



AKZHAYIK

BIOSPHERE RESERVE





United Nations
Educational, Scientific and
Cultural Organization

Almaty
Office



Kazakhstan
National
Committee

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

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KAZAKHSTAN



AKZHAYIK

BIOSPHERE RESERVE NOMINATION



PART I: SUMMARY

AKZHAYIK

1. PROPOSED NAME OF THE BIOSPHERE RESERVE:
AKZHAYIK BIOSPHERE RESERVE

2. COUNTRY:
KAZAKHSTAN



FULFILLMENT OF THE THREE FUNCTIONS OF BIOSPHERE RESERVES. 3.

(Article 3 of the Statutory Framework presents the three functions of conservation, development and logistic support. Explain in general terms how the area fulfills these functions)

3.1

“CONSERVATION — CONTRIBUTE TO THE CONSERVATION OF LANDSCAPES, ECOSYSTEMS, SPECIES AND GENETIC VARIATION”. *(Stress the importance of the site for conservation at the regional or global scales)*

Biosphere Reserve occupies mainly wetlands of Ural river delta and adjacent territories of Caspian Sea coast, which are located on one of the largest in Eurasia Caspian – Black Sea – Eastern African migration route. This territory is included in the Ramsar Convention’s List of wetlands of international importance and is a concentration site for more than 240 migrating bird species, about 110 of which are waterbirds, including 18 specially protected species. Besides, this biosphere reserve is a nesting site for about 70 waterbirds, 8 of which are specially protected natural objects. It is also a haven for rare bird’s colonies – Dalmatian Pelican (*Pelicanus crispus*, VU) – with population reaching more than 600 nesting pairs (12% of the global population). There are 292 bird species recorded for Ural river delta and adjacent sea coast in total, 26 of them are listed in the Red Data Book of Kazakhstan and IUCN Red List. According to expert evaluations, total number of birds during migration goes up to 3 million specimens.

In the present time Ural river delta and adjacent aquatic and terrestrial ecosystems are the last untouched areas of wild nature in the region and serve as a refuge for many species of wild fauna and flora, especially for sturgeon fishes which are recently threatened to complete extinction. Out of 6 sturgeon species inhabiting Caspian basin 4 come to Ural river for spawning: those are Beluga (*Huso huso*), Starry Sturgeon (*Acipenser stellatus*), Russian Sturgeon (*Acipenser gueldenstaedtii*) and Bastard Sturgeon (*Acipenser nudiventris*), and two other species – Sterlet (*Acipenser ruthenus*) and Persian Sturgeon (*Acipenser persicus*) – are sometimes observed in this river’s delta. In total, aquatic ecosystems of biosphere reserve are inhabited by 76 out of 126 species and subspecies of fish and cyclostomes, registered for Caspian Sea and belonging to 17 families. The dominating position is occupied by carp fish – 42 species and subspecies, followed by gobies – 32-35 and herrings – 18 species and subspecies. All other families, including sturgeons, are represented by not more than 1-7 species. The delta itself is supporting 47 species, 5 of which are listed in the Red Data Book of Kazakhstan. Amphibians are represented by 2 species, and reptiles – by 20 species, of which 2 species of snakes are listed in the Red Data Book of Kazakhstan – Four-lined Snake *Elaphe quatuorlineata* and Caspian Whipsnake *Hierophis caspius*.

There are 48 mammal species of 7 orders, recorded on the territory of biosphere reserve, with rodents and predators being most representative. Aquatic parts of biosphere reserve are nowadays the only protected territories for conservation of endemic relict species (at the same time the only representative of mammal fauna in Caspian Sea)- Caspian Seal (*Pusa caspica*) – which is listed in the Red List (IUCN, Endangered). Besides this species, another Red Data Book species is found here – Bobrinski’s Serotine. It is possible that sometimes a very rare and specially protected species – Desman – may come to the delta from the middle stream of Ural and nest on the territory of biosphere reserve. In quantitative concern dominating

species include mammal species, such as Muskrat, House Mouse, Tamarisk Gerbil, raccoon, fox, wolves, badgers and Wild Boar.

Fauna of terrestrial and aquatic invertebrates consists of about 2,000 species, including 24 species listed in the Red Data Book of Kazakhstan. Macrozoobenthos of Ural river delta with adjacent coast of the Caspian Sea is represented by 67 species and forms of 6 groups, among which there are: Hydrozoa – 1, sponges – 1, worms – 11, crustaceans – 30, molluscs – 5, insect larvae – 19. Zooplankton of the lower stream of Ural river contains 315 species and subspecies, including 30 protozoans, 154 rotifers, 71 cladocera and 54 copepods; the rest are plankton's optional inhabitants. Insect fauna of the biosphere reserve is represented by 820 species of 61 families and 15 orders. The basis of insect fauna is made of dragonflies species (order *Lestidae*, *Coenagrionidae*, *Aeschnidae*, *Libellulidae*), praying mantis (*Mantidae*), homopterans (*Cicadellidae*, *Aphidinea*), heteropterans (*Corixidae*, *Nepidae*, *Miridae*, *Lygaeidae*), orthopterans (*Acrididae*, *Gryllidae*, *Tettigoniidae*), beetles (*Dytiscidae*, *Carabidae*, *Staphylinidae*, *Coccinellidae*, *Scarabaeidae*, *Elateridae*, *Tenebrionidae*, *Chrysomelidae*, *Curculionidae*), butterflies (*Geometridae*, *Noctuidae*, *Pyralidae*, *Pieridae*, *Lycaenidae*), hymenopterans (*Ichneumonidae*, *Braconidae*, *Sphecidae*, *Eumenidae*, *Formicidae*), dipterans (*Culicidae*, *Chironomidae*, *Asilidae*, *Bombyllidae*, *Muscidae*, *Syrphidae*, *Ephydriidae*).



The nominated territory of biosphere reserve contains 229 species of higher plants of 141 genera, 56 families, among them 7 species are relict and 4 species are rare and specially protected. Aquatic flora is represented by 23 plant species. The main vegetation associations are represented by 6 types: desert, meadow, marsh, forest, shrubs, water-submerged. Vegetation associations are dominated by halophyte perennial saltworts (semi-dwarf shrubs, dwarf shrubs, shrubs) – *Halocnemum strobilaceum*, *Kalidium caspicum*, *K. foliatum*, *Anabasis salsa*, *Halostachys caspica* and annual saltworts of genera *Salsola*, *Climacoptera*, *Petrosimonia*, *Suaeda*, *Atriplex*, etc. There are 2 species listed in the Red Data Book of Kazakhstan: *Tulipa schrenkii* and *Trapa kasachstanica*.



Larus ridibundus



Cygnus olor

3. 2

“DEVELOPMENT — FOSTER ECONOMIC AND HUMAN DEVELOPMENT WHICH IS SOCIO-CULTURALLY AND ECOLOGICALLY SUSTAINABLE”. *(Indicate the potential of the proposed biosphere reserve in fulfilling this objective.)*

Akzhayik biosphere reserve is located on the lands of Makhambet district and Atyrau city of Atyrau oblast. The population of its 11 settlements is more than 17,000 people, 98% of them are Kazakh and 2% are Russian, Tatar and other ethnicities; population density is 23 people in 1 square km. Economical orientation of the region is fishery and animal stock production.

Industry and Agriculture. There are 9 active production cooperatives in the collaboration zone of Akzhayik biosphere reserve, 7 of them are fisheries and 2 diversified cooperatives (farming and animal breeding): «TES», «Yerkinkala», «Rakusha», «Dzhambyla», «Amangeldy», «Kurmangazy», «Manash», «Kyzyl-Balyk», «Standart», employing only 30% of total working age population. Also there are two fishing plants in this zone: Atyrau Sturgeon Plant (right bank of Ural river near Yerkinkala village) and Damba Sturgeon Plant (left bank of Ural river near Damba village), employing about 150 local people. Fishing industry also includes several small fish processing facilities.

Agriculture (mainly animal breeding) is developing only in private sector, local people usually breed cattle, sheep, camels and horses. Private sector is represented by the following farms: private enterprise «Gvozdika» (flowers greenhouse production), private enterprise «Khairushev» (horses and camels' breeding), agricultural cooperative «Amanat-Arna», private enterprise «Talapker», «Kyzyl-Zhar» (animal breeding and farming). One of the main agricultural enterprises of Atyrau oblast – «Pevomaiskiy» Ltd. – is situated in Chkalovo village. It is a



large enterprise of milk processing and meat and dairy cattle breeding. It runs a greenhouse for vegetables production. It is planned to introduce new technologies for animal fodder provision – green fodder production using hydroponics.

In the villages situated far from Atyrau (Damba, Amangeldy, Kurmangazy, Atyrau, Zhanatalap and Yerkindala) there are small private shops, restaurants and cafe. People living in the villages close to Atyrau prefer making purchases at city markets. Unfortunately, there is not enough jobs for all the population and a part of the citizens, especially young people, are forced to work in Atyrau. Ecological tourism development in the frames of the nominated biosphere reserve will provide additional working opportunities for a part of local people.

Ecological tourism. In the present time ecological tourism is not developed, daily recreational press in the buffer zone does not support more than 15 people. In September 2011 with the support from Italian-Kazakhstan project Ural River Park Project (sponsored by Italian company ENI and Bologna University) the buffer zone of the reserve was equipped with observation sports for watching birds and large mammals, bicycle and hiking routes were created on the basis of two protection stations (cordones 1 and 2), and water routes on Ural river and its delta channels were organized. In the future biosphere reserve will help in developing guest tourism in villages located along the main road from Atyrau to Peshnoye village: Peshnoye, Damba, Zhanatalap, Kurmangazy, as well as on the right bank of Ural river in Yerkindala village. Analysis of transport and

planning structure showed that optimal location for a visit center is in Damba village. Visit-center will be a link in the interactions of the reserve with local people, especially in ecological education, at the same time serving as a basis for scientific tourism and international scientific connections. There will be 2 hiking routes going through the territory of the buffer zone and collaboration zone: Damba – Zarosloye – Zhanatalap (left bank of Ural river delta), Kamennyi – Kyzyl-Zhar (right bank of Ural river delta). Besides, there will be water route for motorized boats, flat-bottomed rowing boats and canoes, organized from Peshnoy village to Caspian waters.



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”. (*Indicate current or planned facilities*).

Currently the main scientific – technical support of the biosphere reserve’s territory is carried out by the staff of Akzhayik state nature reserve and participants of long-term GEF/UNDP Wetlands Project and Kazakhstan – Italian Ural River Park Project (Italian side is represented by scientific group of Bologna University and ENI oil company). Both projects added to the material-technical base and helped by conducting training seminars and large 3-day festival «Opening Delta» in Atyrau (September 2011).

In order to increase technical base the following was purchased: a sea boat, 3 cars, a tractor, a portacabin and computers; also observation towers were constructed and part of UNDP Project’s equipment was donated (2 cars, computers and other office appliances, equipment for water quality control, photo cameras, video camera, echo sounder, binoculars, telescopes, GPS, etc.).

In 2009-2011 training seminars were conducted dedicated to management plan preparation, biodiversity monitoring, state inspectors were trained in drawing up reports, complying with safety operating procedures and fire prevention, trips for experience exchange were organized for 10 staff members of Akzhayik state nature reserve to attend Astrakhan biosphere reserve (Russia) and 2 staff members were sent to Korgalzhyn biosphere reserve (Kazakhstan).

Three-day festival «Opening delta» took place on September 21-23 in Atyrau and on the territory of biosphere reserve and gathered many local people (mainly school children, students, teachers, local authorities and NGOs) and included a variety of activities from exhibitions and concerts to ecological and educational excursions (Festival’s Program is in Appendix 19 Supporting documents(suppl)/08 Additional documents/ Discovering Delta programme 21-23 Sept 2011. pdf). This festival had a very agitational influence on citizens of Atyrau and Makhambet district. This festival will probably become an annual and traditional event.



CRITERIA FOR DESIGNATION AS A BIOSPHERE RESERVE. 4.

(Article 4 of the Statutory Framework presents 7 general criteria for an area to be qualified for designation as a biosphere reserve which are given in order below)

“ENCOMPASS A MOSAIC OF ECOLOGICAL SYSTEMS REPRESENTATIVE OF MAJOR BIOGEOGRAPHIC REGIONS, INCLUDING A GRADATION OF HUMAN INTERVENTION”

(The term “mosaic” refers to a diversity of natural habitats and land cover types derived from human uses such as fields, managed forests, etc. The term “major biogeographic region” is not strictly defined but it would be useful to refer to the map of the “World Network of Biosphere Reserves” which presents 12 major ecosystem types at a global scale.)

The territory of biosphere reserve is in the desert zone, in subzone of semi-deserts (steppified Northern deserts) on brown desert soils and by its botanic-geographical regioning belongs to Sahara-Gobi desert district, Iran-Turan subdistrict, Northern-Turan province, Western – North-Turan subprovince. In whole, biosphere reserve is representative of Ural-Caspian region and includes both aquatic ecosystem complexes and elements of Southern semi-desert and desert. There are 29 ecosystems gathered in the following main groups: 1) terrestrial natural – anthropogenic, 2) island and coastal natural (transitional from terrestrial to marine), 3) aquatic natural with participation of anthropogenic, 4) aquatic natural, 5) terrestrial anthropogenically disturbed. Complete ecosystem classification is given in Appendix (19 Supporting documents(suppl)/08 Additional documents/Classification of ecosystems of BR Akzhaiyk.doc).

According to vegetation types the territory of biosphere reserve is represented by: 1. Desert vegetation type with domination of annual saltworts and perennial (semi-dwarf shrubs, semi-shrubs) saltworts and *Artemisia*; 2. Meadow vegetation type – (marshes, true, halophyte) with domination of hygromesophyte and mesophyte grasses, mainly cereals, on meadow soils; 3. Marsh vegetation type – grass marshes with domination of hygrophytes formed on marshy soils, periodically flooded and drying areas of water-land transition zone; 4. Flood-land forests are fragmentally formed on river-bed ridges of Ural river, delta channels and in local groups along the sloped banks of the channels; with domination in the tree layer of *Salix alba*, *Elaeagnus oxycarpa*, sometimes, in little abundance, *Salix caspica*; 5. Shrub (Tamarix) thickets are observed everywhere in small parts on marine plain and in the delta along river-beds and channels; 6. Water-submerged vegetation of water reservoirs may be divided into associations with domination of *submerged attached to the bottom* higher water plants and large algae; *air-water associations* with domination of higher plants – hygrophytes, including floating on the surface (water lillies, water caltrop, etc.) and layer of under-water plants (*Ceratophyllum*, *Myriophyllum*, etc.).

4.1

4. 2

“BE OF SIGNIFICANCE FOR BIOLOGICAL DIVERSITY CONSERVATION”

(This should refer not only to the numbers of endemic species, or rare and endangered species at the local, regional or global levels, but also to species of globally economic importance, rare habitat types or unique land use practices (for example traditional grazing or artisanal fishing) favouring the conservation of biological diversity. Give only a general indication here.)

Akzhayik biosphere reserve is an extremely important natural complex of Ural river delta with adjacent coast of the Caspian Sea with coastal territories in subzone of steppified Northern deserts and is one of the key sites of global importance on the migration route of Eurasian birds. Ural river delta with adjacent waters of the Caspian Sea are sites of international importance and are nominated in the list of water reservoirs of Ramsar Convention (criteria Ia, Ib). Vast rich in fodder water reservoirs attract many waterbirds. The number of bird species registered here is 292, including 26 bird species listed in the Red Data Book of Kazakhstan and IUCN Redlist. Up to 3 million birds concentrate on the biosphere reserve's territory during migration. Biosphere reserve supports many species of rare waterbirds, part of which reproduce here, including Dalmatian Pelican (*Pelicanus crispus*; VU, 12% of the world's population), Pygmy Cormorant (*Phalacrocorax pygmaeus*), Cattle Egret (*Bubulcus ibis*), Little Egret (*Egretta garzetta*), Whooper Swan (*Cygnus cygnus*), Squacco Heron (*Ardeola ralloides*), Purple Swamphen (*Porphyrio porphyrio*), Pallas's Gull (*Larus ichthyaetus*). Other species use this territory for rest during the migration: Eurasian Spoonbill (*Platalea leucorodia*), White-headed Duck (*Oxyura leucocephala*), Great Bustard (*Otis tarda*), Houbara Bustard (*Chlamydotis undulata*), Little Bustard (*Otis tetrax*), Lesse White-fronted Goose (*Anser erythropus*; VU), Red-breasted Goose (*Branta ruficollis*; VU), Siberian Crane (*Grus leucogeranus*). Surrounding wetlands of steppified desert also provide for the existence of several rare species: Tawny Eagle (*Aquila rapax*), Demoiselle Crane (*Anthropoides virgo*), Houbara Bustard (*Chlamydotis undulata*), Little Bustard (*Otis tetrax*) and Lesser Short-toed Lark (*Calandrella rufescens*).

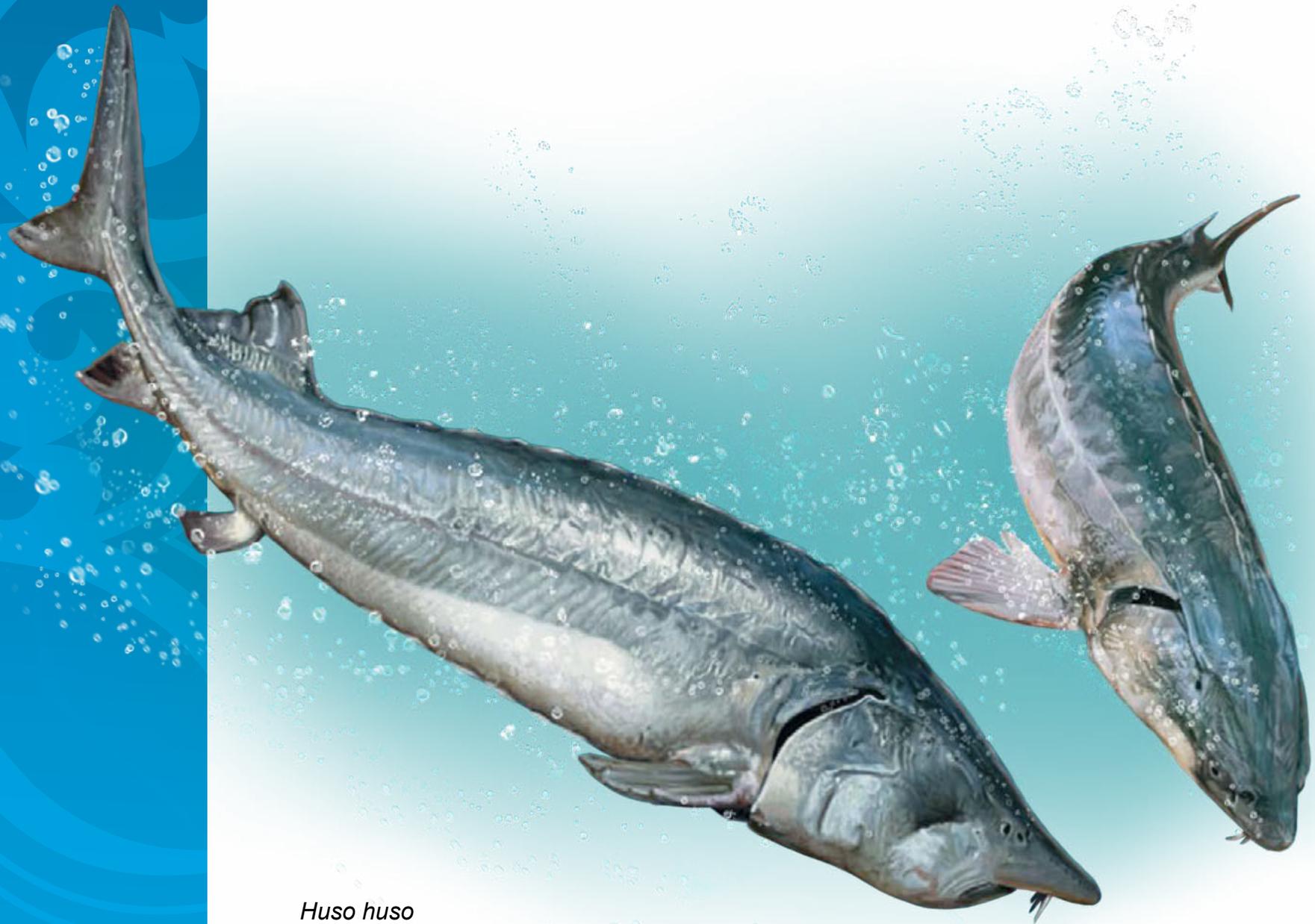
Theriofauna of biosphere reserve is represented by 48 mammal species of 7 orders, which add up to 25% of the total mammal fauna of Kazakhstan. In relation to species composition the most numerous order are rodents (21 species, 43.75% of the total species of the group), predators (12 species, 25%) and bats (8 species, 16.8%). Representatives of other orders are not numerous: insectivores, lagomorphs and undulates – 2 species each (4.1%) and pinnipeds – 1 species (2.1%). The list of mammals contain rare and listed in the Red Data Book species – Marbled Polecat (*Vormela peregusna*), Bobrinski's Serotine (*Eptesicus bobrinskoi*), European Mink (*Mustela lutreola*) and, possibly, Russian Desman (*Desmana moshata*). The most unique inhabitant of the reserve is relict and endemic species – Caspian Seal, which in autumn goes up Ural river to Atyrau. Taking into consideration stable decrease in population, IUCN in 1996 included Caspian Seal in the Redlist into «vulnerable category», and in 2008 moved in to «endangered» category.

Herpetofauna of Akzhayik biosphere reserve is represented by 2 amphibian species (Green Toad *Bufo viridis* and Marsh Frog *Rana ridibunda*) and 20 species of reptiles (40.8% of the total herpetofauna composition of Kazakhstan), 2 of which are listed in the Red Data Book of Kazakhstan (Four-lined Snake *Elaphe quatuorlineata* and Caspian Whipsnake *Hierophis caspius*).

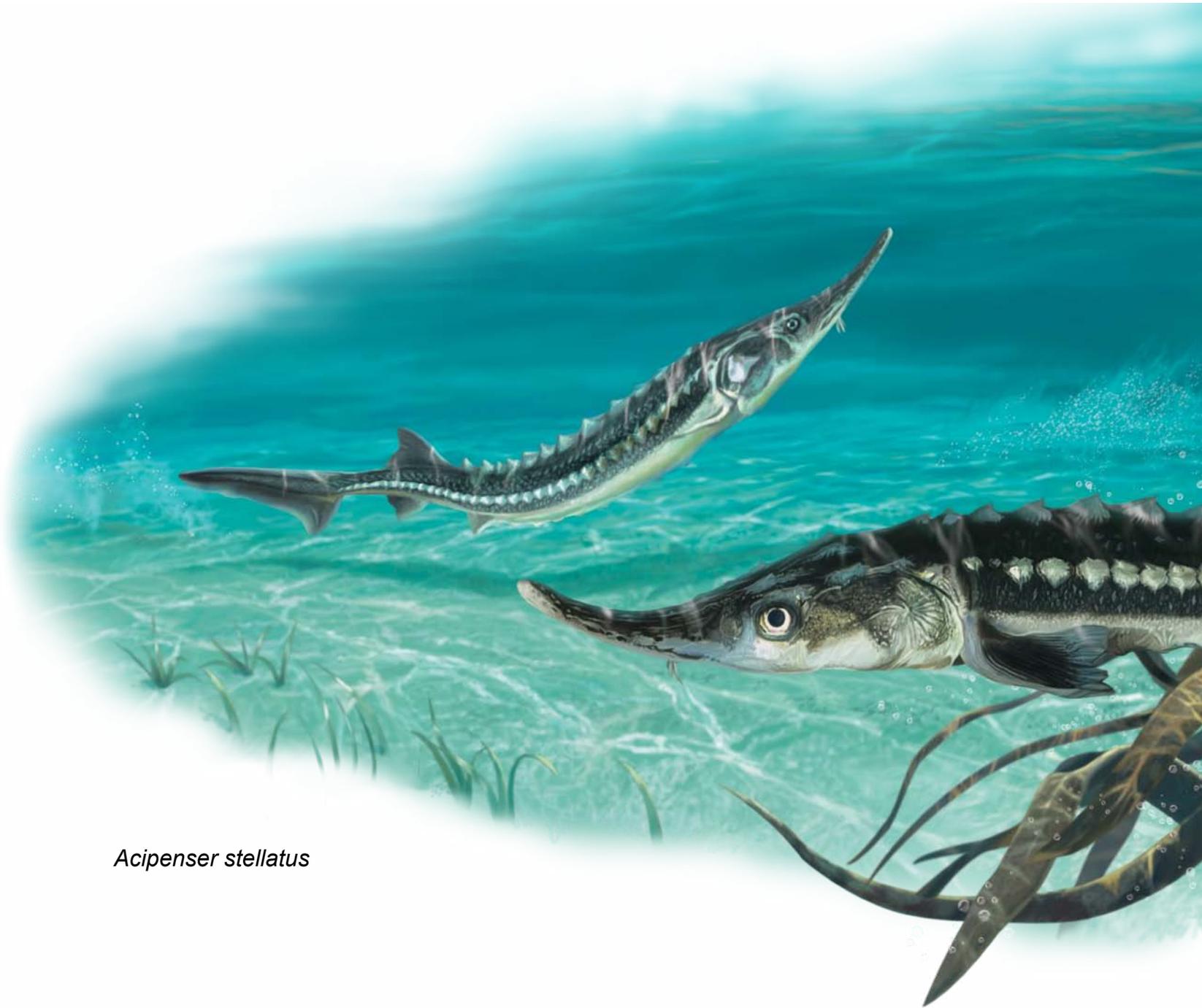
The territory of the reserve is inhabited by 76 species and subspecies (out of 126 species and subspecies registered for the Caspian Sea) of fish and cyclostomata, belonging to 17 families. Dominating position is occupied by carps – 42 species and subspecies, followed by gobies – 32-35 and herrings – 18 species and subspecies. All other families, including sturgeons, are represented by not more than 1-7 species. Sturgeon fishes are the most valuable among industrial species. The reserve of sturgeons in the Caspian reached critically low indices in the recent years. Yield of these valuable fishes decreased in 16 times in the last 20 years. Out of six sturgeon species inhabiting Caspian basin, four go for spawning to Ural river: Beluga (*Huso huso*), Starry Sturgeon (*Acipenser stellatus*), Russian Sturgeon (*Acipenser gueldenstaedtii*) and Bastard Sturgeon (*Acipenser nudiiventris*). Ural river delta with adjacent marine coastal space is extremely important in conservation and rehabilitation of fish reserve of the Caspian basin. Akzhayik biosphere reserve is not only optimal area for foraging of many fish species, but also an important migration site for sturgeon and semi-anadromous fish going to spawning and wintering. Many fish species found favourable conditions for spawning here. Shallow well warmed up and rich in forage area before Ural river mouth in specific year season is a forage zone for young and adult sturgeon fish.

Species composition of zooplankton of the lower stream of Ural river consists of 315 species and subspecies, while macrozoobenthos lists 67 species of 6 groups (hydrozoa – 1, sponges – 1, worms – 11, crustaceans – 30, Mollusca – 5, insect larvae - 19). Entomofauna is not completely studied, in the present time 820 insect species of 61 families of 15 orders are registered.

