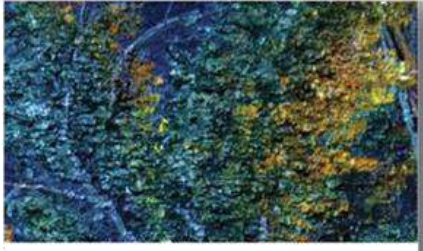

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CONTENT

Natural-resource potential of national natural parks of southeastern Kazakhstan for the development of ecological tourism

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Eco-tourism is one of the developing sectors of the tourism industry, which is based on respect for nature, the preservation of unique landscapes, biological diversity. International experience shows that the dynamic development of ecotourism takes place in specially protected areas. National parks of Kazakhstan are the most suitable for the development of ecological tourism. A network of 7parks of the desert zone as a whole located in the mountainous regions of the southeast of Kazakhstan was studied. They were created in middle and high mountain regions with a defined altitudinal zonation, which includes the steppe, forest, xerophytic-meadow, nival-subnival zones. In these parks natural monuments of national importance are located. In addition, there are 52ecological routes that introduce tourists to typical and rare landscapes, natural monuments and picturesque landscapes of untouched nature. Thus, desert national parks have a wide range of landscapes and natural resource potential for the development of ecotourism.

Keywords: ecological tourism, national natural park, tourist route, biodiversity, Kazakhstan

INTRODUCTION

Tourism and its rapidly developing new direction - ecotourism are becoming one of the most profitable sectors of the global economy, after oil production and the automotive industry. Kazakhstan has significant prerequisites and resources for the development of eco-tourism. The development of eco-tourism is promoted by the growing demand of the population of large urbanized territories to visit the ecologically clean natural environment, interest in learning new things and understanding by society of the need to preserve the diversity of nature for future generations.

International experience shows that the dynamic development of ecotourism takes place in specially protected areas. In Kazakhstan, the system of specially protected natural territories (SPNT) occupies 24.7 million hectares (8.9% of the country's area). It consists of 118 protected areas, which, depending on the purposes of creation and types of protection regime, include 10 state natural reserves, 13 state national natural parks, 2 national natural parks of local significance, 6 state natural wildlife, 5 state botanical gardens, dendrological park, 5 state protected areas, 50 state nature wildlife areas and 26 state natural monuments (Law of the Republic of Kazakhstan, 2018).

National natural parks cover an area of 1443.0 thousand hectares, out of which is 5.8% are specially protected areas of Kazakhstan (Consolidated analytical report, 2018).

This is a unique natural diversity and recreational resources of four natural zones; favorable geopolitical neighborhood with China and Russia, where there is a rapid growth of tourism; high potential for the development of eco-tourism according to the global travel and tourism competitiveness Index of the world economic forum, where in the world ranking for 2017, Kazakhstan ranked 30 out of 136 countries in terms of the number of natural world heritage sites (Travel and Tourism Competitiveness Index, 2017). The development of ecotourism is facilitated by the developed General plans for the development of the tourism infrastructure of national parks (Information on

the development of ecotourism at specially protected natural sites, 2016), as well as amendments to simplify the procedures for financing activities for the development of protected areas infrastructure.

The aim of the research was to assess the development of eco-tourism within the national parks of Kazakhstan, mainly located in the desert zone. At the same time, a comprehensive assessment of the natural resource potential of national natural parks and analysis of existing ecological tourist routes was applied (Akiyanova et al., 2019).

The object of research is of great interest due to the interest in its development of scientific departments of national natural parks, local population, specialists, scientists, business structures planning the placement and development of tourist products.

Kazakhstan has significant prerequisites and resources for the development of eco-tourism. This is a unique natural diversity and recreational resources of four natural zones; favorable geopolitical neighborhood with China and Russia, where there is a rapid growth of tourism; high potential for the development of eco-tourism according to the global travel and tourism competitiveness Index of the world economic forum, where in the world ranking for 2017, Kazakhstan ranked 30 out of 136 countries in terms of the number of natural world heritage sites (Travel and Tourism Competitiveness Index, 2017). The development of ecotourism is facilitated by the developed General plans for the development of the tourism infrastructure of national parks (Information on the development of ecotourism at specially protected natural sites, 2016), as well as amendments to simplify the procedures for financing activities for the development of protected areas infrastructure.

MATERIALS AND METHODS

The initial data for the study of national parks of southeastern Kazakhstan were: published data, statistical information, digital satellite images, thematic maps, data from field research of the authors. Universal methods of scientific knowledge, including decoding satellite images, creating maps and diagrams using the ArcGIS 10.6 program, were used to assess the possibilities of developing ecotourism.

A comprehensive assessment of the network of national parks in Kazakhstan included an analysis of their spatial relevance to the latitudinal zoning and high-altitude zone of the territory, the uniqueness of natural conditions and biodiversity, the features of population settlement, and the availability of infrastructure necessary for the development of ecotourism. Analysis and mapping Assessment of the current state and prospects for the development of eco-tourism within national parks is considered with the account of their natural and climatic features, as well as the socio-economic conditions of the surrounding administrative-territorial units of Kazakhstan.

RESULTS AND DISCUSSION

In accordance with the Law on protected areas (Law of the Republic of Kazakhstan, 2018), national natural parks of Kazakhstan are designed to preserve biological and landscape diversity, use unique natural complexes and objects for environmental protection, environmental education, scientific, tourist and recreational purposes. National natural parks of the Ile-Alatau and Altyn-Yemel desert zone were opened in 1996-98, the others were opened after 2000. The main characteristics of the national natural parks of the steppe, semi-desert and desert zones of southeastern Kazakhstan are given in table 1. The analysis shows that the natural landscapes characteristic of the desert zone are partially represented in national parks and mainly in the lower tier.

National natural parks of southeastern Kazakhstan are created in areas with mainly mountainous terrain with a characteristically vertical belt. The location of national parks and their high-altitude zones has been refined using digital terrain models based on Sentinel satellite images (figure 1). The analysis showed that the landscape and biological diversity of national parks are more dependent on the vertical belt and their climatic differentiation, the dismemberment of the terrain and exposures of slopes, the lithology of rocks, the structure and composition of the soil and vegetation cover.

The current state and the possibility of developing ecological tourism within the national parks of southeastern Kazakhstan are considered in accordance with the natural and climatic zoning, the uniqueness of the geological and geomorphological structure and biodiversity.

Natural and climatic features of national parks desert zone of Kazakhstan for the development of ecological tourism

Mostly in the desert zone of Kazakhstan, spatially between 40^0 and 48^0 North latitude and 69^0 and 86^0 East longitude, there are national parks SayramUgam, Ile-Alatau, Kolsaykolderi, AltynYemel, ZhongarAlatau and Tarbagatai. They are confined to the mountain ranges of southern and South-Eastern Kazakhstan. National parks of the desert zone are located at absolute levels from 347 to 4567 meters. Depending on the absolute heights within their borders, there are two to seven high-altitude zones ranging, from desert, semi-desert, steppe and forest-steppe (represented in all national parks of the desert zone), to forest, xerophytic-meadow, tundra and nival zones. The

TABLE 1. Table 1. Main characteristics of the state national natural parks of southeastern Kazakhstan

Title	Square, ha th.	Relief (mostly)	Absolute height, m	Natural zones, subzones	High-altitude zones	Number of species of higher plants	Number of verteb rate species	Number of red listed (L)/ endemic (E)/ /rare (R) species flora	fauna
Sharyn	127,05	flat	554-1778	desert/ semidesert	desert, semi-desert, steppe, forest-steppe	1000	150	L and E50	L3
Tarba gatai	143,55	mounta nious	347-2981	semidesert	desert, steppe, forest- steppe	1600	400	E3	L40
Sairam-Ugam	149,04	mounta nious	918-3954	desert	steppe, forest-steppe	1635	371	L62	L38
Kolsai-Kolderi	161,05	mounta nious	1399-4438	desert	steppe, forest-steppe-forest-xerophytic meadows	700	231	L5	L11
Ile-Alatau	198,67	mounta nious	994-4433	desert	steppe, forest xerophytic meadow-nival-subnival belt	1000	443	L36	L20 /R2
Altyn-Yemel	307,65	mounta nious	473–4433	desert	desert-steppe, meadow-steppe	1800	393	L21 /60	L31
Zhongar-Alatau	356,02	mounta nious	892–4567	desert	steppe— forest-steppe, forest-xerophytic-meadow-nival-subnival	2168	300	L12 /E76	L12

natural features of these parks include the presence of a dense river network and in some parks – flowing lakes or lake systems of predominantly tectonic origin.

