. USES AND ACTIVITIES

Core Area(s):

Describe the uses and activities occurring within the core area(s):

According to legislation of Kazakhstan, the main zone of proposed Biosphere Reserve is nature reserve zone, so all activities are strictly defined according to Article 40 Chapter 7 of the Law «On specially protected natural territories»:

- 1. Land and aviational works for forest and steppe fires prevention and extinguishing is permitted on the territory of state nature reserves.
- 2. Physical bodies' presence on the territory of state nature reserve is permitted only in the presence of permitting documents, excluding state nature reserve's staff and governmental officials in charge of state nature reserves.
- 3. For access to areas, worshiped by religion followers (pilgrimage sites) and situated on nature reserve's territory or out of its limits, state nature reserve's administration in agreement with corresponding religious association may permit free of charge group visit to these areas accompanied by state nature reserve's inspectors using the roads which go through nature reserve's territory.

According to Article 42 Chapter 7 of the Law «On specially protected natural territories» excursion paths and routes for regulated ecological tourism creation is permitted at specially designated areas which do not include especially valuable ecological systems and object in the order established by the authorized body.

Possible adverse effects on the core area(s) of uses or activities occurring within or outside the core area(s):

The main threats to biodiversity in the core zone have natural character and include:

1. Periodic changes in water level in the lakes. Water level increase and decrease influence the stability of aquatic ecosystem's existance, especially shallow water ecosystems. This water level amplitude leads to disappearance of bird colonies on the islands (Relict Gull, Great Black-headed Gull, Herring Gull, Caspian Tern, etc.) and on the delta lakes (Dalmatian and White Pelicans, Eurasian Spoonbill, cormorants, Night Heron). Lake shallowing and drying leads to disappearance of traditional fish spawning areas, decrease of muskrat areas' productivity and waterbirds population numbers. The same phenomena periodically happen in Tentek river delta as well.

- 2. Hard snowy winters happen 2-3 times every 10 years and lead to almost complete extinction of pheasants, chukars, partiridges, and mammal species roe deer and wildboar. In the shallow lakes fish death is occurring.
- 3. Floods are rarely observed at Tentek river, leading to flooding of the lake plain and settlements, death of burrowing mammals and reptiles, nests of most birds which nest on the ground.
- 4. Storms are regularly recorded at Alakol lake. When the wind velocity is more than 30-40 m/sec, low islands are washed with water, leading to death of gulls, pelicans, waders, terns, cormorants' colonies.

Buffer zone(s)

Describe the main land uses and economic activities in the buffer zone(s):

Biosphere Reserve's buffer zone is actually protected zone of Alakol State Nature Reserve, so according to

Article 43 Chapter 7 of the Law «On specially protected natural territories» all activities are strictly regulated: «Different forms of economic activity may be carried out on the territory of state nature reserves' protected zones if they don't negatively influence the condition of nature reserve's ecological systems:

- 1) forestry activity;
- 2) traditional landuse, including cattle pasture and haymaking, as well as other activity in the limits of long-term biodiversity conservation and invulnarability;
 - 3) tourism and recreational activity;
- 4) mineral waters, balneologic and climatic resources use;
 - 5) commercial and sport fishing;
- 6) land and aviational works on forest and steppe fires extinguishing;
 - 7) disturbed lands recultivation;
- 8) forest and other vegetation associations restoration;



16. 2 16. 2. 1



- 9) wild animals' habitat and population restoration;
- 10) use of land areas for tourist sites development, nurseries for artificial reproduction, plantation of endemic, rare and disappearing plant and animal species, and service buildings (cordones) construction for state natural reserve's staff, providing them with service land plots».

Possible adverse effects on the buffer zone(s) of uses or activities occurring within or outside the buffer zone(s)in the near and longer terms:

The main adverse effects on the buffer zone include natural risk factors recorded for the core zone, and some anthropogenic risks:

- 1) Unsustainable use of biological resources, mainly excessive and poorly controlled fishing and hunting;
- 2) Uncontrolled visits of the zone's territory (disturbance factor, tree cutting, local fires, etc.);
- 3) Consumptive water use. Waters, flowing on the Reserve's territory, are the only source of drinkable and technical water of local population. Irrigation systems, built 30-40 years ago, don't have linings and more than 30% of the water is used for transpiration and evaporation.
- 4) Periodic fires also harm nature a lot; they occur due to storms or due to the fault of hunters and fishermen on adjacent territory of transition zone, as well as from local people burning old grass.

Transition area

Transition zone (development, collaboration zone) of Alakol Biosphere Reserve is situated on the territory of two administrative districts of two oblasts, its total approximate area is about 511,300 ha (146 710 ha terrestrial lands). This zone is located on the periphery of especially valuable wetlands and territories in need of protection. Its separate parts, where fishing and hunting take place, are very important sites of regional biodiversity concentration, this is why it is necessary to introduce rational, sustainable nature use regime for these territories as soon as possible. Nature and resource potential of the transition zone is huge. The largest part of this zone is suitable for pasture cattle breeding and agriculture, which is very profitable on the foothill plains' sierozem. Also there are opportunities for introduciton and development of ecologically balanced forms of hunt, fishing and ecotourism. Regulated nature use regime should be introduced on the territory of transition zone and measures should be taken for restoration of ecosystems disturbed earlier. It is also necessary to develop the strategy of tourist and recreational use of natural territories, providing their maximal protection and

permissible level of stresses. Local population's knowledge of region's territory should be used. In this activity field it is possible to increase their employment and economic benefits they receive.

Biosphere Reserve's conception is aimed to improve living conditions of local people with anthropogenic press decrease on natural ecosystems due to alternative economic activities introduction which do not harm the biodiversity. This is why the main long-term goal of Alakol Biosphere Reserve is decrease of the main threats to the environment of this territory.

Describe the main land uses and major economic activities in the transition area(s):

Transisiton zone (zone of development, collaboration) of Alakol Biosphere Reserve is situated on the territory of two administrative districts of two oblasts: mostly in Alakol district (Almaty oblast) and partly in Urzhar district (East-

ern Kazakhstan oblast). Total area of the transition zone is 511,300 ha. This zone is mostly used for haymaking, pasture and agricultural, used by local population for life support and socioeconomic protection.

The largest land users of Alakol and Urzhar districts are agricultural companies with 251,885 ha of the land (including 18,416 ha of arable lands). Other large land users consist of organizations involved in industry. transport, communications and defence; the largest of them are Atasu-Alashankou oil pipeline, Ministry of Defense of RK and Border Service of the Committee for National Security of the Republic of Kazakhstan. Lands. occupied by settlements and adjacent lands for the use of local people (public pastures, cattle trails, etc.) -59,363 ha. Besides, large territories



16. 3. 1



are owned by State Administration of Forests and Animal World Protection Alakol district (lands of the forest fund – 314,786 ha).

