

## ASSESSMENT OF THE NATURAL RESOURCE POTENTIAL OF THE IMPORTANT BIRD AREAS OF THE NORTH KAZAKHSTAN REGION FOR THE DEVELOPMENT OF ORNITHOLOGICAL TOURISM

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**Abstract:** To assess the potential of the allocated Important Bird Areas (IBA) of the North Kazakhstan region for the development of ecological tourism in the region. The work uses the materials of field research of domestic and international ornithological expeditions, cartographic method, statistical and mathematical processing of the data obtained. The territory of the North Kazakhstan region is of interest for the development of ornithological tourism. This is facilitated by the natural resource potential of the allocated promising IBA. The borders of these territories coincide with lake ecosystems located in the forest-steppe and steppe zones of the region. The selected ornithological areas are confined to lake ecosystems that are on the way of migrations and nesting of birds. IBA are characterized by floristic and faunal diversity, insignificant human development. The habitation of rare and endangered species has been noted. The presence of roads ensures accessibility to the studied territories of tourists and wildlife lovers from Kazakhstan, near and far abroad. The allocated territories may be used not only for ornithological, but also for recreational and educational tourism, as well as amateur fishing. The results of the resource potential assessment confirm the prospects for the development of ornithological tourism in the territory of the North Kazakhstan region in the implementation of environmental measures aimed at preserving the uniqueness of ecosystems. The selected IBA have significant natural resource potential and uniqueness. Key territories associated with lake ecosystems can serve for the development of ornithological and recreational tourism. The comprehensive assessment made it possible to identify the weighting coefficient of the studied properties of the territories. This confirms the fact about the prospects of their use as unique natural objects for scientific research, amateur fishing, various types of tourism on the territory of the North Kazakhstan region.

**Key words:** Important Bird Areas, birds, the Red Book of Kazakhstan, the IUCN Red Book, lakes, ecosystems, ecological tourism, ornithological tourism, tourism industry, natural resource

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### INTRODUCTION

Birds are a unique and integral component of almost all ecosystems, indicators of species diversity in the habitat, and are also used as an indicator of habitat quality (Pereira et al., 2006; Gregory and van Strien, 2010; Kordowska, 2017; Fraixedas et al., 2020;). Thanks to the ability to fly and the peculiarities of adaptation, birds have mastered various habitats, including both natural and man-made landscapes (Hinsley et al., 1995; Fernández-Juricic and Jokimäki, 2001; Ewers et al., 2007; Puhakka et al., 2011). However, despite the high ecological plasticity, as well as the ability to adapt to various environmental changes, birds continue to prefer natural landscapes. Birds concentrate on areas minimally affected by human activity (Sharps et al., 2023). One of these sites are Important Birds Areas (IBA). They were created and described as unique bird habitats based on criteria set by the International Union for Conservation of Nature (Sklyarenko et al., 2008; Carr et al., 2023). In addition to scientific significance, IBA have natural and recreational potential, which includes not only ecological, but also scientific and cognitive aspects. One of the unique aspects of these territories is their placement in places as close as possible to natural landscapes, with their floral and faunal diversity. Under the influence of anthropogenic factors, there is a decrease in the species diversity and number of birds in the already existing IBA. In this regard, there is a

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need for regular monitoring studies to assess the resource potential of IBA. This is confirmed by the studies of a number of authors (Bonzi et al., 2021; Stemmer et al., 2022). Monitoring studies can help to prioritize conservation of the natural resource potential for the IBA (Donald et al., 2019). The study of these territories is not only of scientific interest, but is also of great importance for the formation of environmental education and can be used to develop the tourism industry (Callaghan et al., 2018; Conradie and Van Zyl, 2021; Schwoerer and Dawson, 2022).

One of the modern directions of the tourism industry is ornithological tourism (Nicolaidis, 2014; Steven and Jones, 2015; Ocampo-Peñuela and Winton, 2017). Ornithological tourism has been known for many years and developed in many regions of the world, constituting an important segment of sustainable tourism (Sekercioglu, 2002; Ma et al., 2013; Kronenberg, 2016; Liu et al., 2021). The development potential of ornithological tourism in Northern Kazakhstan is quite high due to the high species diversity of birds of various ecological groups (Vilkov, 2010; Tarasov, 2010; Solovyev et al., 2011).

