

3. SUSTAINABLE USE OF BIOLOGICAL RESOURCES AND CONSERVATION OF BIOLOGICAL DIVERSITY

3.1 THE CASPIAN SEA STURGEONS - THE NATURAL HERITAGE OF RUSSIA, THE CURRENT STATUS OF THE POPULATION AND RECOMMENDATIONS FOR THEIR CONSERVATION

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Historical review of the state of sturgeons in the Caspian sea including spawning migration is described. Characteristic of existing spawning grounds in Lower Volga area is presented along with the assessment of activities of sturgeon and fish hatcheries. Complex of factors affecting the state of sturgeons in the Caspian is identified with the focus on the impact of oil and gas complex. Measures on preserving natural population of sturgeons in the Caspian sea is proposed.

3.2 WWF-RUSSIA'S STANDING ON CONSERVATION OF RARE STURGEON SPECIES ¹

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The problem of the Caspian basin sturgeon conservation has a pronounced complex character. And although this group of living organisms is not among the priorities for our organization, WWF-Russia monitors their tragic fate and pays to the issue as much attention as it can. So, in 2013, on the initiative of the Fund, liability (including criminal) for trafficking the sturgeon products, besides sterlet, was strengthened. Also, we make attempts to create a market for liable trade in the sturgeon products.

It is obvious for us that the problem of conserving the national pride and a symbol of Russia's fisheries wealth can not be solved without due informing all the market participants. As we have managed to find out, not only buyers but also sellers of the sturgeon products are not always aware of the consequences envisaged by Article 258.1 of the Criminal Code "Illegal production and trafficking of the most valuable species of wild animals and aquatic biological resources listed in the Red Data Book of the Russian Federation and (or) protected by international treaties of the Russian Federation".

Another factor that hinders the implementation of projects on the sturgeon conservation is the lack of established effective mechanisms for interagency cooperation. For example, Rosrybolovstvo (the Federal Agency for Fisheries) is not authorized to regulate trade, and Minpromtorg (the Ministry of Industry and Trade of the Russian Federation) has no motivation to change anything without any special instructions from the directive bodies. We still have a lot to do to improve the regulatory framework.

¹ Based on the presentation at the "Caspian Sea Day" celebration, Astrakhan, 2015

Thus, a number of structural gaps at all levels (from the civil society to the authorities), preventing recovery of the sturgeon fish natural populations, is pinpointed. And this situation is just in one country of the Caspian basin - the Russian Federation. One can imagine, in this case, the prospects of this large-scale task in the context of all five countries of the region!

This is even more incredible, if you listen to the opinion of experts who appeal for staying on the ecosystem approach, i.e. to focus on the conservation and restoration of the whole Caspian Sea ecosystem. Will we be able to restore and, in future, to use renewable biological resources and stabilize the ecosystem of the Caspian Sea and the Caspian Sea ecoregion on the long-term and sustainable basis? Obviously, this is impossible as long as the Caspian states are not able to arrange a coherent and systematic approach to solving this problem. After all, the Caspian Sea is a unified ecosystem which is unaware of any territorial boundaries.

That is why WWF-Russia calls on the governments of the Parties to the Tehran Convention to include the elaboration of a common strategy for sturgeon species conservation in the Caspian Sea basin into their joint work plan. The Fund has already obtained positive experience in this field. In 2005, at the initiative of the Danube-Carpathian program office, WWF developed and launched the Sturgeon Conservation Strategy for the Danube basin. This is an excellent example of consolidation of efforts of scientists, governmental agencies of several countries, non-governmental organizations and the business community. And this experience could be applied to the Caspian Sea coast.

We guess the task to be addressed in the near future in Russia is the development of a national strategy for the conservation of sturgeons in the Russian Federation.

3.3 ON THE NEED FOR JOINT ENVIRONMENTAL RESEARCH TO PRESERVE THE HISTORICALLY ESTABLISHED UNIQUE CASPIAN SEA ECOSYSTEM ²

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In August this year we have marked 10 years since the entry into force of the Framework Convention for the Protection of the Marine Environment of the Caspian Sea (Tehran Convention). This legal document is the basis for solving ecological problems and ensuring the environmental safety in the Caspian Sea littoral states at performing their economic activities, in particular the development of hydrocarbon fields and its transportation. Since the last century oil products have been the main type of pollutants flowing into the aquatic environment, sediments and biota in the Caspian basin. Numerous studies have shown its negative impact, especially in the offshore oil production area.