Spatially between 43^0 and 43^040 'North latitude and $78^030'$ and $79^020'$ East longitude, the state national natural Park "Sharyn" is located, which differs from the above mentioned parks. It is located within the mountain and foothill territories that pass into the inter-mountain plain. The valley of the Sharyn river is deeply embedded in the sedimentary deposits of the reservoir plain with the creation of picturesque canyons with steep, fancifully dissected slopes.

The following is a description of the most characteristic natural and climatic conditions and features of the national parks of of southeastern Kazakhstan, which contribute to the development of ecological tourism in them.

The Sharyn state national natural park is located in the South-East of Kazakhstan, 200 km East of Almaty, in the center of the Iley intermountain depression. It was created in order to preserve the unique geological and geomorphological, preserve and restore the relict floristic complexes of the Sharyn river valley.

The length of the Sharyn river canyon is 154 km, height of vertical walls varies from 150 to 300 m, width - 80 m. Deposits exposed in steep walls of the canyon, according to scientists, were formed about 30 million years ago. Thanks to a rare combination of a number of geological factors, the location of bones of the oldest representatives of fauna has been preserved in the Sharyn canyon. Scientists have found clusters of fossilized bones of mastodons, elephants, rhinos, Stenon horses, hyenas, and identified original floral pollen complexes.

The climate is continental and desert. The average annual air temperature is about 5C, the coldest month (January) is 6C, the warmest month (July) is + 27C. Duration of the frost-free period is 180 days, and the atmospheric drought is about 40 days. The snow cover is shallow (10-20 cm), lasts about 60 days, is established in December, and is destroyed at the end of February. The total amount of precipitation is about 150 mm per year. Soils from steppe (black soil, chestnut) to desert (brown, gray-brown, extremely arid) types. Among the intrazonal soils, forest-meadow floodplain and extremely arid soils of the Central Asian type are distinguished.

The Sharyn river is a major left-bank tributary of the Ile river. Sharyn is a rock type river, its' origins are located

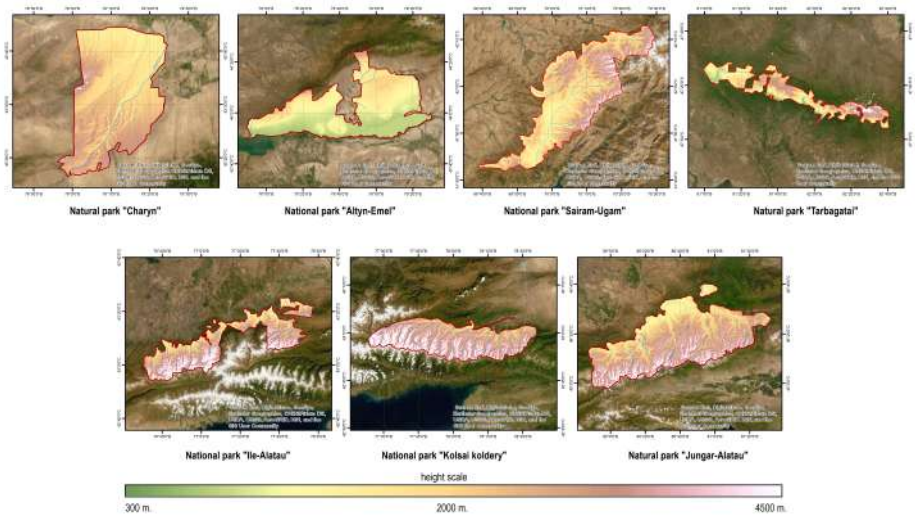

FIGURE 1. Digital terrain models of national natural parks of southeastern Kazakhstan.

above the snow line on the southern slope of the Ketmen ridge. The river crosses all vertical belts and descends from the mountains in torrents, there are picturesque rapids and waterfalls. In the foothills for a long period of time, the river cut through not only the sediments of the Mesozoic-Cenozoic, but also powerful layers of ancient rock. Here, the river formed a completely unique "Sharyn canyon" - the main attraction of the national natural park.

The flora of the national park includes 940 species of higher plants, which is comparable to the richness of the flora of individual mountain areas. The flora includes more than 60 endemic and rare species that belong to 20 families and 39 genera. The richness and originality of vegetation is due to the border position of the territory between the Kazakh and zhongar deserts, the influence of large mountain structures of the Northern Tien Shan, the presence of contrasting habitats and favorable conditions in the river valleys. There are seven types of vegetation (desert, steppe, shrub, forest, tugai, meadow and swamp), more than 70 formations and plant communities (A. A. Ivashchenko, 2009).

One of the main attractions of the Sharyn Park is a relict broad-leaved ash forest in the Sarytogai tract, with an area of 5 thousand hectares. It has been protected as a state monument of nature since 1964. the Dominant of this forest is one of the oldest species of modern flora – Sogdian ash (*Fraxinus sogdiana*). Ash forms a dense stand of trees, often with a sparse grass tier of blueberries, asparagus and blackberries.

Three species (Ferula of Ilia, the desert grate of Zinaida (*Eremostachys zenaidae*) and Michelson's kermek (*Limonium michelsonii Lincz.*) are endemic. There are 8 highly endemic species, three of them (*Oxytropis Niedzwiecki, Ferula syugatinskaya, rocky solonechnik*) are rare and listed in the Red book of Kazakhstan. There are two rare representatives of monotypic genus ikonnikovia Kaufmana (*Ikonnikovia kaufmanniana*) and plagiobasis cornflower are of particular interest. There are 21 red-book species in total (A. A. Ivashchenko, 2009).

The wildlife of the Sharyn national park is also rich. It is home to 36 species of mammals, including fox, korsak, weasel, ermine, rock marten, mountain goat, jeyran, wild boar, hare-tolai, otter, jerboa and sandwort. Of these, five species (jeyran, stone marten, marbled polecat, manul and the Central Asian river otter) are listed in the Red Book of Kazakhstan. The world of birds is diverse, with more than 200 species, including 111 nesting birds. The relict ash grove is dominated by the inhabitants of tree and shrub plantations-pigeons (wood pigeon and brown), turtledoves, orioles, southern nightingale, splyushka, warblers (hawk and zavirushka), tits (big, gray, knyazek). 18 species of reptiles. Of the lizards, the most common species are the alai gologlaz, agama, gray gecko, and of the snakes, the shield - face, patterned and multi-colored poloz. In the riparian habitats a water snake lives. The park's reservoirs are home to 10 species of fish. Seven of them are typical natives of the highland Asian fauna, and one (marinka ileyskaya) is listed in the Red Book of Kazakhstan. The black-tailed toad agama and the Central Asian frog also belong to the Red Book category. Out of the variety of insects, some species has not been studied yet, bright daytime tortoise butterfly, large tortoiseshell, admiral, apollo-mnemosyne, pale clouded yellow and large fiery hunter odorous attract the attention in summer. There are at least 10 species of red-book listed insects in the Park, including dragonflies (black-winged damselfly and emperor dragonfly), locusts (*Caereocercus fuscipennis, Saga pedo*), beetles (*European ground beetle*, musk beetle, ladybird), and others (G. M. Dzhanaleyeva, 2010). The activity of the natural park is aimed not only at preserving unique natural complexes, but also at restoring the number of