Ornithological tourism is one of the most widespread, developing and profitable forms of eco-tourism and ranks second in the world in popularity after hiking (Biggs et al., 2011, Szczepańska et al., 2014; Steven et al., 2014; Goncharova et al., 2020; Afanasyev et al., 2021; Ren et al., 2022). Countries with a high level of development of ornithological tourism include the USA, Canada, Great Britain, Scandinavian countries, France, Germany, Japan. There is a slightly smaller scale of enthusiasm for this type of tourism in other European countries (Popov et al., 2017).

In recent years, ornithological tourism in Kazakhstan has also been developed. The diversity of birds, numbering more than 500 species, determines the high interest and prospects of ecological tourism (Ryabitsev et al., 2014). Natural zones have identified potential regions of the republic for ornithology. The most popular region visited by ornithological tourists is the Almaty region. In spring, up to 260 species of birds can be found in this region in a short period of observation (Ryabitsev et al., 2014). However, other regions of Kazakhstan are no less attractive. Northern Kazakhstan can be singled out, there is a powerful Central Asian migration route. Every year millions of birds visit this territory during spring and autumn migrations (Yerokhov, 2013; Cresswell et al., 1999; Zuban et al., 2020; Jones et al., 2022; Kamp et al., 2015). At the same time, the development of ornithological tourism in the northern regions of Kazakhstan is hindered by the weak study of promising territories for the organization of ornithological tourism. There is no marketing research. There is no tourist infrastructure equipped with communications in accordance with the requirements of international standards (Istomina et al., 2016; Ovalles-Pabon et al., 2022). The North Kazakhstan region is the territory of nesting and migration of many species of birds.

This is facilitated by unique forest, forest-steppe and steppe landscapes. In addition, numerous lakes contribute to the formation of unique ecosystems and recreational facilities. There are 2328 lakes with an area of more than 10 hectares on the territory of the region, which differ in morphometric, hydrological, hydrobiological, and mineral indicators (Fomin et al., 2020). These aspects determine the floral and faunal diversity of reservoirs, form unique aquatic and near-aquatic ecosystems. The natural resource potential of the lakes attracts wetland bird species, as well as near-water representatives. The conducted research allowed us to identify key ornithological territories within the borders of the North Kazakhstan region. These territories may be used as objects for ornithological tourism. Together, this provides a unique resource potential for the development of the tourism industry in the Northern region (Smykova, 2015; Dmitriyev et al., 2021b; Dmitriyev et al., 2022).

## MATERIALS AND METHODS

In order to study the possibility of developing ecological tourism in the region, an assessment of the resource potential allocated by the IBA of the North Kazakhstan region was given. At the first stage of the work, the results of many years of field research conducted by the authors on the territory of the North Kazakhstan region in 2008-2022 were summarized. Field studies included the study of the species composition and abundance of birds at the projected IBAs, their description and further monitoring. For this, generally accepted faunistic methods were used, including visual observations and direct counting with the help of optical instruments (binoculars and spyglasses). At the second stage, the potential of each of the IBAs was assessed by determining the main properties of the object that are important for the organization of ornithological tourism. The evaluation properties (criteria) themselves, as well as the significance of each criterion, are determined using sociological data collected by questioning representatives of the ornithological community. The assessment of the IBA potential was carried out using a complex quality indicator, which was calculated using the weighted average calculation method.

$$k = \sum k_i \sum a_i \quad (1) \quad \text{(Fomin et al., 2020:89) where } (k_i) \text{ - is an indicator of the } i\text{-th property of the object, points; } (a_i) \text{ - is the weighting coefficient of the indicators } (k_i), \text{ a fraction of one } (\sum a_i = 1)$$

Based on the available scientific data, the weighting coefficient of each IBA was calculated. This allowed us to evaluate the properties characteristic of the allocated territories of the North Kazakhstan region. On this basis, the IBA tourism potential significance coefficient was calculated. At the third stage, an assessment of a set of properties of the studied territories was carried out, which made it possible to rank and identify the most promising ecosystems for ornithological tourism within the boundaries of the region under study (Semochkina, 2012; Stoyashcheva and Golovin, 2020; Dmitriyev et al., 2021b).

