

## The contemporary condition of specially protected natural reservations in Aktobe Region of the republic of Kazakhstan

Asyma Galimzhankyzy Koshim<sup>1</sup>, Aigul Maksatovna Sergeyeva<sup>2</sup>, Akzhunus Gafurovna Abdullina<sup>2</sup>, Miras Amangeldievich Galimov<sup>3</sup>

<sup>1</sup>Al-Farabi Kazakh National University, Al-Farabi Avenue, 71, Almaty, 050040, Republic of Kazakhstan

<sup>2</sup>K. Zhubanov Aktobe Regional State University, Moldagulova Ave, 34, Aktobe, 030000, Republic of Kazakhstan

<sup>3</sup>Makhambet Utemisov West Kazakhstan State University, Dostyk street, 162, Uralsk, 090000, Republic of Kazakhstan

**Abstract.** Over the long history of mankind there is an increase of anthropogenic load on natural systems. This load transforms the environment to a greater or lesser extent. In compliance with the law, the main question concerning specially protected natural reservations is to preserve the biodiversity through the conservation of natural habitats. In this regard, the protected areas interconnected by ecological and migration corridors form regional and global networks. These networks are the principal tool for preserving and restoring biodiversity. All types of landscapes within the boundaries of the area have the same scientific and practical conservation value. The article contains the characteristic of landscapes according to their prevalence in the area. This was done for easier analysis of contemporary condition and the validity of the proposals for the structure of specially protected natural reservations of Aktobe Region.

[Koshim A. G., Sergeyeva A.M., Abdullina A.G., Galimov M.A. **The contemporary condition of specially protected natural reservations in Aktobe Region of the republic of Kazakhstan.** *Life Sci J* 2014;11(5s):285-288] (ISSN:1097-8135). <http://www.lifesciencesite.com>. 56

**Keywords:** specially protected natural reservations, natural reserve, zonal landscape, environmental framework, azonal landscape, intrazonal landscape, conservation of biodiversity.

### Introduction

The program for the development of specially protected natural reservations (SPNR) was implemented in the Republic of Kazakhstan. The practice has shown that there is the need to create local programs in each region. They will be funded from local budgets and make it possible to reserve promptly the lands which are the most valuable from the ecological point of view. Thus they will promote the expansion of the network of protected reservations in the Republic [1].

While developing the layout of specially protected natural reservations of Aktobe Region, the authors were guided by the following principles:

1. The most complete geographical representation of environmental conditions in the project network of specially protected natural reservations in Aktobe Region. The main types of zonal, azonal and intrazonal landscapes which need to be protected and restored are situated within the basic area of biodiversity conservation;

2. The proposed structure of SPNR takes into account how much the territory is mastered and the long-term plan of economic development in the Region and in the Republic. The Region specializes in agricultural industry and mining. As a result, the territorial influence on the environment manifests itself as pollution by heavy metals, oil products and

farming waste. Southern areas of the Region belong to the Aral Sea Basin due to their groundwater and surface run-off, hydrogeological and geochemical characteristics. Dehydration and desertification, caused by the shrinking of the Aral Sea, make the southern areas experience stress. They have the status of ecological disaster areas.

3. Taking into account possible contradiction between SPNR and the interests of local communities which are using these areas for farming now. The experience of the Irgiz-Turgay State Natural Reserve has shown that population becomes an active participant in the conservation of biological diversity of their territories when they see the real economic result of creating SPNR.

### Methods and materials

Comparative geography and evaluation methods were used in the work. In 2007-2011, the authors carried out a field research in the Irgiz-Turgay State Natural Reserve and a stability analysis of natural complexes in Aktobe Region using the ecological profiling. Besides, they used reference sources on specially protected natural reservations of Kazakhstan and the world, materials on UNESCO World Heritage Sites, the summary papers of M.K. Nazarchuk, A.A. Chibilyov, N.F. Reymers, S.J. Andelman and other materials from collections of the

Department of Natural Resources and Environmental Control and the Tobol-Torgai Environment Department of Aktobe Region.