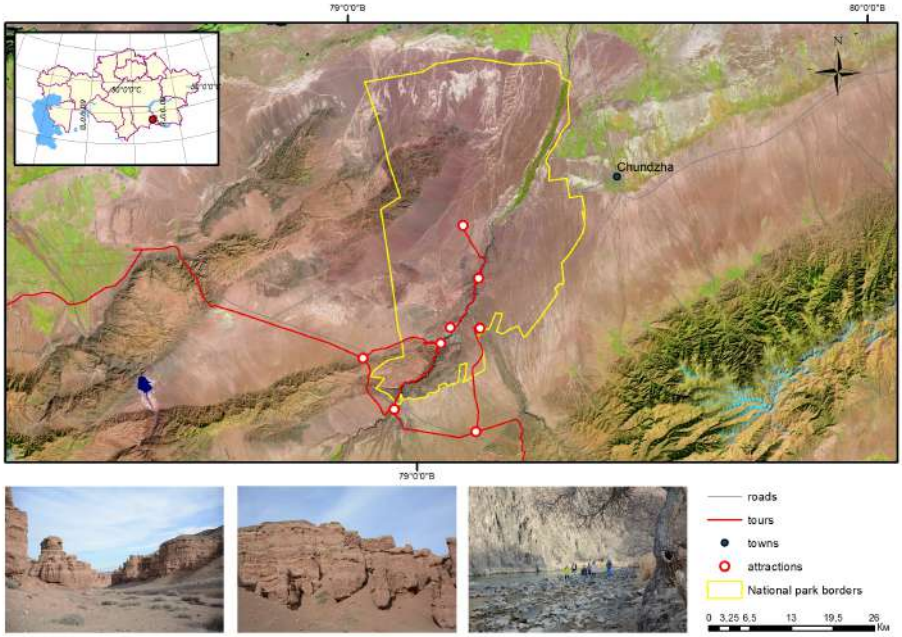

FIGURE 2. Map of the main ecological tourists‘ routes SNPP Sharyn

rare species of fauna. For example, the Aktogay tract is suitable for recreating the population of the tugai red deer (*Cervus elaphus bactrianus*), a subspecies listed in the Red books of the International Union for conservation of nature and Kazakhstan. The valley near the village of Aksai is convenient for creating a nursery for breeding rare birds-Jack (*Chlamidotis undulata*) and Saker Falcon (*Falco cherrug Grayx*) (G. M. Dzhanaleyeva, 2010).

The territory of the national park is divided into functional zones: conservation regime –9,427.5 ha (7.4%), environmental stabilization-13,147. 3 ha (10.4%), tourist and recreational activities-77,739 ha (61.2%) and limited economic activities - 26,736. 2 ha (21%) (Charyn State National Natural Park, 2008).

The territory of the national park has a high natural potential and significant recreational resources. Of particular tourists interest is the "Valley of castles" with picturesque and diverse forms of denudation, similar to quaint towers and palaces, fortress walls and majestic statues. Unique are the steep rocky ledges of the canyon, paleontological finds, rare species of flora and fauna. The canyon resembles the Grand Canyon of Colorado (USA) in miniature. In order to preserve the main attractions (Sharyn canyon and Ash grove), the national natural park was included in the UNESCO network of biosphere reserves by the decision of the International Coordinating Council of the MAB on July 25, 2018 (Two Kazakhstan reserves, 2018).

On the territory of the park there are unique historical and cultural objects, burial mounds, "Sary-Togay" burial ground (III century BC - II century BC), "Muyun-tugay" burial ground of the III century BC - I century BC.

Water and hiking trails have been developed within the national nature park. There are 3 equipped ecological tourist routes: Sharyn canyon "Valley of castles", "Sharyn ash grove", "Burial grounds and burial mounds" (figure 2). In the Sharyn canyon, there are 2 observation platforms, a descent into the canyon, wooden yurts and gazebos, etc.in the floodplain of the Sharyn river, around the "Family tree", there is a fence, wooden tables and benches are installed. In Sharyn ash grove there is a cottage and a guest house with a kitchen and dining room, a dirt road, a special check-in for buses (Charyn State National Natural Park, 2008).

The national natural park is located on the territory of three densely populated districts of Almaty region: Enbekshikazakh, Raimbek and Uyghur. The population of the territories adjacent to the protected areas as of 01.01.2019 amounted to more than 747 thousand people, 59% of the population is economically active.

The state national nature park "Ile-Alatau" was created to preserve unique mountain and foothill landscapes, flora and fauna, improve conditions for tourism and recreation, and develop and implement scientific methods for preserving natural complexes in recreational use (Ile-Alatau State National Natural Park, 2020). The length of the park from the Shamalgan river to the Turgen river is 120 km, the width reaches 30-35 km. The park is located within the low-mountain, mid-mountain and high-mountain landscapes of the Ile Alatau mountains.

The climate is differentiated by altitude climate zones. Summer is warm, winter is mild. In the foothills, the average temperature of January is -7.4^0C, July is $+23^0C$, the duration of the frost-free period is 181 days, and up to 560 mm of precipitation falls annually. The height of the snow cover in the foothills is about 30 cm, in the

middle and high mountains it can reach 100 cm (Ile-Alatau).

The park occupies the Northern macro slope of the Ile Alatau mountains within absolute heights from 900 to 4540 meters above sea level (the highest point is Constitution peak, 4540 m). Several dozen more peaks exceed the four-kilometer height. The dissected mountain relief. Here you can trace a unique series of vertical zones, from the hot low-altitude semi-deserts and dry steppes below to the cool alpine meadows, tundra and nival belt with eternal snow and glaciers on the mountain tops. One of the features of the park is a system of glaciers that serves as the source of rivers. In the Left Talgar gorge, the Dmitriev glacier is located - the largest on the Northern slope of the Ile Alatau, its area is $17km^2$. The Constitution glacier is the longest (5.7 km) and one of the lowest-lying glaciers in the Park. it descends to a height of 3270 m. The Tuyyksu glacier, one of the most studied glaciers in Central Asia, is located at the source of the Kishi river in Almaty. Research has been conducted here since 1902. The river network is dense: Kaskelen, Aksai, Kargalinka, Kishi and Ulken Almaty, Talgar, Issyk, Turgen. Rivers flow in rapid streams in deep gorges, when entering the plain they lose speed, branch out, and form powerful cones of removal. The rivers are mainly snow-glacial fed with spring and summer floods. For the characteristic of the rivers are mountain torrents, for protection against which is built a system of dams and debris flow structures. The park has a large number of glacial, moraine, kar, moreno-dam and landslide-tectonic lakes. Their sizes range from 100-200 m in diameter and up to 1-1,5 km. Lakes of landslide-tectonic origin include Bolshoe Almatinskoe and Issyk lakes.

The soil cover is mainly represented by low-power gravelly soils of mountain slopes. In the middle and lower parts of the low-mountain belt, small island masses of black earth are found in places. Soils in violation of vegetation cover are easily susceptible to erosion and landslide processes.

The flora of the national park is represented by 1200 species of plants. Alpine and subalpine zones (from 2400 m to 3400 m) are characterized by bright meadow grasses, among which there are high-altitude sedge-moss swamps. Hypsometrically, juniper bushes appear below. The shrub-forest belt is located in the middle highlands at altitudes from 1600 to 2800 m. here the most typical deciduous and coniferous forests in combination with areas of grass and grass edges, lush multi-colored rose gardens. The foothills occupy a belt of 1400-1600 m and are a mountain steppe interspersed with rare groves of wild Apple, apricot, and aspen.

The special purpose of the national park is to preserve unique forest ecosystems. Here, four types of forest are classified as particularly rare, requiring special study and regular monitoring. These are moss spruce trees from Picea schrenkiana (Chinturgen massif, which is a natural monument) and "karkasniki"-natural arrays of a relict red book species- Caucasian hackberry (*Celtis caucasica Wild.*), located in the Kishi river valley of Almaty. These are apple forests – Sivers' apple tree (*Malus sieversii*), a relict species listed in the Red Book of Kazakhstan. These are apricots dominated by the common apricot (*Armeniaca vulgaris Lam.*), listed in the Red Book of Kazakhstan. Apple and apricot are wild relatives of cultivated fruit plants, the study and preservation of which is not only a national and global task. 36 species of herbaceous, shrubby and woody plants are also listed in the Red Book. Among them are the oldest forms of flowers – two types of tulips and one of iris and peony. According to experts, the tulip in the middle ages along the silk road went to Asia Minor, and from there to Holland, where it is now recognized as a national symbol (Ivashchenko et al., 2015).

The animal world of the park includes 213 species of vertebrates and more than 1,500 species of invertebrates. Of the vertebrates, there are 47 species of mammals, 148 species of birds, 8 species of reptiles, 2 species of amphibians, and 8 species of fish. Deer (maral, roe deer) live in the thicket of the forest and in open spaces, and Siberian ibex (teke) above on the rocks. Wolf, ox, boar, badger, and mouse-like rodents are frequently met. Many of the animals that live in the park are listed in the Red Book. Mammals include predatory animals (red wolf, snow leopard, manul, Central Asian lynx, Tien Shan brown bear and stone marten), ungulates (argali) and large southern rodent (Indian porcupine), and one species of fish (ili Marinka). The snow leopard is also included in the International Red Book (Ivashchenko et al., 2015). Among the birds are the sickle-billed sandpiper, falcons (saker, turf and shaheen), eagles (kumai, bearded man, Golden eagle, dwarf eagle and vulture), sparrows (painted blue tit, large lentil and blue bird), and black stork.