In Ural river delta with adjacent coast of the Caspian Sea there are 229 recorded species of higher plants which belong to 141 genera, 56 families. Out of 229 species 59 are Angiospermae monocots, 170 species – Angiospermae dicots, playing an important role in vegetation cover composition. Vegetation associations are dominated by halophyte perennial saltworts (semi-dwarf shrubs, dwarf shrubs, shrubs) - *Halocnemum strobilaceum*, *Kalidium caspicum*, *K. foliatum*, *Anabasis salsa*, *Halostachys caspica* and specie of annual saltworts of genera *Salsola*, *Climacoptera*, *Petrosimonia*, *Suaeda*, *Atriplex*, etc. There are 2 plant species listed in the Red Data Book of Kazakhstan: *Tulipa schrenkii* and *Trapa kasachstanica*. Water flora is represented by 23 plant species. One of the genera most numerous in species composition is pondweed, it has 7 species. All species are water-submerged macrophytes, which are distributed in marine waters among reed islands, as well as in Ural river channels. Most observed species are *Potamogeton natans* and *Potamogeton perfoliatus*. Of special interest among water plants are *Trapa kasachstanica* (listed in the Red Data Book of Kazakhstan) and *Salvinia natans*.

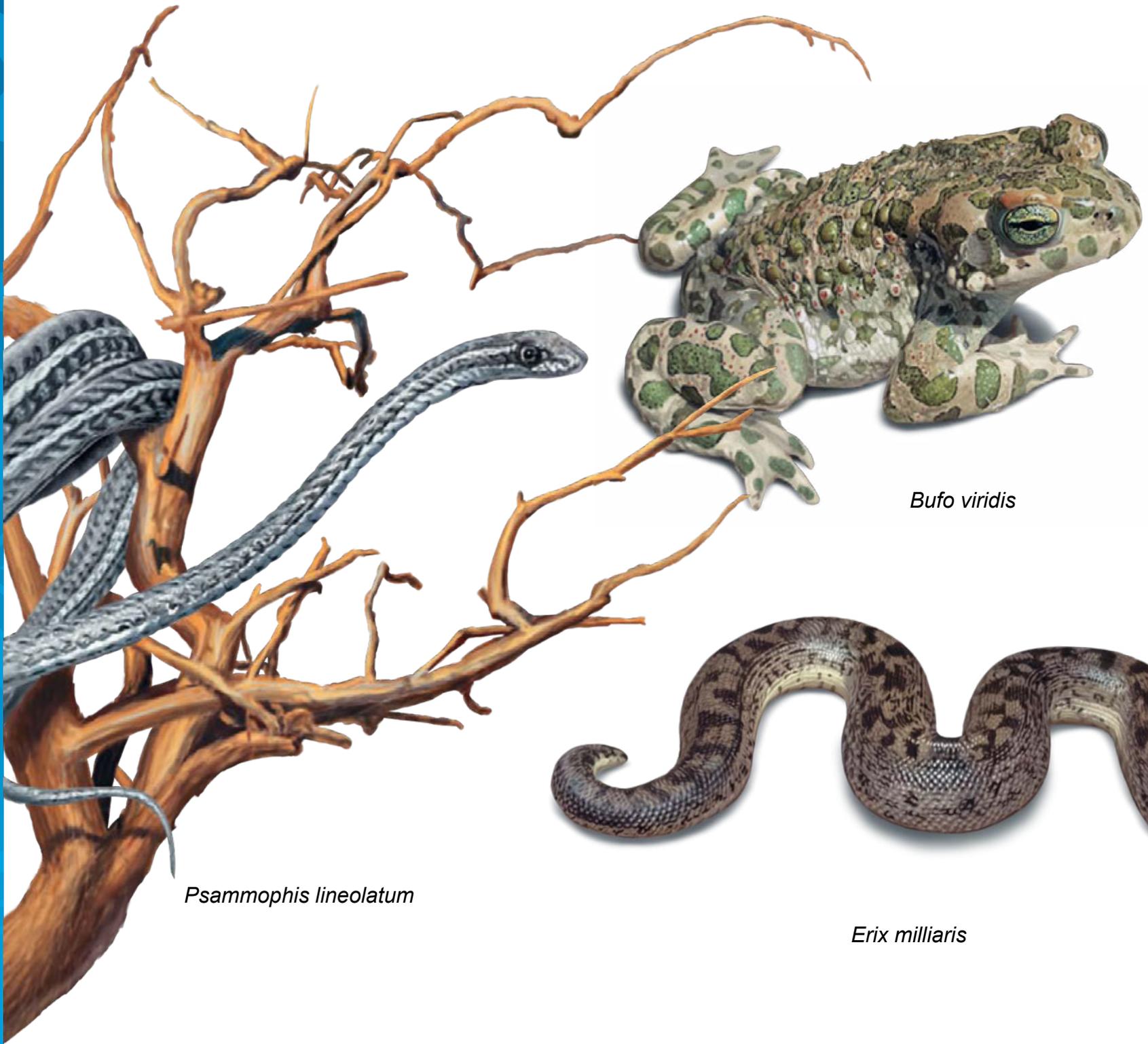


Huso huso



Acipenser stellatus





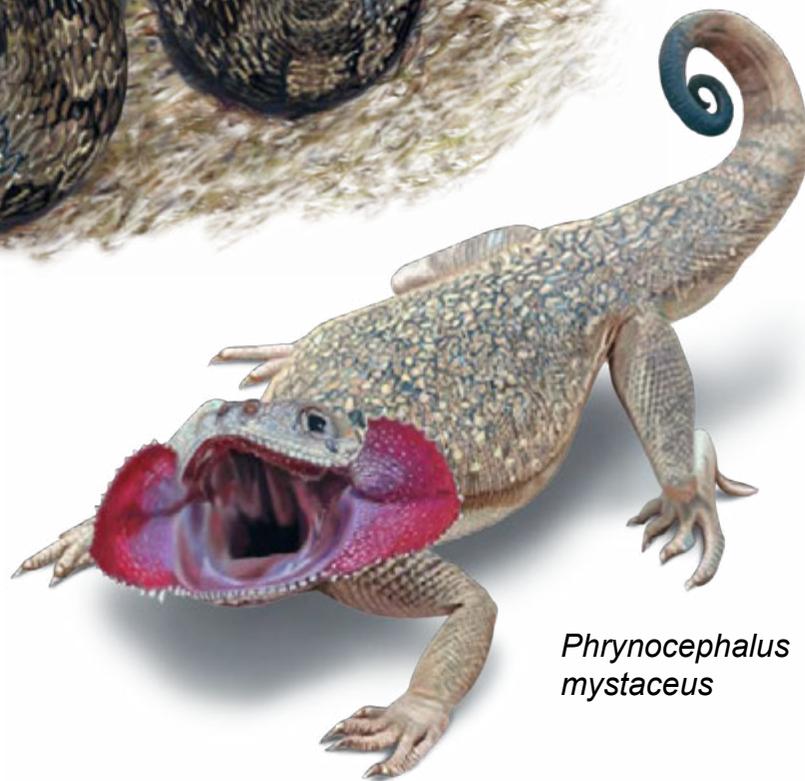
Bufo viridis

Psammophis lineolatum

Erix milliaris



Elaphe dione



*Phrynocephalus
mystaceus*



Pelecanus crispus



Egretta garzetta



Ondatra zibethicus



Sus scrofa

4.3

“PROVIDE AN OPPORTUNITY TO EXPLORE AND DEMONSTRATE APPROACHES TO SUSTAINABLE DEVELOPMENT ON A REGIONAL SCALE”

(Describe in general terms the potential of the area to serve as a pilot site for promoting the sustainable development of its region (or “eco-region”)

Productive landscapes are convenient from cattle breeding point of view, as well as fishery and hunting. At the same time, some parts of Biosphere Reserve need rehabilitation of abandoned lands. In regional scale the experience of ecological tourism development on the territory of Biosphere Reserve may be successfully used at other sites.

It is very perspective to develop ecological tourism on the basis of biosphere reserve. Proximity of the reserve to Atyrau with its well developed tourist infrastructure (international airport, railroad and bus stations, hotels, tourist companies, restaurants, etc.) gives tourists a potential possibility to stay in comfortable conditions of the city with short-term (without night stays) visits of the sightseeing areas. In the future these tourist services will be developed on the territory of biosphere reserve (villages in collaboration zone) in the form of private guest tourism with additional services from local people (hiring and using the boats, horse-riding, fishing, etc.) with realization of local fresh produce and local souvenirs which are very popular among the tourists.



Emys orbicularis



Pelican's chicks

“HAVE AN APPROPRIATE SIZE TO SERVE THE THREE FUNCTIONS OF BIOSPHERE RESERVES”

(This refers more particularly to (a) the surface area required to meet the long term conservation objectives of the core area(s) and the buffer zone(s) and (b) the availability of areas suitable for working with local communities in testing out and demonstrating sustainable uses of natural resources.)

Total terrestrial area of the territory of Akzhayik Biosphere Reserve is about 340 846 ha. The main core is 36 077 ha, buffer zone is 104 769 ha (according to legislative acts: buffer territory 75 423 ha and buffer border protected territory 29 346 ha of the State Nature Reserve), development zone – about 200 000 ha. The marine area is about 55 500 ha and consists of about 500 ha core zone, 25 000 ha buffer zone and 30 000 ha transition zone.

In accordance with Article 50 of Chapter 1 of the Law of RK “On specially protected natural territories”: “the state natural reserve shall be a particularly protected wildlife area registered as nature conservation and scientific organization containing land and water ecological systems, intended for protection restoration and maintenance of biological variety of natural complexes and natural and historical objects relating thereto”.



Larus sp.

The primary activity of the state wildlife reserves shall include the following: 1) conservation and restoration of biological and landscape variety of ecological systems; 2) ensuring of the protection regime of the state wildlife reserve; 3) maintenance of stable development of the territory on the basis of the eco-economic principle of natural resources utilization; 4) arrangement of research and monitoring operations for the purposes of protection and stable development of the territory, and ecological education as well; 5) regulation of the use of the state wildlife reserve's territory and its protective area for the eco-educational, scientific, recreational, tourist, and limited economic activity purposes.



Trapa kasachstanica



Pelicans

4.3

THROUGH APPROPRIATE ZONATION:

“(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” ? (Describe the core area(s) briefly, indicating their legal status, their size, the main conservation objectives)

The main zone of biosphere reserve is strictly protected zone of nature reserve regime of Akzhayik state nature reserve, which represents natural wetland complex of Ural river delta and coastal lands of the Caspian Sea with adjacent water territories. Legal basis for Akzhayik nature reserve creation is Resolution of the Government of RK № 119 as of 6 February 2009. Total area of both parts of the core zone of Akzhayik state nature reserve is 36,077 ha.

In accordance with Article 50 Chapter 3 paragraph 1: “core zone — the core zone intended for the long-term conservation of genetic resources, biological variety, ecological systems and landscapes with sufficient sizes for such purposes”. In accordance with Article 51: “1. Within the reservation conditions zone of the state wildlife reserve scientific researches and monitoring of the environment shall be performed, including keeping the Nature Chronicles, along with eco-educational arrangements. 2. Within the reservation conditions zone of the state wildlife reserve any economic and recreational activities shall be prohibited under the reservation conditions established, which shall be corresponding to the protection regime of the state wilderness area.”

On specially assigned areas, which do not include especially valuable ecological systems and object, it is permitted, in the order stipulated by the authority, to create excursion paths and routes for conducting regulated ecological tourism. Akzhayik state nature reserve corresponds to the highest category (A1) of IUCN natural territories.

The core zone consists of two parts, divided by Ural river. Left side of this zone has an elongated shape, lies in administrative limits of Atyrau lands. Its Northern border goes along dry land from Ural river bank (Southern from Peshnoy observation station) to the East to the crossing with the border of Kurmangazy production cooperative’s lands; then it goes South-Eastern along the border of Kurmangazy production cooperative to marine coast; then along the marine waters to the South, bypassing Peshnoy peninsula, and North-Western to the bank of Ural river; then it goes in North-Eastern direction for about three to five km from the main river bed along the left bank (to Peshnoy observation station). Total area of left-side part of the core zone is 8,056 ha. Right-side part of the core zone is located in administrative borders of Makhambet district of Atyrau oblast, its total area is 28,021 ha.

“(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”.

(Describe briefly the buffer zones(s), their legal status, their size, and the activities which are ongoing and planned there).

Buffer zone of Akzhayik biosphere reserve comprises the lands of the buffer and protected territories of state reserve. Legal basis for the use of this territory as a buffer is Resolution of the Government of RK № 119 as of 6 February 2009 and Decree of the Akim of Atyrau oblast № 108 as of 7 April 2011 on the designation of protective 2-km zone along the border of nature reserve. The Decree of Akim indicated that designation of the protective zone is carried out without withdrawal of land from the land users. According to Article 50 of Chapter 2 of the Law of RK «On SPNA»: «buffer zone — the area used for ecologically oriented economic activity and stable reproduction of biological resources». This zone is created to protect specially protected natural territories from unfavourable influences from the outside, with prohibition of any activity that may negatively influence the condition and restoration of the given territory's ecosystems.

According to Article 52 within the buffer zone of the state wildlife reserve the following forms of regulated and limited economic activities may be implemented: “1) scientific research and organization of training centers; 2) monitoring of environmental conditions and changes in ecological systems; 3) forestry, fire arrangements and protection of woodlands; 4) traditional land use within the limits of ensuring long-term integrity and invulnerability of biological variety of the core zone and stability of ecological systems of the state natural reserve on the whole; 5) enlarged arrangements for restoration of biological and landscape variety and natural ecological systems; 6) tourism and recreation regulated according to recreational load, specified by the rules for visiting Protected areas by physical persons; 7) utilization of mineral waters and treatment resources; 8) ecological education, implementation of training programs, organization of demonstration sites and management of environmentally sound use of natural resources”.

At the same time within the buffer zone the following is prohibited: “1) establishment of new settlements; 2) location and operation of industrial objects; 3) construction and operation of production facilities; 4) exploration and mining operations; 5) final felling operations; 6) introduction of new species of plants and animals; 7) actions changing the hydrological conditions of the core and buffer zones; 8) other activities capable to affect the ecological system of the core zone”.

Within the buffer zone of biosphere reserve economic activity in some parts of the protection zone (haymaking, cattle pasture) is carried out by agreement with state authority (Forestry and Hunting Committee of the Ministry of Agriculture of RK) and under the control of the administration of state nature reserve. Eco-educational, tourist, and recreational activities are conducted on the territory of biosphere reserve's buffer zone, as well as scientific research.

The area of the buffer zone is 104,769 ha, 43,658 ha of it is on the right bank in Makhambet district of Atyrau oblast and 61,111 ha on the left bank in Atyrau city lands.

“(c) an outer transition area where sustainable resource management practices are promoted and developed”.

(The Seville Strategy gave increased emphasis to the transition area since this is the area where the key issues on environment and development of a given region are to be addressed. Describe briefly the transition area(s), the types of questions to be addressed there in the near and the longer terms. The Madrid Action Plan states that the outer boundary should be defined through stakeholder consultation).

Transition zone (collaboration zone) of Akzhayik biosphere reserve is located on the territory of Atyrau and Makhambet district of Atyrau oblast. This zone comprises lands of 6 rural districts: Atyrau district, Atyrau, Damba, Yerkinkala, Kenozek and Chkalovsk, its total approximate area is 200,000 ha. In this zone there are 9 production cooperatives, 7 of them are fisheries and 2 cooperatives of multi-directional production, employing only 30% of total number of working age population, as well as many small private enterprises. Besides, there are two active sturgeon farms (Atyrau and Damba farms), hiring about 150 local people. In Chkalovo village there is Pervomayskiy Ltd. – the main and largest agricultural company of Atyrau oblast, processing milk and growing meat and dairy cattle.

The territory of biosphere reserve's transition zone is used for hayfields, fallow lands, pastures, numerous wetlands and villages. It represents mostly areas which were developed and settled a long time ago. It is necessary to organize restoration of renewable natural resources on those territories. First of all, it considers the rehabilitation of fallow lands and organization of sustainable fishing and hunting. One of perspective directions of this zone is the development of ecological tourism.

(d) Please provide some additional information about the interaction between the three areas.

All three zones are connected and complement each other. The core zone is closed for visits and represents reference areas of regional natural complexes, as well as important genetic reserve of wild flora and fauna species; this zone is a control in long-term monitoring. The buffer zone is also under protective regime, but limited human activity is allowed here (such as tourism, scientific research, educational programs, partial use of natural renewable resources, etc.). Both zones serve for conservation of natural complexes and partially for sustainable development. The transition zone is used for living of local people, development of economy, culture and education. Here there is no strict protection regime of natural complexes, but there are some restrictions on the nature use (ecologically dirty production is prohibited). As a whole, this zoning provides conditions for elimination of the conflict between social-economic development and protection of wild natural complexes and gives an opportunity for stable development of economy and culture.

“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 Akzhayik biosphere reserve was created; its participants include representatives of state nature reserve, nature users, local authorities and public organizations.

4.6.1 Describe arrangements in place or foreseen.

(Describe involvement of public and/or private stakeholders in support of the activities of the biosphere reserve in core, buffer and transition areas (such as agreements, protocols, letters of intent, protected area(s) plans)).

Local communities are involved in the development of biosphere reserve's Management Plan and by participating in the Coordinational Council in the integrated reserve's management. Complete management of the core and buffer zone is conducted by the administration of Akzhayik state nature reserve, but local NGOs, local communities receive full information on natural complexes of the zones that will be used for education, as well as for tourist routes in the buffer and transition zones, development of scientifically based sustainable nature use, etc.

4. 6



Phusa caspia



Hydropogon caspia

4.6.2 *Have any cultural and social impact assessments been conducted, or similar tools and guidelines been used?*

(e.g. Convention on Biological Diversity (CBD)'s Akwé: Kon guidelines; Free, Prior, and Informed Consent guidelines, Biocultural Community Protocols, etc.). (UNESCO's Programme on Man and the Biosphere (MAB) encourages biosphere reserves to consider and respect indigenous and customary rights through programmes or tools, in accordance with the United Nations Declaration on the Rights of Indigenous Peoples (http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf when relevant and appropriate)).

During the UNDP/GEF Wetlands Project in 2004 – 2011 one of the expert groups carried out thorough research of social-economic situation in this region. In the limits of this work the influence of the environment and economical situation on cultural and social life of local people was assessed. In the future this data was used during nature reserve organization for effective territory zoning and nature protection measures' planning.

4.7

MECHANISMS FOR IMPLEMENTATION

Does the proposed biosphere reserve have:

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

If yes, describe. If not, describe what is planned.

According to Kazakhstan's legislation, management of economic activity on some parts of biosphere 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 control of state nature reserve's administration, all questions and arising problems are settled at the meetings of Coordinational Council of biosphere reserve. All activities on the lands of the protected zone were negotiated with all land users in the course of preparation of the Resolution of Akim of Atyrau oblast № 56 as of 2 March 2011 and № 108 as of 7 April 2011 on establishment of 2-km protection zone on the border of Akzhayik State Nature Reserve. Private lands of the buffer zone were not withdrawn from the land users.

“(b) a management policy or plan for the area as a biosphere reserve”?

If yes, describe. If not, state how such a plan or policy will be developed, and the timeframe. (If the proposed area coincides with one or more existing protected natural area(s), describe how the management plan of the proposed biosphere reserve will be complementary to the management plan of the protected area(s)).

At the present time there is a Management Plan for core and buffer zones of Akzhayik Biosphere Reserve, which describes management of the main protected areas of Biosphere Reserve. In the transition zone the land users have their own management plans, which are in accordance with Management Plan of core and buffer zones. So, simple combination of all these plans is in fact Overall Integrated Management Plan of the whole territory of Biosphere Reserve. All controversial issues are discussed at the sessions of Coordinational Council of Biosphere Reserve.

“(c) a designated authority or mechanism to implement this policy or plan” ?

The biosphere reserve is managed through Akzhayik Biosphere Reserve Coordinational Council created in 2012. Before that the territory of the core and buffer zone was and is managed by the administration of Akzhayik State Nature Reserve, and collaboration zone is managed by Akimats of Makhambet district and Atyrau city. In the present time Coordinational Council is a collegial public body created to introduce policies of effective management and sustainable use of biosphere reserve's resources, alternative activities, resource-conserving and resource-restoring technologies. The Coordinational Council of biosphere reserve consists of representatives of state agencies (territorial agency of forestry and hunting, oblast territorial agency of fishery), state nature reserve, Akimats (department of land resources, agriculture, etc.), local NGOs and land users, and is necessary in providing collaboration and problem-solving opportunities for all stakeholders.

“(d) programmes for research, monitoring, education and training”?

If yes, describe. If not, describe what is planned.

There is a current monitoring of the condition and conservation of natural complexes on the territory of biosphere

reserve, and monitoring of rare and threatened species to clarify the condition of the populations, ecological peculiarities of rare plant and animal species, providing a basis for evaluation of the species' conservation and restoration perspectives. The goal of the monitoring is to obtain regular objective data about the condition of plants and animals on the territory of biosphere reserve, as well as on the condition of their habitat. Based on monitoring data it is necessary to conduct current evaluation of the condition of populations and ecosystems, biosphere reserve's functioning effectiveness, and development of measures for critical and unfavourable situations' prevention. Air counting of large waterbirds (swans, flamingo, pelicans, etc.) and Wild Boar are carried out in the limits of monitoring program.

According to the perspective thematic plan of scientific research, the work on the territory of biosphere reserve is carried out for 6 scientific themes: 1) Observations of natural phenomena and processes on the territory of the Reserve and their study for the «Nature Chronicles» program, 2) Akzhayik Nature Reserve's flora and vegetation inventorization, 3) Rare and endangered birds of Akzhayik Nature Reserve and adjacent territories, 4) Teriofauna of Akzhayik Reserve (species composition, biology, residence status), 5) Characteristics of ichthyofauna of Akzhayik Reserve, 6) Monitoring of phyto-zooplankton of Ural river delta.

The department of ecological education of nature reserve is responsible for organization and conduction of cultural-educational activities; it consists of 6 people: department's chief, 2 specialists in ecological education, translator, excursion manager and museum chief. 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.

With the support from UNDP/GEF Wetlands Project 10 staff members of state nature reserve had a chance to raise their qualifications and exchange experience in Astrakhan biosphere reserve (Russia), 2 people went to Korgalzhyn biosphere reserve (Kazakhstan). In 2009-2011 different educational seminars were held for Reserve's staff concerning a variety of topics: management plan development, biodiversity monitoring, inspectors' training in report compilation procedure, compliance with the safety rules and fire-fighting techniques.

An important role in staff preparation is played by international Kazakhstan-Italian Ural River Park Project, supported by ENI Company; Italian side of the Project is represented by a research group of Bologna University under the guidance of Prof. Gabbionelli, and Kazakhstan side is represented by Akzhayik Reserve's staff. This Project gives an opportunity to share experience in nature parks' management between Italian biosphere reserve Po River Delta Park and Akzhayik Reserve, also Italian specialists help in researching nature of Ural delta, organizing ecological tourism, GIS technologies introduction and awareness campaigns (exhibitions, contests, festivals, Bird Days, etc.).





Larus ichthyaetus



River ducks

5. ENDORSEMENTS

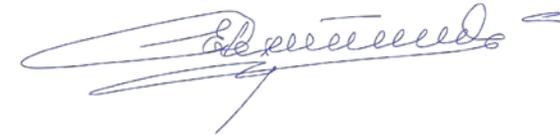
5.1

SIGNED BY THE AUTHORITY/AUTHORITIES IN CHARGE OF THE MANAGEMENT OF THE CORE AREA(S):

Full name: **Elemes Rakhmetov**

Title: Director of the Akzhayik State Nature Protected Territory

Date: 12. 02. 2013



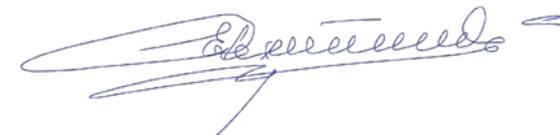
5.2

SIGNED BY THE AUTHORITY/AUTHORITIES IN CHARGE OF THE MANAGEMENT OF THE BUFFER ZONE(S):

Full name : **Elemes Rakhmetov**

Title: Director of the Akzhayik State Nature Protected Territory

Date: 12. 02. 2013



SIGNED AS APPROPRIATE BY THE NATIONAL (OR STATE OR PROVINCIAL) ADMINISTRATION RESPONSIBLE FOR THE MANAGEMENT OF THE CORE AREA(S) AND THE BUFFER ZONE:

Full name: **Erlan Nysanbaev**

Title: Chairman of the Committee for the Hunting and Forestry, Ministry of Agriculture of the Republic of Kazakhstan

Date: 20. 02. 2013



SIGNED BY THE AUTHORITY/AUTHORITIES, ELECTED LOCAL GOVERNMENT RECOGNIZED AUTHORITY OR SPOKESPERSON REPRESENTATIVE OF THE COMMUNITIES LOCATED IN THE TRANSITION AREA.

Full name: **Aidarbekov Serik Kenganovich**

Title: Akim of city

Date: 13. 03. 2013



Full name: **Imangaliev Galymjan Shaidollaevich**

Title: Akim of Damba Rural District

Date: 05. 03. 2013



5. 3

5. 4

Full name : **Tapanov Ergali Tapanovich**

Title: Akim of Yerkindala Rural District

Date: 26. 02. 2013



Full name : **Bisenova Zhibek Kuangalievna**

Title: Direktor OO “Bolashak”

Date: 19. 03. 2013



5. 5

SIGNED ON BEHALF OF THE MAB NATIONAL COMMITTEE OR FOCAL POINT:

Full name: **Roman Jashenko**

Title: Chairman for the Kazakhstan National Committee for the MAB Programme

Date: 25. 08. 2013





Ardea cinerea



Chick of *Hydropogone caspia*



Chlidonias sandvicensis



PART II: DESCRIPTION

6. LOCATION (COORDINATES AND MAP(S)):

6.1 PROVIDE THE BIOSPHERE RESERVE'S STANDARD GEOGRAPHICAL COORDINATES (ALL PROJECTED UNDER WGS 84):

Cardinal points:	Latitude	Longitude
Most central point:	N 46°55'00	E 51°45'00
Northernmost point:	N 47°11'00	E 51°34'00
Southernmost point:	N 46°42'00	E 51°44'00
Westernmost point:	N 46°55'00	E 51°15'00
Easternmost point:	N 46°52'00	E 52°17'00

Provide a map(s) on a topographic layer of the precise location and delimitation of the three zones of the biosphere reserve (Map(s) shall be provided in both paper and electronic copies). Shapefiles (also in WGS 84 projection system) used to produce the map must be attached to the electronic copy of the form.

If possible, also provide a link to access this map on the internet (e.g. Google map, website...).

LOCATION (COORDINATES AND MAP(S)): 7.

Total: 396 346 (ha)

6.2

7.4

	Terrestrial	Marine (if applicable)	Total
7.1 Area of Core Area(s):	36 077 ha	500 ha	36 577 ha
7.2 Area of Buffer Zone(s):	104 769 ha	25 000 ha	129 769 ha
7.3 Area of Transition Area(s):	200 000 ha	30 000 ha	230 000 ha
TOTAL:	340 846 ha	55 500 ha	396 346 ha

BRIEF RATIONALE OF THIS ZONATION IN TERMS OF THE RESPECTIVE FUNCTIONS OF THE BIOSPHERE RESERVE. IF A DIFFERENT TYPE OF ZONATION ALSO EXISTS INDICATE HOW IT CAN COEXIST WITH THE REQUIREMENTS OF THE BIOSPHERE RESERVE ZONATION.

(e.g., if national criteria exist for the definition of the area or zones, please provide brief information about these).

Kazakhstan land legislation defines zoning of territories as identification of the lands and their purpose and usage regime. According to Article 50 of the Law “About specially protected natural territories”, “The state natural reserve shall be a particularly protected wildlife area registered as nature conservation and scientific organization containing land and water ecological systems, intended for protection restoration and maintenance of biological variety of natural complexes and natural and historical objects relating thereto”. This category of specially protected natural territories is subdivided into the following zones with different types of protection regime and use: 1) reservation conditions zone – the core zone, intended for the long-term conservation of genetic resources, biological variety, ecological systems and landscapes with sufficient sizes for such purposes; 2) the buffer zone – the area used for ecologically oriented economic activity and stable reproduction of biological resources. Besides, the Article 53 of the Law “About SPNA” considers establishment of the protective zone of state nature reserve, where “1) the main types of land users’ traditional economic activities ensuring stable utilization of natural resources shall be allowed; 2) ecosystem exploitation and economic activity of the types producing detrimental effect upon the ecological systems of the state wildlife reserve shall be prohibited or limited”. In accordance with the Conception of biosphere reserve this protective zone of state zoning of RK is a buffer zone of biosphere reserve of international importance.