In the last decade coastal territories of the transition zone (Alakol and Sasykkol lakes coasts) are actively used by local people building up facilities for summer beach holidays. This primarily concerns settlements on Alakol lake coast-lines – Kabanbay, Karabulak, Koktuma, Akshi, Alakol and Rybachye villages. Wild beach tourism is observed at the long distances of Southern and Western coasts of Alakol and partly Sasykkol lakes.

Large part of transition zone's territory is occupied by pastures, numerous wetlands and villages. It mostly representes region inhabited and used for a long time. It is necessary to organize restoration of renewable natural resources. First of all, it concerns organization of sustainable fishing and hunting.

Possible adverse effects of uses or activities on the transition area(s):

The main threats of the transition zone include natural risk factors stated for the core zone, supplemented by anthropogenic factors:

- Nature protective legislation's violations. Fishing rules are often violated, leading to uncontrolled commercial fishing;
- Unsustainable use of biological resources, mainly excessive poorly controlled fishing, especially on Sasykkol and Koshkarkol lakes; significant death of waterbirds in nets, reaching 150,000-200,000 birds every year;
- · Poaching, caused by elimination of district hunting inspections and ranger service of hunting communities;
- Increasing recreational press on lake coast due to beach tourism development, especially in Kabanbay, Koktuma, Akshi, Alakol and Rybachye villages' area;
- Spontaneous building in resort zones of Western and Eastern coasts of Alakol lake;
- Waste pollution of beach areas of lake coasts, especially Alakol lake;
- Significant water withdrawal from Tentek, Zhamanty, Karakol, Yeginsu rivers for field irrigation, leading to destabilizing influence on hydro-ecosystems and animal world, especially in delta water reservoirs of Tentek;
- Winter death phenomena on Tentek delta water reservoirs, caused by water withdrawal;
- Cattle pasture in flood-land ecosystems, leading to degradation of soil-vegetation cover;
- · Cutting of flood-land forests;
- Fires, especially harmful for fauna and flora of flood-land tugays and delta water reservoirs.

INSTITUTIONAL ASPECTS 17.

STATE, PROVINCE, REGION OR OTHER ADMINISTRATIVE UNITS:

Republic of Kazakhstan, Almaty oblast and East Kazakhstan oblast, Alakol district and Urzhar district

UNITS OF THE PROPOSED BIOSPHE RERESERVE:

- 1. Core zone territory of Alakol State Nature Reserve.
- 2. Buffer zone a two-kilometer stripe of the land embracing the perimeter of the core zone of biosphere reserve. Buffer zone includes the lands of nature reserve's protection zone and consists of the lands of agricultural use and reserved lands. Part of agricultural lands are used for pastures and haymaking in accordance with governmental authorized body and under the control of administration of Alakol State Nature Reserve.
 - 3. Transition zone of development. Agricultural lands, state reserves lands, settlements.

Are these units contiguous or are they separate?

Alakol Biosphere Reserve is not a cluster biosphere reserve and is presented as one whole territory.

Protection Regime of the core area(s) and, if appropriate of the buffer zone(s)

Core area(s):

The core zone of biosphere reserve is the territory of Alakol State Nature Reserve. Nature reserve corresponds to the 1A category of IUCN nature protection territories. According to Article 40, chapter 7 of the Law of RK «On specially protected natural territories», nature reserve protection regime is established on the territory of state nature reserve.

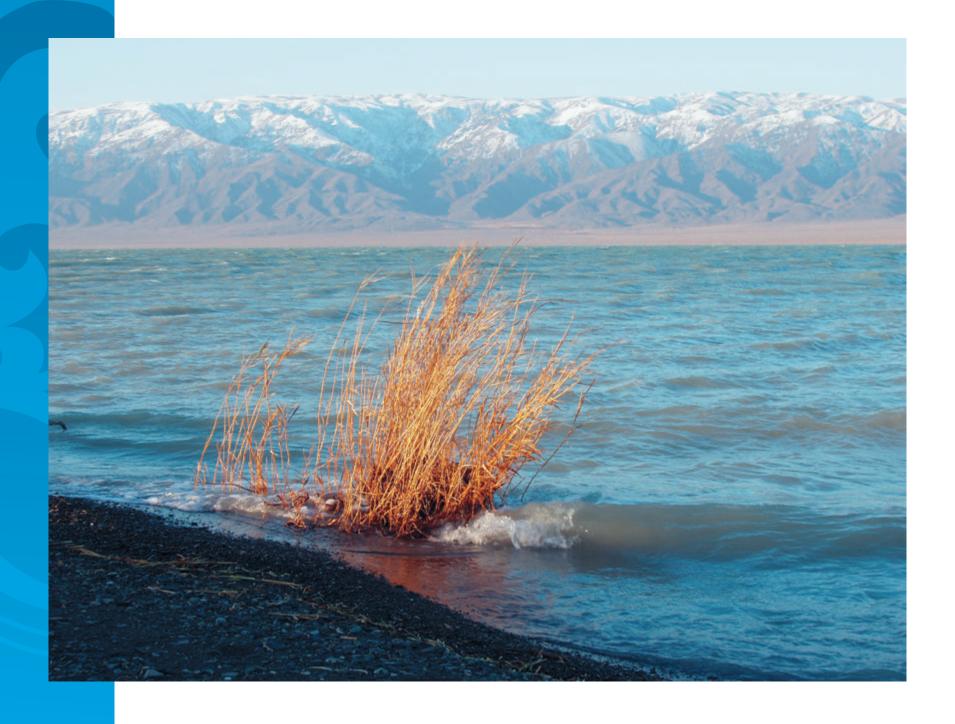
17. 1

17. 2

17. 2. 1

17. 3

17. 3. 1







In March 2003 Regulations of state institution «Alakol State Nature Reserve» came into effect; it was approved by the Order № 44 of Forestry and Hunting Committee under the Ministry of Agriculture as of March 21, 2003. In the present time the area of the core zone is 19,712.9 ha.