The territory of the national park is divided into the following functional zones: conservation regime-62,137 ha (31.2%), environmental stabilization - 16,412 ha (8.2%), tourist and recreational activities – 15,408 ha (7.6%), limited economic activities – 10,5295 ha (53%).

On the territory of the park there are famous natural monuments: "Chinturgen spruce forests", high-mountain lakes Bolshoye Almatinskoye, Bozkol, Akkol, waterfalls Kayrak and Medvezhy, majestic glaciers Tuyuksu, Dmitrieva and Constitution.

Archaeological sites of historical and cultural heritage include burial mounds of the early iron age in the Turgen gorge, Saka mounds along the banks of the river Yesik (in one of them the world-famous "Golden man" was found), as well as the medieval settlements of Talkhiz and Turgen. The Great Silk road passed through the park.

The park has exceptional conditions for eco-tourism, mass recreation and health restoration. There are 42 ecological routes for tourists, including 13 nature training trails and 29 tourist routes (figure 3).

Much is being done in the national park for the development of eco-tourism. Of the tourist routes, 21 are horse-

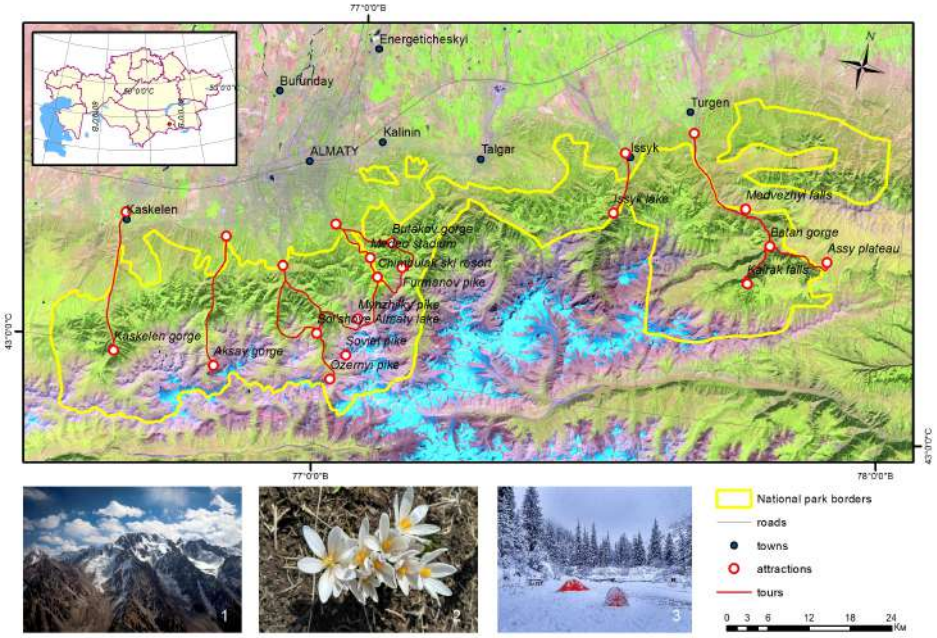

FIGURE 3. Map of the main ecological tourist routes of the Ile-Alatau SNNP.

walking and 8 are cycling routes. Developed day trips on ecological trails, multi-day trips with overnight stays in nature. Widely developed in the winter skiing, sledding and horse-drawn sleigh rides. Organized tourist groups are offered exclusive tours.

The national nature park has an open-air historical and ethnographic museum "Kieli-Bulak", an observation deck in the Maralsay gorge of the Talgar forestry, a cable road in the Kotyrbulak gorge, a stationary permanent recreation place for 300 people in the Aksai forestry and a nature Museum in the administrative building of the national park in Almaty. The national park is located on the territories of densely populated Enbekshikazakh, Karasay and Talgar districts of Almaty region. The population of the territories adjacent to the park as on 01.01.2019 was more than 768 thousand. 50% of the population is economically active.

The state national natural park "Altyn-Yemel" was created to preserve the unique ecosystems of the Ile intermountain basin, preserve biodiversity, protect geomorphological and paleontological objects, historical and cultural monuments. Ecotourism is developed within the national park in strict compliance with the norms of recreational capacity and load (Altyn Yemel State National Natural Park, 2020). The northern boundary of the national park runs along the South-Western spurs of the ridge of Altyn-Yemel, the western goes along the foothills of Sholak mountains to the floodplain of the river Ile, the easernt goes by the floodplain of the river Kokterek, the southern-along the Northern coast of Kapshagai reservoir and river silt (figure 4).

The park includes ecosystem of different altitudinal zones from the Piedmont and low desert, to lowland, mountain and Alpine steppe, above - meadow-steppe belts. The relief is represented by the Altyn-Yemel and Sholak mountain ranges, Degeres, Matai, Kalkan, Katutau and Aktau, which are the result of uplifting tectonic blocks. Deep intermountain valleys are formed by a thick layer of Neogene-Quaternary deposits.

The climate is continental, arid, characterized by summer maximum precipitation, hot dry summers and cold winters with little snow. The aridity of the territory increases from West to East. These bioclimatic features and mountain terrain determine the laws of vertical zoning of soils and landscapes (V.A. Kovshar, 2016).

In the high-altitude zone, the most common high-altitude meadow-steppe soils. Here there are two vertical zones: 1) zone of mountain xeromesophytic shrub and forb-grass, forb-steppes herbs (1700 – 2400m); 2) a zone of mountain shrub fescue-feather grass-sagebrush desert, and shrub stipe grass-fescue dry steppes (1400 - 1700 m). A distinctive feature of the park is the wide distribution of desert landscapes and soils that occupy the foothill plains and rise to the slopes of the mountains to the absolute heights of 1400-1500 m. Zonal soils are light brown.

The desert zone is located at altitudes less than 1400 meters and is divided into two subzones: 1. subzone of foothills summer sagebrush, the "Northern" deserts with brown desert soils; 2. subzone of sub-mountain perennial-halophytic and sagebrush-perennial- halophytic "real" deserts with gray-brown desert soils (V.A. Kovshar, 2016).

The flora of the national park diverse from mountain to flat desert zones and has about 1800 higher plant species, among which 21 species are listed in the Red Book of Kazakhstan, about 60 species are endemic and rare forms

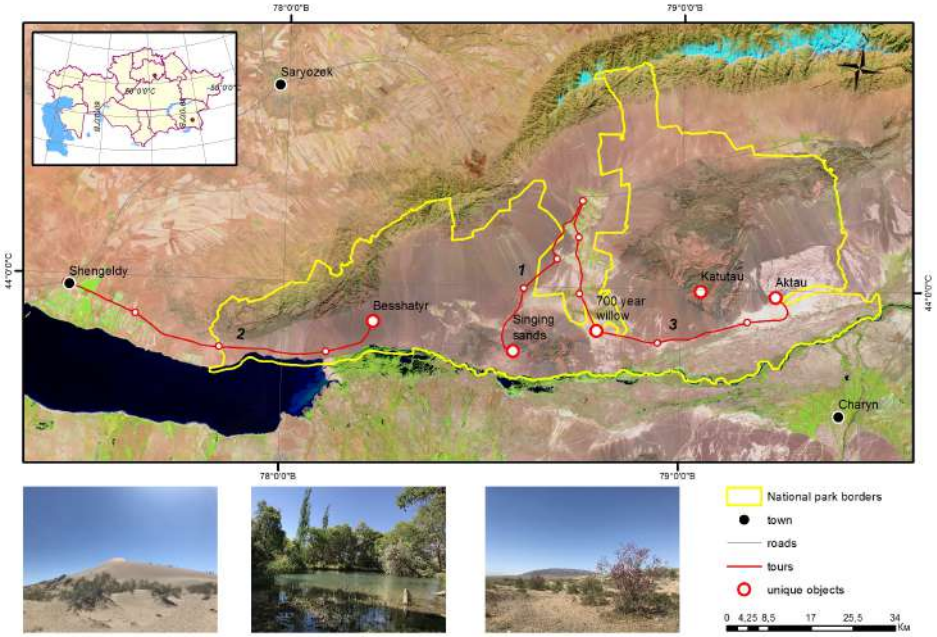

FIGURE 4. Map of the main ecological tourist routes of the Altyn-Yemel SNNP: 1) Basshi village - stone steles "Oshaktas" - Asiatic poplar grove grove-Sh.Ualikhanov spring-state natural monument "Singing barkhans"; 2) post 1-rock paintings " Tamgaly tas " - Saki mounds "Besshatyr"; 3) Basshi village - Kosbastau cordon (700 year old willow) – Katutau and Aktau mountains

within the Zhetysu Alatau and Ile-Balkash basin.