Functional zones' identification in Alakol Biosphere Reserve was conducted with goal of conservation of unique natural types and intrazonal ecosystems of Ural river delta wetlands, 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 nominated Akzhayik Biosphere Reserve:

1. *Core zone (main zone)*. According to the legislation of Kazakhtan, this territory includes the zone of nature reserve's regime of Akzhayik Nature Reserve, which prohibits any economic activity and provides strict protection regime.

2. *Buffer zone*, which consists of the buffer and protective zone of Akzhayik Nature Reserve, established according to the legislation of Kazakhstan. This territory is designed for the protection of the core from unfavourable external influence. Any activity that would negatively influence the condition and rehabilitation of the given territory's ecosystems is prohibited here. 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 Akzhayik 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.



Ardea cinerea



Cygnus olor



Delta area

8. BIOGEOGRAPHICAL REGION:

[Indicate the generally accepted name of the biogeographical region in which the proposed biosphere reserve is located.]

(The term “major biogeographic region” is not strictly defined but you may wish to refer to the Udvardy classification system (http://www.unep-wcmc.org/udvardys-biogeographical-provinces-1975_745.html)).

The territory of Akzhayik biosphere reserve is located in the desert zone, in subzone of semi-deserts (steppe Northern deserts) on brown desert soils and according to its botanic-geographical regioning belongs to Sahara-Gobi desert district, Iran-Turan subdistrict, North-Turan province, Western – North-Turan subprovince. According to soil-geographic regioning the territory of biosphere reserve is located in Caspian province of the subzone of brown soils of Northern deserts’ zone. Biosphere reserve is situated in Southern part of Caspian depression at the negative altitude of the surface from -27 m (modern background sea level) to -20 m in the North.

9. LAND USE:

9.1

HISTORICAL:

(If known, give a brief summary of past/historical land use(s), resource uses and landscape dynamics of each zone of the proposed biosphere reserve).

Lands of Azkhayik biosphere reserve area were being developed by people since about 10,000 years ago. The main activities of ancient people of this region were cattle-breeding and fishery. The earliest written sources tell about a hostile Sarmat tribes living on this territory almost two and a half thousand years ago. Later the first town settlement appeared not far from modern territory of biosphere reserve – Saraychin town (territory of Makhambet district at Ural river bank). In the Middle Ages it was a large shopping center of the Golden Horde situated on the shortest route from Europe to Middle Asia and China. In 1640 a merchant from Yaroslav Guriy Nazaryev with his sons built a wooden fort in Ural (Zhayik) river mouth, after paying toll to Nogai Khan in Saraychik, who owned Zhayik river. Fishermen settlements started to appear around this fort, attracted by benefits of fishing for valuable salmon. From this time and up to early 20 century Guryev city (later renamed to Atyrau) became a city of fishermen and merchants. In 20th century it transformed from ordinary fishing town to oil capital of Kazakhstan. Nowadays Atyrau oblast is a leader in Kazakhstan for oil production. At the same time, fishing and cattle breeding still play a big role in the economy of this region.

WHO ARE THE MAIN USERS OF THE BIOSPHERE RESERVE? (FOR EACH ZONE, AND MAIN RESOURCES USED). IF APPLICABLE, DESCRIBE THE LEVEL OF INVOLVEMENT OF INDIGENOUS PEOPLE TAKING INTO ACCOUNT THE “UNITED NATIONS DECLARATION ON THE RIGHTS OF INDIGENOUS PEOPLES”. (http://www.un.org/esa/socdev/unpfii/documents/DRIPS_en.pdf).

The majority of modern settlements, located in the transition zone of biosphere reserve, were created approximately at the same time by moving people from different settlements of Isatay and Kurmangazy districts of Atyrau oblast. So, for example, **Yerkinkala** village was founded in 1933-1936 as a fishing settlement where about 30 families united into one team and practiced fishery.

Rakusha village was located in the area of Atyrau's old airport along Ural river tributary stream. There was a large port in this village for fishing boats and barges. When the water level of the Caspian Sea decreased, population of Rakusha village was moved to Ural bank near Yerkinkala village. In 1960 these settlements were used to create a large fishing farm, which to 1980 became one of the most developed and rich in its area. This union had its own fishing ships, industrial refrigerator, refrigerator wagons, garage, boiler rooms, turning and metalwork workshops, as well as a large utility sector for growing vegetables, fodder (alfalfa) and legumes. Cattle breeding was also actively developed. There was a kindergarten and medical assistance point in this collective farm, as well as Consumer Services Center with a workshop for fur coats, vests and sleeveless jackets. There were different amateur clubs, museum, folk ensemble and folk orchestra named after Gaziz Zheksimaliyev consisting of 40 dombra players.

Peshnoye villate (or Peshnoy village) was established in 1950s and was developing only thanks to oil-production company Embanefit. An oil pipeline came to the village where there were oil tankers. The village was equipped with gas, electricity and central heating, there was post office, communal sauna, shop, steamshop, medical service and its own elementary school for children up to 4th grade. There were 70 homes with total population of 300 people. Local people practiced cattle breeding and grew fruits and vegetables at their private land. In the beginning of 1990s due to Caspian Sea level increase pastures and meadows and almost all communications of Peshnoy village were flooded. As the result of high sea waves electrical posts, oil tankers and roads were ruined. After 1991 village was almost empty, post office, shop and school were closed. Now there are 10-15 families living in the village, they practice mostly fishing. In the present time there is active weather station of Kazakh Hydro-meteorological Service and observation stations of border control.

9.3

WHAT ARE THE RULES (INCLUDING CUSTOMARY OR TRADITIONAL) OF LAND USE IN AND ACCESS TO EACH ZONE OF THE BIOSPHERE RESERVE?

The access to the territory of the core and buffer zones is regulated by the Law of RK about SPNA and resolutions of local authorities (oblast, city and district Akimats). The land use of the transition zone is also regulated by Kazakhstan's legislation and resolution of local authorities. There are no traditional or other non-formal rules of this land's use.

9.4

DESCRIBE WOMEN'S AND MEN'S DIFFERENT LEVELS OF ACCESS TO AND CONTROL OVER RESOURCES.

(Do men and women use the same resources differently (e.g., for subsistence, market, religious/ritual purposes), or use different resources?).

In Yerkindala men organized a smoking plant, and women made vegetable-growing team for tomato processing and produced their own tomato paste. There are no special differences in the access or control over resources for women and men.



Coast of Caspian Sea





10. HUMAN POPULATION OF PROPOSED BIOSPHERE RESERVE:

[Approximate number of people living within the proposed biosphere reserve]

	Permanently	Seasonally
10.1 Core Area(s):	NO	About 5-15 nature protectionists
10.2 Buffer Zone(s):	NO	About 10-30 nature protectionists
10.3 Transition Area(s):	About 17 000 people	NO
TOTAL:	About 17 000 people	About 15-45 nature protectionists (staff of State Nature Reserve)

10.4

BRIEF DESCRIPTION OF LOCAL COMMUNITIES LIVING WITHIN OR NEAR THE PROPOSED BIOSPHERE RESERVE.

(Indicate ethnic origin and composition, minorities etc., main economic activities (e.g. pastoralism, tourism) and the location of their main areas of concentration, with reference to the map (section 6.2)).

Akzhayik biosphere reserve is located on the lands of Makhambet district and Atyrau city of Atyrau oblast. There are 11 settlements on its territory with population over 17,000 people. In ethnical composition the majority of population is Kazakh (98%), followed by Russian, Tatar and other ethnicities (2%); total population density is 23 people in 1 square km.

The main economic activities are fishing and cattle breeding, carried out mostly in production cooperatives. In private sector local population practices breeding cattle, sheep and horses. The majority of the houses is of adobe type, although in the last 3-4 years bricks are used more often than before. All houses are heated with coal or gas in the winter time, many houses have central water supply. The main religions of the local people are Islam followed by Christianity. Indigenous people practice religious rituals, as well as national traditions (respect of the elderly, higher status of the men, involvement of the children to religious and national customs from the early age).

Population birthrate in Makhambet district in the recent years is an average of 40 babies per 1,000 people, and death-rate – 23 deceased per 1,000 people. Migration balance is positive, according to the data of 2009 it was +47 people (695 moved in while 648 moved out). In the first half of 2009 Tax Committee of Makhambet district registered 553 active subjects of small business, 63 of which are small enterprises, 699 are private businesses and 490 are farms.

NAME(S) OF THE MAJOR SETTLEMENT(S) WITHIN AND NEAR THE PROPOSED BIOSPHERE RESERVE WITH REFERENCE TO THE MAP (SECTION 6.2):

Atyrau City –capital of Atyrau Province (10 km from the BR border) There are 15 settlements within and near the biosphere reserve, which are belong to 5 rural districts: Yerkindala, Damba, Atyrau, Kenuzek and Chkalov.

CULTURAL SIGNIFICANCE:

(Briefly describe the proposed biosphere reserve's importance in terms of past and current cultural values (religious, historical, political, social, ethnological) and others, if possible with distinction between material and intangible heritage (c.f. UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage 1972 and UNESCO Convention for the Safeguard of the Intangible Cultural Heritage 2003 (http://portal.unesco.org/en/ev.php-URL_ID=13055&URL_DO=DO_TOPIC&URL_SECTION=201.html) and http://portal.unesco.org/en/ev.php-URL_ID=17716&URL_DO=DO_TOPIC&URL_SECTION=201.html)).

There are various sites of ancient cattlemen in close proximity of the biosphere reserve: not far from Konyr Kuduk well, Kok Murun sand dune, near Novyi Ushtagan village, Kadyr Gali sand dune and Sazdy wintering site. A total of 19

10.5

10.6

10. 7

monuments of Bronze Age and 128 of Early Iron Age were found on the territory of Atyrau oblast. One of the most important historical and archaeological monuments is Saraychik settlements, located in Makhambet district. It was a large city and merchant center of Golden Orda, lying on the shortest route from Europe to Middle Asia and China. In the end of XIV century (1395) ancient Saraychik city was destroyed by Timur's army. In the present time archaeologists found Iranian ceramic ware, Khorezm ware from gray clay, Chinese porcelain ware, bone flutes, hoes, knives, fishing rods and nails.

There are a lot of monuments of cult Muslim architecture of past centuries on the lands of Atyrau, including ancient necropolises, underground mosques, etc.

SPECIFY THE NUMBER OF SPOKEN AND WRITTEN LANGUAGES (INCLUDING ETHNIC, MINORITY AND ENDANGERED LANGUAGES) IN THE BIOSPHERE RESERVE.

(Refer, for instance, to the UNESCO Atlas of Endangered languages (<http://www.unesco.org/culture/languages-atlas/index.php>)).

There are two main languages: Kazakh and Russian in the biosphere reserve.



Ecological festival



11. BIOPHYSICAL CHARACTERISTICS:

11.1

GENERAL DESCRIPTION OF SITE CHARACTERISTICS AND TOPOGRAPHY OF AREA:

(Briefly describe the major topographic features (wetlands, marshes, mountain ranges, dunes etc.) which most typically characterize the landscape of the area).

Akzhayik biosphere reserve is located on the plain in the Southern part of the Caspian depression on negative altitude. The territory of biosphere reserve is located on the both sides of Ural river with adjacent coast of the Caspian Sea and represents marshy depression, partitioned by a system of delta channels, overgrown with dense semi-aquatic vegetation and adjacent coast of North-Eastern part of the Caspian Sea up to 2 m depth. As a whole, the biosphere reserve is situated in the desert zone, in the subzone of steppified Northern deserts and is occupied by various aquatic and terrestrial ecosystems. This territory is characterized by low plains with saline meadows, solonchaks, solonetz and spacious wetlands.

11.2

ALTITUDINAL RANGE:

11.2.1 Highest elevation above sea level: -20 metres

11.2.2 Lowest elevation above sea level: -27 metres

11.2.3 For coastal/marine areas, maximum depth below mean sea level: - 7 metres

11.3

CLIMATE:

(Briefly describe the climate of the area, you may wish to use the regional climate classification by Köppen as suggested by WMO (http://www.wmo.int/pages/themes/climate/understanding_climate.php)).

Akzhayik biosphere reserve is located in the zone of continental and arid climate, expressed in very harsh change of severe winter by hot summer with low level of atmosphere precipitation. Aridity is one of the peculiarities of the given

region. The region is characterized by abundant warmth and domination of clear dry weather. The average annual sunshine duration is very high and is 2590 hours (Atyrau), the number of days without sun is about 54 days. The sum of temperatures above 10° a year is 3400-4000°. Average annual temperature changes according to the region from 8°C to 12°C. Annual amplitude of air temperature varies from 33°C to 36°C. The duration of the period with average daily temperature above 0°C is 180-210. Winter is moderately cold. Average temperature in January (the coldest month) is -12.7 °C (Atyrau). But in the coldest winters the temperature reaches -38°C. Summer is hot and long. Average temperature in July (the hottest month) is not lower than +25 +26°C. In some years air temperature exceeds +42 +47°C. High temperatures are explained by abundant inflow of solar radiation and little effort of heat for evaporation. The maximum amount of days with high temperature is in July and August, when air temperature of almost every day exceeds +30°C.

Precipitation maximum is in the warm period, from April till October. There is little precipitation in summer, sometimes there may be no precipitation for 2-3 months. The quantity of precipitation in autumn is also not high. Stable snow cover is formed in third decade of December, average height of snow cover reaches 5-8 cm, maximum 20-23 cm (Atyrau, Peshnoy). The number of days with snow cover is about 70 days. In some years the snow cover is unstable and it lies for 20-25 days. Spring frosts usually end in the first-second decade of April. Snow cover is usually gone by that time. The quantity of liquid precipitation increased, and the number of winds with velocity of 9-12 m/s is higher. Most of the precipitations evaporate. Autumn frosts start mainly in second-third decade of October.

The territory of biosphere reserve is characterized by strong winds and storms. On the largest part of the territory average annual wind velocity varies in the limits of 4-6 m/s, increasing up to 5-7 m/s at the coasts. During the cold season (September – April) dominating winds are Eastern and South-Eastern, in the summer time those are Northern and North-Western. The number of days with wind of more than 15 m/s is 42 days. Climatic peculiarities of the region lead to air self-cleaning. So, long-term average frequency of calms and light winds up to 1 m/s is only 10-15%, creating favourable conditions for intensive airing, decreasing the accumulation of pollutants. The region is characterized by winds of mostly Eastern direction with average velocity of 5.5 m/s.

The influence of the Caspian Sea is also very limited, it is visible only in the narrow land stripe of the coast and is expressed in a little increase of air humidity, temperature increase in winter, temperature decrease in summer, in decrease of annual and daily temperature amplitudes. According to long-term observations of weather stations located along Ural river (Makhambet village 145 km above delta, Atyrau – on the Northern end of the city, on the top of delta and Peshnoy island) the average annual air temperature on the studied territory is 8.6°C.

11.3.1 Average temperature of the warmest month: +26,0 °C

11.3.2 Average temperature of the coldest month: -12,7 °C

11.3.3 Mean annual precipitation: 250-290 mm, recorded at an elevation of 380 metres

There is little amount of precipitations, their average annual quantity does not exceed 200 mm (Atyrau – 189 mm, Peshnoy – 144 mm). Rain dominates over snow on the whole territory.

11.3.4 Is there a meteorological station in or near the proposed biosphere reserve? If so, what is its name and location and how long has it been operating?

a) manually:

Weather station of Peshnoy village since 1964,

Weather station of Atyrau city (biosphere reserve's transition zone) since 1878

b) automatically:

Weather station of Atyrau airport, automatically since 2000, (biosphere reserve's transition zone)

Weather station of Atyrau city (biosphere reserve's transition zone), automatically since 2000

c) Name and location of station:

Weather station of Peshnoy village since 1964 (biosphere reserve's buffer zone)

Weather station of Atyrau city (biosphere reserve's transition zone) since 1878

Weather station of Makhambet village since 1970

Weather station of Atyrau airport since 1950

Gauging station of Zhanatalap village (biosphere reserve's transition zone)

Gauging station of Yerkenkala village (biosphere reserve's transition zone)

Gauging station of Makhambet village since 1970

Gauging station of Atyrau city (biosphere reserve's transition zone) since 1878

Sea station in Peshnoy village (biosphere reserve's buffer zone) since 1964

Sea station of Zhambay village since 1964

GEOLOGY, GEOMORPHOLOGY, SOILS:

[Briefly describe important formations and conditions, including bedrock geology, sediment deposits, and important soil types]

Geology. The geological structure of the territory comprises foundation and platform sedimentary cover. Basic rock of the foundation (from the Permian to the Neogene) are represented by platform facies of both marine and continental origin. They lie at the depth of 7-8 km. The oldest deposits are of *Permian system (Kungur layer)* consisting of a layer of sandy-clay and carbonate brightly colored sandstone and pebbles. The rock of *Jurassic system* is divided into two layers: lower mostly terrigenous and upper marine. Lower Jurassic is characterized by medium and fine-grained sands, sandstones and micaceous dark-gray clays, while Upper Jurassic is represented by a combination of gray and brown clays, often thin-layered and ferruginous.

The fractions of the *Cretaceous system* are also characterized by separate layers of marine and continental origin. The layers of the Lower Cretaceous system are made of dense calcareous clays with marl, sand and dense layers of sandstone with glauconite and pyrite, and the Upper Cretaceous are represented by mostly greenish-gray marl and clay.

Quaternary deposits overlay earlier layers by a dense cover. They subdivide into the layers of lower, middle, upper and modern parts. Of widespread distribution are deposits of *Khazar layer* – greenish-gray clays with rare interlayers of fine-grained sands. Marine *Khvalyn* strata are represented by ferruginous sometimes layered loams with dark-gray dense clays

with interlayers of fine-grained gray-brown sands. The formations of *Novocaspiian* layer are distributed on almost all the area of the described region. They include marine alluvial and delta facies consisting of clays and loams which form flood-land terraces of Ural river and are formed mainly by brown-gray fine-grain sands with interlayers of brown clays and loams.

Relief. Biosphere reserve is located in the Southern part of the Caspian depression at the negative altitudes from -27 m (modern background sea level) to -20 m on its North. Relief of Caspian depression in the limits of the reserve is formed mostly by marine activity. The main relief peculiarities are caused by whole geological structure of the territory. The area of the reserve is characterized by plain relief, slightly partitioned surface and small relative elevations. There are following relief types: marine accumulative plain, alluvial-delta plain and fragmental plain of denudation origin.

Dominating relief type is marine accumulative plain, in the limits of which there are two generations of marine plains of Novocaspiian Age – early and late – according to the morphology and formation time.

Ural river delta represents large accumulative relief form, formed near river mouth and made of alluvial material. Processes taking place in Ural delta are characterized by high level of complexity, because there is a gradual transition from river to marine regime. A quite important role in delta relief establishment belongs to river sedimentation, due to which the initial marine plain loses its original features and is transformed into alluvial-marine relief type. In the recent decades the level of Caspian Sea was fluctuating, and the Sea went back for 10-15 km, so the increase of the terrestrial part of Ural river delta was caused not only by active delta growth, but more by sea level decrease. During this period the majority of Ural river channels in the mouth part became not flow-through, and all the discharge went to the main river-bed. In the Quarternary the level of the Caspian Sea was fluctuating quite often with coastal line moving for tens of km. The causes of level fluctuations were in climate changes, increase of water discharge into the Caspian during Ice Ages, which is proved by fresh water during transgressions and saline water during regressions.

Eventually the Caspian Sea level increase led to flooding of considerable (previously dried out) territories and establishment of the whole system of fan-like active channels, including the ones before river discharge parts of the delta.

Estuarine coast of Ural river is an important relief element in the limits of the projected territory. Relief of Ural river coast is inexpressive, although the difference in depth is very expressed here Southern of Peshnoy island. According to bottom relief structure the describe sea area is uniformly shallow, with depth of not more than one meter from the coast to tens of km into the sea. It is necessary to note the presence of anthropogenic relief forms: ground roads, irrigational channels, as well as dams which protect settlements and oil farms from floods and often used as roads. The height of the dams is 2-8 m depending on the relief, width in the basis is not less than 10 m, total length – more than 50 km.

Soils of Akzhayik biosphere reserve are characterized by high level of salinity and carbonateness. Features of the soils include small humus content with not big power of humus horizon, low content of ash supply elements, low absorption

capacity. Saline hydromorphous soils are widely spread in the soil cover of marine coastal territory. Such processes as salinization and deflation are widely spread.

A large space is occupied by lands disturbed in the result of anthropogenic activity. Economic activity seriously influences the soil-forming process. Soils experience intensive technogenic influence caused by proximity of economic zone of Atyrau and adjacent villages, which is expressed as numerous disturbances of soil cover, accompanied by establishment of technogenic relief forms, often with revealing or extraction to the surface of saline bedrocks, which also leads to secondary soil salinization. Systematic list of soils, identified on the territory of biosphere reserve in Ural river delta and on the coast of the Caspian Sea, is following:

1. *Brown solonetzic soils*. In the upper part of humus horizon there is a porous crust with power of 2-3 cm. Horizon “B”, or illuvial horizon, is characterized by bigger density and prism-like or nut-prism-like structure and high density.

2. *Flood-land meadow soils* are closely related to periodic flooding of the flood-land, renewing and increase of sedimentation and the soils themselves, as well as influence of the ground waters lying close to the surface. According to their age flood-land soils are relatively young formations. Soil-forming strata are made of layered deposits of mixed marine and alluvial-delta origin. Buried humus horizons are often found in soil profile.

3. *Flood-land meadow desertifying solonchak* soils were earlier formed in hydromorphous conditions, which is proved by the presence of blue-gray and rusty interlayers in the profile. In the current time they are in more arid conditions.

4. *Meadow solonchak* soils differ from flood-land meadow soils by the depth of upper saline horizon. Among meadow soils the most wide spread are solonchak (0-30 cm) and solonchakous (30-70 cm).

5. *Meadow-marsh solonchak soils* are formed in the conditions of close ground water deposits and have limited distribution in the limits of Ural river delta, along the channels and dams. According to the content of easily soluble salts meadow-marshy soils are divided into common and saline species. The main direction of soil-forming process which periodically follows marshy type with domination of anaerobic processes in the conditions of flood, and meadow with conditions changing to aerobic in the drying stage.

6. *Meadow coastal solonchak*. Meadow coastal soils are formed in the conditions of constant moisture. Their profile is underdeveloped and represented by a combination of sandy, loamy layers with high content of shell fragments.

7. *Meadow coastal desertifying solonchak and solonchakous soils*. When the sea level decreased, the ground water level decreased as well. The result was that a part of coastal meadow soils that were on relatively elevated areas started forming in arid conditions. Vegetation cover began to include *Artemisia*, annual saltworts, which are indices of desertification





processes. There are not considerable changes in the profile, only a layered crust, characteristic for desert soils, was formed on the surface. Sea level increase led to ground waters level increase, resulting in intensive development of salinization processes.

8. *Solonetz desert (brown) solonchak* soils are poorer than zonal automorphous soils by the content of humus and mobile nutrition elements, and although they are formed among the latter, the content of organic matter in them is 0.3-0.8%.

9. *Solonchak meadow* are dependant component in soil combinations of the territory of modern delta plains and are formed under the influence of slightly mineralized ground waters lying on the depth of 1-2 m, and their capillary edge almost reaches the surface. The concentration of the salts in these soils is highest on the surface, their number considerably decreases on the lower profile levels. Meadow solonchak have poorly defined turf horizon, often with visible humus color. Meadow solonchak are characterized by increased humus content among other solonchaks.

10. *Common solonchak* are characterized by very high salt content in all the profile, up to 2.5-4%. Common solonchak are formed on the surfaces of higher level than meadow, in the conditions of very expressed effusion regime with not deep deposit of considerably mineralized ground waters.

11. *Coastal solonchak* are formed in the conditions of close deposits of very mineralized ground waters. The profile of the described soils is weakly formed, layered, open and saline, with big quantities of shell inclusions. Salt regime of these soils is unstable and is closely connected to the level fluctuations of the sea and ground waters.

12. *Solonchak marsh*, their profile is not yet formed and is composed mostly by layers of marine sediments, containing a lot of shells; it is characterized by high moisture, salinization and denudation.

11.5

BIOCLIMATIC ZONE:

(Indicate the bioclimatic region in which the proposed biosphere reserve is located, refer to the table below and tick the appropriate box for each area of the biosphere reserve).

Table 1: Aridity index resulting from the use of P/ETP

Mean annual precipitation (P)/mean annual potential evapotranspiration (ETP)

Areas	Average annual rainfall/mm	Aridity index		Core area(s)	Buffer zone(s)	Transition area(s)
		Penman	(UNEP index)			
Hyper-arid	P<100	<0.05	<0.05			
Arid	100-400	0.05-0.28	0.05-0.20	✓	✓	✓
Semi-arid	400-600	0.28-0.43	0.21-0.50			
Dry Sub-humid	600-800	0.43-0.60	0.51-0.65			
Moist Sub-humid	800-1200	0.60-0.90	>0.65			
Per-humid	P>1200	>0.90				

BIOLOGICAL CHARACTERISTICS:

List main habitat types (e.g. tropical evergreen forest, savanna woodland, alpine tundra, coral reef, kelp beds) and land cover types (e.g. residential areas, agricultural land, pastoral land, cultivated areas, rangeland).

REGIONAL

First type of habitat/land cover: **Alluvial-delta plain / Pasture**

Alluvial-delta plain, slightly sloped, with shallow depressions, channels of erosion and erosion-marine origin is located in the central part of biosphere reserve. All the territory of this plain type includes only hydromorphous and partly semi-hydromorphous ecosystems, formed in the condition of close ground waters deposit. Most characteristic are *slightly concave plains of modern delta floodings with domination of motley-grass – cereal meadows*. This ecosystem type is widely distributed in the mouth part of delta channels – Chyornaya river, Zaroslyi, Bukharka, Peretaska, which mostly don't have access to the sea and overflow the flood waters into the depressed parts of alluvial-delta plain at the altitudes from -26 to -27 m, as well as in the limits of depressed parts of marine plains, located near slope curves, partitioned by temporary water

11.6

courses. Soil cover is characterized by different combinations of meadow, meadow-marshy soils and meadow solonchaks. Ground waters lie at the depth of 1-2 m and above.

Characteristic species:

Vegetation is represented by motley-grass – cereal associations with domination of *Calamagrostis epigeios*, with *Phragmites australis*, *Aeluropus littoralis*, and motley-grass: *Glycyrrhiza glabra*, *Alhagi pseudalhagi*, *Vexibia alopecuroidesi*. *Tamarix ramosissima* is observed everywhere. *Elaeagnus oxycarpa* is registered by separate specimens. Characteristic birds of the given type include Great Cormorant (*Phalacrocorax carbo*) and Hooded Crow (*Corvus cornix*), mammals – Fox (*Vulpes vulpes*), European Hare (*Lepus eurapaeus*), Tamarisk Jird (*Meriones tamariscinus*).

Halophyte vegetation is common in combination with motley-grass – cereal meadows on meadow solonchak. Among halophyte vegetation there grows *Halimodendron halodendron* – a shrub rare for this area, and *Halostachys caspica*.

Important natural processes:

Soil cover is characterized by different combinations of meadow, meadow-marshy soils and meadow solonchaks. Ground waters lie on the depths of 1-2 m and above. In the condition of close deposit of ground waters most distributed vegetation is cereal (*Aeluropus littoralis*).