The importance of the practical realization of this document is determined by a number of significant objective factors, which are specific for the Caspian Sea. These include:

- The unity of the Caspian Sea ecosystem, which is characterized by the physico-chemical fields exchange among different parts of the Sea (heat and salt exchange, transfer of biological components of the marine ecosystem as well as pollutants, etc.);

- The uniqueness of the Sea fauna, the qualitative composition of which is presented by nearly 50% of the Caspian Sea endemic species with 20% of the species found only in the Ponto-Caspian basin;

- The habitat for ancient ichthyofauna species in the water object which has global commercial demand – sturgeon species, and conservation of the fish on the basis of natural reproduction in the larger rivers of the Sea basin and, thus, conservation of the sturgeon species gene pool.

² Based on the presentation at the “Caspian Sea Day” celebration, Astrakhan, 2015

Despite a significant decline in the sturgeon population in the recent period, however, the largest gene pool of these fishes on the planet and their natural spawning in the large rivers of the basin (Volga, Ural, Terek, Kura) have been observed in the Caspian Sea since the early 1990s up to the present day.

An important measure aimed at conserving the sturgeon was a decision to cease the commercial catch of the sturgeons and their partial catching for artificial reproduction of fry fish at fish hatcheries in the region. The decision was adopted by all Caspian states.

The integrity of the Caspian Sea ecosystem, recognized by the littoral countries, determines the need for coordinated and joint action to conserve and restore the marine environment, to implement its monitoring, to carry out researches, etc. According to the Tehran convention (Article 6), planning and implementation of interstate environmental projects can be carried out on a bilateral and multilateral basis in addition to the activity under the national action plans (NCAP).

An important step was the signing by the heads of the Caspian states (Astrakhan, 2014) of the document on setting 24-mile national fishing zones in the Sea aquatoria.

As of top-priority measures, it seems to be necessary to conduct multilateral Caspian Sea monitoring studies to assess the current numbers of transboundary water biological resources (sturgeon, herring, seals), as well as *Mnemiopsis Leidy* population status, the invasion of which has led to the dramatic (quantitative and qualitative) changes in the Caspian Sea ecosystem processes, with the aim of rational use of the commercial aquatic organisms.

In order to develop a program of priority environmental protection measures in the framework of the Tehran Convention and to sum up the first results of its implementation in regard to the current status of the Sea ecosystem, it is expedient to hold in the near future an international scientific/practical conference at which it is necessary to elaborate guidelines for the implementation of priority environmental protection measures for the coming years.

It is also essential within the framework of the Tehran Conference, to update constantly information about ongoing environmental activity in the Caspian states, which will increase the effectiveness of its implementation.

To conclude my brief remarks, I would like to emphasize once again the need to strengthen joint environmental research activity with the aim to conserve the historically unique ecosystem of the Caspian Sea, including the habitats of the aquatic organisms, and to restore the population of the cross-border sturgeons, to exercise joint control over the population of seals. At the same time, we should not be limited to local remote sensing studies, but also conduct comprehensive observations on both the number of the animal and its quality indicators, including age-related structure, sex ratio, female barrenness, which requires field research.

3.4 KYZLIAR BAY – POTENTIAL AREA FOR ESTABLISHING BIOSPHERE RESERVE AND INCLUDING IT IN THE LIST OF WETLANDS UNDER THE RAMSAR CONVENTION

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State natural reserve “Dagestansky”

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The Kyzliar Bay is located in the north-western part of the Caspian Sea between the delta of the Kuma River in the north and the delta of the Terek River in the south. Total area of the Bay with fluxes makes up about 110 thousand ha. In 1987 the site “Kyzliar Bay” with the area of 18485 ha was established there under the State natural reserve “Dagestansky”. From the west and south the reserved territory is surrounded by a protective zone with an area of 19890 ha. At present, the rest of the Bay territory is not under the protection.



Kyzliar bay.

The reserved area and its protective zone cover marine shallow waters and flat coasts of the Kyzliar Bay north-western part. This territory is under constant control of the “Dagestansky” reserve security service. Various forms of patrolling are used at organizing its protection – foot patrols, horse patrols, vehicles and water transport patrols. Since 2012 patrols have been organized with application of small aircraft. Fire prevention measures are being undertaken along with cordons establishing, information panels and boards installing. Measures are taken

to raise environmental awareness of the local population in the Tarumovsky district and to organize mass environmental actions (March of Parks, Ecologist Day, Day of Birds, etc.). Films about the reserve nature are shot along with organization of photo exhibitions, publishing of books, leaflets, posters and calendars, sets of post cards. Guided tours of the Bay have been elaborated in order to promote environmental tourism.