The fauna of vertebrates consists of 393 species. The park is a home to 78 species of mammals, 260 species of birds, 25 species of reptiles, 4 species of amphibians, and 26 species of fish. The animal world includes 1658 species of invertebrates. Of the animals living on the park territory, 56 species are listed in the Red Book of Kazakhstan, including 10 species of mammals (including argali, kulan, jeyran), 12 species of birds, 3-fish, 2-amphibians, 1-reptiles, and 25 species of insects. The pride of the park is a large population of kulans. In 1982, several dozen of Turkmen kulans were brought to Altyn-Yemel from the Barsakelmes reserve. Now their population numbers more than two thousand individuals. Another decoration of the national park is jeyran. In addition, in the early 2000s, as part of the reintroduction, Przewalski's horses were imported from zoos in Germany and released into the wild nature. Birds are represented by such species as: lapwing, herbalist, snipe, meadow thyrkushka, pheasant, quail, meadow arrier, yellow and black-headed wagtails, sandpiper, gull.

Altyn-Yemel is included in the UNESCO international network of biosphere reserves. The park is unique in that it preserves in its original form all kinds of natural complexes, from the unique landscape to ancient archaeological and historical monuments, as well as representatives of the richest flora and fauna.

The territory of the national park is divided into the following functional zones: the zone of conservation regime-54,767. 5 ha (20.8%), environmental stabilization – 54,590.5 ha (20.7%), tourist and recreational activities – 12,023 ha (4.6%), limited economic activities – 141,948 ha (53.9%) (The state national park "Altyn-Yemel", 2013).

Altyn-Yemel is a popular eco-tourism destination. There are 3 automobile and walking routes for tourists: 1) Basshi village - stone steles "Oshaktas" –Asiatic poplar grove-Sh. Ualikhanov spring - state natural monument "Singing barkhans"; 2) post 1-rock paintings "Tamgaly tas" - Saki mounds "Besshatyr"; 3) Basshi village-Kosbastau cordon (700 year old willow) - Katutau and Aktau mountains.

Numerous natural, cultural and historical monuments adorn the park. The Singing barkhan nature monument, 1.5 km long and up to 130 m high, emits melodious sounds in dry weather due to the friction of the smallest grains of sand when the wind blows. With strong gusts of wind, the barkhan emits a more intense and expressive sound, similar to the sound of an organ. In the Aktau mountains there is a reference stratigraphic section associated with exposures of marine multicolored deposits of the mesozoic-cenozoic period, where, bone remains of dinosaurs were found (The state national park "Altyn-Yemel", 2013).

There is the necropolis of the Saka nomadic culture Besshatyr from the VIII-III centuries BC on the distance of 3 km from the bank of the Ile river. This is a system of large mounds with a height of more than 20 meters, in which the Saka leaders who lived in the VII – III centuries BC are buried. Along the mounds there are 45 solid blocks of stone with images of animals carved on them. Tourists compare them to the famous stones of megalithic

FIGURE 5. The tract Tamgaly tas (rock paintings).

structure "Stonehenge". The park is a home to the famous monument of ancient rock images Tamgaly tas (figure 5). Petroglyphs were carved around the XVI-XIV centuries BC. These are mostly drawings of mysterious deities.

At present, the state national natural park "Altyn-Yemel" has at its disposal 6 hotels, 4 sites for placing tent camps with a capacity of 44 people at a time, as well as gazebos and viewing platforms on the territory of the park (The state national park "Altyn-Yemel", 2013).

The park is located in the Almaty region within the Kerbulak and Panfilov districts, the central office is located in the village of Basshi. The population of the territories adjacent to the protected areas as on 01.01.2019 amounted to more than 768 thousand people. About 50% of the population is economically active. The park's road network is in good condition. This generally contributes to the development of eco-tourism and the attraction of the local population.

The state national natural park "Zhongar-Alatau" was created for the purpose of preserving biodiversity (including the gene pool of globally significant wild-fruit forests) and natural mountain landscapes that have special ecological, genetic, historical and aesthetic value. Special attention is paid to the conservation and restoration of unique Apple forests – Sivers Apple trees (*Málus sievérsii*), Nezvecki Apple trees (*Malus niedzwetzkyana*), which are a source of genetic resources of world importance.

Zhongar-Alatau Park is located on the Northern slope of the Zhetysu (Zhongar) Alatau ridge, which stretches from west to east for 300 km. The climate is continental, with a long warm period and a snowy cold winter.

The park's flora includes 2,168 species of plants, of which 76 are endemic and are found only in these mountains. On the territory of the park there are rare and endangered species of plants listed in the Red Book of Kazakhstan (*Siver's apple tree, pale-flowered grouse, zhongar gentian, etc.*).

Zhetysu Alatau is one of the most saturated regions of Kazakhstan in terms of species diversity of animals, the second place in saturation belongs to Altai. The park's fauna includes 52 species of mammals, 238 species of birds, 2 species of amphibians, 8 species of reptiles, and 2 species of bony fish. Rare and endangered species include: danatinsky toad (*Bufo danatensis*), black stork, golden eagle, lammergeier, saker falcon, owl, Tien Shan brown bear, stone marten, Turkestan lynx, snow leopard, etc.

By the decision of the International Coordinating Council of the MAB on July 25, 2018, the Zhongar-Alatau SNNP is included in the UNESCO network of biosphere reserves in order to preserve the Sivers and Nedzvetsky apple trees in the wild, from which many garden varieties of apples originated.

The territory of the national park is divided into functional zones of the protected regime-142.9 thousand hectares (40.1%), environmental stabilization – 52.2 thousand hectares (14.7%), tourist and recreational activities – 81.5 thousand hectares (22.9%), limited economic activities – 79.2 thousand hectares (22.3%). It is planned to increase the protected area to 195.1 thousand hectares or 54.8% of the total area of the Park (The state national park "Zhongar-Alatau ", 2015). 7 ecological tourist routes have been developed on the territory of the park - from three-kilometer 1-day hikes to marches for 3-4 days. For the development of ecological tourism, there are natural monuments, including the Shumsky glacier, which resembles the bride's headdress "saukele", and the Upper and Lower Zhasylkol lakes. There are cultural, historical and archaeological sites: petroglyphs of the early iron age, the Obatas mound stone of the Turkic period of the VI-VIII centuries ad, the Aulie Tas ("Holy stone"), the Uygentas burial ground, etc.

The territory of the Zhongar-Alatau national park is a striking beauty of the land, which is attractive for the development of ecological tourism. The unique natural conditions of the territory, favorable climate, surface water resources, the presence of mineral springs, and the significant aesthetic appeal of the mountain landscape are complemented by the richness and diversity of the flora and fauna.

The park is rich in objects of historical and cultural heritage. Archaeological sites located on the territory of the national park date back to the early iron age, the time of formation of nomadic and semi-nomadic cattle breeding in Kazakhstan, the era of nomads. In the park is the burial ground agents, burial mounds in the river valley Sarymsakty, at the North-Western slopes of the ridge Karagach to pass Koktobe (1814 m) in the mountains of Junjurek, rock paintings in the gorge Karupsha, 7 km from the town of Sarkand, on the left bank of the river Baskan there are images of wild animals, etc. The park has exceptional conditions for organizing eco-tourism, the program of which is based on using the unique natural features of the national park in combination with visiting archaeological and cultural-historical monuments. At the same time, the park's infrastructure is poorly developed, with the exception of a network of dirt roads.

Zhongar-Alatau park is located on the territories of Aksu, Alakol and Sarkand districts of Almaty region. The population of the territories adjacent to the protected areas as of 01.01.2019 amounted to more than 146 thousand people, 77 thousand people are economically active.

The state national natural park "Sairam-Ugam" was established on January 26, 2006 (Decree of the Government of the Republic of Kazakhstan).