To systematize and evaluate the obtained data, methods of mathematical and statistical analysis, geoinformation systems were used, which made it possible to assess the resource potential of ornithological territories (Dirin et al., 2017).

To visualize the selected ornithological territories, a map has been prepared, confirming their compact location, reflecting their association with lakes and administrative regions, as well as the presence of a transport network, which is the basis for the development of ornithological tourism in the region.

## RESULTS AND DISCUSSION

IBA are unique sites of global importance for the conservation of bird populations identified based on a set of

criteria. The criteria were defined in 1979 at the international level within the framework of the IBA creation concept developed by BirdLife International (Donald et al., 2019; Steven et al., 2015). Based on the proposed criteria, 121 IBA in Kazakhstan were described and confirmed by the BirdLife secretariat by 2008. The materials of scientific expeditions were published in the summary catalog "Important Bird Areas of Kazakhstan" (Sklyarenko et al., 2008). 10 IBA of the North Kazakhstan region were included in this catalog, combining a number of wetlands most important for birds with adjacent areas (Table 1). Each of the territories has a name corresponding to the name of the lake (or group of lakes). A universal international IBA code is proposed that emphasizes the uniqueness and belonging of the territory to the studied region of Kazakhstan (Sklyarenko et al., 2008). The IBA of the North Kazakhstan region are located within the administrative boundaries of 7 districts of the region (Timiryazev, Zhambyl, Shal Akyn, Yesil, Akkayyn, Tayynshin and Ualikhanov) within the subzones of the southern forest-steppe and moderately arid steppe.

Table 1. Important Bird Areas of the North Kazakhstan region (Source: the authors' own calculations)

IBA Code	Name of the territory	Area (ha)	Distance from the regional center (km)	Number of species from the Red Book of Kazakhstan, individual	Number of globally threatened species, individual	Share of the total number of birds in the region, %
KZ025	Sorbalyk-Maybalyk group of lakes	3400	201	11	8	18.5
KZ028	Lake Bol'shoyKak	11500	269	13	5	9.3
KZ029	Lake Aksuat	4589	244	12	8	20.0
KZ030	Lake Zhaltyr	2594	195	9	10	29.6
KZ031	Lake Maly Kak	9721	220	7	8	27.8
KZ045	Lake Terenkol`	835	58	5	7	9.3
KZ046	Lake Zhylandy	3410	89	4	6	20.4
KZ047	Lake Balykty	4138	90	8	10	31.5
KZ048	Lake Shaglyteniz	34750	123	10	7	31.5
KZ080	Lake Teke	70310	383	5	6	6.3

They differ in area, their landscape and floral component and are unique in species composition. Moreover, the species composition is represented by numerous faunal diversity. There are rare bird species from the Red Book of Kazakhstan, as well as globally threatened species from the red list of the International Union for Conservation of Nature (IUCN). A feature of the ecosystems of the studied lakes and adjacent territories is their insignificant anthropogenic transformation. This is confirmed not only by biological diversity, but also by the weak infrastructure development of adjacent territories and the lack of high-quality highways. The combination of these factors makes it possible to conclude that the allocated territories can be used as objects for ecological, including ornithological tourism. A number of these lakes are used by the local population and visitors for amateur fishing. The resource potential of IBA is insufficiently studied, there are no modern comprehensive studies. A necessary element of the scientific substantiation of the possibility of using these natural complexes for tourism is the assessment of their natural resource potential. Below we present a brief description of the IBA region.