Main human impacts:

Cereal meadows were previously used for haymaking, and they happen to be not very influenced by anthropogenic disturbance.

Relevant management practices:

Nature reserve regime.

REGIONAL

Second type of habitat/land cover:

Coastal ecosystem of river beds and channels with high thickets of reeds / wetland vegetation on flood-land arcwise-marsh soils.

Characteristic species:

Associations of *Phragmites australis*, *Bolboschoenus maritimus* and *Typha* (*Typha angustifolia*, *Typha latifolia*, *Typha minima*) are formed along the banks, river beds, channels. Reeds' height in these conditions reaches up to 300-500 cm. One of the leading plants in this ecosystem is *Scirpus lacustris*, hygrophyte with height up to 150-200 cm. A water fern – *Marsilea quadrifolia* – is observed on reed meadows. Along with other water plants it forms thickets (with *Juncus*, *Phragmites*, *Alisma*, *Bolboschoenus maritimus*), which may become a spawning area for the fish, as well as development site for young fish. In the low flood-lands of Ural river *Bolboschoenus* and *Eleocharis* associations (*Bolboschoenus maritimus*, *Eleocharis acicularis*, *Eleocharis intersita*) are recorded, in the water there are water plants (*Potamogeton pectinatus*, *Potamogeton perfoliatus*). Small non-flowing pools along the bank are full of *Entheromorpha prolifera*. Sometimes tree-shrub thickets are observed with domination of *Salix alba*, rarely *Elaeagnus oxycarpa* in the tree layer, and Tamarix (*Tamarix ramosissima*, *Tamarix laxa*) in the shrub layer.

Characteristic bird inhabitants of the given ecosystem type are Eurasian Bittern (*Botaurus stellaris*) and Little Bittern (*Ixobrychus minutus*), Eurasian Coot (*Fulica atra*), mammals – Wild Boar (*Sus scrofa*), Muskrat (*Ondatra zibethicus*), European Water Vole (*Arvicola terrestris*).

Important natural processes:

1. Reeds catch fire from storms, these fires are especially dangerous in spring, because at this time it hurts wild animals the most.
2. Snow and dust storms, caused by winds, hails, storms, harsh temperature decrease in spring, etc., have limited influence on natural objects.

Associations of this ecosystem serve as a wonderful protective and food base for birds, fish and other animals.

Main human impacts:

Fires. Periodically there are steppe fires on the transition zone of biosphere reserve, caused by hunters and fishermen, as well as by burning of the old grass by local people.

Unsustainable use of biological resources – mainly excessive insufficiently controlled fishery and hunting.

Uncontrolled visits of wetland territory (disturbance factor, tree cutting, local fires, etc.).

Relevant management practices:

Nature reserve regime.

REGIONAL

Third type of habitat/land cover:

Shallow water lagoons with dominations of floating reeds and canes / wetlands

Ecosystems of shallow water lagoons (with depth of 0.5-1.5 m) are separated from the open sea waters by a wall of reed thickets, promoting conditions for lagoon protection from waves and decreasing human impact. Those are shallow water fresh and slightly saline ecosystems. They occupy huge space (more than 30%) of biosphere reserve's territory and are very diverse in overgrowth character and vegetation composition.

Characteristic species:

Lagoons are dominated by cattail – reed (*Phragmites australis*, *Typha angustifolia* *Typha latifolia*) thickets. Reeds' height reaches 300-500 cm. More rarely observed are thickets of reeds and cattails (*Typha angustifolia*, *Typha latifolia*, *Scirpus lacustris*). Accompanying phytocoenoses - *Scirpus lacustris* and *Bolboschoenus maritimus*, observed on the edges of reed thickets. They are distributed in clumps and don't form dense grass stands. Here one may record *Butomus umbellatus* – a beautiful decorative plant, *Sagittaria trifolia*, *Alisma gramineum* and other plants. Along the edge of the lagoons among reed-cattail grass stand one may rarely observe *Phalaroides arundinaceae*.

It is important to note large variety of macrophytes. *Trapa kasachstanica*, *Salvinia natans*, *Hydrocharis morsus-ranae*, *Lemna triscula* are registered in the still waters of the lagoons. These macrophyte freely swim on water surface. Water-submerged macryphytes are usual for areas near reed thickets. Those are *Myriophyllum verticillatum*, *Ceratophyllum demersum*, *Ceratophyllum submersum*, *Najas marina*, *Ruppia maritima*, *Potamogeton natans*, *Potamogeton perfoliatus*, *Vallisneria spiralis*. Shallow water lagoon ecosystems are the most important habitats for fish, nesting waterbirds and other valuable animals. In *Myriophyllum* thickets there are large aggregations of small invertebrate animals, which serve as food for many water reservoir's inhabitants. And *Myriophyllum* itself is food for plant-eating fish and birds (seeds), as well as a substrate for fish spawning and refuge for all animal population of the water reservoir, especially for young fish.

Important natural processes:

Water ecosystems of lagoons (especially curtain reeds) are of big natural and economic importance. They are the most important habitat sites for nesting waterbirds, as well as for fattening of young sturgeon and some other fish species.

Important bird sites in this habitat type include feeding sites of Pallas's Gull (*Larus ichthyæetus*), Common Tern (*Sterna hirundo*) and Sandwich Tern (*Sterna sandvicens*). Starting from the middle of summer, hatches of young and adult Dalmatian Pelicans (*Pelicanus crispus*) and Mute Swans (*Cygnus olor*) come here from more overgrown inaccessible areas. Natural ignition of the reeds is possible.

Main human impacts:

Due to inaccessibility of the territory direct anthropogenic influence is inconsiderable. At the same time, there are threats associated with pollution of rivers and sea by oil, phenols, organochlorine pesticides, heavy metals, etc.

Relevant management practices:

Nature reserve regime

ECOSYSTEM SERVICES: 12.

IF POSSIBLE, IDENTIFY THE ECOSYSTEM SERVICES PROVIDED BY EACH ECOSYSTEM OF THE BIOSPHERE RESERVE AND THE BENEFICIARIES OF THESE SERVICES.

(Please refer to the Millennium Ecosystem Assessment Framework and The Economics of Ecosystems and Biodiversity (TEEB) Framework (<http://millenniumassessment.org/en/Framework.html> and <http://www.teebweb.org/publications/teeb-study-reports/foundations/>)).

Among water ecosystems the following have the most importance in conserving the landscape and ecosystem biodiversity:

1) **River flowing**, including the main river-bed of Ural river with channels, connected with the sea, with domination of sparse associations of macrophytes (*Potamogeton perfoliatus*, *P. natans*) and green algae (*Spirogyra* sp., *Mougeotia* sp.) on sand-silty soils. Total area is 31.47 km² (1.15% of the territory of two main zones of biosphere reserve), including river-beds – the main river-bed of Ural river, channels, delta channels Malyi Yaitskiy and Shirokiy. Algae are eaten by many marine invertebrates, as well as young fish of some species, which, in their turn, are food for other fish. Macrophytes serve as a refuge for many marine organisms, many fish species spawn on their twigs. Anthropogenic influence on the ecosystem is high and is related to water withdrawal for irrigation, its use as a transport channel for construction materials, and with fishery.

12. 1

2) **River not-flowing ecosystems**, separated from the sea, with weak current, with domination of aquatic macrophyte associations (*Trapa kasachstanica*, *Salvinia natans*, *Potamogeton nodosum*, *Lemna triscula*) and algae (*Entheromorpha prolifera*) on sand-silty soils. Area is 8.58 km² (0.31% of the total area of the main and buffer zones of biosphere reserve. River not-flowing ecosystems include channels Kapuzek, Mitrofan Uzek, Peshnovskiy Kovsh and delta channels Peretaska, Zaroslyi and Zolotenka. All of them are not connected to the sea at the present time. Not-flowing water courses have weak current, leading to domination of aquatic macrophytes located on water surface. Those are *Trapa kasachstanica*, *Salvinia natans*, *Potamogeton nodosus*, *Potamogeton perfoliatus*, *Lemna triscula*, *Lemna minor* and algae (*Entheromorpha prolifera*) on silty soils. Typical bird fauna representatives for the given types are Little Bittern (*Ixobrychus minutus*), Red-crested Pochard (*Netta rufina*), Gadwall (*Anas strepera*), Eurasian Coot (*Fulica atra*); water mammals – Muskrat (*Ondatra zibethica*), coastal - Raccoon Dog (*Nyctereutes procyonoides*).

3) **Lagoons with reed curtain thickets and dense reed swimming islands**, located in Western and Eastern parts of biosphere reserve and separated from open sea waters by a wall of reed thickets, promoting conditions for lagoon protection from waves and decreasing human impact. Those shallow fresh and slightly saline water ecosystems occupy huge area (31.77%) and are very diverse in overgrowth character and vegetation composition. The main vegetation here are reed and cattail thickets (*Phragmites australis*, *Scirpus tabernaemontani*), as well as water-submerged macrophytes (*Potamogeton pectinatus*, *P. perfoliatus*, *P. pusillus*, *Ceratophyllum submersum*, *Najas marina*, *Caulinia minor*). Curtain reeds also have a big nature protecting importance as valuable sites of habitat and feeding for nesting waterbirds (Pallas's Gull *Larus ichthyæ-tus*, Common Tern *Sterna hirundo*, Sandwich Tern *S. sandvicens*, Dalmatian Pelican *Pelicanus crispus*, Mute Swan *Cygnus olor*, etc.), as well as for fattening of young sturgeon and other fish species.

4) **Open sea waters with reed thickets and reed swimming islands**, occupying fifth part of biosphere reserve's territory (21.27%). They are represented by three individual ecosystem types, differences between which are caused by the character of reed thickets (sparse curtain thickets, swimming islands) and the ratio between them and open water surface, as well as by the diversity of macrophytes and algae populations on them. The main plant species is *Phragmites australis* in combination with associations of water-submerged macrophytes (*Ceratophyllum demersum*, *Potamogeton perfoliatus*, *Myriophyllum spicatum*, *Ceratophyllum demersum*) and algae (*Chara tomentosa*, *Tolypella* sp., *Nitellopsis* sp., *Nitella* sp.).

On the territory of biosphere reserve these ecosystems are located on both sides from Ural river-bed and distributed along the banks and the edge of delta, in the estuary coast, and also stretches from West to East almost along all the coast and are located on the border with open sea waters of Northern Caspian. This ecosystem is food base for birds, fish and other animals.

Among terrestrial ecosystems the most important for biodiversity are:

1) **Anabasis salsa desert** – slightly sloped plain with domination of *Anabasis salsa* on desert solonetz in complex with *Artemisia terrae-albae* on brown solonetz soils, its area is 7.71 km (28% of total area of biosphere reserve's main and buffer zones). This ecosystem type is observed along North-Western edge of the territory at the altitude from -23 to -25 m. Species dominating in vegetation cover are *Anabasis salsa* (90% of the area) and *Artemisia terrae-albae* (9%). Besides dominating species, the following species are recorded: *Eremopyrum triticeum*, *Climacoptera brachiata*, *Ferula tatarica*, *Ceratocarpus arenarius*, *Camphorosma monspeliaca*. A Red Data Book decorative species with decreasing distribution area – *Tulipa schrenkii* – is found on this territory. Most characteristic birds are Houbara Bustard (*Chlamydotis undulata*), Lesser Short-toed Lark (*Calandrella rufescens*) and Red-capped Lark (*Calandrella cinerea*), mammals – Rat (*Ratus norvegica*), Mouse (*Mus musculus*) and Hedgehog (*Erinaceus auritus*).

2) **Ecosystem of *Aeluropus littoralis* meadows, *Tamarix* thickets and *Artemisia* deserts** occupies 3.02% of natural terrestrial ecosystems' area. The main vegetation species here are *Aeluropus littoralis*, *Climacoptera lanata*, *C. brachiata* and *Petrosimonia oppositifolia* in combination with *Tamarix* – *Artemisia* (*Artemisia monogyna*, *Tamarix ramosissima*) and halophyte – juicy saltwort species (*Halocnemum strobilaceum*, *Halostachys caspica*) on meadow coastal desertifying soils with coastal solonchak, as well as in combination with *Artemisia* – *Tamarix* – cereal (*Elytrigia repens*, *Tamarix ramosissima*, *T. laxa*, *Artemisia monogyna*, *A. nitrosa*) and annual – saltwort plants (*Petrosimonia sibirica*, *Climacoptera crassa*) on meadow coastal solonchak desertifying soils. The birds, characteristic for the two named types, are Black-winged Pratincole (*Glareola nordmanni*), European Rollet (*Coracias garrulus*), Western Yellow Wagtail (*Motacilla flava*), mammals – Fox (*Vulpes vulpes*), Badger (*Meles meles*), European Hare (*Lepus europaeus*), Tamarisk Jird (*Meriones tamariscinus*), Five-toed Jerboa (*Allactaga elater*) and Great Jerboa (*Allactaga major*).

SPECIFY WHETHER INDICATORS OF ECOSYSTEM SERVICES ARE USED TO EVALUATE THE THREE FUNCTIONS (CONSERVATION, DEVELOPMENT AND LOGISTIC) OF BIOSPHERE RESERVES. IF YES, WHICH ONES AND GIVE DETAILS.

Indicators of ecosystem services for evaluation of three functions of biosphere reserve are: conservation – population number and population condition of dominant plant and animal species, characteristic for each ecosystem type (list of species see above in paragraph 12.1);

12. 2

development – population number (stock) and overall population condition of plants and animals' species, used by local people with economic aims. These species include, first of all, economic species of fish, birds and mammals. The list of these indicator species is given in the Appendix;

logistic – the number of nature conservation, education, scientific or other projects dedicated to sustainable development of the region, carried out on the territory of biosphere reserve, as well as total number of the tourists who visited biosphere reserve during a year. This information is given in paragraphs 3.3, 4.7, etc.

12. 3

DESCRIBE BIODIVERSITY INVOLVED IN THE PROVISION OF ECOSYSTEMS SERVICES IN THE BIOSPHERE RESERVE (E.G. SPECIES OR GROUPS OF SPECIES INVOLVED).

Biodiversity used for support of ecosystem services belongs, first of all, to the main wetlands of Ural river delta and adjacent territories of Caspian Sea coast, located on one of the largest in Eurasia Caspian – Black Sea – East-African birds' migration route. More than 240 migrating bird species are concentrated here, about 70 of waterbirds stay for nesting. Ural river delta and adjacent water and terrestrial ecosystem serve as a refuge for many wild fauna and flora species, especially for sturgeon fish. Mammals dominating in numbers on the territory of biosphere reserve one may name Muskrat, House Mouse, Tamarisk Jird, Raccoon Dog, Fox, Wolf, Badger and Wild Boar.

12. 4

SPECIFY WHETHER ANY ECOSYSTEM SERVICES ASSESSMENT HAS BEEN DONE FOR THE PROPOSED BIOSPHERE RESERVE. IF YES, IS THIS ASSESSMENT USED TO DEVELOP THE MANAGEMENT PLAN?

Evaluation of ecosystem's importance for biodiversity conservation and ecosystem services was carried out during application's preparation for biosphere reserve nomination. This assessment was also used during the development of Management Plan of the main and buffer zones of biosphere reserve. In course of this work Akzhayik Biosphere Reserve ecosystems' classification was elaborated; it served as a base for development of ecosystem map with detailed legend (given in the Appendix).



Protectioners in border of core zone

13. MAIN OBJECTIVES FOR THE BIOSPHERE RESERVE'S DESIGNATION:

13. 1

DESCRIBE THE MAIN OBJECTIVES OF THE PROPOSED BIOSPHERE RESERVE, INTEGRATING THE THREE FUNCTIONS (CONSERVATION, DEVELOPMENT AND LOGISTIC), PRESENTED BELOW (SECTIONS 14 TO 16), INCLUDING COMPONENTS OF BIOLOGICAL AND CULTURAL DIVERSITY. PLEASE SPECIFY THE INDIRECT PRESSURES AND/OR ORGANIZATIONAL ISSUES.

Contribution to the conservation of landscape and ecosystem biodiversity

Major types of ecosystems (of natural territorial complexes) in the project site are young and were formed under the influence of advances and relictions of the Caspian sea as well as modern surging in the coastal zone. All this has determining influence on the humidification and salinification regimes of the ecosystems.

The core zone of the biosphere reserve consists of two sites (clusters). They are divided by Ural riverbed, river-sea channel. The core zone includes South-West Shalygi as a valuable ecosystem and significant habitat of Caspian seal and nesting ground of great black-headed gull.

Within the delta front, the right and left bank clusters of the core zone include the ecosystems with predominance and participation of key flora and plant community species: reed, cattail, cane and macrophytes (nut, moss, pondgrass, hornwort, parrot's-feather).

The plant cover in the core zone is mainly represented by aquatic ecosystems. These are reed communities and submersed macrophytes. Reed is found as strip stands or plavni (*Phragmites australis*). Reed communities are developed together with submersed macrophytes: caltrop (*Trapa kasachstanica*), pondgrass (*Potamogeton pectinatus*, *Potamogeton perfoliatus*), hornwort (*Ceratophyllum demersum*, *Ceratophyllum submersum*), parrot's-feather (*Myriophyllum verticillatum*, *Myriophyllum spicatum*), naias (*Lemna triscula*), bladderwort (*Urticularia vulgaris*) and algae (*Entheromorpha prolifera*, *Chara tomentosa*, *Tolypella sp.*).

The core zone also includes an unusual 'marine' island ecosystem, which due to the rise of the Caspian sea level is mainly flooded and at present forms reed (*Phragmites australis*) stands with thinned macrophyte communities (*Potamogeton*

perfoliatus, *Myriophyllum verticillatum*, *Myriophyllum spicatum*). Reed is well developed. It is up 4-5 m high. The area is hardly accessible and is a wonderful shelter for the waterfowl.

There is a unique ecosystem of high reed stands along riverbed and deltas of modern channels. Here in addition to reed communities one can find clubroots, cattails as well as trees and shrubs (*Tamarix ramosissima*, *Elaeagnus oxycarpa*, *Salix caspica*) at alluvial meadow and swamp meadow soils.

Despite of relatively small areas with island ecosystems, such areas play an important role as nesting and feeding grounds for a key species, great black-headed gull (up to 263 birds per sq. km), and a rookery of great black-headed gull may include over 8,000 birds. Until recently there was also a rookery of Dalmatian pelican which inhabited South-West shalyga, the bird rookery has recently moved to Massabai kultuk.

In the north-east the buffer zone will include terrestrial ecosystems at undulating alluvial delta plains. Here the ecosystems are represented by annual saltwort (*Climacoptera*, *Petrosimonia*), weed (*Peganum harmala*, *Xanthium strumarium*, *Zygophyllum fabago*), brush (*Tamarix ramosissima*, *Halostachys caspica*, *Nitraria schoberii*) communities at flood meadow desertificated alkali soils. The buffer zone also includes aquatic ecosystems, both shallow water ecosystems with predominant reed (*Phragmites australis*), cane (*Scirpus tabernaemontani*) and macrophytes, and deep water ecosystems in the south with predominant rare macrophytes and green algae (*Zignema sp*, *Spyrogyra sp*, *Mougeotia sp*).

Valuable aquatic ecosystems are the ecosystems of river channels with low current and predominant communities of floating macrophytes (floating moss, pondgrass, duckweed), including a Red-booked species, caltrop. Marine freshwater and saltish ecosystems of preestuary seashore with predominant reed complete plavni and peculiar floating islands of reed are of considerable value. Here high and middle complete hydrophyte thickets prevail: reed (*Phragmites australis*), with cattail and cane (*Typha angustifolia*, *Scirpus lacustris*, *Scirpus tabernaemontani*). Very valuable are the ecosystems of shores, riverbeds, deltas of modern channels where the vegetation is represented by unique high reed, clubroot, cattail thickets with grouped tree and shrub vegetation.

The group of species of economic importance include, first of all, all sturgeon species and large and small ordinary fish (carp, perch, mudfish). Over 60% of fish caught in Kazakhstan is caught in fishing and marine areas adjacent to the reserve.

In the areas adjacent to the SNR it is allowed to fowl 18 game bird species: gray goose, shelduck, mallard duck, gadwall, common teal, garganey teal, pintail, wigeon, common shoveler, red-crested pochard, pochard, tufted duck, greater scaup, common coot, ruff, stone plover, Eurasian curlew and grey partridge.

Mammals of economic importance include wolf, jackal, fox, corsac fox, raccoon dog, badger, brown hare, and musk beaver.

Caspian seal is included into the IUCN Red list. The reason of this was the overall degradation of the Caspian ecosystem. There is no commercial seal fishery in the estuary of the Ural River and adjacent Caspian coast. Navigation of small, river and sea crafts is a concern. One should not forget that Caspian seal is often illegally procured by fishermen in order to get fat which has medicinal properties.

The group of medicinal plants (officially allowed for application in Kazakhstan) include 10 species: marsh-mallow, blowball, ginger plant, licorice, plantain, etc.

DEVELOPMENT FUNCTION

Productive landscapes close to the biosphere reserve, buffer and outer transition zones have considerable potential for sustainable development of the region.

Economic potential includes implementation of sustainable agriculture practice (improved use of pastures, hayfields and vegetable production in small greenhouses, etc.), sustainable fishery community-based management, development of alternative livelihoods (development of ecological, rural and ethnographic tourism; opening of farms for development of commercial fish rearing; production of souvenirs; development of amateur and sport fishing, etc.). The above economic activities in addition to acquisition of income by rural people will also foster reducing load on the natural ecosystems and biodiversity of the biosphere reserve.

Social aspects include creation of additional jobs in villages, especially for rural women, which will help in reducing poverty of vulnerable groups of people.

Alternative energy, sustainable agricultural and fishery management, development of ecotourism will foster both conservation and improving ecological situation of the region.

LOGISTIC FUNCTION

•Abiotic research and monitoring:

The Atyrau Branch of KazHydroMet provides monitoring water levels, consumption and quality on a quarterly basis. For this new technologies need to be utilized, for example, to install Vaisala automated meteorostation. The number of hydrological and hydrometric stations needs to be increased.

- **Biotic research and monitoring:**

The topics of biotic research should be expanded with a focus on problematic applied studies. Cooperation with other academic institutions, universities and other stakeholders is required for such studies.

Monitoring species and number of sites and routes need to be expanded in order to cover major types of ecosystems. To perform monitoring exercises students need to be mobilized as part of their field practice.

- **Socio-economic research:**

Socio-economic research will be performed on continuing basis by the Akzhaiyk SNR in cooperation with local governments.

DESCRIBE THE SUSTAINABLE DEVELOPMENT OBJECTIVES OF THE BIOSPHERE RESERVE.

(If appropriate, please refer to Agenda 21, Rio+20 and SDG post 2015).

The main task of sustainable development on biosphere reserve's territory is harmonization of relations between people and nature, i.e. economic and socio-cultural development that would take place without harm for the environment and promote conservation of biodiversity and region's unique/typical ecosystems. Wild nature complexes' conservation is carried out in the core and partially in buffer zones, and human potential's development takes place in the transit zone. Due to this the most suitable activities for stable economic and socio-cultural development are cattle breeding, hunting farms, fishery and ecological tourism, as well as educational, ecological and cultural programs.

INDICATE THE MAIN STAKEHOLDERS INVOLVED IN THE MANAGEMENT OF THE BIOSPHERE RESERVE.

The main stakeholders in biosphere reserve's management are the following:

- 1) Akzhayik State Nature Reserve's administration,

13. 2

13. 3

2) local authorities / administration – Akimats of Makhambet district and Atyrau city,

3) local land users and NGOs – district Hunters and Fishermen Society, 9 production cooperatives (7 fishing farms and 2 multi-directional cooperatives for agriculture and cattle breeding): TES, Yerkinkala, Rakusha, Dzhambyla, Amangeldy, Kurmangazy, Manash, Kyzyl-Balyk, Standart.

4) representatives of inspecting authorities – oblast territorial management of forestry and hunting, oblast territorial management of fishery.

13. 4

WHAT CONSULTATION PROCEDURE WAS USED FOR DESIGNING THE BIOSPHERE RESERVE?

The GEF/UNDP Wetlands Project performed comprehensive research to assess current state and values of the natural ecosystems (2004-2006). The research results helped to prepare scientific justification for establishing the Akzhaiyk State Nature Reserve, to identify its borders, to zone the area based on the values of the natural ecosystems, to justify the required conservation activities, to prepare the first Management Plan, to identify topics of applied research studies and to develop a programme of habitat and biodiversity monitoring based on key and indicator species of birds, mammals and higher plants.

13. 5

HOW WILL STAKEHOLDER INVOLVEMENT IN IMPLEMENTING AND MANAGING THE BIOSPHERE RESERVE BE FOSTERED?

Biosphere Reserve's management is conducted through Coordinational Council of Akzhayik Biosphere Reserve, which is a coordinational body for management and is created for promoting policies of sustainable resource use, collaboration and problem mitigation between state nature reserve and local people. This organ 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. At the present time all questions regarding biosphere reserve's management are discussed at the sessions of Coordinational Council. Its sessions focus on the problems of territory's development and management, and discuss biodiversity conservation and conflicts between nature users and nature reserve's administration. Resolutions of the Council are obligatory to follow by all local organizations and private land users. Local communities and private land users are represented in the Coordinational Council through their elected representatives of local authorities, local NGO or directly as its members. All Council members have equal rights in voting and making decisions.

WHAT ARE THE EXPECTED MAIN SOURCES OF RESOURCES (FINANCIAL, MATERIAL AND HUMAN) TO IMPLEMENT THE OBJECTIVES OF THE BIOSPHERE RESERVE AND PROJECTS WITHIN IT?

(Please provide formal commitments and engagements.)

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



Core zone

14. CONSERVATION FUNCTION:

14.1

AT THE LEVEL OF LANDSCAPES AND ECOSYSTEMS (INCLUDING SOILS, WATER AND CLIMATE):

14.1.1 Describe and give the location of ecosystems and/or land cover types of the biosphere reserve.

Major types of ecosystems (of natural territorial complexes) in the project site are young and were formed under the influence of advances and relictions of the Caspian sea as well as modern surging in the coastal zone. All this has determining influence on the humidification and salinification regimes of the ecosystems.

The core zone of the biosphere reserve consists of two sites (clusters). They are divided by Ural riverbed, river-sea channel. The core zone includes South-West Shalygi as a valuable ecosystem and significant habitat of Caspian seal and nesting ground of great black-headed gull.

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The plant cover in the core zone is mainly represented by aquatic ecosystems. These are reed communities and submersed macrophytes. Reed is found as strip stands or plavni (*Phragmites australis*). Reed communities are developed together with submersed macrophytes: caltrop (*Trapa kasachstanica*), pondgrass (*Potamogeton pectinatus*, *Potamogeton perfoliatus*), hornwort (*Ceratophyllum demersum*, *Ceratophyllum submersum*), parrot's-feather (*Myriophyllum verticillatum*, *Myriophyllum spicatum*), naias (*Lemna triscula*), bladderwort (*Utricularia vulgaris*) and algae (*Entheromorpha prolifera*, *Chara tomentosa*, *Tolypella sp.*).

The core zone also includes an unusual 'marine' island ecosystem, which due to the rise of the Caspian sea level is mainly flooded and at present forms reed (*Phragmites australis*) stands with thinned macrophyte communities (*Potamogeton perfoliatus*, *Myriophyllum verticillatum*, *Myriophyllum spicatum*). Reed is well developed. It is up 4-5 m high. The area is hardly accessible and is a wonderful shelter for the waterfowl.

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14.1.2 Describe the state and trends of the ecosystems and/or land cover types described above and the natural and human drivers of the trends.

As core area of the proposed biosphere reserve is strictly protected according to Article 40 Chapter 7 of the PA Law:

1. It is allowed to perform surface and aviation activities for the prevention and extinguishing of forest and steppe fires within the core zone.