### Main part

Zonal landscapes are the basis of farming industry and the very existence of the major part of the Region's population. The basic gene pool of Region's flora and fauna remains within zonal landscapes [2]. Consequently, the separation and protection of zonal landscapes in SPNR will make it possible to preserve and restore biological diversity at least fragmentarily. Besides, it will ensure the sustainable development of the Region. There are 6 types of zonal landscapes in Aktobe Region:

1. landscapes of arid steppes on denudation plains with hills, ridges and small knolls;
2. landscapes of moderately dry steppes mainly on bedded plains;
3. landscapes of dry steppes on ancient lacustrine, lacustrine-alluvial and bedded plains;
4. landscapes of desert steppes in the northern part, mainly on bedded plains;
5. landscapes of steppe deserts on ancient alluvial and lacustrine-alluvial plains;
6. landscapes of deserts on structural inclined plateaus.

The plain character of relief in Aktobe Region determined almost subaltitudinal position of zonal landscapes with significant displacement of boundaries to the south in the center. This displacement was caused by the azonal influence of the Southern Ural mountain range and its continuation – the low-mountain range of the Mugodzhar Hills.

*Azonal landscapes* within the borders of the Region are formed under the predominant influence of lithological, geomorphological and hydrological factors. Against the background of zonal landscapes, azonal ones are notable for unusual look of their relief and vegetation. The most common of them are the massifs of relict eolian fixed, semi-fixed and non-fixed sand which occupy huge areas. Strongly eroded and dissected outcrops on the slopes of many-colored sedimentary rocks are less common. The low-mountain massif of Mugodzhar – the continuation of the Southern Urals – is a major element in the landscape structure of the Region. It promotes the displacement of latitudinal zonality – the steppe types penetrate much further south and border the zone of steppe deserts. Azonal landscapes often have a higher biological productivity. That is why they are widely used in agricultural production and attract the attention of tourists. However biological productivity is much lower in places where saline clay sedimentary strata crop out in the form of eroded

slopes, but they are very attractive for tourists. Azonal landscapes require significant protection because of their rarity and wide use [3].

*Intrazonal landscapes* in Aktobe Region include river valleys crossing several natural areas. Considerable year-round humidification forms a special climate in river valleys and favours the significant growth of the biological productivity of plants. As a result, the biological diversity of flora and fauna also increase. River valley is the place where species of plants and animals from neighbouring zones coexist peacefully and where the migration occurs. The azonal landscapes of river valleys experience maximum anthropogenic load from all kinds of economic and recreational activity. Thus they are in the stage of degradation. In spring, water fills all the hollows of bayou lakes and sors in river valleys and meadow herbs start growing rapidly. This creates the food supply for millions of birds migrating from hibernating areas to the north. All predators – eagles, kites, wolves and foxes – are connected to the resting places of numerous flocks of birds [4].

The biocoenoses with unique diversity extend through all landscape zones enriching them with representatives from other zones and broadening the natural habitats of plants and animals. The landscapes of large sor hollows jointing together in chains for hundreds of kilometers are interesting from the point of view of preserving the biodiversity. These are relict landscapes survived from the time when the humidity was higher and the flow ran here to the basins of the Aral Sea and the Caspian Sea. The migration routes of birds and partly saiga are connected to these sor hollows [5].

The places, where zonal, azonal and intrazonal landscapes intersect and where birds and saiga migrate, form the centers of biological diversity which play an important role in preserving the gene pool of the Region and in landscape diversity.

In the practice of environmental design, they use a synonym for the notion of biodiversity preserving center – “the kernel of environmental framework”. This fact emphasizes the importance of this kind of areas in nature conservation practice. The kernel of environmental framework is a combination of valuable areas which was created by nature under the influence of various factors. On the strength of indisputable value of environmental framework kernels, it is necessary to create specially protected natural reservations just within their boundaries [6].