Nest boxes are installed in the protective zone of the natural reserve in order to attract birds of prey. Monitoring of the commercial and rare species of fish populations status, as well as of nesting, migrating and wintering birds is conducted. The biggest colony of Dalmatian Pelican (*Pelecanus crispus*) that has formed here in recent years is under special control of the natural reserve. In 2014 there were 600 nesting pairs. In 2015 works on monitoring population of the Caspian seal (*Pusa caspica*) started in the reserve.

At the same time environmental, educational and research activity of the reserve faces several objective problems addressing of which in the present conditions is possible only via versatile interaction with local authorities, owners of adjacent lands and marine water body, local population and visitors (tourists, fishermen, hunters).

The present boundaries of the Kyzliar site of “Dagestansky” natural reserve are the result of a compromise between “the environment protectors” and “economic subjects”, at that not in favor of the first stakeholders. The natural reserve site does not have terrestrial area, and therefore there is practically no opportunity to provide protection for terrestrial flora and fauna, including a significant amount of rare and endangered species. The reserve site is practically surrounded by fishing or hunting areas. A lot of habitats of rare and endangered species of flora and fauna of the Kyzliar Bay are located directly near the boundaries of the reserve site or outside it.

The natural reserve has practically no levers of direct and indirect influence on owners and users of lands and water bodies outside the protected area.

Earlier, in order to raise landscape-biotope representativeness of the reserve it was more than once proposed to expand the boundaries of the Kyzliar site by including intact semi-desert areas in the lower Kuma River and marine shallow waters of the southwestern part of the Bay up to the mouth of the Srednyaya River and Nordovyi island (Bukreev,

Dzhamirzoev, 2003; Dzhamirzoev, 2004; Dzhamirzoev et al., 2006; Kuniev et al., 2012). However, in the present conditions, practical implementation of such proposals seems to be highly improbable as it requires withdrawal of vast areas and water bodies from agricultural, hunting and fishing use.

Options of attaining the Kyzliar Bay the status of a biosphere reserve and declaring it a wetland to be protected under the Ramsar Convention with subsequent regulation of nature management by introducing management plans and versatile interaction with users of natural resources seem to be more realistic and optimal.



Map-scheme of the planned biosphere reserve the "Kyzliar Bay".

This will significantly improve the reserve capacity for the regulation of economic activities in the Kyzliar Bay and on the shore, for introduction of gentle forms of bioresource use and preservation of traditional natural resources use, introduction of management, for establishment of biosphere polygons and implementation of various environmental and research projects.

Undoubtedly, the international status will allow the reserve to interact more effectively with energy companies on ensuring the safety of projects related to the extraction and transportation of hydrocarbons.

The present paper contains a summary substantiation of the Kyzliar Bay correspondence to all criteria of the UNESCO biosphere reserve and

wetland of international importance to be protected under the Ramsar Convention.

With respect to the criteria for assigning the status of a biosphere reserve to a specific site, the corresponding substantiation is given below.

Criterion 1. It includes the mosaic of ecological systems representing main biogeographical regions, including regions with different degree of anthropogenic impact.

Wetland and arid ecosystems of the Caspian Depression and the Caspian north-western area are fully represented in the Kyzliar Bay and on its coast, including the Nogai steppe. Aquatic ecosystems of the reserved site the “Kyzliar Bay” are under strict protection and are fully withdrawn from economic use. The protective zone of the site “Kyzliar Bay” is protected and partially withdrawn from economic use. Its ecosystems are affected by anthropogenic impacts in varying degree, partially transformed, but they mostly preserve their natural character and biological and landscape diversity. Most of the Kyzliar Bay area and its coast are not protected and subject to anthropogenic impact in varying degree.

Criterion 2. It is important for the biological diversity conservation.