**Sorbalyk-Maybalyk group of lakes.** The territory is located on the territory of a slightly undulating plain in the Zhambyl district and has a total area of 3,400 hectares. The distance to the regional center of Petropavlovsk is 201 km. It includes a group of 9 big and small lakes alternating with grain fields, steppe areas and small birch-aspen stakes. The largest reservoirs on the site are lakes Maybalyk (190 ha.) and Sorbalyk (360 ha.). Some of the reservoirs are suitable for amateur fishing, as well as recreation and swimming in the summer. About 60 (18.5% of the species diversity of the region) bird species are found on the site, including 11 species from the Red Book of Kazakhstan. Among them, Steppe Eagle *Aquila nipalensis*, Eastern Imperial Eagle *Aquila heliaca*, White-tailed Sea-Eagle *Haliaeetus albicilla*, Peregrine Falcon *Falco peregrinus*, Whooper Swan *Cygnus cygnus*, Tundra swan *Cygnus bewickii*, Red-breasted Goose *Branta ruficollis*, Lesser White-fronted Goose *Anser erythropus*, Common Crane *Grus grus*, Demoiselle Crane *Anthropoides virgo*, Tittle Bustard *Tetrax tetrax*. A globally threatened mammal species, Bobak marmot *Marmota bobak*, is found in undeveloped steppe areas.

**Lake Bol'shoy Kak.** The territory is located within the subzone of the moderately arid steppe within the administrative boundaries of the Timiryazev district and has a total area of 11,500 hectares. The distance to the regional center of Petropavlovsk is 269 km. The territory is represented by a large brackish lake, as well as adjacent open areas of preserved steppes, as well as agricultural land. The reservoir is used for growing commercial fish species (*Carassius gibelio*, *Esox lucius*, *Perca fluviatilis*). There are about 30 species of birds - 27.8% of the species diversity of the region, including 13 species from the Red Book of Kazakhstan. For example, Steppe Eagle *Aquila nipalensis*, Eastern Imperial Eagle *Aquila heliaca*, White-tailed Sea-Eagle *Haliaeetus albicilla*, Peregrine Falcon *Falco peregrinu*, Whooper Swan *Cygnus cygnus*, Tundra swan *Cygnus bewickii*, Red-breasted Goose *Branta ruficollis*, Lesser White-fronted Goose *Anser erythropus*, Common Crane *Grus grus*, Demoiselle Crane *Anthropoides virgo*, Tittle Bustard *Tetrax tetrax*, Dalmatian Pelican *Pelecanus crispus*, Pallas's Gull *Larus ichthyaeu*.

**Lake Maly Kak.** The territory is located in a shape area, with a slightly undulating relief within the administrative boundaries of the Timiryazev district. It has an area of 9721 hectares. The distance to the regional center of Petropavlovsk is 220 km. The territory is represented by a large brackish lake, as well as open areas adjacent to it. The natural vegetation around the lake is almost destroyed because most of the land is played and used for agriculture. In different seasons of the year, about 70 species of birds are found here - 27.8% of the species diversity of the region,

including 7 species from the Red Book of Kazakhstan. These species are White-tailed Sea-Eagle *Haliaeetus albicilla*, Whooper Swan *Cygnus cygnus*, Tundra swan *Cygnus bewickii*, Red-breasted Goose *Branta ruficollis*, Lesser White-fronted Goose *Anser erythropus*, Common Crane *Grus grus*, Tittle Bustard *Tetrax tetrax*. Steppe areas on the western side of the lake are inhabited by – Bobak marmot *Marmota bobak*.

**Aksuat Lake.** The territory is located on a steppe site, within the administrative boundaries of the Timiryazev district. It has an area of 4589 hectares. The distance to the regional center of Petropavlovsk is 244 km. The wetlands of the territory are represented by the fresh lake Aksuat and occupy about 40% of the total area of the site. The remaining 60% of the territory is occupied by grassy areas and crops of grain crops. Reed thickets and areas adjacent to the reservoir are a nesting site and a place of migratory aggregations of more than 50 bird species – 20.0% of the species diversity of the region. Of the species listed in the Red Book of Kazakhstan, there are: White-headed Duck *Oxyura leucocephala*, Steppe Eagle *Aquila nipalensis*, Eastern Imperial Eagle *Aquila heliaca*, White-tailed Sea-Eagle *Haliaeetus albicilla*, Peregrine Falcon *Falco peregrinus*, Whooper Swan *Cygnus cygnus*, Tundra swan *Cygnus bewickii*, Red-breasted Goose *Branta ruficollis*, Lesser White-fronted Goose *Anser erythropus*, Common Crane *Grus grus*, Dalmatian Pelican *Pelecanus crispus*, Pallas's Gull *Larus ichthyaetus*. Steppe areas on the eastern and southern sides of the lake are inhabited by – Bobak marmot *Marmota bobak*.