2. Any presence of individuals without permission documents in the core zone is not allowed, except for reserve employees as well as officials from government authorities supervising protected areas.

3. To ensure access to sites hold sacred by followers of any religion (pilgrimage sites), located within core zone of biosphere reserve, visits to such sites can be allowed in groups only as accompanied by inspectors of a state nature reserve.

4. It is allowed to set up, in accordance with procedures set forth by regulator, trails and routes within a core zone of a nature reserve at specially designated plots which do not include valuable ecological systems and objects.

1. Different types of restricted, regulated and environmentally benign for the core zone activities can be performed in the buffer zone:

1) scientific research and establishment of training and development centers;

2) environmental monitoring and monitoring of changes in ecological systems;

3) forestry, fire safety activities and protection of woodlands;

4) traditional land uses provided that such uses secure long-term conservation and do not affect biological diversity of the core zone and sustainability of ecological systems of the overall state nature reserve;

5) advanced measures for the rehabilitation of biological and landscape diversity, natural ecological systems;

6) tourism, recreational uses, controlled and regulated in accordance with the recreational intensity set forth by rules for visiting protected areas by individuals;

7) usage of mineral waters and curative resources;

8) ecological education, delivery of training programmes, arrangement of demonstration sites and environmentally benign nature use management

Any activities which can have a negative impact on the core zone ecological system are prohibited in the buffer zone, particularly:

1) to establish new settlements;

2) to deploy and operate industrial facilities;

- 3) to construct and operate production facilities;
- 4) to perform geological exploration works and to produce mineral resources;
- 5) to fell forests for principal use;
- 6) to introduce new plant and animal species;
- 7) to take actions which change the hydrological regime of the core zone area and buffer zone; and
- 8) to perform any other activities which can impact the ecological system of the core zone.

14.1.3 What kind of protection regimes (including customary and traditional) exist for the core area(s) and the buffer zone(s)?

The core area(s): according to the Kazakhstan Law on Protected Nature Areas the core zone is strictly protected (highest protection regime).

The Buffer zone(s): according to the Kazakhstan Law on Protected Nature Areas the buffer zone is protected area with some human activity (monitoring, tourism, etc.). Some explanations of protection regime also are presented in the Resolution of the Kazakhstan Government No.119 dd. 6 February 2009, 'Some issues regarding the establishment of the Akzhayik State Nature Reserve' (copy attached).

14.1.4 Which indicators or data are used to assess the efficiency of the actions/strategy used?

Different indicators and data are used to assess the effectiveness of used activities. They include overall population's condition of dominant and rare plant and animal species, dynamics of economically important species population number, and total number of:

- tourists who visited biosphere reserve,
- university students undertaking practice,
- violators of the nature reserve regime in the core zone,
- scientific, educational and ecological projects.

AT THE LEVEL OF SPECIES AND ECOSYSTEM DIVERSITY:

14.2

14.2.1 *Identify main groups of species or species of particular interest for the conservation objectives, especially those that are endemic to this biosphere reserve, and provide a brief description of the communities in which they occur.*

Plants. The only data on lower plants of biosphere reserve's territory are of **green algae (Chlorophyta)**, to the present date 10 species of 10 genera of 7 families are recorded here: family Spirogyraceae - *Spirogyra* sp., family Myogotiaceae - *Mougeotia* sp., family Cladophoraceae – *Cladophora* sp.; family Zignemataceae - *Zygnema* sp.; family Oedogoniaceae - *Oedogonium* sp., family Ulvaceae - *Entheromorpha (Ulva)* sp., family Charales - *Nitella* sp., *Tolypella* sp., *Nitellopsis* sp. and *Chara* sp. The composition of phytoplankton comprises 52 species of unicellular algae which belong to diatomous, green and blue-green algae, euglenophytes and pyrophytes. Of all the unicellular groups mentioned above diatomous algae are characterized by biggest species diversity (29 species or 55.8% of total species number). Dominating species are *Cyclotella meneghiniana*, *Cyclotella compta*, *Synedra acus*, *Synedra ulna*, *Nitzschia aciculariz*. The second place is taken by green algae (12 species or 23%) with biomass (17.3% of total biomass). Leading species among the latter are *Ankistrodesmus pseudomirabilis*, *Scenedesmus quadricanda*, followed by blue-green algae – 7 species (13.5%) and pyrophytes – 1 species (1.9%).

Flora of higher plants consists of 229 species of 141 genera and 56 families, 59 species are Angiospermae monocots and 170 species are Angiospermae dicots (higher flora list is given in the Appendix).

Higher plant flora of different systematic groups

Taxonomic units	Terrestrial higher plants	Aquatic higher plants
Families	44	12
Genera	127	14
Species	206	23

Floristic spectrum of leading plant families in Ural river delta with adjacent waters of the Caspian Sea

№	Family	Number of species	Percentage
1	Chenopodiaceae	44	19,2
2	Asteraceae	29	12,6
3	Poaceae	19	8,3
4	Brassicaceae	16	7,0
5	Fabaceae	14	6,1
6	Cyperaceae	10	4,3
7	Polygonaceae	9	3,8
8	Potamogetonaceae	7	3,0
9	Boraginaceae	5	2,1
10	Salicaceae	4	1,7

Water flora is represented by 23 plant species. One of the most numerous in species genera is *Potamogeton*, it includes 7 species. All species are water-submerged macrophytes, distributed in sea waters among reed islands, and also in Ural river channels. Most registered species are *Potamogeton perfoliatus* and *P. natans*. Of special interest among water plants are *Trapa kazachstanica* (listed in the Red Data Book of Kazakhstan) and *Salvinia natans*.

Six species are key plant species for biodiversity conservation in Akzhayik biosphere reserve:

Tulipa schrenkii, decorative species with decreasing area, listed in the Red Data Book of Kazakhstan, inhabits *Anabasis salsa* desert.

Trapa kazachstanica, endemic species, observed in Ural river delta with adjacent coast of the Caspian Sea in slightly flow-through water reservoirs, sometimes covering all water surface.

Salvinia natans, water fern, macrophyte. Floats on the surface of stagnant and slowly flowing waters, forming dense thickets, preventing sunlight access and thus changing water reservoir's ecological conditions. *Salvinia* thickets are a good refuge for young fish.

Vallisneria spiralis, macrophyte of slowly flowing or stagnant water reservoirs on silt bottom deposits with depth of up to 1 m. Long spirally curled female flowers' stalks rise to the surface during the flowering and form spiral bundles of silky threads.

Invertebrates. In the present time there are 820 insect species of 61 families of 15 orders registered for the given territory. According to preliminary data, 24 species of insects are listed in the Red Data Book of Kazakhstan.

Macrozoobenthos of Ural river delta with adjacent coast of the Caspian Sea is represented by 67 species and forms of 6 groups, among which there are hydrozoa – 1, sponges – 1, worms – 11, crustaceans – 30, mollusks – 5, insect larvae – 19. In the zooplankton of Ural river's lower stream there are 315 recorded species and subspecies, including protozoa - 30, rotifers - 154, cladocerans - 71, copepods - 54; the rest are optional residents of the plankton. From all zooplankton species, registered for Ural river mouth, there are 21 key species, including rotifers: *Brachionus angularis angularis*, *Brachionus calyciflorus ampiceros*, *Brachionus diversicornis diversicornis*, *Bipalpus hudsoni*, and lower crustaceans: copepods - *Hali-cyclops oblongus*, *H. robustus*, *Paracyclops dilatatus*, *Eucyclopos orthostylis*, *Schizopera akatovae*, *Ectinosoma concinnum*, *Calanipeda aquadulcis*, *Heterocope caspia*, *Ectinosoma abrau*, cladocerans - *Podonevadne camptonix macronyx*, *Cornigerius maeoticus hircus*, *Podonevadne trigona typica*, *Podonevadne trigona rotunda*, coelenterates - *Moerisia pallasi*, *Cordylophora caspia*, plankton barnacle larvae *Cirripecta* - *Balanus improvisus* and larvae of *Rhithropanopeus harrisi*.

Fish. The territory of Akzhayik biosphere reserve is inhabited by 76 of 126 species (with subspecies) of fish and cyclostomata, registered for the Caspian Sea and belonging to 17 families (list of ichthyofauna is given in the Appendix). The most numerous in species family are carps (42 species and subspecies), followed by gobies (32-35) and herrings (18 species and subspecies). All other families, including sturgeons, are represented by not more than 1-7 taxons. The Red Data Book of Kazakhstan lists 5 fish species found on the territory of biosphere reserve: *Caspiomyzon wagneri*, *Acipenser ruthenus*, *Salmo trutta caspius*, *Alosa kesslerii volgensis* and *Stenodus leucichthys leucichthys*.

Distribution of fish according to biological groups

Groups	Number of species and subspecies	Percentage
Marine	53	43,5
Migratory	18	14,7
Semi-migratory	9	7,4
River	42	34,4

Marine fish are most numerous species-wise – 53 species and subspecies (43.5% of ichthyofauna composition). All life cycle of these fish is carried out in the sea. It includes 3 species of Caspian sprats (*Clupeonella delicatula*, *C. grimmi*, *C. engrauliformis*), herrings - *Alosa caspia caspia*, *A. saposhnikovii* and *A. brashnikovii brashnikovii*, and also majority of Caspian gobies, Atherina, *Liza aurata*, *L. saliens* and *Sander marina*.

Migratory fish include 18 species and subspecies (14.7%). Before sexual maturity they live in the sea and migrate for reproduction into the rivers, far from the river mouth, using specific areas of the river's bed and flood-land for spawning. Migratory forms include *Caspiomyzon wagneri*, all salmons, all Caspian sturgeon except starlet, *Alosa kesslerii kesslerii*, *A. kesslerii volgensis*, *Chalcalburnus chalcoides*, *Barbus brachycephalus caspius*, etc.

Semi-migratory species are represented by 9 species and subspecies (7.4%). This fish feeds in fresh water parts of the sea, and reproduces in river delta formed during flood periods. Typical representatives of this group include bream, roach, carp, perch, *Abramis sapa*, sabrefish, etc.

Riverine fish are represented by 42 species and subspecies and occupy 34.4% of ichthyofauna's composition. In all course of their life this fish inhabits fresh waters of Ural lower part and rivers flowing in it, as well as other delta water

reservoirs. They include pike, rudd, tench, bleak, silver bream, crucian carp, catfish, spined loach, eel, perch, burbot and other freshwater fish.

Sturgeon fish in Caspian basin are represented by two populations – Volga and Ural populations – which include 6 species of 2 genera: *Huso* and *Acipenser*. Economically important species spawn in Ural river: beluga, Russian and Persian Sturgeons and stellate sturgeon, as well as appearing in single specimens and prohibited for fishing sterlet and tenon. Due to a whole variety of factors, the main of which being poaching and habitat pollution, the population numbers of all sturgeon species in the Caspian basin is decreased dramatically in the present time.

The key species of biodiversity conservation among sturgeon species are:

Beluga *Huso huso* inhabits Ural river and Caspian Sea, migratory fish. Spawns in May, when water temperature is +7+12° C on sand and pebbles bottom soils. Becomes reproductively mature at the age of 12 years. Fertility up to 5.7 million eggs. Young fish eat water invertebrates, adult fish are predatory.

Stellate Sturgeon *Acipenser stellatus* inhabits Caspian Sea and Ural river, is migratory species. Spawning takes place on sandy-pebble ground in spring when the temperature is +13+17° C. Young fish becomes sexually mature at age 6. Fertility – up to 0.9 million eggs, with average of 0.24 million. Feeds mostly on benthos and fish. Body mass is usually 7-15 kg, but there are cases of up to 63 kg.

Russian Sturgeon *Acipenser guldenstadti*, Kazakhstan sector of the Caspian Sea and in Ural river are inhabited by nominative subspecies *A.g. guldenstadti*, migratory species. Becomes sexually mature at age 8-10. Spawns in May, when water temperature is +1+-20° C. Fertility is up to 1 million eggs, average is 0.4 million. Young fish feed on invertebrates, adult specimens – on crustaceans, molluscs, fish. Body mass reaches 60 kg.

Amphibians and reptiles. Amphibians of Ural river delta and adjacent coast of the Caspian Sea are represented by 2 species – Green Toad *Bufo viridis* and Marsh Frog *Rana ridibunda*. Reptiles of biosphere reserve's territory are represented by 20 species (40.8% of the total herpetofauna composition of Kazakhstan), including *Alsophilax pipiens* and 2 Gekko species: *Tenuidactylus caspius* and *T. russowi*; 3 species of *Phrynocephalus* - Sunwatcher *Phrynocephalus helioscopus* and Toad-headed agama *Ph. mystaceus*, as well as Spotted toad agama *Ph. guttatus*. Sandy massifs are inhabited by Steppe Agama *Agama sanguinolenta*, Rapid fringed-toed lizard *Eremias velox*, Dwarf Sand Boa *Erix miliaris* and Rapid fringed-toed lizard *Psammophis lineolatum*. More moist coastal territories are inhabited by Sand Lizard *Lacerta agilis*, Large whip snake *Hierophis caspius*, Four-Lined Snake *Elaphe quatuorlineata*, Halys viper *Agkistrodon halys* and Dice Snake *Natrix tessellata*, and Grass Snake *Natrix natrix*, garter snakes, Pallas coluber *Elaphe dione*, and listed in the Red Data Book of Kazakhstan Four-Lined snake *Elaphe quatuorlineata* and Large whip snake *Hierophis caspius*. On sandy massifs of South-Eastern part of the territory one may record Horstfeld's tortoise *Agrionemys horsfieldi*.

Birds. To the present time 292 bird species were registered on the territory of Akzhayik biosphere reserve, 26 of them are listed in IUCN Redlist and Red Data Book of Kazakhstan (the full list is given in the Appendix). Background species include Great Crested Grebe, Cormorant, Great Egret, Little Egret and Grey Heron, Night Heron, Bittern, Little Bittern, Glossy Ibis, Mute Swan, Red-crested Pochard, Common Moorhen, Eurasian Coot, Herring-Gull, Black Tern, Common Tern, Common Cuckoo, Hooded Crow, Reed Wabler and Paddy-field Warbler. During migrations up to 3 million birds concentrate here. The territory of biosphere reserve support many rare species of waterbirds, part of which reproduce here: Dalmatian Pelican (*Pelicanus crispus*; VU, 12% of world population), Little Cormorant (*Phalacrocorax pygmaeus*), Cattle Egret (*Bubulcus ibis*), Little Egret (*Egretta garzetta*), Whooper Swan (*Cygnus cygnus*), Squacco Heron (*Ardeola ralloides*), Purple Swamphen (*Porphyrio porphyrio*), Pallas's Gull (*Larus ichthyaetus*). Other species use biosphere reserve's territory for rest during migration: Eurasian Spoonbill (*Platalea leucorodia*), White-headed Duck (*Oxyura leucocephala*), Great Bustard (*Otis tarda*), Houbara Bustard (*Chlamydotis undulata*), Little Bustard (*Otis tetrax*), Lesser White-fronted Goose (*Anser erythropus*; VU), Red-breasted Goose (*Branta ruficollis*; VU), Siberian Crane (*Grus leucogerannus*). Adjacent wetlands of steppified desert also support some rare species: Steppe Eagle (*Aquila rapax*), Demoiselle Crane (*Anthropoides virgo*), Houbara Bustard (*Chlamydotis undulata*), Little Bustard (*Otis tetrax*) and Lesser Short-toed Lark (*Calandrella rufescens*).

Key species for biodiversity conservation are the following 16 species:

Great White Pelican *Pelecanus onocrotalus*, one of the largest birds in Kazakhstan fauna, this migratory bird is observed here from April to October.

Dalmatian Pelican *Pelecanus crispus*, rare species listed in the Red Data Book of IUCN and Russia, migratory bird, is registered in this region from April to October, feeds on fish, mostly of medium sizes. In April of 2002 a small colony was recorded on Peshnoy islands.

Pygmy Cormorant *Phalacrocorax pygmaeus*, in Ural river delta appeared in 1999, before that only irregular presence of this bird was recorded. Nesting colonies are located on the trees and shrubs, rarely on broken reeds. Colonial settlements of Pygmy Cormorants are situated in the right-side part of Ural delta along channels Shaman-ozek, Shirokiy and Malyi Yaitskiy. This species is listed in the Red Data Book of Russia and some other countries.

Cattle Egret *Bubulcus ibis*, rare migratory bird, is observed from April to September. First nesting in Ural delta was recorded in 1990. Its main habitat is reed massifs between Ural and Yaitskiy channel. This species is listed in the Red Data Book of Russia and some other countries of the Caspian region.

Little Egret *Egretta garzetta*, according to expert assessment, about 350 pairs nest in Ural delta. According to the data of quantitative countings, Little Egret is on the second place by its population number after Great Egret and is 24.7% of the total heron population (of all heron species).

Glossy Ibis *Plegadis falcinellus*, with highest population number in Volga and Ural deltas, where in the last decade not less than 600 pairs nest. Glossy Ibis was observed in considerable numbers on Peshnoy island, where every day 60-100 specimens were observed flying for food from the direction of Yaitskiy channel. Separate groups of these birds fly up along Ural even up to Atyrau vicinity, sometimes birds were recorded at the suburbs of the city. Total number in the limits of Ural delta is 290 specimens, or 13.8% of total number of all herons.

Whooper Swan *Cygnus Cygnus*, rare species with decreasing population migratory bird, is recorded from March to November, nearest wintering site – Mangyshlak bay and Karakol lake near Aktau city. Sexual maturity starts at age of four.

Sqacco Heron *Ardeola ralloides*, migratory bird, in spring it appears at the nesting sites in Ural delta in late April – early May, starts nesting in middle May.

Eurasian Spoonbill *Platalea leucorodia*, on migration is observed almost on all the coast of Kazakhstan part of the Caspian, rarely above open sea waters. In 1992-1993 the population number of this bird in the limits of Ural delta was up to 200 specimens. In the present time its population is harshly decreased.

White-headed Duck *Oxyura leucocephala*. It is known that this bird is observed on water reservoirs of all plain territory of Kazakhstan while on migration. More than ten birds were found here for the first time in late May of 2000 seven km Western from Atyrau city.

White-tailed Eagle *Haliaeetus albicilla* inhabits biosphere reserve throughout the year, including wintertime. Its population number especially increases during warm winters, when Caspian Seal (*Pusa caspia*) moves very close to Northern coast of the sea, including Ural delta, for reproduction and molt. Approximate number of wintering here Eagles is about 390 birds.

Great Bustard *Otis tarda*, rare species threatened to extinction. It is rarely observed on the territory of biosphere reserve during migration in April and in September-October.

Houbara Bustard *Chlamydotis undulata*, rare species, is recorded in the region from April to September.

Little Bustard *Otis tetrax*, is quite numerous on migration, in Volga-Ural interfluvium about 940 birds were recorded. The first 3 birds on the territory of biosphere reserve were registered in October 2005.

Purple Swamphen *Porphyrio porphyrio*, in Ural river delta this bird was recorded while nesting in 1991, it is observed along the edge of the reed near the channels and along causeways among reed, flooded with water with areas of open water. In 1998-2002 not less than 6 pairs were nesting in Ural delta from Damba to Peshnoy villages (3 km).

Pallas's Gull *Larus ichthyaetus*. In 1996-2005 the colony of Gulls was more than a thousand pairs and was located on several islands of Zyuidvestovaya Shalyga and on Southern edge of Peshnoy peninsula in the limits of biosphere reserve territory. Pallas's Gull is observed while feeding along Ural river-bed, on shallow waters of Kamennyi Kultuk, and on evaporation pond Western from Atyrau city.

Mammals. There are 48 mammal species of 7 orders (complete list of theriofauna of biosphere reserve is given in the Appendix) on the territory of biosphere reserve in Ural river delta and adjacent areas. The most numerous in species are rodents – 21 species (43.75% of all species number of the group), predators – 12 species (25%) and bats – 8 species (16.8%). Representatives of other orders are not numerous here: insectivores, lagomorphs and ungulates – 2 species each (4.1%) and pinnipeds – 1 species (2.1%). According to their status the majority of mammals are common or numerous species (predators, rodents), but there are rare and specially protected species listed in the Red Data Book of Kazakhstan. Those are, first of all, Marbled Polecat (III category status, rare species with decreasing distribution area), Bobrinski's Serotine (III category status, rare species). In the nearest past European Mink was recorded here in small numbers, but it was not observed in the recent years, probably superseded by American Mink. Russian Desman must also be viewed as potential inhabitant, supposedly visiting delta from the middle stream of Ural. In quantitative concern dominating species include Muskrat, House Mouse, Tamarisk Jird, and hunting species – Raccoon Dog, Fox, Wolf, Badger and Wild Boar. Unique inhabitant of this territory is Caspian Seal, which goes along Ural river up to Atyrau city in autumn.

Mammals of Akzhayik Biosphere Reserve may be subdivided into 3 groups: aquatic, semi-aquatic and terrestrial.

Aquatic – the only representative of Pinnipedae – Caspian Seal, with his life closely connected to water. Is observed in the buffer zone and in the zone of development. Population number in the limits of the biosphere reserve is relatively small. Seals come here only for feeding. Population number and density fluctuates in different years and seasons, which depends on the abundance of the food and disturbance factors.

Semi-aquatic includes Muskrat. They occupy flowing and stagnant water reservoirs with fodder plants' reserve along their banks, and floating islands of reed thickets in coastal zone of water reservoirs. Population number and density is fluctuating in different years and seasons, which is caused by constant change of Caspian Sea water level. The number of recorded Muskrat families varies from 0.25 to 1 (average of 0.32) in 1 ha, and the number of animals – from 1 to 6 (average of 2.3) in 1 ha.



Kazakh yurt:
shanyrak





Terrestrial – all other mammal species, which inhabit different ecosystems: reed thickets of the coastal zone (on the land part) of water reservoirs, forests and shrubs (willow thickets), shrub thickets, dry steppe, steppe deserts, desert hyperhalophyte, halophyte – semi-dwarf-shrub, agricultural ecosystems, technogenic ecosystems, etc. The majority of terrestrial mammal species (lagomorphs, predators, ungulates) undertake seasonal local or distant migrations in search of food and shelter, this is why they often change habitat and, correspondingly, ecosystems.

14.2.2 What are the pressures on key species? In other words: what are the threats (example unsustainable management of forest), their immediate causes (drivers of change like forest change or habitat change), their underlying causes (example overgrazing, fire, pollution), and the main driving forces (example: economic, political, social, external, etc.) and the area(s) concerned?

1. Farming (ploughing) – complete destruction of natural vegetation cover, takes place in Makhambet district. Some lands are not used now as arable land and have become fallow land where vegetation is restoring.

2. Stock raising (impact of grazing on pastures) – today’s practice of distant pasture cattle rearing often result in pasture overuse in some areas and underuse of pasture resources in other areas. Excessive grazing and overbrowsing can be evidenced in the surroundings of all settlements as well as in places where cattle stays.

3. Pyrogenic factor of ecosystem destabilization is of primary importance for aquatic ecosystems. All coastal zones of the project site have been affected by it. People burn old reed in the areas far from the settlements. After that spring appears there and cattle eat it well.

4. Plant harvesting. Several species of valuable food, medicinal and decorative have been registered in the site but not many of them are harvested by local people and tourists. Spring flowers are most subject to harvesting among decorative flowers: both tulip species, fritillaria, pasqueflower.

4.2.3 What kind of measures and indicators are currently used, or planned to be used to assess both species groups and the pressures on them? Who undertakes this work, or will do so in the future?

Standard approaches to ecological research was used for evaluation of species groups' condition and influence of different factors on them. Those approaches include identification of qualitative composition of fauna and flora, establishment of dominant and rare species groups, undertaking quantitative countings of dominant and some rare species, establishment of the main ecosystem types and their threats, identification of indicator species (is given in the Appendix, see species list) and evaluation of overall condition of dominant plant and animal populations, characteristic for every ecosystem type. This work was carried out by a special research group in the limits of UNDP/GEF Project and in the future will be done by scientific department of Akzhayik Biosphere Reserve.

14.2.4 What actions are currently undertaken to reduce these pressures?

A functional zoning of all biosphere reserve's territory was conducted for sustainable land use, and, based on Kazakhstan's legislation, special types of protection regime were established. For their support control stations were established, zone borders were defined, informational – agitational nature conservation activities for local people were carried out.

14.2.5 What actions do you intend to take to reduce these pressures?

In order to reduce the pressure on ecosystems, it is necessary to promote and control corresponding protection regime in the core and buffer zones, as well as transition to resource-conserving and clean technologies in the transition zone in the limits of sustainable land use.

14.3

AT THE LEVEL OF GENETIC DIVERSITY:

14.3.1 Indicate species or varieties that are of importance (e.g. for conservation, medicine, food production, agrobiodiversity, cultural practices etc).

The territory of biosphere reserve plays an important role in conservation of regional genetic biodiversity. Many valuable species are under strict protection in the core zone of the reserve, and in transition zone economic species are under the control of nature protection inspectors.

Among animals many species are economically important and necessary for genetic biodiversity conservation.

In Ural river delta of economic importance are about 40 fish species, although only about 25 species serve as the basis. Fishery in Ural river is concentrated mostly in the lower part of the river (fishing with seines) and before mouth part of the sea (fishing with nets) very close to Akzhayik Biosphere Reserve's territory. The group of economically important species includes, first of all, sturgeon species, as well as big and small fish – carps, gobies, and catfish. Of six sturgeon species, inhabiting the Caspian basin, four come for spawning to Ural river: Beluga (*Huso huso*), Stellate Sturgeon (*Acipenser stellatus*), Russian Sturgeon (*Acipenser gueldenstaedtii*) and Bastard Sturgeon (*Acipenser nudiventris*). Sterlet (*Acipenser ruthenus*) and Persian Sturgeon (*Acipenser persicus*) are rarely registered in Ural river, only separate records are made. In 2002 economic withdrawal of Bastard Sturgeon (one of the smallest in number sturgeons) was prohibited. Thus, in the present time economic fishery of sturgeons is based on three species: Beluga, Russian Sturgeon and Persian Sturgeon. The most numerous sturgeon species of Ural river is Persian Sturgeon, the most valuable commercially – Beluga. Besides sturgeons, there are other fish species of economic importance, reproducing in water reservoirs of Northern Caspian: Common Rudd, Silver Bream, Northern Pike, Catfish, Carassius, etc. After the young fish grows up, it goes for fattening to firths and avant-delta.

Fishing for semi-migratory species in Ural-Caspian basin is based on yields of Caspian roach and, to a greater extent, bream. In the last years the yield of roach is decreasing. At the end of 1990s up to 2,000 tons of this species were withdrawn, but to the present time this number decreased in 3-4 times. The reserves of Ural bream are rapidly decreasing, leading to fishing yield decrease as well. In the last 10 years fishing yield of this species decreased more than 10 times. At the same time annual fishing limits were not used more than by 50%.

The territory of Akzhayik Biosphere Reserve is very important for conservation of different economic species of birds and mammals, namely Greylag Goose, Common Shelduck, Mallard, Gadwall, Eurasian Teal, Eurasian Coot, Ruff, Gray Partridge, etc, as well as Wolf, Jackal, Fox, Corsac Fox, Raccoon Dog, Badger, Weasel, Stoat, European Hare, Muskrat, etc.