The main title documents are:

Resolution of the Government of RK № 335 as of April 24, 1998 «About establishment of Alakol State Nature Reserve on the territory of Almaty and Eastern Kazakhstan oblasts» on the area of 12,520 ha,

Certificate of state registration of legal body – State institution «Alakol State Nature Reserve» of the Forestry and Hunting Committee under the Ministry of Agriculture of the Republic of Kazakshtan # 160-1907-ГУ, issued by the Department of Justice of Almaty oblast, Justice Administration of Alakol district as of March 13, 2009,

Resolution about state institution «Alakol State Nature Reserve», approved by the Order № 44 of Forestry and Hunting Committee under the Ministry of Agriculture as of March 21, 2003,

And also 4 state acts of ownership of land plots:

- 1) cadastre number of the land plot # 03-255-150-101, chief of Alakol District Committee of Land Resources Management, A.T. Idrishev, February 23,1999. № 818, area 17,422.9 ha.
- 2) cadastre number of the land plot # 05-248-054-001, chief of Urzhar branch of Eastern Kazakhstan Committee of Land Resources Management, S.K. Igenbayev, July 4,2001. № 916, area 148 ha.
- 3) cadastre number of the land plot # 05-248-054-002, chief of Urzhar branch of Eastern Kazakhstan Committee of Land Resources Management, S.K. Igenbayev, July 4, 2001. № 914, area 23 ha.
- 4) cadastre number of the land plot # 05-248-054-003, chief of Urzhar branch of Eastern Kazakhstan Committee of Land Resources Management, S.K. Igenbayev, July 4, 2001. № 915, area 2119 ha.

Buffer zone(s):

Biosphere Reserve's buffer zone corresponds to nature reserve's protection zone (two-kilometer stripe along nature reserve's perimeter). According to Article 42 Chapter 7 of the Law «On specially protected natural territories» a special protection regime is established in protection zone of state nature reserve, permitting different forms of economic activity on this territory which do not negatively influence the condition of nature reserve's ecological systems.

Besides the Law of Kazakhstan «On specially protected natural territories» the main title documents regulating management of Biosphere Reserve's buffer zone (besides Certificate of state registration, Provisions on Alakol State Nature Reserve and State act on land plot possession) are:

1) Decree № 1-13 of Alakol district Akimat «On protected zone establishment of state institution «Alakol State Nature Reserve» on the territory of Alakol district of Almaty oblast» as of January 19, 1999 with area of 21,547 ha, including 4,400 ha of waters of Sasykkol lake,

2) Decree № 946 of Eastern Kazakhstan oblast Akimat «On protected zone establishment of state institution «Alakol State Nature Reserve» on the territory of Urzhar district of Eastern Kazakhsatn oblast» as of November 17, 2000 with area of 5,130 ha.

Land use regulations or agreements applicable to the transition area (if appropriate)

All lands of transition zone are administered bylocal regional Akimats. Besides, all private and state land users have their own state acts of land plots possession. Legal entities also have Certificates of state registration and Charters, regulating all activities of these organizations.

Land tenure of each zone:

Core area(s):

Main zone's territory is in state possession (national property) and administered by authorized state body – Forestry and Hunting Committee of Ministry of Agriculture of Kazakhstan. Main zone territory is managed by Alakol State Nature Reserve.

Buffer zone(s):

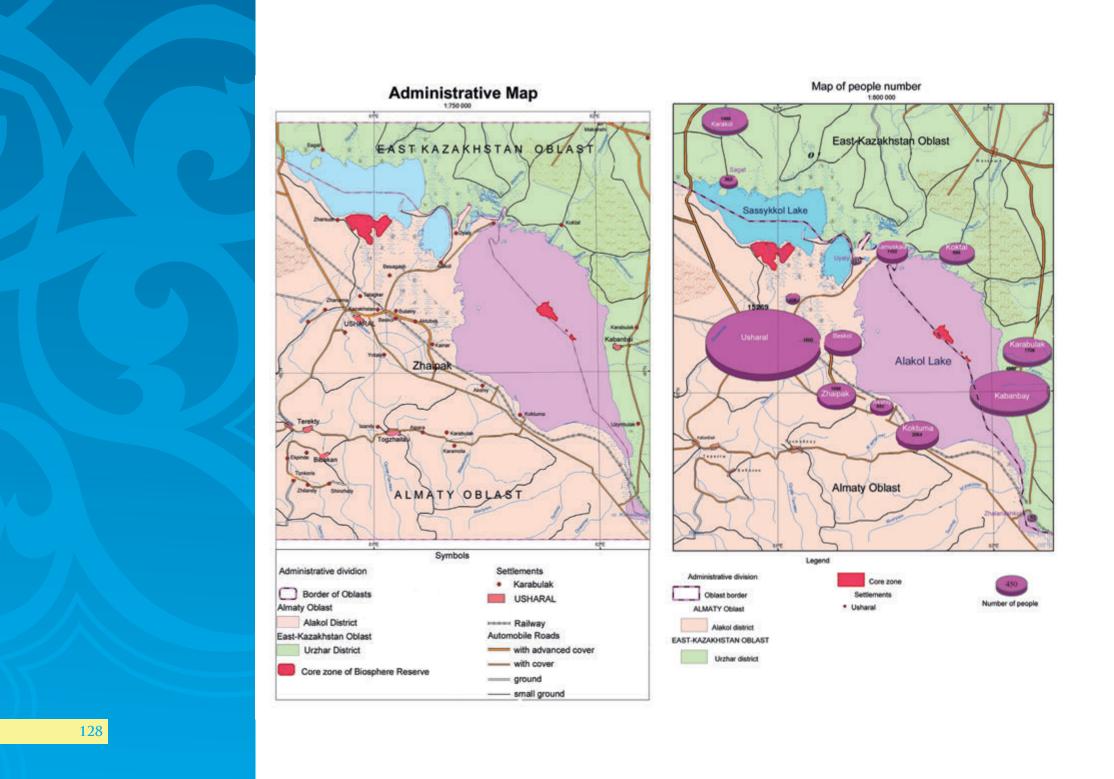
Buffer zone lands are national (state) property and consist of agriculture and reserve lands. Agricultural lands are used by farmers. Inconsiderable part of buffer zone is in private possession of peasant farms, but land use for pasture and hayfields is controlled by nature reserve's administration. Buffer zone is administered by authorized state body – Forestry and Hunting Committee of Ministry of Agriculture of Kazakhstan. As a whole, the territory of buffer zone is controlled by Alakol State Nature Reserve.