In the Kyzliar Bay and on its coast there are more than 250 species of higher vascular plants. This area is inhabited by 46 species of mammals, more than 250 species of birds, 13 species of reptiles, 3 species of amphibians, 1 species of cyclostomes and 66 species and subspecies of fish. More than 80 species of plants and animals found on this territory are listed in the Red Data Books of Dagestan and Russia. The planned reserve ensures the existence and successful reproduction of many species of freshwater and marine fish populations having great importance for maintaining the Caspian Sea biodiversity, including rare and endangered species. The reserve plays an important role in the reproduction and maintenance of the wetland birds number in populations (pelicans, cormorants, herons, swans, geese, river and diving ducks, gulls, terns, sandpipers, water rails, etc.), whose well-being is crucial for maintaining biological diversity of birds in the Northern Eurasia. The reserve covers two key ornithological territories of international importance: the “Kyzliar Bay” and the “Lower Kuma Flooding Areas”. It also embraces territories where pasture breeding - traditional and unique nature management – is in

practice (Dzhamirzoev, Bukreev, 2006; Dzhamirzoev et al., 2006; Dzhamirzoev, Bukreev, 2009; Barkhalov et al., 2012).

Criterion 3. It gives an opportunity to study and demonstrate approaches to sustainable development on a regional scale.

The Kyzliar Bay is the most important source of water resources and supplier of fish products for the Republic of Dagestan. Well-being and sustainable development of fisheries sector in the region depend largely upon the activity of the reserve. Activities of the reserve administration will be aimed at both protecting aquatic and terrestrial bioresources and at maintaining traditional and introduction of new, environmentally adjusted technologies in the sphere of fishing and grazing stockbreeding. The future reserve territory has high but insufficiently used potential to develop the ecological and educational tourism, recreation and amateur fishing.

Criterion 4. It has an appropriate area for the execution of three functions of a biosphere reserve.

Total area of the proposed SPNA will make almost 300 thousand ha, which will allow ensuring full-scale implementation of all three functions of the biosphere reserve in future. The lands and water bodies included in the reserve have sufficient area to ensure the conservation of the biological and landscape diversity. They are capable to contribute to the sustainable socio-economic development of the region and are optimal for implementing various scientific-practical and environmental education projects for the rational use of natural resources and the environment protection.

Criterion 5. It has relevant zoning of the territory.

Main zone. Its function will be fulfilled by the reserve site the “Kyzliar Bay”. In the main zone only scientific research and activity connected with the protection and environmental monitoring is allowed. The area of the main zone will make up 18 485 ha.

Buffer zone. It will consist of an extended protective zone of the reserve site that will be enlarged in such a way as to surround the main zone from all sides, as well as of the biosphere polygon on the Isle of Tyuleni and adjacent water area. In this case the buffer zone total area can be up to 55 000 ha. In the buffer zone, along with the protection function, the following activity compatible with the biodiversity conservation is carried out: monitoring of populations of rare and endangered species;

improvement of habitat conditions for rare and valuable species of animal; implementation of scientific research, organization of ecological tourism, limited traditional nature use.

Zone of cooperation. It covers the territory of the whole Kyzliar Bay with the Caspian Sea aquatoria which is adjacent to it in the east, water bodies of the lower Kuma River and semi-deserts of the Nogai steppe on the western coast. Its total area makes up about 227 thousand ha.

Within the cooperation zone of the biosphere reserve a wide spectrum of economic, nature protection, research and educational activities is implemented (monitoring of ecosystems and their components, commercial and amateur fishing, mowing, traditional and regulated grazing, limited time amateur hunting, various types of touristic and recreation activities).

Criterion 6. Organizational measures should be taken for the involvement and participation of, among others, the government authorities, local population and private sector in the planning and executing functions of a biosphere reserve.

In order to involve the public and local authorities in the processes of decision-making and general coordinating nature protection, scientific, environmental education and economic activities of the biosphere reserve, it is planned to establish a public council. Moreover, the scientific-technical council of the “Dagestansky” reserve will take over the functions of a consultative and coordinating body at strategic planning of the key activity areas in regard to the future biosphere reserve. Competent Russian and foreign environmental organizations (World Wildlife Fund, Union of Bird Protection of Russia, etc.), research and educational institutions of the region will be involved in this work.

In regard to the criteria for identifying Wetlands of International Importance adopted by the Conference of the Parties to the Ramsar Convention the substantiation is as follows.