The majority of higher plants have valuable features, many of them have economic importance:

Economic use of the plants

Plant name	Fodder	Weeds	Dying	Poisonous	Medicinal	Insecticide	Decorative
Ephemers – early spring cereals	+						
Annual saltworts	+						
<i>Kalidium</i>	+						
<i>Nitraria</i>			+				+
<i>Peganum harmala</i>		+	+	+	+		
<i>Vexibia alopecuroides</i>		+		+	+	+	
<i>Aeluropus littoralis</i>	+						
<i>Anabasis aphylla</i>					+	+	
<i>Tamarix</i>							+
<i>Xanthium</i>		+	+	+			

14.3.2 What ecological, economic or social pressures or changes may threaten these species or varieties?

- Increased risk of pollution of rivers and sea with petroleum products, phenols, organochlorine pesticides, heavy metals, etc.;
- Non-compliance with the conservation legislation. Fishing rules continue being temporary regulations, they are continuously violated and this results in uncontrolled catch of fish, often in the sea and including sturgeons;
- Unsustainable use of biological resources, mainly excessive and insufficiently regulated fishing and hunting;
- Uncontrolled visits to the wetlands (disturbance, forest felling, local fires, etc.);

- Unrestricted, uncontrolled grazing, trampling of coastal biotopes by cattle, destruction of rookeries and nests;
- Petroleum expansion in the shelf zone of shallow eastern Caspian sea as another negative factor for sturgeon activities;
- Uncontrolled economic activities at the Ural river with gravelling, sanding and placing of concrete slabs, etc. worsen the conditions of natural spawning as sturgeons fail to reach original spawning grounds and instead shed the eggs at artificial solid substrata where the eggs die due to lack of necessary conditions for development;

14.3.3 What indicators, at the level of the species, are used, or will be used, to assess the evolution of population status and associated use?

Indicators at the level of species are population dynamics and condition of the main populations of dominant, some rare and economic plant and animal species, population dynamics of indicator species (given in the Appendix, see species list) and overall condition of plant and animal populations characteristic for every ecosystem type.

14.3.4 What measures will be used to conserve genetic diversity and practices associated with their conservation?

Strict protection and wildlife reserve regimes are enforced within the Akzhayik BR. Some management activities (haymaking, cattle grazing and fishing) take place in the outer transition zones.





15.1

15. DEVELOPMENT FUNCTION:

POTENTIAL FOR FOSTERING ECONOMIC AND HUMAN DEVELOPMENT WHICH IS SOCIO-CULTURALLY AND ECOLOGICALLY SUSTAINABLE:

15.1.1 Describe how and why the area has potential to serve as a site of excellence/model region for promoting sustainable development.

Lands of Akzhayik 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.

Unfortunately the current environmental degradation of Ural delta leads to decrease of local people's standard of living and income. In this case 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 conditions 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 The Kazakhstan – Italian collaborative complex project is realized on the territory of Akzhayik Biosphere Reserve. It is aimed to increasing the qualification of the staff of the State Nature Reserve and development of ecotourism in this area.

15.1.2 How do you assess changes and successes (which objectives and by which indicator)?

For the evaluation of stable development it is necessary to use the following indicators: stability of natural wild and anthropogenic ecosystems, stability of demographic indices, stability (and, in the future, increase) of local people's income, tourism development, ecologically clear productions and economic infrastructure, increase of overall educational and cultural level of local people.

IF TOURISM IS A MAJOR ACTIVITY:

In the present time tourism is not the main activity type on the territory of biosphere reserve. But, taking into consideration the unique biodiversity of Northern Caspian region and proximity of large Atyrau city with developed infrastructure, one may state that Akzhayik Biosphere Reserve has a strong potential for the development of ecological tourism. There is an experience of work with local and foreign tourists on the territory of biosphere reserve, including international staff of oil companies working in Western Kazakhstan.

In accordance with the Law of RK «About specially protected natural territories» and with the goal of further development of excursion – educational activity, ecological tourism of biosphere reserve’s buffer zone – two ecological walking and bicycle routes were created, covering the most interesting sites, and also objects of tourist and recreational importance were defined. At the same time water route with going into the Caspian waters through «water labyrinth» is being created for the boats.

15.2.1 Describe the type(s) of tourism and the touristic facilities available. Summarize the main touristic attractions in the proposed biosphere reserve and their location(s).

Tourism types practiced at the territory:

- *Familiarization tourism* – Atyrau city proximity, where international companies’ headquarters are situated, provides many foreigners who are interested in natural and cultural heritage of Kazakhstan, its people, traditions, etc.
- *Educational tourism*. Organized excursions for familiarization with Akzhayik Biosphere Reserve’s nature and historical monuments in its vicinity (for example, ancient city Saraychik). Is often organized in universities, schools, companies.
- *Recreational tourism* – spending leisure time at open air, one-day picnic trips, family leisure, camping, often combined with amateur fishing.

- *Birdwatchers*. Groups of tourists from abroad coming to see only birds of the given territory. Has its peculiarities and specific demands for tour conduction.
- *Sport fishing*. Tourists who come especially for sport fishing; this tourism type is very close to birdwatching.
- *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.

Routes developed on the territory of Biosphere Reserve:

1. 2 walking ecological routes
2. 2 bicycle ecological routes
3. 1 water ecological route.

15.2.2 How many visitors come to the proposed biosphere reserve each year? (Distinguish between single-day visitors and overnight guests, visitors only visiting the proposed biosphere reserve or only passing on the way to another place). Is there an upward or downward trend, or a particular target?

Unfortunately, there is no precise data on the tourists for 2010-2013, although during annual festivals «Opening Delta» 8-9 groups of local tourists (including foreigners), 15-20 people each, are organized. Usually for the 3 days of the festival the total number of the tourists, visiting biosphere reserve, exceeds 150 people. Taking into account annual 8-10 groups (6-15 people each) of birdwatchers, not-organized ecological tourists (about 30-40 people) and scientific tourists (about 20 people) the annual total number of tourists on the territory of biosphere reserve is about 400 people. Due to big interest in Northern Caspian region, rapid economic development of the region, including tourist infrastructure, the number of the tourists will increase.

15.2.3 How are tourism activities currently managed?

Tourist development is managed by local authorities, national tourist operators in close collaboration with foreign partners and Akzhayik Reserve administration. Local Akimats conduct annual ecological – tourist festivals, which promote local and, partly foreign, tourists. Local tour operators form groups of tourists both from other regions of Kazakhstan and form abroad. Akzhayik Reserve administration promotes organization of tourist paths, routes, support of field tourist infrastructure and attracting of scientific tourists.

15.2.4 Indicate possible positive and/or negative impacts of tourism at present or foreseen and how they will be assessed (linked to section 14)?

Tourism development has its positive and negative sides. Positive include more work opportunities and income increase for local population, infrastructure development and mitigation of uncontrolled access to the territory of the core and buffer zones, as well as increase in educational level of local people. As tourism development is only at its initial phase, nothing can be said at the moment about positive or negative impacts of tourism on the ecosystems.

Positive impact will include regulation of visits to the area, benefits from tourism for the reserve and local community, reduced illegal hunting and fishing and improved environmental culture. Negative impacts of tourism on ecosystem might be trampling down of grass and soil, disturbance for wildlife, littering and others. Such negative impacts can be mitigated through clear regulation of numbers of tourists based on recreational capacity of the natural ecosystems.

Buffer zone of biosphere reserve. Tourism development increases the pressure on this zone's territory. Unfortunately, there is not enough qualified guides, insufficient information for the tourists, not enough educational and advertising materials, including the ones in English. Staff of state nature reserve does not have economic stimuli for ecological tourism development.

Transition zone (development zone). In order to decrease the pressure on the buffer zone, it is extremely important to provide conditions for ecotourism development in biosphere reserve's transition zone, especially because there are interesting objects on this territory as well. In the future it is planned to offer additional services to the tourists from local people – boat rides and rent, horse riding, fishing, locally grown ecologically clean produce realization, and local souvenir production.





It is very important to build biosphere reserve's visit-center, which will be constructed in the nearest years with funding from the state and possible sponsors.

15.2.5 How will these impacts be managed, and by whom?

Positive and negative sides of tourism development on the territory of biosphere reserve will be controlled by the administration of Akzhayik reserve and local authorities, as well as by local tour operators. Infrastructure development will be realized mostly with state support (Akzhayik Reserve and local authorities), and creation of the working spots – by initiative of private companies (tour operators, local national and foreign companies).

15.3

AGRICULTURAL (INCLUDING GRAZING) AND OTHER ACTIVITIES (INCLUDING TRADITIONAL AND CUSTOMARY):

15.3.1 Describe the type of agricultural (including grazing) and other activities, area concerned and people involved (including men and women).

The concept of biosphere reserve is directed to improving the life conditions of local population with simultaneous pressure decrease on the natural ecosystems caused by introduction of alternative environmentally friendly economic activity types. This is why the long-term goal of Akzhayik Biosphere Reserve is to minimize the main threats to the environment of this territory.

Transition zone (collaboration zone, zone of regulated nature use) – the lands used for agriculture, fishery and hunting. There are 9 production cooperatives in the collaboration zone of Akzhayik Biosphere Reserve, 7 of which are fishing farms and 2 multi-directional cooperatives (farming and cattle breeding): «TES», «Yerkinkala», «Rakusha», «Dzhambyla», «Amangeldy», «Kurmangazy», «Manash», «Kyzyl-Balyk», «Standart», employing only 30% of the total working age population. There are also two fishing plants in this zone – Atyrau Sturgeon Plant (right bank of Ural river, Yerkinkala village area) and Damba Sturgeon Plant (left bank of Ural river, Damba village area), employing about 150 local people. Fishing industry is also represented by several small fish processing facilities.

Agriculture (mainly cattle breeding) is developing only in the private sector, local people usually breed cattle, sheep, camels and horses. Private sector is represented by the following farms: private enterprise «Gvozdika» (plant growing in the greenhouse conditions), private enterprise «Khairushev» (horse and camel breeding), agricultural cooperative «Amanat-Arna», private enterprise «Talapker», «Kyzyl-Zhar» (cattle breeding and farming). In Chkalovo there is one of the main agricultural enterprises of Atyrau oblast – «Pervomayskiy Ltd.». This is a large enterprise for milk processing and meat and dairy cattle breeding. There also is a greenhouse for vegetables production. It is planned to introduce new technologies for fodder provision – growth of green fodder on hydroponics.

15.3.2 Indicate the possible positive and/or negative impacts of these activities on biosphere reserve objectives (section 14).

The positive sides of agricultural development on biosphere reserve's territory include increase of employment and income of local population, development of infrastructure and application of modern agricultural technologies.

Negative sides include:

- 1) *Uncontrolled and not systematic cattle pasture* (trampling of coastal biotopes, destruction of colonial birds' settlements and separate nests).
- 2) *Uncontrolled economic activity on Ural river*, accompanied by gravelling, dense sand and concrete slabs laying, etc. This makes natural spawning conditions worse for sturgeon fish, because sturgeons don't come to their original spawning sites, but lay eggs on artificial hard substrates, where it will die because necessary conditions for the development are absent;
- 3) *Fires.*

15.3.3 Which indicators are, or will be used to assess the state and its trends?

The main indicators include:

- 1) *Use of biological resources*, mainly excessive insufficiently controlled fishing and hunting.

- 2) *Water usage.* Water, flowing through biosphere reserve, is the only source of drinking and technical water for local population. Irrigation systems, built in early 1960s, have no facing, are overgrown with hard vegetation, more than 30% of consumed water is aimlessly used for transpiration and evaporation.
- 3) *Quantity of fires,* which appear from storms or accidents caused by hunters and fishermen on the territory of the transition zone, as well as from burning of old grass by local people.
- 4) *Alien species introduction* (Muskrat).

In the last 2-3 years overall situation is improving – water use and bioresource use are decreasing, as well as the number of fires.

15.3.4 What actions are currently undertaken, and which measures will be applied to strengthen positive impacts or reduce negative impacts on the biosphere reserve objectives?

In the transition zone of biosphere reserve local authorities carried out reconstruction of irrigation systems, fire mitigation measurements, strengthened fishing and hunting control.

15.4

OTHER TYPES OF ACTIVITIES POSITIVELY OR NEGATIVELY CONTRIBUTING TO LOCAL SUSTAINABLE DEVELOPMENT, INCLUDING IMPACT/INFLUENCE OF THE BIOSPHERE RESERVE OUTSIDE ITS BOUNDARIES.

15.4.1 Describe the type of activities, area concerned and people involved (including men and women).

In the villages located far from Atyrau city (Damba, Amangeldy, Kurmangazy, Atyrau, Zhanatalap and Yerkindala) there are small private shops, cafe and restaurants. People living closer to the city prefer buying produce on city markets. Unfortunately, there is not enough work for local people and part of the population, especially youth, is forced to work in

Atyrau. In the future development of ecological tourism in the limits of nominated biosphere reserve will provide additional employment for part of local people.

North Caspian region is famous by its intensive oil production, the capital of the oblast is also called Oil Capital of Kazakhstan. World largest oil companies – Total, ENI, Chevron, etc. – work in this region.

15.4.2 Indicate the possible positive and/or negative impacts of these activities on biosphere reserve objectives (section 14). Have some results already been achieved?

Positive influence is connected to oil production and financial inflow into region's economy. It is visible in many new employment opportunities, development of universities and schools, construction of new buildings, communication lines, water and gas pipes, etc.

Negative impacts include:

1) *Decrease of Ural waters transit zone's area.* Here the threat factors include winds, currents, bottom soil rolling by waves, decrease of aquatic vegetation, water temperature decrease, increase of the coastal area depth.

2) *Ural river delta's silting.* An example of this process is Pesnovskiy channel, previously known as Peshnovskiy scoop; nowadays its depth is only 0.2-0.4 m, and in 1989-1990 it was suitable for shipping. In order to support its flowing it is necessary to systematically deepen its bottom.

3) *Local water level's fluctuations of the Caspian Sea.* A great threat to biodiversity of Ural river delta is posed by periodically occurring waves causing water level fluctuations. The consequences may be very different – from making waters not navigable to flooding of the coast up to 10 km in depth.

4) *Water blooms.* Excess of biogenic elements (nitrogen and phosphorus) combined with light water flow and increased temperatures sometimes leads to so called «blooming» of the water or its eutrophication. Blooming is the result of developmental outburst of microscopic algae (phytoplankton), mainly blue-green algae, the number of which may increase in 30-100 times during the blooming in comparison with normal condition. Dying, those algae excrete toxic substances in the water. A big part of the oxygen, dispensed in the water, is used for oxidation of died cells, leading to anoxaemia and death of the fish. Development of hypoxia (lack of oxygen) zones may start hydrogen sulfide production and corresponding





poisoning of all hydrobionts by this substance. These effects are recorded from late 1990 to the present time on the territory of the reserve in its farthest sites on the right bank, in the area of Zaburunye – Kamyshytovoye in July – August. There were registered facts of fish death during water blooming on the coastal edge of the sea up to 2-m depth in Zaburunye village area. In slowly flowing water reservoirs of Peretaska, Bukharka, and also in slowly flowing and stagnant channels water blooming is registered every year in hot summer months.

5) *River and sea waters' pollution by oil product, phenols, organochlorine pesticides, heavy metals, etc. (is almost uncontrolled).*

6) *Oil expansion in the shelf zone of shallow Eastern Caspian (negative factor for life of sturgeon fish and Caspian Seal).*

15.4.3 What indicators are, or will be used to assess the state and its trends?

Indicators are the following: level of chemical pollution of rivers and sea, populations' condition and population numbers of sturgeon fish and Caspian Seal, events of water blooming and silting of Ural river delta. Overall trend is, unfortunately, linked to the decrease of population numbers of sturgeon fish and Caspian Seal due to anthropogenic influence.

15.4.4 What actions are currently undertaken, and which measures will be applied to strengthen positive impacts or reducing negative ones on the biosphere reserve objectives?

There is a developed program on conservation of Caspian Seal and sturgeon fish, Government of Kazakhstan is going to support these programs along with Caspian International Ecological Program. Zoning of the territory allows support of of the established nature protection regime in the core and buffer zones of biosphere reserve.

BENEFITS OF ECONOMIC ACTIVITIES TO LOCAL PEOPLE:

15.5.1 For the activities described above, what income or benefits do local communities (including men and women) derive directly from the site proposed as a biosphere reserve and how?

Local people, living on the territory of biosphere reserve and in the surrounding area, will get considerable economic benefit from biosphere reserve creation. First of all, that would be new employment opportunities, connected to tourist activities (development of infrastructure, creation of private hotels and guest houses, equipment rent, guide services, etc.). The second important factor is overall rehabilitation of the environment and sustainable nature use.

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

15.5.2 What indicators are used to measure such income or other benefits?

The numbers that may serve as indicators are the number of tourists per year, number of opened private hotels, guest houses and restaurants, as well as agriculture productivity (number of fish, cattle and poultry, milk production, etc.). One of the indicators is per capita income of local people.

SPIRITUAL AND CULTURAL VALUES AND CUSTOMARY PRACTICES:

(Provide an overview of values and practices, including cultural diversity).

15.6.1 Describe any cultural and spiritual values and customary practices including languages, rituals, and traditional livelihoods. Are any of these endangered or declining?

15. 5

15. 6

There are no existing unique cultural and spiritual practices on the territory of biosphere reserve. At the same time, there are many archaeological monuments, in the close proximity from biosphere reserve there are different known sites of ancient cattlemen: not far from Konyr Kuduk well, Kok Murun sand dune, near Novyi Ushtagan village and Kadyr Gali sand dune and near Sazdy wintering site. A total of 19 monuments of Bronze Age and 128 of Early Iron Age were found on the territory of Atyrau oblast. One of the most important historical and archaeological monuments is Saraychik settlements, located in Makhambet district. It was a large city and merchant center of Golden Orda, lying on the shortest route from Europe to Middle Asia and China. In the end of XIV century (1395) ancient Saraychik city was destroyed by Timur's army. In the present time archaeologists found Iranian ceramic ware, Khorezm ware from gray clay, Chinese porcelain ware, bone flutes, hoes, knives, fishing rods and nails.

The main religions of local people are Islam and Christianity. Indigenous people usually support religious traditions, besides which they keep national customs and traditions (respect for the elderly, higher status of the man, involving children in religious and national traditions).

15.6.2 Indicate activities aimed at identifying, safeguarding, promoting and/or revitalising such values and practices.

Large archaeological works are carried out in Northern Caspian in the area of former capital of Golden Orda (Zolotaya Orda) – Saraychik city.

15.6.3 How should cultural values be integrated in the development process: elements of identity, traditional knowledge, social organizations, etc.?

Information on cultural heritage, collected by archaeologists and historians, is included in the courses of secondary and higher education institutions of the region and is used for creation of documentaries, TV shows and educational projects.

15.6.4 Specify whether any indicators are used to evaluate these activities. If yes, which ones and give details. (Examples of indicators: presence and number of formal and non-formal education programmes that transmit these values and practices, number of revitalisation programmes in place, number of speakers of an endangered or minority language).

One of the indicators is the fact that information, collected by the archaeologists, was included in the school history programs of not only schools of the region, but throughout all Kazakhstan. In the present time on the remains of this city archaeologists found Iranian ceramic ware, Khorezm ware from gray clay, Chinese porcelain ware, bone flutes, hoes, knives, fishing rods and nails.



16. LOGISTIC SUPPORT FUNCTION:

16.1

RESEARCH AND MONITORING:

16.1.1 Describe existing and planned research programmes and projects as well as monitoring activities and the area(s) in which they are (will be) undertaken in order to address specific questions related to biosphere reserve management and for the implementation of the management plan (please refer to variables in Annex I).

Scientific research of Biosphere Reserve's territory is carried out according to perspective thematic plan for 2010-2014. The main task of scientific research in Akzhayik 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 characteristics 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 subcategories on the research of rare and endangered bird species with evaluation of populations' 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 2014 the work on the following scientific themes is conducted on the territory of Biosphere Reserve:

- 1) Mammals of Atyrau Reserve (fauna, biology, population number),
- 2) Rare, endangered and globally important bird species of state nature reserve and adjacent territories,
- 3) Characteristics of ichthyofauna of state nature reserve (this theme will also include materials of hydrobiological research),

- 4) Flora of Atyrau Reserve (species composition, population numbers according to ecosystems),
- 5) Nature Chronicles
- 6) Condition of water (collection of data on level and use of water, as well as hydrochemical indices of riverine and marine water),
- 7) Problems of ecology and monitoring of waterbirds on the example of key and monitoring species (Glossy Ibis, Pallas's Gull, Little Egret and Eurasian Coot),
- 8) Problems of ecology of mammal monitoring species (Wild Boar, Muskrat, European Hare, Caspian Seal, Saiga, Wolf),
- 9) Monitoring of key vegetation species and associations,
- 10) Monitoring of hydrological regime and water hydrochemical indices of Akzhayik state nature reserve and adjacent territories,
- 11) Monitoring of ecosystem dynamics (with application of GIS-technologies),
- 12) Definition of recreational pressure standards for visiting Akzhayik ecosystem and adjacent territories.

In the present time monitoring of climatic, hydrological changes is carried out by Atyrau department of Kazakhstan Hydro-meteorological Service, and by scientific subdivisions of Agip KCO oil consortium.

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) Perspective Plan.

In the future monitoring of climatic, hydrological changes will also be continued by Atyrau department of Kazakhstan Hydro-meteorological Service, and by scientific subdivisions of Agip KCO oil consortium.

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

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.

16.1.2 Summarize past research and monitoring activities related to biosphere reserve management (please refer to variables in Annex I).

In the limits of GEF/UNDP Wetlands Project complex scientific research was conducted in 2004-2005, natural-scientific justification for creation of nature reserve in Ural river delta was elaborated in 2007, and technical – economic justification for creation of Akzhayik State Nature Reserve – in 2008. They became the basis for Resolution of the Government of Kazakhstan dedicated to organization of Akzhayik State Nature Reserve in 2009 and Decrees of Akim of Atyrau oblast to land allocation. 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 biosphere reserve's zones. Besides, in 2010-2011 in the limits of Kazakhstan – Italian Project the main directions of ecological tourism development were elaborated, taking into consideration experience of Italian biosphere reserve Po River Delta Park.

Before the nature reserve was organized, there was a lot of research of different scientific areas: geological, soil, hydrological, landscape, botanical, zoological, ecosystem and social-economic. From 1960s a lot of zoological and botanical research was carried out here, continued now in the frames of scientific themes of nature reserve.

Monitoring and biological observations was carried out on the modern territory of Akzhayik Biosphere Reserve in the limits of state scientific and practical 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 Northern Caspian 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.

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 Guryev oblast sanitary-epidemiological station and field groups of Antiplague Station.

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.

16.1.3 Indicate what research infrastructure is available in the proposed biosphere reserve, and what role the biosphere reserve will play in supporting such infrastructure.

In order to realize scientific activity, biosphere reserve possesses:

1. Scientific station (in the main building of Nature Reserve)
2. Observation site for birdwatching - 2
3. Monitoring sites and routes
4. Vehicle (1 car «UAZ-452», 1 car «Chevrolet Niva»)
5. Boat «Quicksilver 620» – 1
6. GPS – 5 devices.
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





16.2

EDUCATION FOR SUSTAINABLE DEVELOPMENT AND PUBLIC AWARENESS:

16.2.1 Describe existing and planned activities, indicating the target group(s) and numbers of people involved (as “teachers” and “students”) and the area concerned.

In the Law «About specially protected natural territories» there are 3 main directions of ecological education defined for the category of nature reserve: 1) propaganda of nature science and nature reserves, environmental protection and sustainable nature use; 2) showing objects of plant and animal world, objects of inanimate nature and historic-cultural heritage; 3) acquaintance with activity of nature reserve. The territory of Ural river delta is globally known for its unique wetlands, and its international importance grows each year. This is why it is especially important that people living in this region would be ecologically literate, knew and loved the nature of their native land, were patriots of their land and could actively participate in nature-protective activities.

The work of ecological education in Akzhayik biosphere reserve is carried out on the basis of «The provisions on scientific and educational activities and eco-tourism in state institution «Akzhayik State Nature Reserve»». This activity is carried out according to the Program and annual Plan of cultural – educational activities, developed in the beginning of each year and approved by the administration of Nature Reserve, where there is a special structure – department of ecological education. The staff of the Department consists of 6 specialists of the following positions: Department chief, 2 specialists of ecological education, translator, excursionist and museum chief. Cultural – educational work is partly carried out by staff from Department of Science and Monitoring.

According to the Program 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:

- popularization of the Reserve on the national and oblast levels
- work with target groups
- development of advertising and publishing activities
- creation of cinema and videoproduction

- organization of school ecological camps
- initiation of extra-school activities
- participation in further introduction of eco-education programs for 6-8 grades
- attraction of the students to undertake practice on the territory of SPNA
- creation, information and technical support of Internet – websites
- work on creation of Visit-center
- ecological tourism and educational tourism
- ecological festivals and activities
- involvement of local people into biodiversity protection of the Reserve
- qualification increase of eco-education department's staff
- improvement of material-technical base of eco-education department

development of Visit-center

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

1) *Development of advertising - publishing activity*. Goal: distribution of the information on SPNA and establishment of positive image of SPNA. Target group – broad audience. Key actions:

- informational booklets,
- posters,
- leaflets,
- brochures on ecotourism,





- photo albums,
- postcards,
- calendars,
- multimedia production,
- video films

2) *Introduction of eco-education programs for schoolchildren of 6-8 grades.* Goal: involvement of schoolchildren in protection and study of nature of their native land. Target group – schoolchildren. Key actions:

Publication of methodic materials for study program;

Seminars in schools on the problems of biodiversity conservation in biosphere reserve.

4) *Creation and technical support of Internet-sites of the Reserve.* Goal: Provide access to citizens and organizations to the information on the activities of SPNA. Target group – Internet users, wide range of public. Key actions:

Create and support Internet-sites

Give complete and accurate information about biosphere reserve.

Update the information in time.

5) *Work on the development of Visit-center of the Reserve.* 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 center;

For nature protection ideas' propaganda among broad audience to organize exhibitions: stationary (photos), temporary (children's paintings, etc.) and mobile.

6) *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;

Equip ecological paths and routes with information stands and boards, located in the most suitable places and with necessary informational and emotional context;

- elaborate permissible levels of recreational pressure;
- define the limit of visits to eco-routes.

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 tourists etc. Key actions:

- World Environmental Day;
- International Birds Day;
- Parks March;
- Wetland Day;
- Earth day;
- Tourism Day;
- August seminar;
- Organization of Reserve's anniversaries;
- Organization of festivals dedicated to separate animals and plants;
- Organized help to the SPNA on its territory;
- Childrens' ecological festivals.

9) *Involvement of local people in ecotourism on the territory of biosphere reserve*. Goal: Involvement of local population in ecotourism work. Target group – local adults, local and foreign tourists, etc. Key actions:

- organize special training for local people:
- «guest houses for tourists»;

- courses of guides and tourist instructors;
- courses of local crafts.

10) *Qualification increase of eco-education department's staff.* Goal: Increase effectiveness 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.

11) *Public relations in the questions of nature protection.* Goal: Creation of positive opinion and participation of population in SPNA management. Target group – all layers of local population. Key actions:

- target presentations: albums, booklets, stickers, T-shirts with emblems of biosphere reserve;
- development of thematic plan of actual exhibitions, expositions, information boards;
- preparation of specialized thematic exhibitions and contests.

12) *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», «Karavaika», «Zhuravl/Crane», 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.).

13) *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 scientific research and works;
- Organization 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;
- Children and youth ecological festivals, contests, conferences;
- Schoolchildren participation in ecological festivals and activities.

14) *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 realization;
- 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.

In the last 3 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 and local decision-makers. 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 2009-2013 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, 10 nature reserve's staff members exchanged experience with Astrakhan Biosphere Reserve, and 2 state inspectors went to Korgalzhyn Biosphere Reserve. 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 2010-2013 graduate students of Bologna University carried out their scientific research on the territory of Biosphere Reserve, and students of Kazakhstan universities carried out their scientific practice there.

Professional training and seminars for managers and resource planners. In the last 2 years in the frame of Kazakh-Italian Project several seminars and experience exchange trips were organized between Akzhayik Biosphere Reserve,

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.