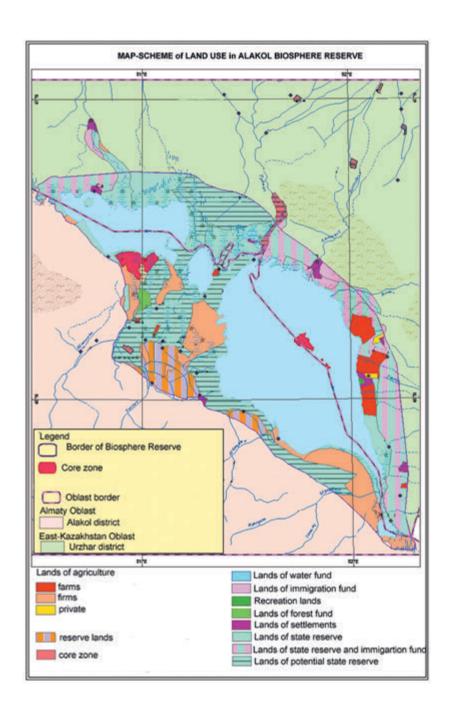
17. 4

17. 5

17. 5. 1

17. 5. 2





17. 5. 3

17. 5. 4

17.6

17. 6. 1

Transition area(s):

The territory of transition zone is divided between different owners. Most part of the lands is state property and is administered by district/regional Akimats, including lands of state reserve, agricultural lands, settlements and governmental institutions. The rest of the territory is owned by private organizations – joint-stock companies and limited liability companies, and peasant farms.

Local authorities play considerable role in activity coordination of different state and private organizations in the limits of administrative unit, in collaborative operational plans on bioresources conservation, fire prevention and emergencies and in ecological education of population.

Foreseen changes in land tenure:

No special programs on state lands privatization or private lands deprivatization are foreseen in the nearest 10 years.

Management plan or policy and mechanisms for implementation

In the present time Integrated Management Plan of Biosphere reserve represents simple composition of Management Plan of Alakol State Nature Reserve which is directed for the main and buffer zones of Biosphere Reserve development, and management plans of other nature users. Special Management Plan for Biosphere Reserve territory is not developed, there is not need for it at the present stage of Biosphere Reserve development. Nature users of protected and transition zones have their own management plans and all controversial issues are solved at the Coordinational Council of Biosphere Reserve sessions.

Generally, management of Biosphere Reserve is conducted through Coordinational Council of Alakol Biosphere Reserve, which is a coordinational management organ created to promote sustainable resources use policy, provide collaboration and overcome contradiction between state nature reserve and local people.

Indicate how and to what extent the local communities living within and next to the proposed biosphere reserve have been associated with the nomination process

During the last three years the idea of Biosphere Reserve organization is often discussed between Alakol State Reserve administration, Akimats, local nature users and people. The main topics of this discussion are the following:

how with biosphere reserve organization influence biological resources conservation and use, local regions' economic potential and educational level increase, and how will local population participate in Biosphere Reserve's management and nature protection iniciatives. To the present date local people see Biosphere Reserve only as a mechanism to overcome conflicts between nature reserve and nature users, and also as a mechanism for development of ecotourism and sustainable nature use.

The idea was created by nature reserve's staff, Kazakhstan National Committee of UNESCO and ISESCO, GEF/UNDP Wetlands Project, scientists of Kazakhstan scientific research institutes. These ideas were discussed at different work meetings, seminars, ecological festivals with participation of local people an at specialized scientific conferences in 2010-2012. Final decision of nomination preparation was announced at regional scientific-practical conference of UNESCO in Almaty in May, 2010 at the meeting of MAB national committees representatives, chiefs of nature reserves'—potential biosphere reserves.

Main features of management plan or land use policy

The main goal of Alakol Biosphere Reserve is to conserve typical, rare and unique natural complexes with all the entiry of their components in their natural condition, as well as support stable social-econoic development of the territory on the basis of ecologic-economical principle of nature resources' use.

The main long-term goal of Alakol Biosphere Reserve is integrated sustainable management of the territory, providing typical and unique ecosystems and biological diversity conservation with simultaneous development of local social-economic potential leading to local people's living standards increase.

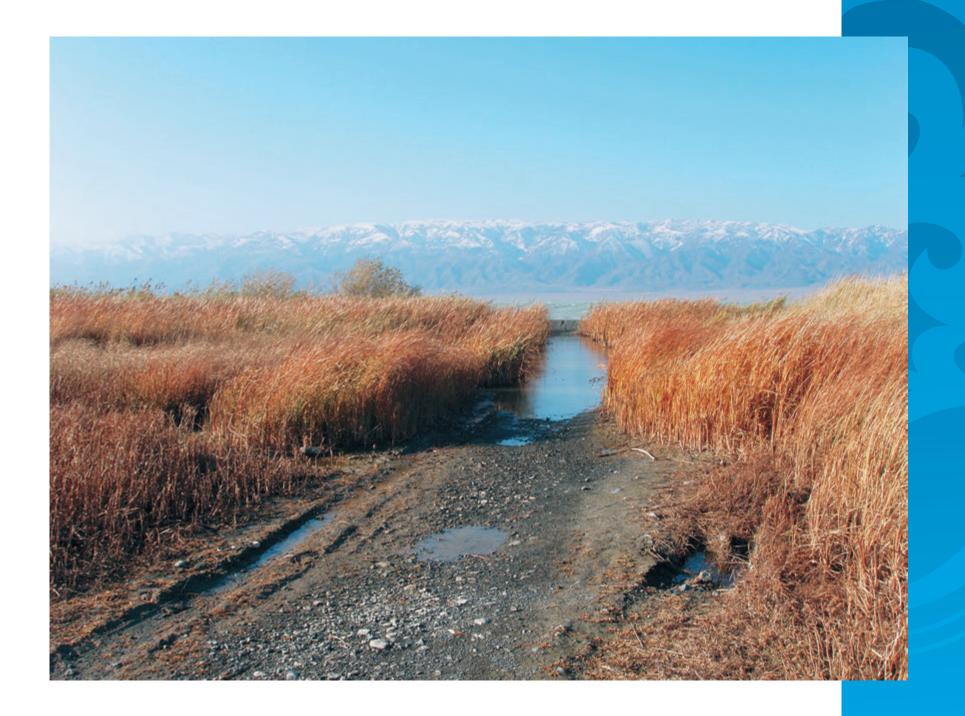
Short-term goal of Biosphere Reserve is conservation of typical, rare and unique natural complexes with entire set of their components in natural condition, as well as organization of territory management mechanisms allowing prevention of natural resources depletion and support their sustainable use by local people.

Local population sees the necessity of nature riches' conservation for future generations. Due to this one of Biosphere Reserve's objectives is ecological education of local people, raising the responsibility for nature environment conservation. Nature reserve regime, established about 15 years ago, formed special attitude and respect to nature reserve in local people's mind, although consumerism concerning nature reserve's resources is still observed.

Generally, biosphere reserve conception development will help local people increase their ecological competence level, arouse responsibility to the descendants for biodiversity conservation, establish ecologically-friendly methods of local natural resources use, and allow nature reserve staff finding more effective region's biodiversity conservation mechanisms.