Sayram-Ugam park is located in the South of the country and covers the territories of three districts of the Turkestan region: Kazygurt, Tolebiy and Tulkubas. It was created through the merger of the Ugam, Tolebi and Tulkubas state institutions for the protection of forests and wildlife. The total area of the national park is 149,053 hectares. The purpose of creating a natural park was to preserve the typical and unique landscapes of the Kazakh part of the Western Tien-Shan in their natural form, use unique natural complexes and objects of the state nature reserve Fund that have special ecological, scientific, historical, cultural and recreational value for environmental, ecological and educational, scientific, tourist and recreational purposes.

The national park includes the north-eastern part of the Western Tien-Shan: the Ugam, Karzhantau and Boraldaytau mountain ranges, as well as the north-western spurs of the Talas Alatau (State National Natural Park Sairam-Ugam, 2008) (figure 6). The territory of the national park has 7 high-altitude zones, ranging from the foothill desert and mountain steppe to the high-altitude nival.

Mountain systems are neotectonic uplifts, clearly expressed in the topography. The Tulkubas section includes the Boraldaytau ridge, extending in the north-westerly direction. Here, the absolute marks vary between 1300 and 1800 meters, and the relative height above the Boraldai river reaches 300-800 meters fragments of ancient peneplain are observed. On the narrow ridge top of the Boraldaitau ridge. The slopes are steep, dissected by deep gorges. Within the Sairam-Ugam SSPE included the southern slopes of the ridge. It's the midlands, there originate of the mountain river Kairakty, Frozen, Kenosis, Kokbulak Opened Kokbulak, Nurbaiti, Zhylandy, Sisu etc.

Tolebi area of the national park includes the north-eastern mountainous part of the Ugam range. The length of the ridge is 115 km, the highest point (the Sairamsu mountain) is located at an altitude of 4,236 m. the Ridge is divided by longitudinal valleys extending from the North-East to the South-West. The predominance of steeply sloping, deeply divided terrain is characteristic. Fragments on watersheds remained aligned portions of the peneplain. One of these regions corresponds to the territory expansion of national park within Tolebi area between the headwaters of the rivers and saryaygyr Olokor (local name is Ulyzhurt) with an area of 10 000 ha.

The Ugamsky section includes the Ugamsky and Karzhantau ridges, as well as Kazygurt mountain. Individual peaks of the ridge reach 2500-2800 m of absolute heights. The highest point of the Karzhantau ridge is Mynbulak mountain with a mark of 2823 m.

Descending to the South-West, the Karzhantau ridge passes into the Karashatau hill.

North-West of the Karzhantau ridge is Kazygurt mountain with a mark of 1,768 m, which is the watershed of the Badam and Keles rivers. Kazygurt mountain is composed of Mesozoic limestones. Karst processes and forms are widely spread here: niches and small caves, a lot of springs. Paleontological finds were found near Kazygurt

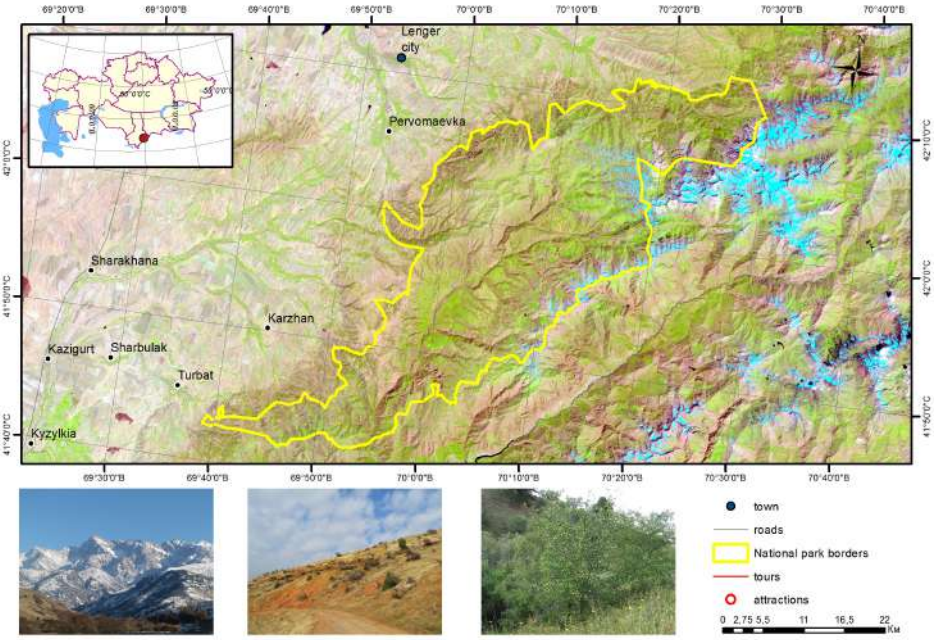

FIGURE 6. Map of the state national natural park "Sairam Ugam".

mountain, some of them are stored in the State museum of the Republic of Kazakhstan.

The climate of the territory has continental features due to the distance from the world ocean. The winter is mild and short, with frequent thaws and a large amount of precipitation, the summer is hot, long and very dry (precipitation may not fall for 3-4 months). In the mountainous part, the continental climate is significantly weakened.

In the area under consideration, ground waters are common in quaternary sediments, and in older rocks - pressure waters separated by a regional water barrier (Eocene-Oligocene clays) with a capacity of more than 100 m. rare low - power layers and lenses of low-water-bearing fine and fine-grained Sands containing highly mineralized waters of sporadic distribution lie among the water-resistant strata. The underground waters of the region are characterized by high mineralization and variegated chemical composition, which is typical for areas of continental salinity. According to the degree of mineralization, they vary from fresh to salty.

On the territory of the national park there is a flow of a mountain stream Zhylandy, Kokbulak Cocalico, Says, Frozen, Kaskasu, Sayramsu, Ugam, Burgulyuk, Badam, etc. They are fed mainly by melted snow waters, so in the summer the flow drops sharply. Some watercourses are fed by spring water. The Ugam river is a small river, at the same time an important cross-border tributary of the Chirchik river. The length of the river reaches 70 km, the basin area is about 870 km^2. The river originates on the Ugam ridge and crosses the Sairam-Ugam SNNP.

The soil cover of the park is diverse. Mountain brown and gray-brown soils formed on eluvial-deluvial gravelly loams are common in the low-mountain region. In fine-knoll-undulating lowland area on loess-like loamy and clayey rocks developed chestnut soils. Mountain meadow-steppe and mountain-steppe soils that develop on rough eluvial-deluvial gravelly loams are common in the Western Tianshan Alpine region of Sairam-Ugam. The subalpine belt has developed mountain meadow-steppe, mountain-steppe, mountain and mountain-meadow hydromorphic subalpine soils formed on eluvial-deluvial gravelly loams. The species composition of the park's vegetation is unique. There are 240 species of plants listed in the Red Book of the Republic of Kazakhstan. Very rare species-Sogdian ash, wild grapes, Yanchevsky currant, Albert's iris-are represented by rare specimens. The most remarkable feature of the Western Tien Shan is the spread of many species of wild relatives of cultivated plants - apple, pear, plum, grape, walnut, onion and tulip.

The fauna of Sairam-Ugam park is diverse, including bears, wolves, wild boars, ROE deer, badgers, and porcupines. More rare is to meet Karatau argali, very rare are meetings with snow leopards and Turkestan lynx (State National Natural Park Sairam-Ugam, 2008).

Vegetation, wildlife, diverse terrain, rivers, waterfalls and mountain lakes create picturesque, unique landscapes that have a huge recreational potential. In the Park there are places of worship, ancient settlements and burials from various periods, but the overall cultural landscape of the Park is poorly understood and waiting to be explored. Among the high snow peaks is Sairamsky peak (4236 meters above sea level). Beautiful turquoise mountain lakes

and among them the pearl of Ugam-lake Makpal (2100 m). The mountains are the "green heart" of a vast territory where more than one million people live. Mountain forests regulate river flow and enrich the air with oxygen and phytoncides. They protect the territory from rain and spring floods, slow down the melting of snow, prevent the formation of landslides and soil erosion. The mountains provide the population of Shymkent and surrounding areas with water resources and, first of all, high-quality drinking water.