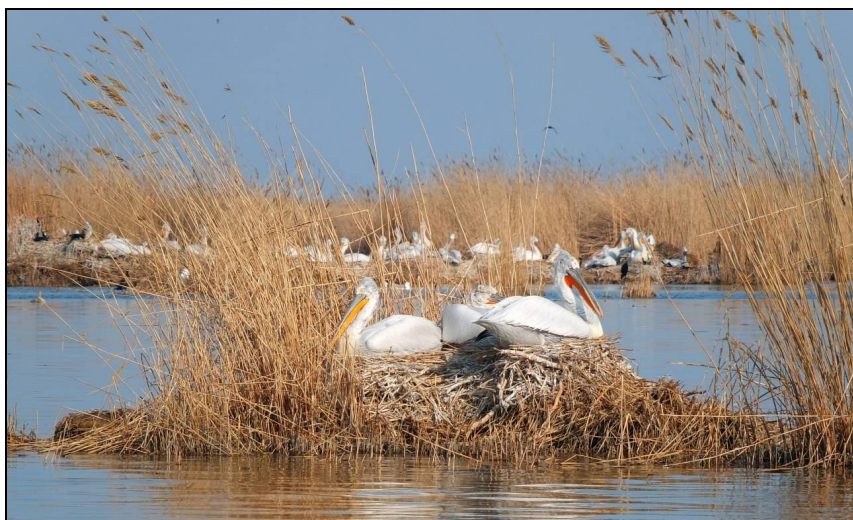
Criterion 1. It contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.

The Kyzliar Bay is an example of a representative type of ecosystems of desalinated marine bays and river mouths of arid zone in the Northern Palearctic. Its coast is in close to natural status, and the

flooded areas and the Caspian Sea aquatoria within the Bay are mostly in their natural state.

Criterion 2. It supports existence of vulnerable and endangered species or communities.

9 species of plants and 58 species of vertebrae included into the Red Data Books of Russia and Degestan can be found in the Kyzliar Bay and on its shores. According to the IUCN data, 18 species of them are globally endangered (CE – critically endangered), endangered (EN – endangered) or vulnerable (VU – vulnerable): beluga (*Huso huso*), Russian sturgeon (*Acipenser gueldenstaedtii*), Persian sturgeon (*Acipenser persicus*), pike (*Acipenser nudiventris*), starlet (*Acipenser ruthenus*), stellate (*Acipenser stellatus*), the Volga herring (*Alosa volgensis*), Dalmatian Pelican (*Pelecanus crispus*), white-headed duck (*Oxyura leucocephala*), the lesser white-fronted goose (*Anser erythropus*), Siberian crane (*Grus leucogeranus*), sociable lapwing (*Vanellus gregarius*), Sacer falcon (*Falco cherrug*), steppe eagle (*Aquila clanga*), Imperial eagle (*Aquila heliaca*), marbled polecat (*Vormela peregusna*), European mink (*Mustela lutreola*), Caspian seal (*Pusa caspica*) (Dzhamirzoev et al., 2013).



Colony of Dalmatian Pelicans.

Criterion 3. It ensures existence of populations of plants and animals important for maintaining biological diversity of a particular biogeographical region.

In the Kyzliar Bay and on its shores there are more than 250 species of higher vascular plants, 46 species of mammals, 13 species of reptiles, 3 species of amphibians, 1 species of cyclostomes and 66 species and subspecies of fish. The Bay and its coast play a very important role in reproducing and maintaining populations level of no less than 26 species of wetland birds of the Tersko-Kuma lowland and of more than 40 species of fish of the Northern Caspian. The well-being of these populations is of great importance for maintaining biological diversity of the natural region of the Volga-Terek Pre-Caspian lowland.

Criterion 4. It is the habitat of plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.

The Kyzliar Bay and its coast are areas that provide favorable conditions for the reproduction of more than 160 species of vertebrae. As a place of mass assemblage under adverse conditions, the Kyzliar Bay is of special importance for great cormorant (*Phalacrocorax carbo*), Dalmatian pelican, mute swan (*Cygnus olor*), whooping swan (*Cygnus cygnus*), gray goose (*Anser anser*), lesser white-fronted goose, mallard (*Anas platyrhynchos*), red-crested pochard (*Netta rufina*), white-tailed eagle (*Haliaeetus albicilla*), coot (*Fulica atra*), white-winged tern (*Chlidonias leucopterus*), little stint (*Calidris minuta*), dunlin (*Calidris alpina*), ruff (*Philomachus pugnax*) and many other species of waterfowl and wetland birds.

Criterion 5. It regularly supports 20000 or more wetland birds.

No less than 20000 waterfowl and wetland birds breed regularly in the Kyzliar Bay during the nesting period. In the periods of migration their number exceeds hundreds of thousand individuals. The threshold of 20000 individuals can be exceeded even by some migrating species of wetland birds (red-crested pochard, white-winged tern, etc.).

Criterion 6. It regularly supports 1% of individuals in a population of one species or sub-species of waterbird.