17. 6. 2





17. 6. 3

The designated authority or coordination mechanisms to implement this plan or policy

Authorized management coordination organ of biosphere reserve is Coordinational Council of Alakol Biosphere Reserve. This organ is coordinational collegial public body and is created for introduction of effective management and sustainable resource use policies, introduction of alternative activity types, resource-conserving and resource-renewable technologies. Coordinational Council consists of representatives from Alakol State Nature Reserve, local nature users and public organizations, administration of Alakol district of Almaty oblast, administration of Urzhar district of Eastern Kazakhstan oblast (Akimats), regional territorial Department of Fishing and regional Association of Hunters and Fishermen. Coordinational Council was organized in 2012 on the basis of extended Scientific – Technical Council of Alakol Nature Reserve.

17. 6. 4

The means of application of the management plan or policy

In the present time all questions concerning Biosphere Reserve management are solved at Coordinational Council sessions. Its sessions are used for addressing the problems of development and whole territory's management, biodiversity conservation and conflicts between nature users and nature reserve's administration. Council decisions are mandatory for all local organizations and private land users.

17. 6. 5

Indicate how and to what extent the local communities participate in the formulation and the implementation of the management plan or policy

Local societies and private land users are represented in both Councils through their elected authorities representatives, local NGO or directly as its members. All Councils members have equal rights in decision-making voting.

17. 6. 6

The year of start of implementation of the management plan or policy

2012 is the year of Biosphere Reserve policy realization, after official decision announcement of its organization in 2010.

Financial source(s) and yearly budget:

(The only yet) financial source of Biosphere Reserve is state (national) budget (through Alakol State Nature Reserve). Approximate annual budget in Kazakhstan tenge is about 60,000,000 tenge.

Authority(ies) incharge

Alakol State Nature Reserve is authority in charge of Biosphere Reserve at the present time.

The proposed biosphere reserve as a whole:

Forestry and Hunting Committee under the Ministry of Agriculture of Kazakhstan.

Alakol State Nature Reserve
Akimat of Alakol district of Almaty oblast
Akimat of Urzhar district of Eastern Kazakhstan oblast
Local associations (nature users)
If appropriate, name the National (or State or Provincial) administration to which this authority reports:
Forestry and Hunting Committee under the Ministry of Agriculture of Kazakhstan.

The core area(s):

Name(s): in Russian: Алакольский государственный природный заповедник - Alakol State Nature Reserve Legal powers: All necessary legal powers for supporting strict nature reserve regime are in accordance with Article 40 Chapter 7 of Law «On specially protected natural territories».

The buffer zone(s)

Name: Alakol State Nature Reserve

Legal powers (if appropriate): Main legal powers for administration - Alakol State Nature Reserve.

Legal powers for limited economic activity by agreement with Forestry and Hunting Committee of Ministry of Agriculture of Kazakhstan and under control of Alakol State Nature Reserve: Akimat of Alakol district of Almaty oblast, Akimat of Urzhar district of Eastern Kazakhstan oblast.

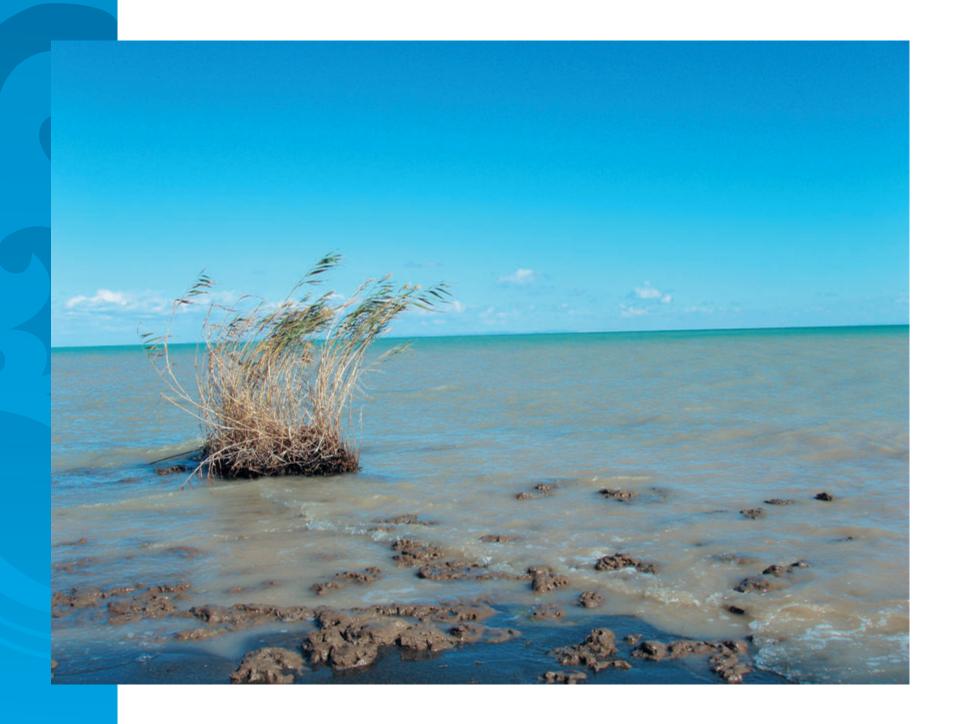
17. 7

17.8

17. 8. 1

17. 8. 2

17. 8. 3







18. SPECIAL DESIGNATIONS:

Name:

RAMSAR Conventionon Wetlands
«Alakol-Sasykkol Lakes System»has been designated as a Wetland of International Importance
№ 1892at 25November 2009



This is to certify that

Alakol-Sasykkol Lakes System

has been designated as a

Wetland of International Importance

and has been included in the List of Wetlands of International Importance established by Article 2.1 of the Convention. This is site No.:1892

Date of designation: 25 November 2009

Secretary General Convention on Wetlands

Other internationa/regional I conservation conventions/directives

Long term monitoring site

Meteorological and hydrological monitoring have been conducted in the BR Alakol since 1948 with the founding of the first weather station in Usharal. Monitoring and observation were conducted by research department of Alakolreserve since 1999 in response to the annual component of the "Chronicle of Nature" at the standard unified program.

SUPPORTING DOCUMENTS 19.