In accordance with the Law on specially protected natural territories within the Sairam-Ugam SNNP, the following functional zones are allocated: conservation regime - 55589.4 ha; environmental stabilization - 13124.6 ha; tourist and recreational activities - 19711 ha; limited economic activity - 60628 ha.in Addition, the protection zone allocated in accordance with the "law on protected areas" with a width of 2 km along the border of the sspp includes 93420.4 ha. (State National Natural Park Sairam-Ugam, 2008).

On the territory of Sairam-Ugam SNNP developed and there are 10 tourist ecological route, passports are approved by order of the Committee of forestry and fauna: Horse route to the lake Makpal, the length of 45 km; Pedestrian and horse route to the lake Susingen, length 31 km; Hiking and horse trail to the petroglyphs Sazanata, a length of 12 km; Walking route to the lake "Sayramsu", length-14 km; Hiking and horse trail, "the river Saryaygyr – lake Susingen – the ampsite "South", length 72 km; Pedestrian (mountaineering) route "Boztorgay Creek", length 72 km; Pedestrian (mountaineering) route "Vladislav Peak", length 30 km; Pedestrian and equestrian route "Kaskasu-Susingen", length 32 km; pedestrian route "saryaygyr gorge", length 13 km; pedestrian route "Bird Bazaar", length 7 km (Sairam-Ugam State National Park, 2020).

The tourist resources of Sairam-Ugam park attract more and more tourists every year. However, the park does not have the necessary infrastructure and has guest houses located only in the stow Kokbulak, Tulassay, village Ugamskiy Leskhoz and the cordon in the stow Kaskasu.

Sayram-Ugam park is located on the territory of three districts of the Turkestan region (Kazygurt, Tolebiy and Tulkubas) with a traditionally high population density. The population of the territories adjacent to the protected areas as on 01.01.2019 amounted to more than 405 thousand people, 58% of which belong to the economically active population.

The state national natural park "Kolsay kolderi" was established on February 07, 2007 (Decree of the Government of the Republic of Kazakhstan). It is located on the northern slope of the Kungei Alatau range in the eastern part of the Northern Tien-Shan system. The northernmost border of the park is the Shelek river, which belongs to the lake Balkash basin. The southern border of the park is the border with the Kyrgyz Republic, which runs along the crest of the Kungei Alatau ridge. The total area of the park is 161,045 hectares. According to natural zoning, the park is included into the desert zone of the temperate zone.

The purpose of creating the park was the need to preserve the state nature reserve Fund, biological diversity, unique natural and historical-cultural complexes and objects of special ecological, recreational and scientific value. One of the most unique natural objects of the park is Kolsay lakes and Kaindy lake. Kolsay lakes are located at altitudes of 1800, 2250 and 2700 meters above sea level. They are surrounded by a unique mountain landscape, within which three high-altitude zones change and there is a variety of rare plants and animals. The Kolsay river originates in the Kungei-Alatau range and flows through three lakes: Upper, Mynzhilki, and Lower. The water in the lakes is fresh, hard, and contains sodium sulfate. The lakes are deep, the deepest place on the first lake reaches 80 m, on the second-about 50 m. The bottom is flat in places, without rocky ledges.

Lake Kaindy is one of the mysterious lakes of the foothills. It is located 12 km East of the first Kolsay lake at an altitude of 2000 m above sea level, among fir trees, surrounded by mountain peaks. The lake was created about 100 years ago as a result of the collapse of a huge mass of rock that blocked the gorge with a natural dam. the Lake is about 400 m long and reaches a depth of almost 30 m. on all sides, Kaindy lake is surrounded by steep ledges and scree rocky slopes. From the rocky ridge, you can enjoy picturesque views of the Saty gorge, the Shelek river valley and the Kaindy gorge.

The climate of this territory is subordinates to the vertical belt. In the mountains, heavy precipitation occurs in April-June, and least of all in December-January. The climatic conditions of the territory are favorable for tourism and recreation, which is facilitated by a comfortable temperature regime, clean air, lack of winds and extreme heat. The duration of the period with an average daily air temperature of +15 is equal to 110-120 days. In the transitional seasons of the year dominated by the sunny, humid weather with precipitation.

The flora of the national park has more than 700 species. There are plants listed in the Red Book-Kungei grasshopper (*Stipa kungeica Golosk*), Golden Adonis (*Adonis chrysocyathus*), Tian Shan Adonis (*Adonis tianschanica*), orange jaundice (*Erysimum perofskianum*), Schrenka fir tree (*Pícea schrenkiána*) and others. Tan-Shan fir tree forests occupy mainly the Northern slopes. The coniferous forest belt reaches up to 2700-3000 meters, gradually turning into high-altitude Alpine meadows. The Tien Shan spruce reaches a height of 40-50 meters and a diameter of 2 meters (National Park "Kolsai Lakes", 2020).

The wildlife of the natural park is rich and diverse-there are more than 200 species of vertebrates. It is home to 4 species of fish, 2 species of amphibians, 197 species of birds and 29 species of mammals. Typical inhabitants of all

three natural zones are: bear (*Ursus*), wolf (*Canis*), lynx (*Lynx*), hare (*Lepus*), Siberian goat (*Capra sibirica*), snow leopard (*Panthera uncia*), wild boar (*Sus scrofa*), badger (*Meles leucurus*). Bird species listed in the Red Book of Kazakhstan: Bluebird (*Myophonus caeruleus*), painted tit (*Leptopoecile sophiae*), Golden eagle (*Aquila chrysaetos*), lammergeier (*Gypaetus barbatus*), Saker Falcon (*Falco cherrug*), kumai (*Gyps himalayensis*). Mammals include the following species of the Red Book animals: argali (*Ovis ammon*), Tien Shan bear (*Ursus arctos isabellinus*), snow leopard (*Panthera uncia*), Turkestan lynx (*Lynx lynx isabellinus*), Central Asian otter (*Lutra lutra*) (State National Natural Park "Kolsai Lakes", 2020).

On the territory of the natural park there are important objects of historical and cultural heritage. 4 km from the village of Karabulak there are rocks with ancient rock images and symbols (petroglyphs of Tanbala tas). The confluence of Kaindy and then, on the left Bank of the Ile river, are outcrops with petroglyphs (Asilegal).

Tourist resources of the Kolsay lakes park attract more tourists every year. The closest to the Kolsay lakes is the village of Saty, where the tourist infrastructure is actively developing. You can stay in a hotel or in guest houses. Also in the village of Saty one can rent horses for a walk.

"Kolsay lakes" park is located on the territory of two districts of Almaty region: Rayymbek and Talgar with a low population density. The population of the territories adjacent to the protected areas as of 01.01.2019 there were about 105 thousand people, and 69% of them are economically active.

The state national natural park "Tarbagatai" (Tarbagatay State National Natural Park, 2020) established on June 27, 2018 (Decree of the Government of the Republic of Kazakhstan), located in the Urzhar district of the East Kazakhstan region.

The purpose of creating a natural park was to preserve the natural systems of the southern slope of the Tarbagatay range, the Karabas and Arkaly mountains, and the valleys of the Urzhar, Katynsu, and Yemel rivers. The area of the park is 143550.5 hectares.

According to the physical-geographical zoning, the park is located in the semi-desert landscape area of the temperate zone and is included into Tarbagatai physiographic province Saur-Tarbagatai physiographic region of Dzungar-Saur-Tarbagatai country.

The natural park includes the southern slope of the Western part of the Tarbagatay range (Western Tarbagatay). The Tarbagatay ridge is oriented latitudinal, divides the Zhaysan and Alakol depressions, length up to 200 km, width from 15-20 to 100 km. The highest point of the ridge is mountain Tastau with abs. mark 2992.7 m (Physical and geographical conditions of the national park, 2020).

Within the borders of the Western Tarbagatai, the mid-mountain, low-mountain and foothill adyr relief are distinguished. Sharply divided middle mountains have the highest absolute heights of 2000-2900 m. this type of terrain is characterized by the presence of deep gorges (up to 700 m). Scree is developed on the slopes of the gorges. At absolute altitudes of 2000-2200 m, there are kars -traces of ancient glaciation are noted. The foothills of tectonic ledges are adjoined by powerful foothill plumes of removal cones and the adyr relief. The adyr relief is an alternation of ridges and hummocks with a height of 50-70 m, with weakly grass covered slopes.