The Kizlyar Bay supports nesting and migrations of at least 1% of individuals of the following large geographic populations: Dalmatian Pelican, great white heron (*Egretta Alba*), purple heron (*Ardea purpurea*), lesser white-fronted goose, grey goose, white-eyed pochard (*Aythya nyroca*) and other wetland birds.

Criterion 7. It supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values.

The Kyzliar Bay provides for existence of no less than 100 endemic Caspian species and sub-species of animals, including 4 endemic genus and more than 20 species and sub-species of fish: Caspian lamprey (*Caspiomyzon wagneri*), Persian sturgeon, Caspian shad (*Alosa caspia*), bigeye shad (*Alosa saposhnikovii*), Caspian migratory herring (*Alosa kessleri kessleri*), the Volga shad (*Alosa kessleri volgensis*), Brashnikovi herring (*Alosa brashnikovi brashnikovi*), Caspian sprat (*Clupeonella cultriventris caspia*), Caspian round gobi (*Neogobius melanoctomus*), Caspian big gobi (*Neogobius iljini*), Caspian starry gobi (*Benthophilus macrocephalus*), Caspian barbel (*Barbus brachycephalus caspius*), Caspian brown trout (*Salmo trutta caspius*), inconnu (*Stenodus leucichtys*), roach (*Rutilus rutilus caspicus*), Black sea roach (*Rutilus frisii kutum*), Caucasian bullhead (*Sabanejewia caucasica*) and others.

Criterion 8. It is an important source of food for fishes, spawning ground, nursery and/or migration path.

The Kyzliar Bay is a highly important fishing region of the Dagestan coast of the Caspian Sea. The bigger part of catches is represented by freshwater species – sazan (*Cyprinus carpio*), bream (*Abramis brama*), pike (*Esox lucius*), pike perch (*Stizostedion lucioperca*), roach (*Rutilus rutilus*), catfish (*Silurus glanis*), asp (*Aspius aspius*), rudd (*Scardinius erythrophthalmus*), perch (*Perca fluviatilis*), tench (*Tinca tinca*) and carps (*Carassius* sp.). The Bay is a unique water body for spawning, fattening and wintering for many species of fish. It is of great importance for maintaining populations and genetic diversity of ichthyofauna of the Caspian basin. Here are the most important migration routes of adult individuals and juveniles of many fish species. Brood stocks are adapted here for transition from marine to fresh water, while young fishes from desalinated waters fatten here to a viable status in order to be prepared gradually for the marine environment (Столяров, 1999; Бархалов и др., 2012).

Thus, the Kyzliar Bay with the adjacent territories and water areas fully meet the UNESCO biosphere reserves criteria. In case of relevant zoning and management, the Bay, the Caspian Sea aquatoria with islands

Nordovyi and Tyuleni, which are adjacent to it from the East, as well as water bodies of the lower Kuma River and semi-deserts of Nogai steppe bordering the Bay from the West, can become models of sustainable development and rational nature management.

The Kyzliar Bay may also be included in the List of Wetlands of International Importance as it meets all criteria adopted at the 7-th Conference of the Parties to the Ramsar convention.

The State natural reserve “Dagestansky” should play the key role in the strategic planning and management of the future biosphere reserve and a Ramsar site, as well as in the organization of the protection, monitoring and rational use of the biological resources of the Kyzliar Bay.

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3.5 ECONOMIC APPRAISAL OF ECOSYSTEM SERVICES OF HAZAR STATE NATURE RESERVE

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In traditional understanding, preservation of the natural ecosystems, landscapes and biodiversity is presented important only from the viewpoint of support of integrity and their existence. It particularly belongs to the specially protected natural territories (SPNT), limitedness of access to which makes it practically impossible to get some economic welfare and benefits from their vital activity.

Attitude to nature as to source of getting economic benefit and life support of the society began to be formed in the 70-ies of XX century. While speaking about quantitative aspects of the ecological problems, John P. Holdren (California) stressed that creation of alternatives to welfare, provided by nature, often is expensive (up to inexpediency) action of human being (Holzman, 2012). In the end of the 90-ies of XX century, the scientists headed by Professor of Portland University Robert Costanza calculated that the cost of the so-called “ecological services” in the world can make up to 54 trillion USA dollars per year (Costanza et al., 1987). It exceeds by several times the yearly production of gross product by all countries of the world. At present, mechanisms of assessment of natural resources and services with purpose of their stable and long-term consumption. Besides, many global agreements, for example, Convention on Biodiversity, provides as a demand the inclusion of assessment of natural services in process of adoption solutions by governments of the countries of its participants.