The territory of Aktobe Region contains several kernels of that kind. They are the basis for future environmental network. The proposed structure of environmental framework kernels extends from north to south and from west to east. It

includes all landscape zones except absolute desert. This will make it possible to conserve species and provide their safe migration in all directions.

*The northernmost kernel* of environmental framework is the combination of already existing objects of natural preservation stock (geological, geomorphological, water and wildlife objects), the Kargaly Reservoir, zonal landscapes of arid and moderately dry steppes, intrazonal valley landscapes of river Jayik and its tributaries – Ebita and Ylek (with large tributary Zhaksy-Kargaly). Birds migrate through the river valleys this region from the southwest to the northeast. The natural combination of landscapes with different environmental functions formed a kernel. In case if a protected area is created here we can get the maximum result in preserving the biodiversity of the northern part of Aktobe Region [7].

*The second kernel* of environmental framework is made by nature in the western part of the Region. It is based on the combination of such zonal landscapes as dry and desert steppes intersected by the intrazonal valley landscapes of river Oyyl and the azonal landscapes of sand massif Barkyn. The migration route of birds from North African, Southern European and Near Eastern wintering places runs through all the mentioned landscapes, along river valleys, bayou and floodplain lakes. Today this area experiences less stress as compared with the north of the Region. This ensured good preservation of valley landscapes in the whole Oyyl basin and beautiful woodland in the sands of Barkyn. This kernel of environmental framework formed by nature should be taken into account in the layout of SPNR in the Region.

*The third environmental kernel* is the biggest in terms of size and the diversity of landscapes. It is situated in the center of the Region. It is based on the largest complex of azonal landscapes – the low-mountain range of the Mugodzhar Hills. To the west of the Mugodzhar Hills there is a confluence of two rivers – Jem and Temir – with two sand massifs – Kokzhide and Kumzhargan. This is a unique combination of azonal and intrazonal landscapes. The low-mountain chain stretched from north to south includes various combinations of zonal landscapes – in foothills and watersheds – and azonal landscapes – on slopes with different exposure and in river valleys. It is a broad spectrum of ecotopes for many birds and animals. The intrazonal landscapes of river valleys cover the whole rock massif. They greatly increase the natural diversity and value of the area. Along the western slopes, there are the origins of river Or', which flows north, and river Jem, which flows south-west. Numerous tributaries of river Yrgyz run down the eastern slope [8].

Many springs and shallow lakes – salt and fresh – make for two migration routes of birds from Southern European, North African and Near Eastern wintering places along the whole mountain range and river valleys. These routes run from the Mugodzhar Hills to south-west where rivers Jem and Temir interflow. Here there are the azonal landscapes of relict sand massifs Kumzhargan and Kokzhide divided by the intrazonal landscapes of rivers Jem and Temir and surrounded by the zonal landscapes of desert steppe. All the mentioned landscapes form the natural basis for ecological corridor for migratory birds and create the wealth of biotopes. This determines the diversity of flora and fauna in the Region. In the sedimentary strata of sand massifs Kokzhide and Kumzhargan, there are large deposits of fresh and ground waters which are of great value for water supply. This water is used in residential houses and oil-production enterprises. The area experiences the strongest anthropogenic load under the influence of production and distribution of oil and construction materials, field development, growth of settlements, overgrazing and fires [9].

*The fourth environmental kernel* as a basis for future environmental network is situated within the boundaries desert steppe zonal landscapes. It already exists on the basis of two SPNR. These are the Irgiz-Turgay State Natural Reserve which consists of two sections and the Tugray State Natural Preserve lying between them. The intrazonal landscapes in the valleys of rivers Yrgyz, Torgay and Ol'keyek with many relict bayou and floodplain lakes, sors and water meadows form the food supply for the migration routes (ecological corridors) of birds from Indian, Pakistani and North African wintering places [10].

## Conclusion

So, the territories for target protection are various areas valuable from the point of view of conserving certain components of natural environment – unique forms of relief, azonal and intrazonal landscapes, plants and animals.