The Tarbagatay ridge is located in the zone of dry steppes, the total radiation per year is $120 kcal/cm^2$, the radiation regime in winter is reduced by more than 5 times compared to the summer. Here, the effect of temperature inversion extends to its very tops, so relatively warm weather is often observed.

There are rivers on the territory of the park, the largest of which are Karakol, Karabuta, Keldymurat, Urzhar and Ayagoz. The current glaciation of Tarbagatai is insignificant, there is only one hanging glacier up to 0.7 km long, located on the Northern slope of the ridge near mount Tastau (2794.7 m).

The soils of the Tarbagatai range are very diverse in accordance with the vertical belt. The following soil zones are distinguished: 3100-2400 m-dominated by mountain-meadow Alpine black soils, combined with mountain-steppe. Below, from 2400 to 1800m, the mountain-meadow subalpine black soils are developed in combination with the mountain-steppe ones. From 1800 to 1000 m, mountain-steppe xeromorphic leached soils are developed in combination with mountain black soils. Below, from 1000 to 700 m, southern granular black soils, dark chestnut and chestnut soils are developed, from 700 to 500 m - light chestnut soils.

There are 1,640 species of plants within the park, including many species of medicinal plants. The peculiarity of the park is the presence of more than 35 species of endemic plants included in the Red Book of Kazakhstan: mertensia tarbagataica (*Mertensia tarbagataica*), stelleropsis tarbagataica (*Stelleropsis tarbagataica*), acantholimon tarbagataicum (*Acantholimon tarbagataicum*). One of the aims of the park is to preserve rare species of trees and shrubs (Siver's apple (*Málus sievérsii*), Ledeburov almond (*Amygdalus*), Altai wolfberry (*Daphne altaica*), etc.) and herbaceous vegetation (pale-flowered grouse (*Fritillaria pallidiflóra*), snow weevil (*Cardamine nivalis*), needle-tailed Holly (*Oxytropis Hystrix*), ledeburiella zhabricevidnaya (*Ledeboriella seseloides*), etc.).

There are 376 species of vertebrate fauna in the Tarbagatai national park, including 19 species of fish, 23 species of reptiles, 2 species of amphibians, 272 species of birds, and 60 species of mammals. Among them, 40 species of animals are included in the Red Book of Kazakhstan. Ecotourism on the territory of the Tarbagatai state enterprise is at the very initial stage of development. The park is located on the territory of Urzhar district of East Kazakhstan

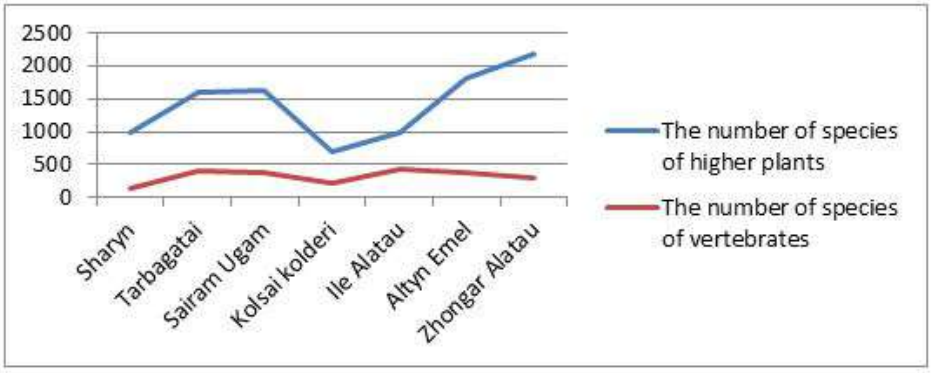

FIGURE 7. Total number of species of higher plants and vertebrates within the national natural parks of southeastern Kazakhstan

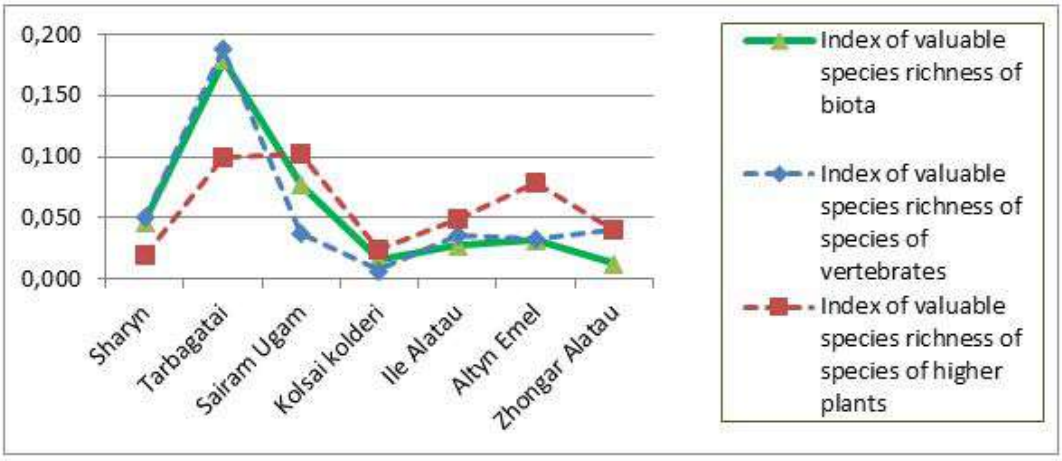

FIGURE 8. Index of valuable species richness of species of higher plants and vertebrates of national natural parks of southeastern Kazakhstan

region. Thus, the population of the territories adjacent to the protected areas as of 01.01.2019 amounted to more than 74.8 thousand people (10% less than in 2009), about half of them are economically active.

National natural parks of southeastern Kazakhstan have unique natural resources, diverse landscapes, rich floristic and faunal diversity. They represent the nature of 6 high-altitude zones, which create a solid foundation and ample opportunities for the active development of eco-tourism.

A comparative quantitative analysis of the flora and fauna of the national natural parks of the desert zone of Kazakhstan showed a greater variety of higher plants, compared with the diversity of vertebrate species. At the same time, the largest number of species of higher plants are confined to the national natural parks of Zhongar-Alatau, Altyn-Yemel, Sairam-Ugam and Tarbagatai (Fig. 7). Among them, the national natural park of ZhongarAlatau should be particularly noted, where the species diversity of vegetation reaches 2168.

The biological diversity of natural parks is characterized by the presence of rare and relict protected species listed in the Red Book of Kazakhstan. The analysis of their distribution, taking into account the area of natural parks, shows that the highest indices of valuable protected species are typical for natural parks of the mountains of the South-East of Kazakhstan: Tarbagatai, to a lesser extent Sairam Ugam and Altyn-Yemel (figure 8).

At the same time, the highest index of valuable species diversity is typical for higher plants, relative to the species richness of vertebrates.

CONCLUSIONS

Most of the natural parks of the desert zone were created in the last 20 years due to the urgent need to preserve the unique landscapes and biodiversity of Kazakhstan in the conditions of climate change and anthropogenic impact. The main purpose of their creation was to preserve and restore unique natural complexes that have special ecological, scientific, cultural and recreational value.

Natural parks of the desert, semi-desert and steppe zones located in the south and southeast of Kazakhstan within the middle and high mountainous territories with a typical high-rise zone, they are characterized by a clearly

developed elevation and the differences in the exposure of the slopes. The foothills of mountain systems are located in the zone of deserts and semi-deserts, which are replaced by higher belts of steppes, forests, high-mountain tundra and nival belt with glaciers. Within the high-altitude zones, their characteristic flora and fauna is developed, rich in rare species.

These are unique natural parks, within which there are almost all existing natural landscapes in the Northern hemisphere. Natural parks "Sharyn" and "Kolsai kolderi" also represents a rare geological-geomorphological and hydrological plans the objects with relict species.

Due to the location of natural parks in the desert zone in different high-altitude zones, they have a wide range of diverse landscapes and significant resource potential for the development of eco-tourism. There are 65 routes that introduce tourists to typical and rare landscapes, natural monuments, picturesque landscapes of untouched nature, cultural and historical monuments and eco-friendly types of local crafts.

At the same time, the potential of national parks in the desert zone has not yet been fully explored. It is necessary to study aquatic ecosystems and biodiversity of water bodies, to study further rare species of biodiversity for their conservation, to establish monitoring system of natural resources and biodiversity of national parks, their adaptation to climate change, to determine the ecological and recreational capacity of national park ecosystems for sustainable development of ecological tourism.

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