**Lake Terenkolʼ.** The territory covers an area of 835 hectares and is located within the kolochnaya forest-steppe within the administrative boundaries of the Akkajyn district. The distance to the regional center of Petropavlovsk is 58 km. There is an artificial freshwater lake with an unstable hydrological regime on the site. Reed-cattail thickets are well developed on the lake. The areas adjacent to the lake are occupied by grazing and sowing fields. Vegetation on the northern side of the meadows adjacent to the lake is represented by steppe associations. The woody and shrubby vegetation of the adjacent territories is represented by birch-aspen spikes with an undergrowth of rose hips and willows. The avifauna of the site is represented by 25 species of nesting and flying birds - 9.3% of the species diversity of the region. Rare species include White-tailed Sea-Eagle *Haliaeetus albicilla*, Whooper Swan *Cygnus cygnus*, Red-breasted Goose *Branta ruficollis*, Dalmatian Pelican *Pelecanus crispus*, Pallas's Gull *Larus ichthyaetus*.

**Lake Zhaltyr.** The territory covers an area of 2594 hectares and is located within the kolochnaya forest-steppe within the administrative boundaries of the Shal Akyn district. The distance to the regional center of Petropavlovsk is 195 km. About 50% of the territory is occupied by Lake Zhaltyr. The western and southern shores of the reservoir are swampy, there are extensive shoals. The area around the lake is represented by a plain. The lands adjacent to the lake are partially plowed and used for agriculture. Steppe mesophilic vegetation grows in the preserved natural areas. In the western part of the site, at a distance of about 2 km there are birch-aspen spikes. The avifauna of the territories is quite typical for wetlands of the forest-steppe zone. In different seasons of the year, about 80 species of birds are found here during nesting, molting and migrations - 29.6% of the species diversity of the region, including 9 species from the Red Book of Kazakhstan. These include White-headed Duck *Oxyura leucocephala*, White-tailed Sea-Eagle *Haliaeetus albicilla*, Peregrine Falcon *Falco peregrinus*, Whooper Swan *Cygnus cygnus*, Tundra swan *Cygnus bewickii*, Red-breasted Goose *Branta ruficollis*, Common Crane *Grus grus*, Dalmatian Pelican *Pelecanus crispus*, Pallas's Gull *Larus ichthyaetus*.

**Lake Zhylandy.** The reservoir with adjacent territories is located in the forest-steppe zone, within the administrative boundaries of Akkajyn district and has an area of 3410 hectares. The distance to the regional center of Petropavlovsk is 89 km. The lake is shallow of a monstrous type of overgrowth. The territories adjacent to the reservoir are swampy and covered with meadow vegetation, there are also agricultural fields. The territory is a place of nesting and migration aggregations of about 55 species of waterfowl and near-water birds - 20.4% of the species diversity of the region, including those listed in the Red Book of Kazakhstan (White-tailed Sea-Eagle *Haliaeetus albicilla*, Common Crane *Grus grus*, Red-breasted Goose *Branta ruficollis*, Whooper Swan *Cygnus cygnus*).

**Lake Balykty.** This territory has an area of 4138 hectares. The distance to the regional center of Petropavlovsk is 90 km. It includes Lake Balykty and adjacent areas of forest-steppe, with fields of grain crops alternating with grazing. It is located within the administrative boundaries of the Akkajyn district. The lake is open, there is a border of reeds and cattails along the banks. Woody vegetation within the territory is represented by birch-aspen forests with rosehip undergrowth. Lake Balykty is a nesting place for mass aggregations of more than 80 species of waterfowl and near-water birds - 31.5% of the species diversity of the region, including 8 species from the Red Book of Kazakhstan (White-headed Duck *Oxyura leucocephala*, White-tailed Sea-Eagle *Haliaeetus albicilla*, Peregrine Falcon *Falco peregrinus*, Whooper Swan *Cygnus cygnus*, Tundra swan *Cygnus bewickii*, Red-breasted Goose *Branta ruficollis*, Lesser White-fronted Goose *Anser erythropus*, Common Crane *Grus grus*, Dalmatian Pelican *Pelecanus crispus*).