1) This category includes practically all large sand massifs of the Region because they are the relicts of previous historical epochs. Besides, they have various biotopes based on the combinations of zonal and azonal landscapes. For example, sand massifs Malye Barsuki, Bolshye Barsuki, Akkumsagyz, the chalk residual elevation Shirkala and the range Aktolagay deserve to be protected for the conservation of unique biotopes and their plants and animals. Against the background of shrinkage and desertification in the disaster area of the Aral Sea, these territories are the ground for demonstrating

contemporary relief-making processes and their anthropogenic modifications.

2) The migration corridors in Aktobe Region are the natural complexes which promote the ecological connection between kernels and territories and the seasonal migration of certain species of birds and animals due to their characteristics – relief, microclimate, rich vegetation and large territories with river valleys, mountain ranges, ancient hollows of flow occupied by sors, shrinking lakes, etc.

3) In the Region, there are the main and secondary migration routes of waterfowl from North African, Near Eastern, Caspian, Pakistani and Indian wintering places. In the south and south-west of the Region there are the main directions of the spring-summer and autumn-winter migration of the Ustyurt population of saiga and the places of summering and wintering. In the east and north-east of the Region there are the main spring-summer migration directions for the Betpak-Dala population of saiga and the places for summering and wintering.

“The Layout for Specially Protected Natural Reservations” adopted in Aktobe Region is based on really existing environmental framework and the socio-economic characteristics of the area. The ecological network of specially protected natural reservations (SPNR) will develop step-by-step during several years.

#### Acknowledgements

The author thank Ph.D. Professor M.K. Nazarchuk for high professionalism and his attention to the partners ensuring mutually beneficial cooperation.

#### Corresponding Author:

Dr. Koshim Asyma Galimzhankyzy, Al-Farabi Kazakh National University, Al-Farabi Avenue, 71, Almaty, 050040, Republic of Kazakhstan.

3/25/2014

#### References

1. Andelman, S.J., I. Ball, F. Davis and D. Stoms. 1999. Sites v. 1.0: An Analytical Toolbox for Designing Ecoregional Conservation Portfolios. The Nature Conservancy, Arlington, VA.
2. Arcese, P. and Sinclair A.R. E., 1997. The role of protected areas as ecological baselines. *The Journal of Wildlife Management*, 61, 587-602.
3. Nazarchuk, M.K., 2001. The Prospects for Ecological Tourism in Kazakhstan. Almaty: “Ecoproject”, pp: 80.
4. Report on environmental zoning in Aktobe Region and its constituent ecological and geographical areas, 2004. Aktobe: “AktobNIGRI”.
5. Mirkhashimov I.H., V.N. Kraynuk and K.Z. Ustemirov, 2005. Proposals for the development program of specially protected natural reservations in the Republic of Kazakhstan for 2005-2011. Almaty, pp: 53.
6. Rustamov, A. and E. Rustamov, 2007. Biodiversity conservation in Central Asia: on the example of Turkmenistan. Japan, Nagao Natural Environmental Foundation, pp: 204.
7. The Layout and Development Scheme for Specially Protected Natural Reservations in Aktobe Region (the 1st stage). Explanatory Note, 2006. Almaty: “Ecoproject”, pp: 173.
8. The Layout and Development Scheme for Specially Protected Natural Reservations in Aktobe Region (the 2nd stage). Explanatory Note, 2007. Almaty: “Ecoproject”, pp: 80.
9. Hansen, A. J. and R. DeFries, 2007. Ecological mechanisms linking protected areas to surrounding lands. *Ecological Applications* 17, 974-988.
10. Chibilyov, A. A., S.V. Bogdanov and M.N. Sdykov, 2011. The phenomenon of the historical-geographical continuity of nomadic empires in Eurasian steppes. *Geography. Environment. Sustainability. Issue 2 (T. 4)*, pp: 72-84.