16.2.2 What facilities and financial resources are (or will be) available for these activities?

In order to realize scientific activity, biosphere reserve possesses:

1. Scientific station (in the main building of Nature Reserve)
2. Observation site for birdwatching - 2
3. Monitoring sites and routes
4. Vehicle (1 car «UAZ-452», 1 car «Chevrolet Niva»)
5. Boat «Quicksilver 620» – 1
6. GPS – 5 devices.
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

In the main core zone, on cordones 1 and 2 there are conditions for overnight staying or temporary living of SPNA scientific staff, as well as for visiting scientists.

In the reserve's buffer zone there are the following objects of tourist infrastructure:

- ecological routes (marked, clean) – 10 km;
- bench for 4 people – 10;
- picnic tables for 4 people – 3;
- sheds from rain – 3;
- stoves for cooking – 3;
- garbage cans – 30;
- portable toilets – 10;
- signs, information stands – 200;
- Camping sites – 1.

CONTRIBUTION TO THE WORLD NETWORK OF BIOSPHERE RESERVES:

16.3.1 How will the proposed biosphere reserve contribute to the World Network of Biosphere Reserves, its Regional and Thematic Networks?

On national level collaboration is established with Korgalzhyn Biosphere Reserve, and at the regional level – with Astrakhan Biosphere Reserve (Russia). On the global level contacts were established with Italian Po River Park Biosphere Reserve in the frames of Kazakhstan – Italian Project, supported by Bologna University and ENI company. In the

limits of this collaboration experience is exchanged, educational excursions and trainings are held, as well as data sharing and their collaborative processing (for example, processing of space images of biosphere reserve's territory).

At the same time Akzhayik 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 discussed the ways to collaborate at the regional level. In 2011 Kazakhstan became a member of Eastern Asian (EABRN) and South-Asian – Central-Asian (SACAM) networks of biosphere reserves, which allows close contacts' establishment with the nearest biosphere reserves of Russia, Iran, Pakistan, India, China, Mongolia, Korea and Japan.

16.3.2 What are the expected benefits of international cooperation for the biosphere reserve?

International collaboration is aimed for exchange of experience and ongoing information, introduction of best practices of nature protection and sustainable development.

16.4

INTERNAL AND EXTERNAL COMMUNICATION CHANNELS AND MEDIA USED BY THE BIOSPHERE RESERVE:

Akzhayik Biosphere Reserve collaborates with several national and local TV companies (Khabar, Bilim, KTK) and some periodical press (magazines and newspapers), where articles about the beautiful nature of Northern Caspian and current problems of its conservation regularly appear.

16.4.1 Is (will) there (be) a biosphere reserve website? If yes, what is its URL?

<http://www.oopt.kz/forest/27/4829/>

16.4.2 Is (will) there (be) an electronic newsletter? If yes, how often will it be published?

At the present time there is no electronic newsletter of Akzhayik Biosphere Reserve, but it is planned for 2014 with frequency of twice a year.

16.4.3 Does (will) the biosphere reserve belong to a social network (Facebook, Twitter, etc.)?

No



17. GOVERNANCE, BIOSPHERE RESERVE MANAGEMENT AND COORDINATION:

[Describe the following characteristics in the prospective that the site is being designated.]

17.1

MANAGEMENT AND COORDINATION STRUCTURE:

The Committee for Forestry and Hunting of the Ministry of Environment Protection ensures for the State Nature Reserve Akzhayik.

1. Core area – lands of the Akzhayik State Nature Reserve
2. Buffer area – lands of the Akzhayik State Nature Reserve
3. Transition area – agricultural and stock lands, including:

Makhambet District:

- land of Pervomaiski LLC of 1,420 ha
- stock land (municipal property) of 12,664 ha

Rural districts in the jurisdiction of Atyrau City Akimat:

- land owned by Amangeldy cooperative of 1,702 ha
- land owned by Amanat Aral cooperative of 696 ha
- land owned by Yerken-Kala cooperative of 4,370 ha
- land owned by Kurmangazy cooperative of 160 ha
- land owned by Kzyl-Balyk cooperative of 802 ha
- land owned by Dzhambul cooperative of 6,985 ha
- land owned by Algabas cooperative of 547 ha.

etc.

17.1.1 What is the legal status of the biosphere reserve?

Akzhayik Biosphere Reserve is being created on the basis of Akzhayik State Nature Reserve, all necessary powers for strict nature reserve regime provision in the core zone and protection regime in the buffer zone are in accordance with Article 50 of the Law of RK «About SPNA».

17.1.2 What is the legal status of the core area(s) and the buffer zone(s)?

The core area(s): nature reserve zone of Akzhayik State Nature Reserve. All necessary powers for strict nature reserve regime provision are in accordance with Article 50 of the Law of RK «About SPNA».

The buffer zone(s): buffer zone of Akzhayik State Nature Reserve. The main powers of administration are in accordance with Article 50 of the Law of RK «About SPNA». Powers for limited economic activity are carried out by agreement with Forestry and Hunting Committee under the Ministry of Environmental Protection of RK and under control from Akzhayik State Nature Reserve.

17.1.3 Which administrative authorities have competence for each zone of the biosphere reserve (core area(s), buffer zone(s), transition area(s))?

Akzhayik State Nature Reserve and Akimats of Atyrau city and Makhambet district of Atyrau oblast.

17.1.4. Clarify the respective competence of each of these authorities. Make a distinction between each zone if necessary and mention any decentralized authority.

Akzhayik State Nature Reserve is management body for the core and buffer zones of biosphere reserve.

Akimats of Atyrau city and Makhambet district are management bodies for transition zone.

Overall management is carried out by Coordinational Council of biosphere reserve.

17.1.5 Indicate the main land tenure (ownership) for each zone.

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 Akzhayik State Nature Reserve.

Buffer zone lands are national (state) property and consist of agriculture and reserve lands. Agricultural lands are used by farmers. Buffer zone's 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 Akzhayik State Nature Reserve.

The territory of transition zone is divided between different owners. Most part of the lands is state property and is administered by Akimats of Makhambet district and Atyrau city, 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.

17.1.6 Is there a single manager/coordinator of the biosphere reserve or are several people in charge of managing it? If one manager/coordinator, who designates and employs him/her (national authorities, environmental administrative agency, local authorities)?

Director of Akzhayik State Nature Reserve is responsible manager of the core and buffer zones of biosphere reserve. He is a staff member of environmental administrative agency (Forestry and Hunting Committee under the Ministry of Environmental Protection of RK). Management of the transition zone is carried out at the sessions of Coordinational Council by decision-making based on consensus.

17.1.7 Are there consultative advisory or decision-making bodies (e.g., scientific council, general assembly of inhabitants of the reserve) for each zone or for the whole biosphere reserve?

- If yes, describe their composition, role and competence, and the frequency of their meetings.

Biosphere Reserve's management is conducted through *Coordinational Council of Akzhayik Biosphere Reserve*. This organ is a coordinational 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. Coordinational Council consists of representatives of Akzhayik State Nature Reserve, local NGO and land users, administration of Makhambet district and Atyrau city (Akimats), state agencies (territorial office of forestry and hunting and territorial office of fishery). Coordinational Council was formed in 2011 on the basis of Scientific-technical Council of Akzhayik nature reserve.

17.1.8 Has a coordination structure been established specifically for the biosphere reserve?

- If yes, describe in detail its functioning, composition and the relative proportion of each group in this structure, its role and competence.

The goal of Coordinational Council of biosphere reserve is introduction of the policy of effective management and resources' sustainable use, introduction of alternative activity types, resource-conserving and resource-renewing technologies. The members of the Council include director of Akzhayik State Nature Reserve and his deputies, representatives of 2 Akimats (Makhambet district and Atyrau city), 9 main land users of the transition zone, representatives of Association of Hunters and Fishermen of Atyrau oblast, territorial office of forestry and hunting and territorial office of fishery.

- ***Is this coordination structure autonomous or is it under the authority of local or central government, or of the manager/coordinator of the biosphere reserve?***

It is autonomous structure





17.1.9 How is the management/coordination adapted to the local situation?

Management of biosphere reserve is carried out using unified approach in whole Kazakhstan, and it does not need to be adapted to local conditions.

17.1.10 Is there a procedure for evaluating and monitoring the effectiveness of the management?

At the given stage a special procedure for evaluation and monitoring of biosphere reserve's management effectiveness is not elaborated. In Kazakhstan for SPNA of Republican importance a method of management effectiveness evaluation, developed in IUCN, is used.

17.2

CONFLICTS WITHIN THE BIOSPHERE RESERVE:

17.2.1 Describe any important conflicts regarding the access or the use of natural resources in the area considered (and precise period if accurate). If the biosphere reserve has contributed to preventing or resolving some of these conflicts, explain what has been resolved or prevented, and how this was achieved for each zone.

One of serious conflicts for the last 2 years were cases when local economic fishermen went into the territory of the buffer zone in order to catch fish in delta channels of Ural river. The main river-bed of Ural river does not belong to biosphere reserve, but the channels, going in and out of the river and full of fish, are on the territory of the buffer and core zones of the reserve. As the result of reserve's staff actions, the fishermen were caught several times with the nets, acts were compiled and materials were sent to court, where the fishermen filed complaints for «illegal» actions of reserve's staff. This conflict between reserve's administration and direction of fishermen company were discussed at the session of the Coordinational Council with collegial resolution about legality of actions of Akzhayik Reserve's staff.

Another serious case was building of infrastructure object in Ural river delta by one of the largest oil company in 2010-2012. The object is a storage of various equipment, necessary for liquidation of accidental oil spill in the field of hydrocarbon production. The main requirement to the object was its accessibility from the Caspian Sea waters. At first, oil company suggested locating the object on the territory of the buffer and partially core zones of the reserve, motivating their choice by high importance of the object. After agreement of the project between reserve's administration, local authorities and company's direction in the frames of Coordinational Council session, another place was found for object's construction, which is located outside of the buffer and core zones.

17.2.2 If there are any conflicts in competence among the different administrative authorities in the management of the biosphere reserve, describe these.

To the present time there are no conflicts between different management bodies of biosphere reserve (reserve's administration, local authorities).

17.2.3 Explain the means used to resolve these conflicts, and their effectiveness.

The main means of conflict solving were direct talk of conflicting sides or discussion in the frame of Coordinational Council sessions. As the result of discussions, all conflicts were solved.

REPRESENTATION, PARTICIPATION AND CONSULTATION OF LOCAL COMMUNITIES:

17.3.1 At what stages in the existence of a biosphere reserve have local people been involved: design of the biosphere reserve, drawing up of the management/cooperation plan, implementation of the plan, day to day management of the biosphere reserve? Give some specific examples.

17.3

During the last several years the idea of Biosphere Reserve organization is often discussed between Akzhayik 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 initiatives. To the present date local people see Biosphere Reserve only as a mechanism to overcome conflicts between nature reserve and nature users.

The idea was created by nature reserve's staff, Kazakhstan National Committee of UNESCO and ISESCO, Kazakhstan – Italian Project Ural River Delta Park (participants: Bologna University, ENI, Ministry of Environmental Protection of RK), GEF/UNDP Wetlands Project and scientists of Kazakhstan scientific research institutes. These ideas were discussed at different work meetings, seminars, ecological festivals with participation of local people and at specialized scientific conferences in 2010-2013. 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. Local NGOs and experts were involved in the creation of biosphere reserve. For example, local population of nearest villages participated in development of bicycle and walking tourist routes and in construction of observation tower in the buffer zone.

17.3.2 Describe how the local people (including women and indigenous communities) have been, and/or are represented in the planning and management of the biosphere reserve (e.g., assembly of representatives, consultative groups).

Local communities and private land users are represented in Coordinational Council through their elected representatives of local authorities, local NGOs or directly as its members. All members of the Council have equal rights in voting and decision-making.

17.3.3 Describe the specific situation of young people in the proposed biosphere reserve (e.g., potential impacts of the biosphere reserve on youth, consideration of their interests and needs, incentives to encourage them to participate actively in the governance system of the biosphere reserve).

Young people actively participate in creation and life of biosphere reserve. Development of bicycle and walking routes was done with participation of local youth from surrounding villages. Annual ecological festivals, open classes for schoolchildren, garbage collection along the main waters of Ural river and many other activities took place with active involvement of the youth. Young people are very interested in conservation and learning about natural resources of the region. Biosphere reserve gives an opportunity to realize youth potential in this direction. In the present time the question of representativeness of youth organization in Coordinational Council of biosphere reserve is solved, giving young people an opportunity to manage the reserve.

17.3.4 What form does this representation take (e.g., companies, associations, environmental associations, trade unions)?

Representation of youth in activity and management is carried out through local NGOs, school committees and Palace of Schoolchildren and Studenta of Atyrau city.

17.3.5 Are there procedures for integrating the representative body of local communities (e.g., financial, election of representatives, traditional authorities)?

Local communities are represented in management organ of biosphere reserve (Coordinational Council) through their elected representatives of local authorities and through local NGOs.

17.3.6 How long-lived are consultation mechanisms (permanent assembly, consultation on specific projects)? Make a complete description of this consultation. What are the roles of involved stakeholders compared to the role of the biosphere reserve?





Consultational mechanisms work on the basis of expert groups, created for solving the problems during the work of special projects. For example, for withdrawal justification of a part of Ural river delta territory in order to add it to the nature reserve, an expert group was created, consisting of the leading specialists in nature protection. This expert group was organized in the frames of UNDP/GEF Wetlands Project and included part of the experts of nature reserve. As the result of this group's work, a natural-scientific justification was compiled for addition of a part of the territory to the reserve. Benefit recipient in this case was nature reserve.

17.3.7 What consultation mechanisms have been used, and who has been involved? Are they for specific purposes or long-term? What impacts have they had on decision-making processes (decisional, consultative or merely to inform the population)?

A group of specialists from Akhzayik reserve staff, Bologna University, Kazakhstan scientific academic institutes (geologists, historians, archaeologists, palaeontologists, zoologists, botanists and GIS specialists) was invited as consultants for compiling nomination for Akzhayik Reserve inclusion in the global network of biosphere reserves. The work of this expert group was supported by Italian company ENI through Agip-KCO consortium. This activity lasted for 2 years and was finished by the beginning of 2013. All materials were given to the Ministry of Environmental Protection and MAB National Committee. In the future these materials were used for compilation of national nomination to UNESCO.

17.3.8 Do women participate in community organizations and decision-making processes? Are their interests and needs given equal consideration? What incentives or programmes are in place to encourage their representation and participation (e.g.: was(were) a "gender impact assessment(s)" carried out)?

Both women and men are equal in their rights to participate in the activities of state and non-governmental organizations, involved in the work with Akzhayik Biosphere Reserve. There were no special efforts for increased representation of women in management bodies, in order not to humiliate women's dignity by creating gender preferences. Due to high educational level of local people and cultural traditions, formed by centuries, women in Kazakhstan have equal economic and political rights.

THE MANAGEMENT/COOPERATION PLAN/POLICY:

17.4.1 Is there a management/cooperation plan/policy for the biosphere reserve as a whole?

In the present time Integrated Management Plan of Biosphere reserve represents simple composition of Management Plan of Akzhayik 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 Akzhayik 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.

17.4.2 Which actors are involved in preparing the management/cooperation plan? How are they involved?

Local and national / international experts, as well as representatives of state authorities and NGOs were involved in preparing the Management Plan. A draft, developed by experts, was discussed at the sessions of expert group, it was corrected with the recommendations of local consultants.

17.4.3 Do local authorities formally adopt the management/cooperation plan? Are local authorities making reference to it in other policies and/or plans? If so, please provide details.

Management Plan was agreed with local authorities and, according to legislation of Kazakhstan, was approved by the authorized body – Forestry and Hunting Committee under the Ministry of Environmental Protection of RK. Authorities and representatives of public organizations had an opportunity to give their recommendations during the process of Plan develop-





ment. For example, recommendations of public organizations about ecologic educational programs and nature conservation ideas' agitation campaigns among local people were taken into consideration and put in the Management Plan.

17.4.4 What is the duration of the management/cooperation plan? How often is it revised or re-negotiated?

According to the legislation, a Management Plan is developed for five year period. After that the results of its implementation are analyzed and new Management Plan is created taking into consideration positive and negative experiences of previous plan's realization. Further changes in the Management Plan are possible, but these changes must be approved by the authorized body – Forestry and Hunting Committee under the Ministry of Environmental Protection of RK.

17.4.5 Describe the contents of the management/cooperation plan. Does it consist of detailed measures or detailed guidelines? Give some examples of measures or guidelines advocated by the plan? (Enclose a copy).

Management Plan along with list of contents and illustrations is given in the Appendix. It consists of introduction and 24 chapters, gathered in three main parts: 1) status and peculiarities of nature reserve, 2) evaluation of current condition and overall conclusions, 3) management plan's realization mechanism. Tables, maps and other materials are given in the Appendices to the Management Plan. This is why the Management Plan contains as detailed analysis of the condition and importance of the reserve, as detailed action plan for five years. For example, the second part (evaluation of current condition) in Chapter 13 gives assessment of labor resources, and Chapter 14 presents analysis of the main threats and management problems.

17.4.6 Indicate how this management/cooperation addresses the objectives of the proposed biosphere reserve (as described in section 13.1).

Management of biosphere reserve corresponds with the three main goals of biosphere reserve: conservation, development and access (logistics). The first and second parts of the Management Plan give assessment of the conditions of natural diversity (physical and biological peculiarities), social-economic potential for stable development, access to natural resources, management programs, scientific research and environmental monitoring, threats, etc. The third part gives detailed action plan for the nearest five years.

17.4.7 Is the plan binding? Is it based on a consensus?

The developed Management Plan is obligatory for execution, it is created based on consensus of all parties interested in the management of biosphere reserve.

17.4.8 Which authorities are in charge of the implementation of the plan, especially in the buffer zone(s) and the transition area(s)? Please provide evidence of the role of these authorities.

Authorized management coordination organ of biosphere reserve is *Coordinational Council of Akzhayik 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 Akzhayik State Nature Reserve, local nature users and public organizations, administration of Makhambet district and Atyrau city (Akimats), regional territorial Department of Fishing and regional Association of Hunters and Fishermen. Coordinational Council was organized in 2011 on the basis of extended *Scientific – Technical Council of Akzhayik Nature Reserve*.

17.4.9 Which factors impede or help its implementation (e.g.: reluctance of local people, conflicts between different levels of decision-making).

The main risk factors for Plan's implementation are not manageable natural processes (fires, floods, etc.), possible anthropogenic catastrophes in Northern Caspian, caused by oil production, and instability of world financial market which may lead to economic crisis in the country. Positive factors for Management Plan's implementation include favorable attitude of local people to biosphere reserve, quite high educational level of local population and nature conservation activity of local people, as well as of large industrial companies working in this region.

17.4.10 Is the biosphere reserve integrated in regional/national strategies? Vice versa, how are the local/municipal plans integrated in the planning of the biosphere reserve?

Biosphere reserve is integrated in national and regional strategies for biodiversity conservation and stable economic growth. This integration is carried out on the level of authorized body - Forestry and Hunting Committee under the Ministry of Environmental Protection of RK – and Government of Kazakhstan.

17.4.11 Indicate the main source of the funding and the estimated yearly budget.

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

CONCLUSIONS:

17.5.1 In your opinion, what will ensure that both the functioning of the biosphere reserve and the structures in place will be satisfactory? Explain why and how, especially regarding the fulfillment of the three functions of biosphere reserves (conservation, development, logistic) and the participation of local communities.

Successful functioning and interaction of biosphere reserve and other organizations of the region is guaranteed by the legislation of Kazakhstan, favourable attitude of local and large industrial and agricultural companies in biosphere reserve, clear understanding of goals and tasks of biosphere reserve by local authorities. This is why all possible conflicts of interests may be quite easily solved at the level of Coordinational Council's sessions, where representatives of local communities take part.



18. SPECIAL DESIGNATIONS:

[Special designations recognize the importance of particular sites in carrying out the functions important in a biosphere reserve, such as conservation, monitoring, experimental research, and environmental education. These designations can help strengthen these functions where they exist or provide opportunities for developing them. Special designations may apply to an entire proposed biosphere reserve or to a site included within. They are therefore complementary and reinforcing of the designation as a biosphere reserve. Check each designation that applies to the proposed biosphere reserve and indicate its name]

Name:

UNESCO World Heritage Site

RAMSAR Wetland Convention Site. The area of the proposed biosphere reserve is included into the Ramsar List as of 10 April 2009.

Other international/regional conservation conventions/directives (specify)

The Framework Convention for the Protection of the Marine Environment of the Caspian Sea (Tehran Convention) is effective in the area of the proposed biosphere reserve.

Long term monitoring site (specify)

Unique and vulnerable ecosystems of the Ural river delta and adjacent Caspian coast require continuous and long-term monitoring of habitats and biodiversity in order to monitor the natural processes and to respond duly on any consequences of disasters and anthropogenic threats.

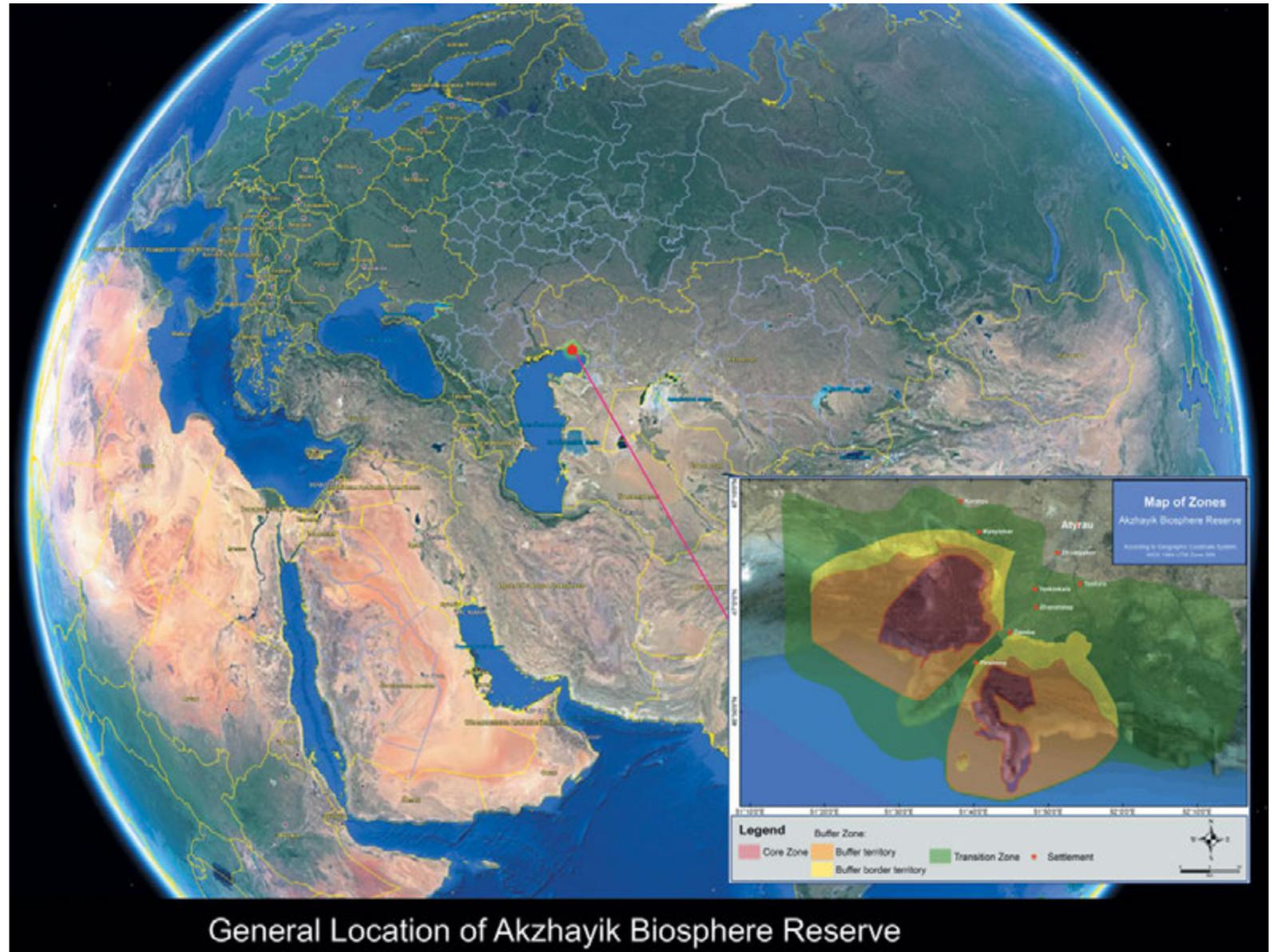
Long Term Ecological Research (LTER site)

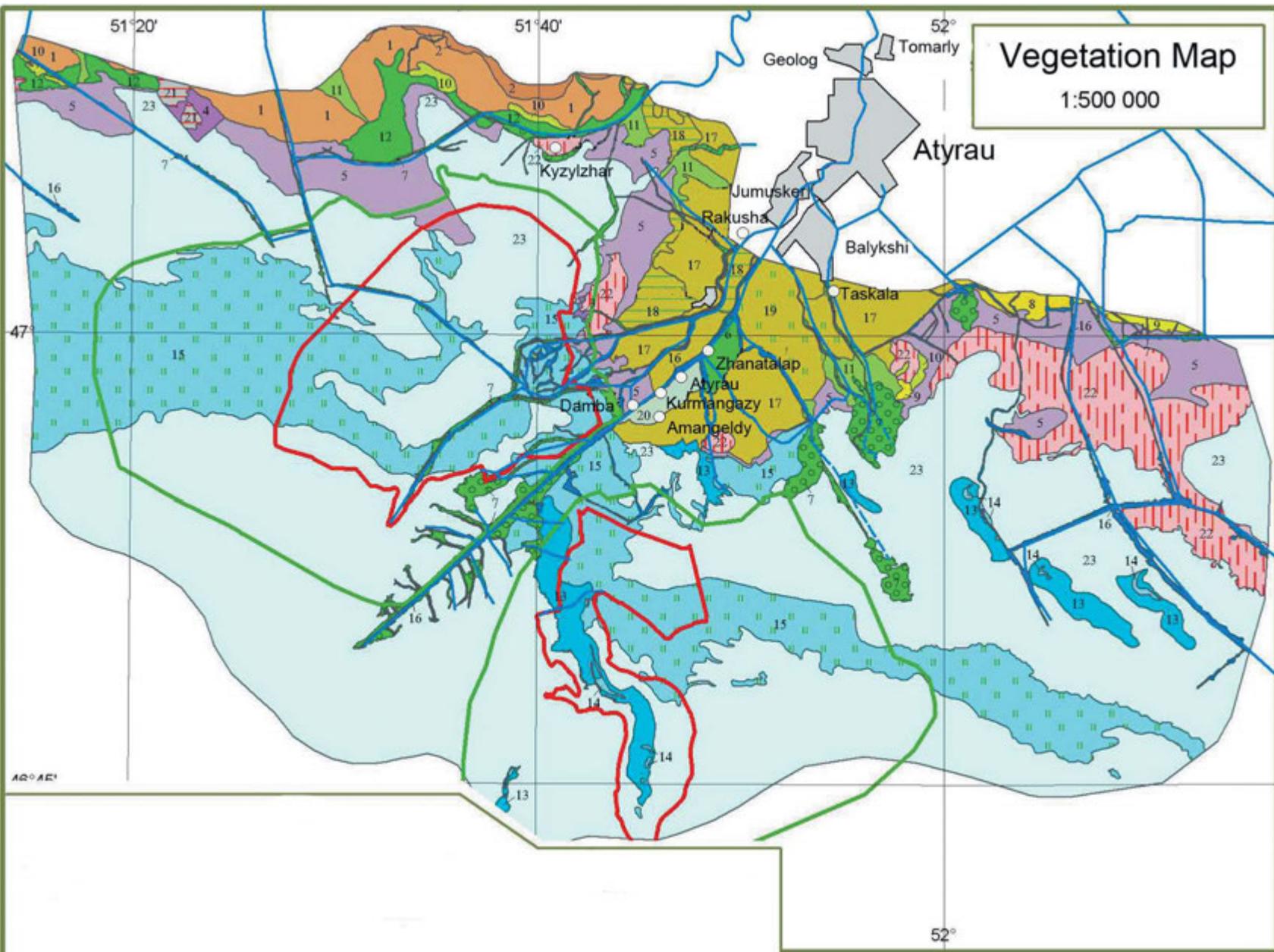
Other (specify)