The services of the ecosystems can be defined as “benefit, which human being takes from nature” (Convention on Biological Diversity, 1992). They can be direct, i.e. directly used by people (food stuff, water, grasslands, wood and so on) and non-obvious character (pollination by wild bees, cleaning of sewage in water-marshy lands, protection from floods, landslides, natural calamities and so on). The latter are very important, but difficulty of their reveal and economic assessment makes it impossible to include them into process of making administrative decisions, which can lead to the loss of these services and heavy expenses to their restoration or search of alternative. It concerns, for example, cultural values (monuments of nature), SPNT or animals, the presence of which often is not taken into account in decision-making.

The dependence of economy of the country from agricultural sector and, consequently, from services, rendered by nature is decreased in Turkmenistan with development of industry and sphere of service. Therefore, they play a great role in life support of the people, particularly; it relates agriculture, forestry and healthcare. In Turkmenistan, first of all, it is connected with traditional concentration of population in rural area, vulnerability of arid ecosystems to man impact, climate fluctuation as well as strong dependence on existence of transboundary water and other resources, the volume of which is limited in the country. All this makes

extremely important the understanding of mechanism of stable use of services, provided by nature.

The Hazar State Nature Reserve is one of the oldest ornithological nature protection territories. It was founded with purpose preservation of the unique wintering and habitation places of birds in the South-East coast of the Caspian Sea. Taking area in 267960,58 hectares, reserve has two main protected territories and wildlife preserve. The fauna of the reserve is presented by about 300 species of birds, 46 species of mammals and 39 species of reptiles. The importance of the reserve areas is confirmed by Ramsar Convention of 1971, according to which Turkmenbashi Bay is entered into the List of water-mushy lands of international significance and is nominated to getting status of the Key ornithological territory. The main area of the reserve is the protected zone, but some territories of the



Hazar part are used by residents of the neighbouring townships for fishing.

In the framework of the realization of the joint project of UNDP Regional Office, Ministry of Nature Protection of

Turkmenistan and the Royal Society of Birds Protection (the Great Britain), the purpose of which is improvement of the activity of the system of nature protection territories in Turkmenistan on the example of the Hazar Reserve in 2009-2010 years, the economic assessment of the ecosystem services of SPNT and their participation in social-economic development of the country. These data is necessary for working out the financial strategy of the activity of the nature protection territories.

The methods of the quick assessment of the services of the reserve ecosystems took into account the approaches, elaborated by the Institute of European Ecological Policy for nature protection territories of Europe: defining and ranking of main services; ascertainment of their economic value; interpretation of the results (Kettunen et al., 2010).

The main services of the ecosystems of the Hazar Reserve are existence of habitation places of birds and fish and their resources as an object of food of the local population, use of animal fat as medicine, regulation of climate, and aesthetic significance. The potential services of the ecosystems, not studied up to the period of researches were revealed by means of analysis: tourist (excursion) activity – familiarization with landscapes, places of birds' gathering; regulation of climate in form of trapping and keeping of carbon; cleaning of sewage.



Services of the ecosystems of the Hazar State Reserve.

The economic assessment of the natural services was carried out according to the famous methods with involvement of date of their market cost, expenses for definite activity, and readiness of the population to pay for life support of the reserve. There, where it is impossible to assess services, the indices of stable use were taken.

The results of assessment of natural services of the Hazar reserve show that the total value of the reserve territories makes up about 23,6 million manats (8.3 million USA dollars) per year. The main services of the reserve are “rendering” of habitation places for migratory and wintering species of birds, places of fattening of the Caspian fine-mesh species of fish. The value of the latter is estimated in more than 20 million manats per year (84% from total value). Opportunity of getting of food stuff with taking into account of the market cost of the caught fish

and bird, got in unregulated hunting, is the second one by its value. The total value of the used natural resources makes up more than 1,27 million manats (about 450 USA dollars) per year. About 13 thousand manats fall on the potential and firm (1 t per year) catch of crawfish in the region of the Turkmenbashi Bay. Besides, biological resources are used as raw stuff for getting medicines – it is fat of seal, some species of birds and fish. Their market cost makes up about 61,8 thousand manats (about 22 thousand USA dollars) per year.