- (X) General location map
- A GENERAL LOCATION MAP of small or medium scale must be provided showing the location of the proposed Biosphere Reserve, and all included administrative areas, within the country, and its position with respect to major rivers, mountain ranges, principal towns, etc.
- (X) Biosphere Reserve zonation map [large scale, preferably in black & white for photocopy reproduction] [A BIOSPHERE RESERVE ZONATION MAP of a larger scale showing the delimitations of all core area(s) and buffer zone(s) must be provided. The approximate extent of the transition area(s) should be shown, if possible. While large scale and large format maps in colour are advisable for reference purposes, it is recommended to also enclose a Biosphere Reserve zonation map in a A-4 writing paper format in black & white for easy photocopy reproduction. It is recommended that an electonic version of the zonation map be provided]
- (X) Vegetation map or land cover map [A VEGETATION MAP or LAND COVER MAP showing the principal habitats and land cover types of the proposed Biosphere Reserve should be provided, if available].
- (X) List of legal documents (if possible with English or French translation)
 [List the principal LEGAL DOCUMENTS authorizing the establishment and governing use and management of the proposed Biosphere Reserve and any administrative area(s) they contain. Please provide a copy of these documents, if possible with English or French translation].
- (X) List of land use and management plans [List existing LAND USE and MANAGEMENT PLANS (with dates and reference numbers) for the administrative area(s) included within the proposed Biosphere Reserve. Provide a copy of these documents]

ЖЕР УЧАСКЕЛЕРІНІҢ БӨТЕН МЕНШІК ИЕЛЕРІ ЖӘНЕ ЖЕР ПАЙДАЛАНУШЫЛАРЫ ПОСТОРОННИЕ СОБСТВЕННИКИ ЗЕМЕЛЬНЫХ УЧАСТКОВ И SEMПЕПОЛЬЗОВАТЕЛИ

Thought, ra	Жей учаскалернің меназк мелернің хоне жар найдалануылырдың атары Наименсевния собственников землалыны участове и землетогласытелей	ослардағы е на плане

Запись о выдаче настоящего акта произведена в Книге записей актов на право себетвениети на праводение и праводение на праводение овлись о выдаче настовацего акта произведена в Книге записей актов на право собственности на земельный участок, право постоянного земленохызования за No. 916.



жер ресурстарын басқару жөніндегі комитеттің ватык жер ресурстарын баскару жинидег комитетты; Урхар филиальның бастығы К Урожарского филиала ВК Областисго комитета по управлению земельными ресурсами

А.Э.А.Т. С.К. Игенбаев Ф.И.О.

4 - 07 2001 x

жер учаскесьнің құқылың тіркеу туралы белгісі Отметка о регистрация права на земельный участок.

ГЫНЫН 2011-2015 ЖЖ.

-ot		TAKBER TAKBER		TAYEST MY
алакол мемлен Алакол мемлен Аралығындағы	WOI KOI	BI WHIH	25.04.36	THE REPEREMENT
a_16_0_	TABILLI WE	VIET OCHAPPA	Klar	
8	TIK TAB SEPTIE	TI KOCI		rest
-51	ETTA TANKS	F Da W MESH	THOU	Targetto.
**EMILE	CHIBERCAFBIT	Куны нази		
wall me arb	AT CLIM BA	7	26.00	MENCES ASSESSMENT
AJIANOCHHAM	E BACH	A TAGRERY	WOLFEL MILES	THE PERSON
Hear Hell va	Wal-	марит Корак табигат эксэкуйслерінде жаткан өзгеріст	-i fortime? vool	
APA	Thenes opensayes	THOUSE WOOD WINDS	repair	
	THE LAND THE PARTY AND	MAXCALMEST LA	Form In-	рестиштерин мум корсетиели
Openiany	serensiary Filther, as	3631 No.	A STATE AND AND	-1 KOCCO -11
	WINDSHIP WILLIAM TON	HIERTER THE		
THE MEETING	фекторами фекторами жана жананата болька	at the second		
GARIN RIVE	PARTICIACIONAL PROTECTION MOTERNA PROTECTION OF THE PROTECTION OF	Caractey.		осімлік түріні жақ дайы жоғына
THEOREM RECOGNIS		T. Marie	MANUACHMAN REGISTAL SEPTICY.	SCI WING MONEY
THE TAXABLE DESCRIPTION OF THE PARTY OF THE	Par Court	N To Will	AND SEPTICY.	ATTACKES SKRAPS
1. «Тибитит жылыма быгарымысы бойынны быгары корыпының	ratification of the same of th	ткерлер от акпарат казіргі жаг	TANSAN SEPT. TAPATYAN SERIE TAPATYAN SERIE	4 21/31114 4 26 21 W
I. « I mornichi Donna	- LEDGE	W. anziabaz M. anziabaz Mezintel mat	THE PLANTER	жиналалы корык аумагы
CAPTED THE PARTY OF THE PARTY O	No. of the last of	W. SKINY KILLY	Confession of the Confession o	MAN THE MY MAN
Om to and Koban and Kilder	Filling	Ozapa	CM 7/20 4330334	Kobres
Ger Appendict Office Assets As	TO TK OKATEK MARK	Osabana Ovabana Osabana Kasab	каглайын	
Land M. Control of Con	THE REPORT OF THE PARTY OF THE	And Comment of Asia	124 A.	



ЗЕМЛЕПОЛЬЗОВАНИЯ:

игат қорығы, вкол ауданы,

жер учаскесін пойдалонудағы шектеулер мен ауыртпашылықтар: ҚР мер учаскося пакашландагы шектеулер мен ауыртташалақтар. қу 15,07,97ж. №162″Ерекше қорғалатың табиғат ауыақтары "Заңының 35 бабына сойжес ерекше қорғау режимі Жер учаскесінің бөлінілуі - бөлімбейді

Актиен берілу негізі ҚР Үкіметінің 1998 жылғы 21 сәуірдегі Ne 355 каулысы

Кадастровый номер земельного участка (код) 05-248-054-001

Землегогьзователь Алакольский государственный природный заповодник, Республика Казахстан, Алматинская область, Алакольский район, город Ушарал

Право на земельный участок - постоянное землепользование

Площадь земельного участка - 148.0 га.

Целевое назначение земельного участка - для охраны государственного природно-заповедного фонда

Ограничения в использовании и обременения земельного участка: режим особой охраим, согласно ст.35 Закона РК "Об особо охраняемых природных территориях от 15.07.97 г. № 162

Делимость земельного участка - неделимый

Основание выдачи акта постановление Правительства РК от 21 апреля 1998 года № 355



No 0035542

Жер учаскесінің ЖОСПАРЫ ПЛАН земельного участка

Учаскенен орналаскан жері Шығыс Қазақстан облысы, Үржар әуданы, Алакол кәлі, Кішкене-Аралтобе аралы Местоположение участка Восточно-Казахстанская область, Урджарский район, оз.Алаколь, о.Кишкене-Аралтобе

Учистов № 1 (о.Какимене-Аралтобе)



Elecapathopasis, western travel А дан Б дейін Алматы облысының аумагы Б дан А дейін Алакол кылын аквалориясы CHACTOME CHECKECTE от А до Б территории Алматинской области от Б. до А инватория со Алеколь

Масштаб 1: 25000



No 0035543

жөр учаскесінің кадастрлік нөмірі (коды) 05-248-054-002

Жер пайдаланушы Алакол мемлекеттік табигат қорығы, Қозақстан Республикасы, Алматы облысы, Алакол ауданы,

жер учаскесінің құқығы - тұрақты жер пайдалану

Жер учаскесінің көлемі - 23.0 га.