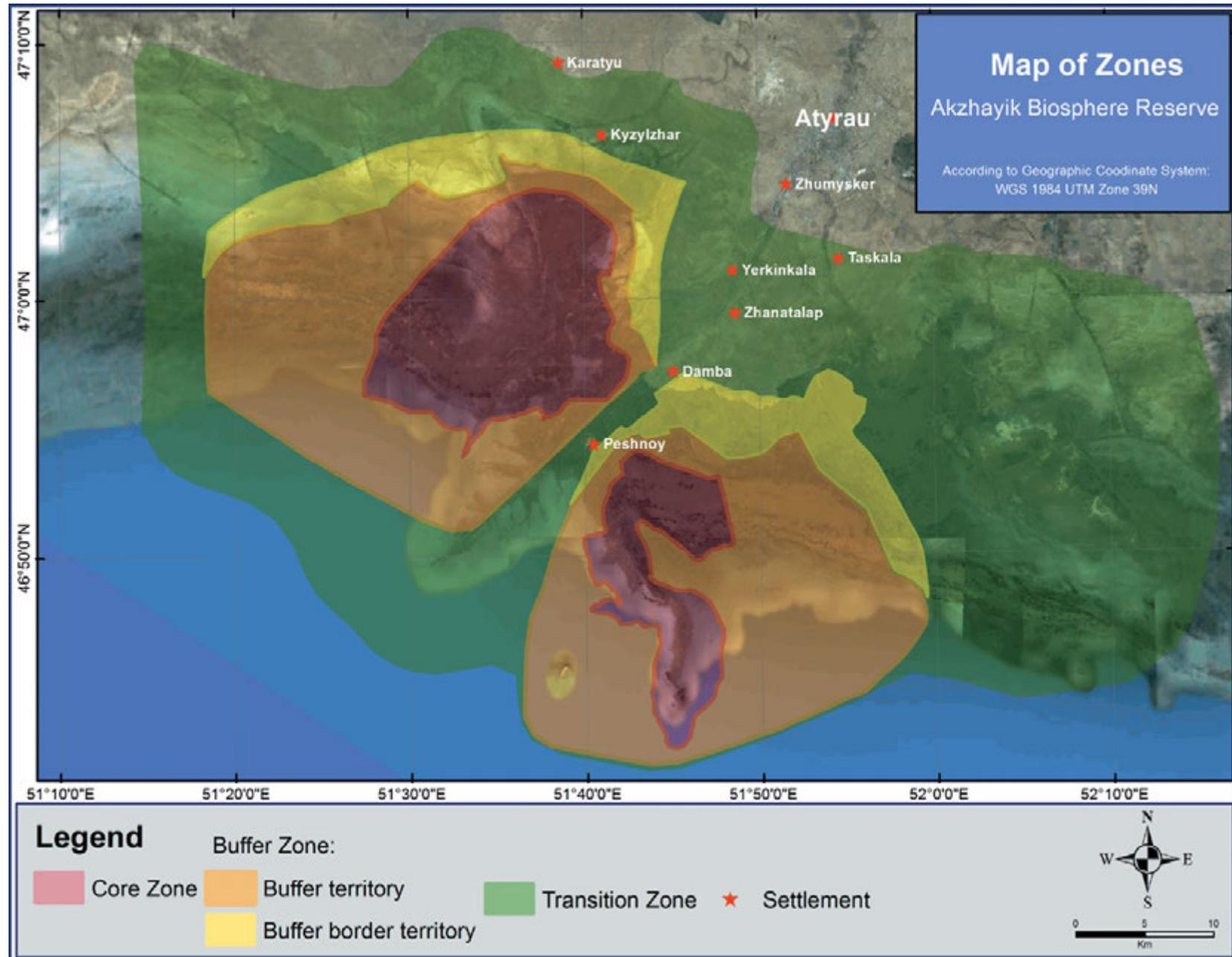
The Ural River delta and adjacent Caspian coast is included into the network of important bird areas (IBA).

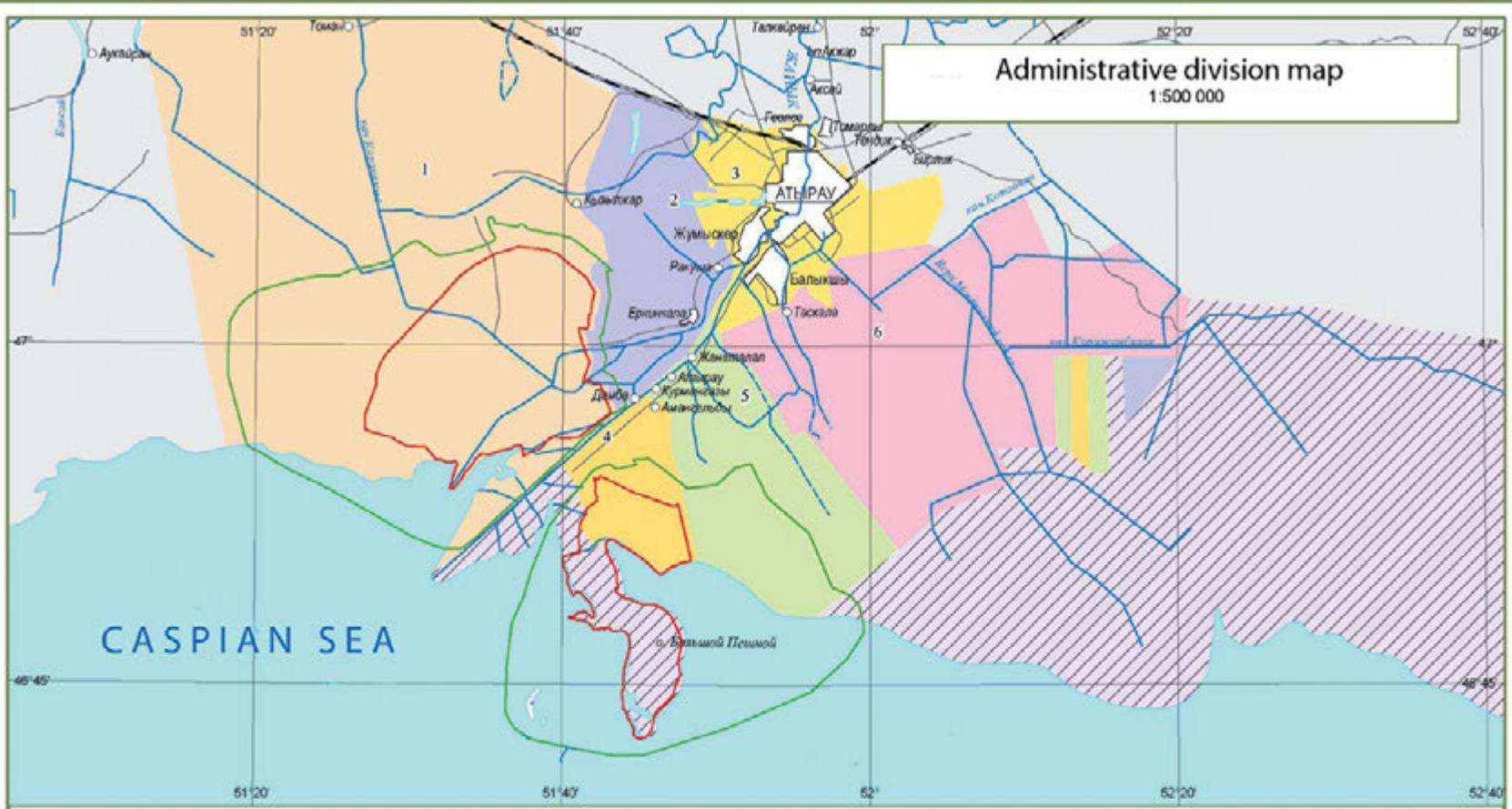


19. SUPPORTING DOCUMENTS (TO BE SUBMITTED WITH NOMINATION FORM):









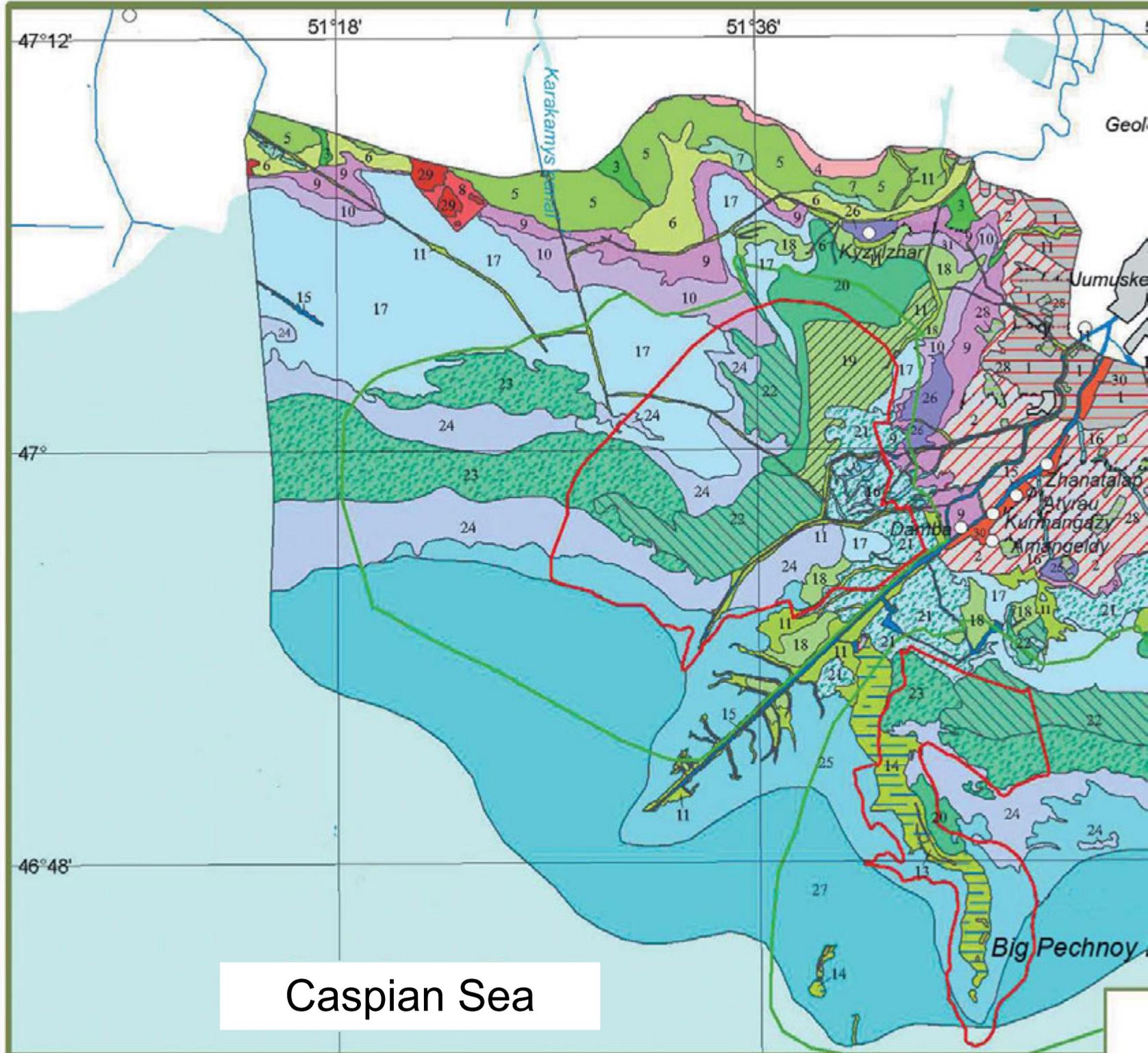
Administrative division

Province	District	#	Village counties	Villages
Atyrau City administration		5	Atyrau	Atyrau City
		3	Atyrau administration	Balykshy
		4	Damba	Damba
		2	Erkinkala	Erkinkala
		6	Kenezek	Taskala
Makhambet		1	Chkalov	Beibarys

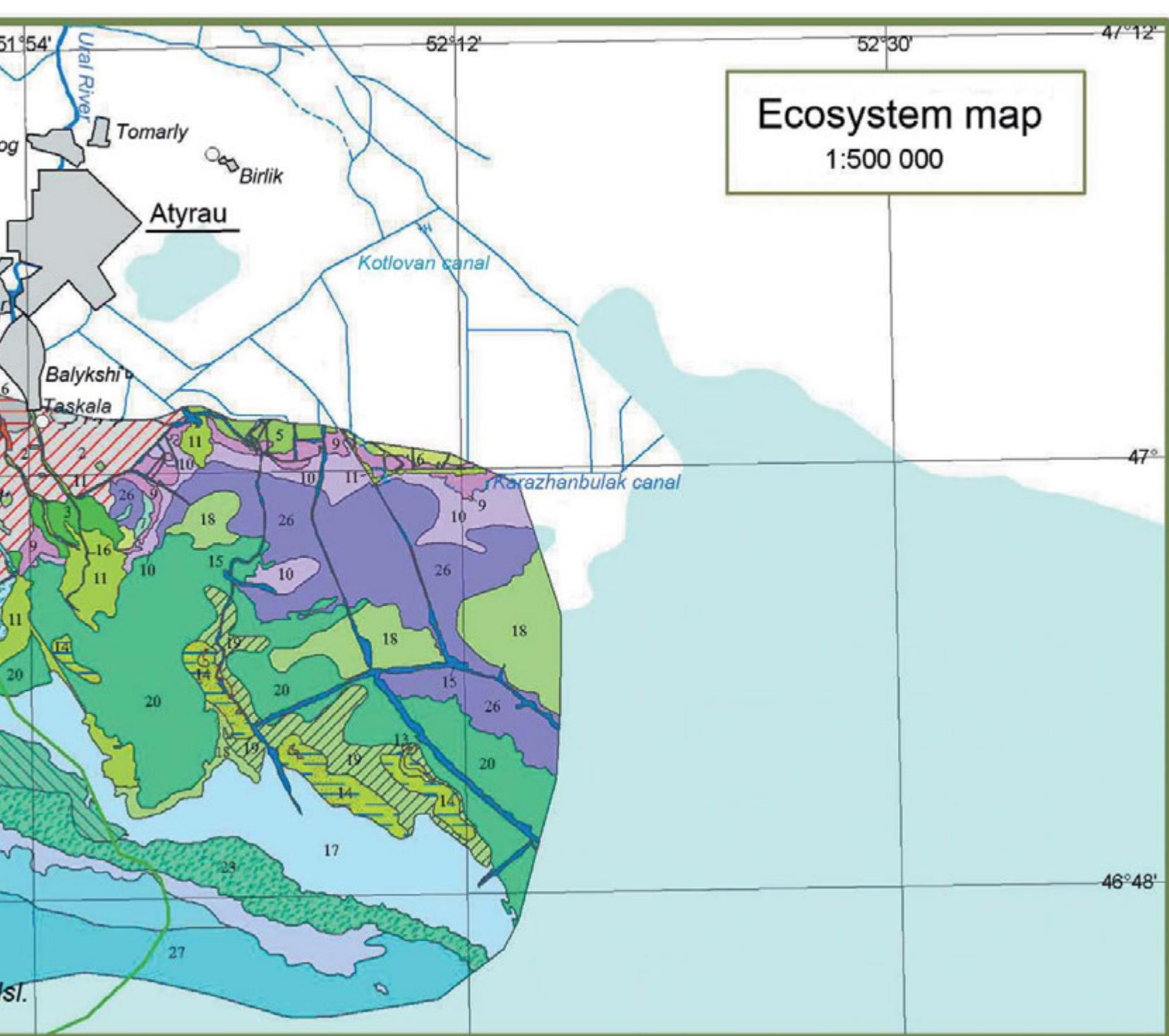
Akzhaiyk BR:

- Core zone
- Buffer zone
- Reservation lands of Atyrau City administration





Caspian Sea







**Жоспар шегіндегі бөтен жер учаскелері
Посторонние земельные участки в границах плана**

Жоспар дығы № на плане	Жоспар шегіндегі бөтен жер учаскелерінің кадастрлық нөмірлері Кадастрлық нөмірлері посторонних земельных участков в границах плана	Алаңы, га Площадь, га
	жоқ нет	

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Настоящий акт изготовлен Махамбетским районным кадастровым центром ДГП "Атырау НПЦзем"
М.О. Орынғали Б.М.

М.П. 2016 ж. 01. 09

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Начальник Махамбетского районного отдела земельных отношений
Жуков Г.Н.

2016 ж. 01. 09

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Описание смежеств действительно на момент изготовления идентификационного документа на земельный участок

**Жоспар шегіндегі бөтен жер учаскелері
Посторонние земельные участки в границах плана**

Жоспар дығы № на плане	Жоспар шегіндегі бөтен жер учаскелерінің кадастрлық нөмірлері Кадастрлық нөмірлері посторонних земельных участков в границах плана	Алаңы, га Площадь, га
	жоқ нет	

Осы Акт "Атырау ҒӨЖер" ЕМК жасалды
Настоящий акт изготовлен ДГП "Атырау НПЦзем"
Куанышев С. 2010 ж. "25" сентября

Осы актіні беру туралы жазба жер учаскесіне меншіктік құқығын, жер пайдалану құқығын беретін актілер жазылатын Кітапта № 1950 болып жазылды
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Приложение: нет

М.О.
М.П.
Атырау қаласы жер қатынастары бөлімінің бастығы
Начальник отдела земельных отношений города Атырау
Шатанов К.К.

2012 ж. 03. 09

Шектесулерді сипаттау жөніндегі ақпарат жер учаскесіне сәйкестендіру құжатын дайындаған сәтте күшінде
Описание смежеств действительно на момент изготовления идентификационного документа на земельный участок

20. ADDRESSES

20. 1

Contact address of the proposed biosphere reserve:

[Government agency, organization, or other entity (entities) to serve as the main contact on the MABnet to whom all correspondence within the World Network of Biosphere Reserves should be addressed.]

Name: **Akzhayik Biosphere Reserve**

Street or P.O. Box: **Microrayon Avangard, 102 Vladimirskaia Str.**

City with postal code: **Atyrau City, 060000**

Country: **Kazakhstan**

Telephone: **+7 712 228 2781**

E-mail: **akzhayik_oopt@mail.ru**

20. 2

Administering entity of the core area:

Name: **State Nature Reserve Akzhayik**

Street or P.O. Box: **Microrayon Avangard, 102 Vladimirskaia Str.**

City with postal code: **Atyrau City, 060000**

Country: **Kazakhstan**

Telephone: **+7 712 228 2781**

E-mail: **nurash-59@mail.ru**

Web site: **<http://www.oopt.kz/forest/27/4829/>**

Administering entity of the buffer zone:

Name: **State Nature Reserve Akzhayik**

Street or P.O. Box: **Microrayon Avangard, 102 Vladimirskaya Str.**

City with postal code: **Atyrau City, 060000**

Country: **Kazakhstan**

Telephone: **+7 712 228 2781**

E-mail: **nurash-59@mail.ru**

Web site: <http://www.oopt.kz/forest/27/4829/>

Administering entity of the transition area(s):

Name: **State Nature Reserve Akzhayik**

Street or P.O. Box: **Microrayon Avangard, 102 Vladimirskaya Str.**

City with postal code: **Atyrau City, 060000**

Country: **Kazakhstan**

Telephone: **+7 712 228 2781**

E-mail: **nurash-59@mail.ru**

Web site: <http://www.oopt.kz/forest/27/4829/>

20.3

20.4





ANNEX I TO BIOSPHERE RESERVE NOMINATION FORM,
JANUARY 2013
MABNET DIRECTORY OF BIOSPHERE RESERVES
BIOSPHERE RESERVE DESCRIPTION ¹

Administrative details

Country: Kazakhstan

Name of BR: Akzhayik

Year designated: *(to be completed by MAB Secretariat)*

Administrative authorities: State Nature Reserve Akzhayik

Name Contact: Coordination Council

Contact address: Microrayon Avangard, 102 Vladimirska Str., Atyrau City, 060000, Kazakhstan

Approximately 25 lines

Akzhayik Biosphere Reserve is situated on the plain in the Southern part of the Caspian depression at the negative altitudes. The territory of biosphere reserve is located on both sides of Ural river with adjacent coast of the Caspian Sea and represents marshy depression, partitioned by a system of delta channels, with their banks overgrown by dense vegetation, and adjacent coast of North-Eastern part of the Caspian sea up to 2 m depth. As a whole, the biosphere reserve is located in the desert zone, in the subzone of steppified Northern deserts, and occupied by various aquatic and terrestrial ecosystems. This territory is characterized by low plains with saline meadows, solonchaks, solonetz and spacious wetlands.

¹To be posted on the MABnet once the nomination has been approved. The numbers refer to the relevant sections of the nomination form.

Human population of proposed biosphere reserve: core area – no population, about 5-15 nature protectionists working inside core area simultaneously (staff of Akzhayik State Nature Reserve), buffer zone - 5-15 nature protectionists, transition Area - about 17 000 people.

Units of the proposed biosphere reserve: Akzhayik Biosphere Reserve is not a cluster reserve and is represented by one territory, divided by Ural river, the waters of which are not included in the biosphere reserve.

1. The main zone (core zone) – the territory of Akzhayik State Nature Reserve, with area of 36,077 ha. Title documents: Resolution of the Government of RK № 119 as of 6 February 2009, and Resolution (Charters) of Akzhayik State Nature Reserve, approved by the Decree № 59 of Forestry and Hunting Committee under the Ministry of Natural Resources and Environmental Protection as of 2 March 2009.

2. Buffer zone - corresponds to the buffer and protective zone of state nature reserve and consists of agricultural lands and lands of reserve. Its area is 104,769 ha. Part of agricultural lands is used for pastures and haymaking 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 RK № 119 as of 6 February 2009 and Decree of Akim of Atyrau oblast № 108 as of 7 April 2011 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 Makhambet district and Atyrau city. All private and state land users have their own state acts of land plots possession.

Related links (*web sites*): <http://www.oopt.kz/forest/27/4829/>

Description

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

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

Major habitats & land cover types: Alluvial – delta plain / pastures (regional); coastal ecosystem of river beds and channels with high reed thickets / wetland vegetation on flood-land arc-marshy soils (regional); shallow lagoons with domination of floating reeds and bulrush / wetlands (regional).

Bioclimatic zone (11.5)

Location (latitude & longitude): N 47° 00' E 51° 40', north border - N 47° 10', south - N 46° 40', west - E 51°00' and east - E 52° 15'.

Total Area (ha): 340 846 ha (terrestrial)

Core area(s): (7) 36 077 ha

Buffer zone(s): (7) 104 769 ha

Transition area(s): 200 000 ha

Different existing zonation: (7.4): absent

Altitudinal range (metres above sea level): (11.2) -27 to -20

Zonation map(s): (6.2)

Main objectives of the biosphere reserve

Brief description (13.1)

Approximately 5 lines

The main goal of biosphere reserve is to conserve typical, rare and unique natural complexes in their natural condition with all wholeness of their components, and support of stable social-economic development of the territory on the basis of ecologic-economical principle of natural resources use. Long-term goal of biosphere reserve's management is integrated sus-

tainable management of the territory with simultaneous development of local social-economic potential, leading to increase in local population's standard of living.

Research

Brief description (16.1.1) Approximately 5 lines

The main task of scientific research is natural complexes' condition monitoring and conservation, including further inventarization of fauna and flora. A special attention is drawn to territorial distribution of valuable semi-aquatic mammals and their influence on the conservation of species diversity of biocoenoses, ecologic-morphological characteristic of water reservoirs' ichthyofauna (study of species composition, sexual and age structure of ichthyofauna in rivers and bays of the Caspian Sea).

Research

Monitoring

Brief description (16.1.1)

Approximately 5 lines

In the present time the monitoring of climatic, hydrological changes is carried out by Atyrau department of Kazakhstan Hydro-meteorological Service, and also by scientific subdivisions of Agip KCO oil consortium. The main goal of scientific research in Akzhayik State Nature Reserve is monitoring the condition and conservation of natural complexes, including further inventarization of fauna and flora. Besides, special attention is drawn to territorial distribution of valuable semi-aquatic mammals and their influence on the conservation of species diversity of biocoenoses, ecologic-morphological characteristic of water reservoirs' ichthyofauna (study of species composition, sexual and age structure of ichthyofauna in rivers and bays of the Caspian Sea). 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.

Specific variables (please fill in the table below and tick the relevant parameters)

Abiotic		Biodiversity	
Abiotic factors	X	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	X
Meteorology	X	Coral reefs	
Modeling		Degraded areas	X
Monitoring/methodologies	X	Desertification	
Nutrients		Dune systems	
Physical oceanography		Ecology	X
Pollution, pollutants	X	Ecosystem assessment	X
Siltation/sedimentation	X	Ecosystem functioning/structure	X
Soil	X	Ecotones	X
Speleology		Endemic species	X

Topography	X	Ethology	X
Toxicology	X	Evapotranspiration	
UV radiation		Evolutionary studies/Palaeoecology	
		Fauna	X
		Fires/fire ecology	X
		Fishes	X
		Flora	X
		Forest systems	
		Freshwater systems	X
		Fungi	X
		Genetic resources	X
		Genetically modified organisms	
		Home gardens	
		Indicators	X
		Invertebrates	X
		Island systems/studies	
		Lagoon systems	X
		Lichens	X
		Mammals	X
		Mangrove systems	
		Mediterranean type systems	
		Microorganisms	
		Migrating populations	X
		Modeling	
		Monitoring/methodologies	X
		Mountain and highland systems	
		Natural and other resources	X
		Natural medicinal products	X



		Perturbations and resilience	
		Pests/Diseases	
		Phenology	X
		Phytosociology/Succession	X
		Plankton	X
		Plants	X
		Polar systems	
		Pollination	
		Population genetics/dynamics	X
		Productivity	X
		Rare/Endangered species	X
		Reptiles	X
		Restoration/Rehabilitation	
		Species (re) introduction	
		Species inventorying	
		Sub-tropical and temperate rain-forest systems	
		Taxonomy	X
		Temperate forest systems	
		Temperate grassland systems	
		Tropical dry forest systems	
		Tropical grassland and savannah systems	
		Tropical humid forest systems	
		Tundra systems	
		Vegetation studies	X
		Volcanic/Geothermal systems	
		Wetland systems	X
		Wildlife	X

Socio-economic		Integrated monitoring	
Agriculture/Other production systems	X	Biogeochemical studies	X
Agroforestry		Carrying capacity	
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		Landscape inventorying/monitoring	X
Human health		Management issues	X
Human migration	X	Mapping	X
Hunting	X	Modeling	
Indicators	X	Monitoring/methodologies	X
Indicators of sustainability	X	Planning and zoning measures	X
Indigenous people's issues		Policy issues	
Industry		Remote sensing	X

Livelihood measures	X	Rural systems	X
Livestock and related impacts	X	Sustainable development/use	X
Local participation	X	Transboundary issues/measures	X
Micro-credits		Urban systems	
Mining		Watershed studies/monitoring	
Modeling			
Monitoring/methodologies	X		
Natural hazards			
Non-timber forest products			
Pastoralism	X		
People-Nature relations	X		
Poverty			
Quality economies/marketing			
Recreation	X		
Resource use	X		
Role of women			
Sacred sites			
Small business initiatives			
Social/Socio-economic aspects	X		
Stakeholders' interests	X		
Tourism	X		
Transports			



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