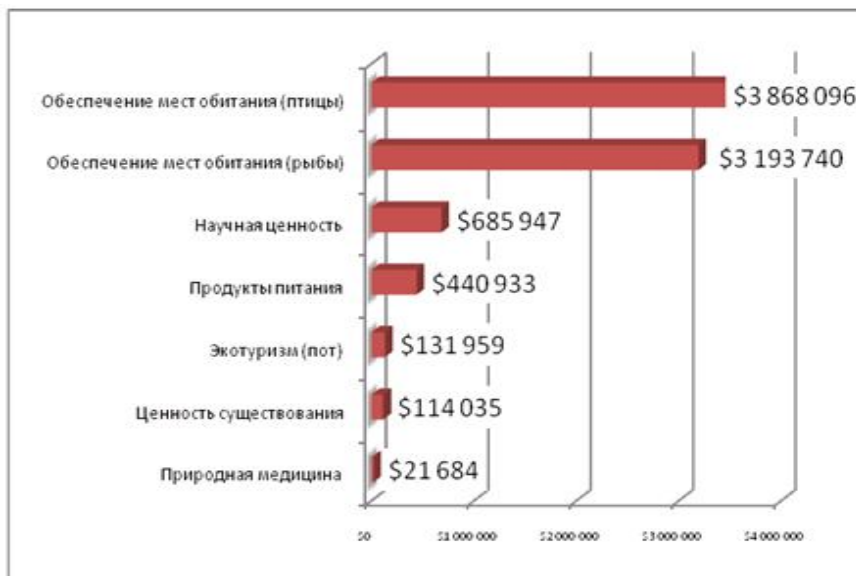


The reserve is a bearer of the scientific value, acknowledges by the world community as well but not in whole volume at the national level. As of the period of carrying out researches it made up more than

680 thousand USA dollars. This sum of the investments is the grants and other financial funds, directed to the preservation of biodiversity and carrying out research investigations, got mainly from foreign sources.

The value of the reserve as an object of tourism is defined by determination of expenses of the potential tourists for visit of its territory. As of the 2010, it made up about 376 thousand manats (131 thousand USA dollars). Tourism is the potential (in aspect of organization and carrying out of the activities of the educational character) and additional source of incomes of the reserve.

The assessment of the life activity of the reserve is expressed by sum of money, which residents of Turkmenbashi city are ready to pay. This sum was calculated in accordance with data of the residents' poll, i.e. on the basis of "the declared preference" and it made up 325 thousand manats per year.



Value of services of the ecosystems of the Hazar State Nature Reserve, USA dollars per year. ¶

The economic assessment of the life activity of the reserve testifies its international significance as a place of habitation of the migratory and wintering birds, the main nesting places of which are located in the European North, including Russia and Kazakhstan. The places of fattening fine-mesh fish, being the object of catch in the whole coast zone of the Caspian Sea present the important value, i.e. the local communities and residents of littoral zone of all Caspian countries are the users and receivers of the benefits.

Approach to the assessment of the natural services supposes the use of results of their complex analysis, revealing the significance and making decisions, aimed at preservation and stable use of the most important of them. Assessment of services of nature protection territories of Turkmenistan will promote improvement of information awareness of the population and all interested parties about importance of activity of the reserves for economic development of the country. It also will help to define main receivers of benefits and work out innovation mechanisms of nature protection territories of new type, creation of which is provided by Turkmenistan Law “On Specially Protected Natural Territories”.

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3.6 ECOLOGICAL MONITORING OF THE CASPIAN SEAL POPULATION IN THE MODERN PERIOD

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Population the Caspian seal as of 2015 was estimated on the basis of annual research of CaspNIRH performed during feeing an pre-winter periods, including main regions of its areal in the Caspian sea. Population of Caspian seal was estimated at 263 thousand seals. The given level of population reflects the lower border of fluctuations of population of the Caspian seal.

The conclusion was made that in order to identify the upper border of total population additional research related to studying qualitative structure of summer island rookeries in the main areas of fattening. Contemporary environmental monitoring of the Caspian seal envisages adoption of relevant national research programmes.

3.7 THE VALUE OF THE ISLAND TYULENY FOR THE CONSERVATION OF BIOLOGICAL AND LANDSCAPE DIVERSITY OF THE NORTHERN CASPIAN SEA AND THE PROSPECT OF ITS TERRITORIAL PROTECTION

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Basing on consideration of specific features of nature and history of formation, as well as ecological importance the necessity of giving the status of specially protected natural area to Tulenyi island is presented along with substantiation of consideration of options for giving the above island the legal status of specially protected natural area of federal and regional importance. Options for drawing boundaries of such specially protected natural area on Tulenyi island and adjacent water body of the Caspian sea is proposed.