жөр учаскесін пайдалану нысаны - мемлекеттік табиғат қорықтық

жер учаскесін пайдаланудағы шектеулер мен ауыртпашылықтар: ҚР л.ор учаскени пандалануршкы алектеулер мен ауыргаашылыктар. А.Р. 15.07.97ж. Ns162"Ерокше коргалатың табиғат аумақтары "Заңының 35 бабына сәйкес ерекше қорғау режимі Жер учаскесінің бөлінілуі - бөлінбейді

Актінаң берілу негізі ҚР Үкіметінің 1998 жылғы 21 сәуірдегі №

Кадастровый номер земельного участка (код) 05-248-054-002

Землетого зователь Алакольский государственный природный заповедиик, Республика Казахстан, Алматинская область, Алакольский район, город Ушарал

Право на земельный участок - постоянное землепользование Площадь земельного участка - 23.0 га.

Целевое назначение земельного участка - для охраны государственного природно-заповедного фонда

Ограничения в использовании и обременения земельного участка: ограмм особой охрамм, согласно ст.35 Закона РК "Об особо охраняемых природных территориях" от 15.07.97 г. № 162 Делимость земельного участка - неделимый

Основание выдачи акта постановление Правительства РК от 21 апреля 1998 года № 355





(X) Species list (to be annexed)

[Provide a LIST OF IMPORTANT SPECIES (threatened species as well as economically important species) occurring within the proposed Biosphere Reserve, including common names, wherever possible.]

(X) List of main bibliographic references (to be annexed)

[Provide a list of the main publications and articles of relevance to the proposed biosphere reserve over the past 5-10 years].

20. ADDRESSES

Contact address of the proposed biosphere reserve:

Name: Alakol Biosphere Reserve Street or P.O. Box: 32 Kabanbai batyr Str.

City with postal code: Usharal City, Alakol district, Almaty Province, 040200

Country: Kazakhstan

Telephone: +7 728 332 3597 / +7 728 332 2147

Telefax (or telex): +7 728 332 5119 E-mail: +2 alakol_gpz@mail.ru

Web site:

Administering entity of the core area:

Name: Alakol State Nature Reserve

Street or P.O. Box: 32 Kabanbai batyr Str.

City with postal code: Usharal City, Alakol district, Almaty Province, 040200

Country: Kazakhstan

Telephone: +7 728 332 3597 / +7 728 332 2147

Telefax (or telex): +7 728 332 5119 E-mail: alakol_gpz@mail.ru

Веб-сайт: http://www.fhc.kz/forest/25/4815/

Administering entity of the buffer zone:

Name: Alakol State Nature Reserve

Street or P.O. Box: 32 Kabanbai batyr Str.

City with postal code: Usharal City, Alakol district, Almaty Province, 040200

Country: Kazakhstan

Telephone: +7 728 332 3597 / +7 728 332 2147

Telefax (or telex): +7 728 332 5119 E-mail: alakol_gpz@mail.ru

Веб-сайт: http://www.fhc.kz/forest/25/4815/

20. 2

20. 3



Annex to Biosphere Reserve Nomination Form, February 2004 MABnet Directory of Biosphere Reserves Biosphere Reserve Description

Administrative details Country: Kazakhstan Nameof BR: Alakol

Year designated: (to be completed by MAB Secretariat) Administrative authorities: Alakol State Nature Reserve

Name Contact: Coordination Council

Contact address: 32 Kabanbai batyr Str., Usharal City, Alakol district, Almaty Province, 040200 Kazakhstan

Related links (web sites):

Description

General description: (Site characteristics in 11.1; human population in 10; land management units in 17.2)Approximately 25 lines

Alakol Biosphere Reserve is located in the desert zone of Eurasia in the central part of Alakol inter-mountain depression which is limited by Southern reaches of Tarbagatai mountains from the North and Dzhungarian Alatau from the South. Territory of Biosphere Reserve is characterized by rare combination of different ecosystem and landscape types on relatively small territory and represents ephemeroid – *Artemisia* deserts, steppifies cereal – *Artemisia* deserts and true deserts; central part of Biosphere Reserve is occupied by the lakes with hydromorphous meadow and marshy vegetation at its periphery and marshy lowland with a system of delta channels. In botanic-geographical concern the territory of Biosphere Reserve is situated in the transition zone between Dzhungarian and North-Turan desert types, which explains the existence of unique plant associations and their combinations. There are 58 ecosystem types on the Reserve's territory, included in three orders: terrestrial natural, terrestrial anthropogenically transformed and aquatic ecosystems. Human population of proposed biosphere reserve: Core area –no population, about 10-30 nature protectionists working inside core area simultaneously (staff of Alakol State Nature Reserve), Buffer zone - 10-30 nature protectionists, Transition Area - about 33,000 people.

Units of the proposed biosphe rereserve: Alakol Biosphere Reserve is not a cluster reserve and is presented in one whole territory.

- 1. Core zone the territory of Alakol State Nature Reserve, area 19,712.9 ha. Title document: Resolution of the Government of RK № 335 as of April 24, 1998, and Resolution (Charters) of Alakol State Nature Reserve.
- 2. Buffer zone corresponds to the protective zone of state nature reserve and consists of agrucultural lands and lands of reserve. Its area is 26,667 ha. Part of agricultural lands is used for pastures and haymiaking in accordance with

state authorized body and under the control of Nature Reserve's administration. The main title documents are Resolution of the Government of of RK № 335 as of April 24, 1998 and Decree № 946 of Eastern Kazakhstan oblast Akimat as of November 17, 2000 about the establishment of two-kilometer protective zone along the border of nature reserve.

3. Transition zone of development – agricultural lands, lands of state reserve, settlements. All lands of transition zone are administered by Akimats of Alakol district (Almaty oblast) and Urzhar district (Eastern Kazakhstan oblast). All private and state land users have their own state acts of land plots possession. Total terrestrial area of transition zone is 146 710 ha (511,300 ha with water areas).

Major ecosystem type: Reed thickets, lakes' shallow waters, meadows and shrub thickets along rivers, and virgin desert ecosystems.

Major habitats & land cover types: terrestrial hydromorphous ecosystems of meadow vegetation on meadow soils / pastures (Regional); aquatic ecosystem of saline lakes / hunting and fishing areas (Regional); terrestrial automorphous cereal – Artemisia deserts / agricultural lands (Regional).

Location (latitude & longitude): N 46°11' / E 81°46', north border - N 46°45', south - 45°22', west - E 80° 29'and east - 82°25'.

Area (ha):

Total: 193 089,9 ha (or 529 300 ha with water areas)

Core area(s): 19 712,9 ha Buffer zone(s): 26 667 ha

Transition area(s) (when given): 146 710 ha (511 300 ha with water areas)

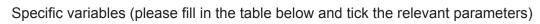
Different existing zonation: (7.4)

Altitudinal range (metres above sea level): from 348 m to 723 m.

Research and monitoring Brief description: 15.1.3)

Approximately 5 lines

In the present time the monitoring of climatic, hydrological changes is carried out by Taldykorgan department of Kazakhstan Hydro-meteorological Service. The main goal of scientific research in Alakol State Nature Reserve is monitoring the condition and conservation of natural complexes, including further inventarization of fauna and flora. Another research direction is in monitoring of rare and endangered species in order to clarify populations' condition, elucidate the ecology of rare animal and plant species, giving an opportunity of evaluate the perspectives of these species' conservation and restoration.



Abiotic	l l	Biodiversity	
Abiotic factors	Х	Afforestation/Reforestation	
Acidic deposition/Atmospheric factors		Algae	X
Air quality		Alien and/or invasive species	X
Air temperature	x	Amphibians	X
Climate, climatology	X	Arid and semi-arid systems	X
Contaminants	x	Autoecology	
Drought	x	Beach/soft bottom systems	X
Erosion		Benthos	X
Geology	X	Biodiversity aspects	X
Geomorphology	X	Biogeography	X
Geophysics		Biology	X
Glaciology		Biotechnology	^
Global change		Birds	X
Groundwater	X	Boreal forest systems	^
Habitat issues	X	Breeding	
Heavy metals	X	Coastal/marine systems	X
Hydrology	X	Community studies	X
Indicators	X	Conservation	l x
Meteorology	X	Coral reefs	^
Modeling		Degraded areas	X
Monitoring/methodologies	x	Desertification	^
Nutrients		Dune systems	
Physical oceanography		Ecology	
Pollution, pollutants	X	Ecosystem assessment	X
Siltation/sedimentation	X	Ecosystem functioning/structure	l l
Soil	X	Ecotones	X
Speleology	^	Endemic species	X
Topography	X	Ethology	X
Toxicology	X	Evapotranspiration	X
UV radiation	^	Evolutionary studies/Palaeoecology	
O v Tadiation		Fauna	
		Fires/fire ecology	X
		Fishes	X
		1 131163	X

Flora Forest systems	Χ
Freshwater systems Fungi Genetic resources Genetically modified organisms	X X X
Home gardens Indicators Invertebrates Island systems/studies	X X
Lagoon systems Lichens Mammals Mangrove systems Mediterranean type systems	X X X
Microorganisms Migrating populations	X
Modeling Monitoring/methodologies Mountain and highland systems	X
Natural and other resources Natural medicinal products Perturbations and resilience	X X
Pests/Diseases Phenology Phytosociology/Succession Plankton Plants Polar systems	X X X
Pollination Population genetics/dynamics Productivity Rare/Endangered species Reptiles Restoration/Rehabilitation Species (re) introduction	X X X



Socio-economic		Integrated monitoring	
Agriculture/Other production systems Agroforestry	Х	Biogeochemical studies Carrying capacity	Х
Anthropological studies	X	Conflict analysis/resolution	
Aquaculture		Ecosystem approach	X
Archaeology	X	Education and public awareness	X
Bioprospecting		Environmental changes	X
Capacity building	X	Geographic Information System (GIS)	X
Cottage (home-based) industry		Impact and risk studies	X
Cultural aspects	X	Indicators	X
Demography	X	Indicators of environmental quality	X
Economic studies	X	Infrastructure development	X
Economically important species	X	Institutional and legal aspects	
Energy production systems		Integrated studies	X
Ethnology/traditional practices/knowledge	X	Interdisciplinary studies	X
Firewood cutting		Land tenure	X
Fishery	X	Land use/Land cover	X

Forestry Human health Human migration Hunting Indicators Indicators of sustainability Indigenous people's issues Industry	X X X	Landscape inventorying/monitoring Management issues Mapping Modeling Monitoring/methodologies Planning and zoning measures Policy issues Remote sensing	X X X X
Livelihood measures	X	Rural systems	X
Livestock and related impacts	X	Sustainable development/use	X
Local participation Micro-credits Mining Modeling	x	Transboundary issues/measures Urban systems Watershed studies/monitoring	X
Monitoring/methodologies Natural hazards Non-timber forest products	X		
Pastoralism	X		
People-Nature relations Poverty Quality economies/marketing	X		
Recreation	X		
Resource use Role of women Sacred sites Small business initiatives	X		
Social/Socio-economic aspects	X		
Stakeholders' interests Tourism Transports	X X		

CONTENT

PART I: SUMMARY

 PROPOSED NAME OF THE BIOSPHERE RESERVE: COUNTRY FULFILLMENT OF THE THREE FUNCTIONS OF BIOSPHERE RESERVES CRITERIA FOR DESIGNATION AS A BIOSPHERE RESERVE ENDORSEMENTS 	2 5 13 25
PART II : DESCRIPTION	
6. LOCATION	28
7. AREA	28
8. BIOGEOGRAPHICAL REGION	35
9. LAND USE HISTORY	35
10. HUMAN POPULATION OF PROPOSED BIOSPHERE RESERVE	39
11. PHYSICAL CHARACTERISTICS 12. BIOLOGICAL CHARACTERISTICS	40 57
13. CONSERVATION FUNCTION	69
14. DEVELOPMENTFUNCTION	90
15. LOGISTIC SUPPORT FUNCTION	94
16. USES AND ACTIVITIES	118
17. INSTITUTIONAL ASPECTS	123
18. SPECIAL DESIGNATIONS	138
19. SUPPORTING DOCUMENTS	139
20. ADDRESSES	142
Annex to Biosphere Reserve Nomination Form	144

Special thanks to staff of Alalkol State Nature Reserve, UNDP Wetland Project in Kazakhstan, Custer Office of UNESCO in Almaty, and National Commission of Republic of Kazakhstan for UNESCO and ISESCO

Authors of photographs: A. Filimonov, A. Zamzinov, Z. Moldakhan, N. Berezovikov, M. Childebaev and R. Jashenko

Design and graphic works by Vladimir Timokhanov

English translation by Elina Maltseva

Nomination Brochure was prepared by Kazakhstan National Committee for UNESCO Programme «Man and Biosphere»

Printed by Tethys Scientific Society

September 2012, Almaty, Kazakhstan



Cultural Organization