**Lake Shaglyteniz.** The territory is located within the administrative boundaries of the Akkajyn and Tajynshin districts, covers the water area of the lake, adjacent floodplain meadows and covers an area of 34750 hectares. The distance to the regional center of Petropavlovsk is 123 km. The shoreline of the reservoir, heavily overgrown with an array of reeds and cattails. The open areas adjacent to the lake on the eastern side are occupied for the cultivation of agricultural crops. The territory is a place of nesting and migration aggregations of about 85 species of waterfowl and near-water birds - 31.5% of the species diversity of the region. In some years, the number of which can reach more than

150,000 individuals. Among the species listed in the Red Book of Kazakhstan, there are regularly found: Steppe Eagle *Aquila nipalensis*, White-tailed Sea-Eagle *Haliaeetus albicilla*, Peregrine Falcon *Falco peregrinus*, Whooper Swan *Cygnus cygnus*, Tundra swan *Cygnus bewickii*, Red-breasted Goose *Branta ruficollis*, Lesser White-fronted Goose *Anser erythropus*, Common Crane *Grus grus*, Dalmatian Pelican *Pelecanus crispus*, Pallas's Gull *Larus ichthyaetus*.

**Lake Teke.** The territory includes Lake Teke with adjacent fields, has a total area of 70370 hectares and is located within the steppe zone within the administrative boundaries of the Ualikhanov district. The distance to the regional center of Petropavlovsk is 383 km. Teke is a drainless bitter-salty lake with several streams flowing into it that temporarily dry up in summer. On all sides, the lake is surrounded by salt lakes and salt marshes. The natural steppe areas adjacent to the lake are plowed for the cultivation of agricultural crops. The bird species diversity of the territory is not high, there are about 20 species of steppe and aquatic birds - 6.3% of the species diversity of the region. The lake is a place of migratory accumulations in the autumn of Common Crane *Grus grus* and Demoiselle Crane *Anthropoides virgo*. The number of these species in some years can reach more than 10,000 individuals. Other rare bird species are also recorded here during migrations: Red-breasted Goose *Branta ruficollis*, Steppe Eagle *Aquila nipalensis*, Common Crane *Cygnus cygnus*.

Thus, 10 key ornithological territories have been allocated within the borders of the North Kazakhstan region. As a result of the research and analysis of the available materials, an assessment of the level of tourist potential of each IBA is given, based on a modified complex quality indicator obtained by weighted average calculation, according to 10 criteria, according to a 5-point system. This made it possible to present the studied material in the form of a table (Table 2).

The properties of Important Bird Area are determined by 10 criteria, which are assigned numbers. I – The development of the transport network. II – Anthropogenic load on IBA III – Environmental status. IV - Species diversity of birds. V –Bird Cluster. VI – Globally threatened bird species from the list (IUCN). VII - Species listed in the Red Book of Kazakhstan. VIII – Availability of observations. IX - Aesthetics and diversity of landscapes. X - The degree of improvement.

Table 2. Evaluation of the properties of Important Bird Areas (Source: the authors' own calculations)

IBA Property	Quantitative characteristic of the parameter of the object property indicator (ki), score					The weighting coefficient of the indicator (ai)
	1	2	3	4	5	
I	Distance from paved roads – more than 20 km	Distance from paved roads – 10 – 20 km	Distance from paved roads – 5-10 km	Distance from paved roads – 3 – 5 km	Distance from paved roads - 1-3 km	0.07
II	Availability of industrial facilities	Dense network of rural settlements, the presence of landfills	A large area of land allocated for agriculture	The predominance of natural landscapes over those used in agriculture	A large number of natural landscapes of natural territories	0.08
III	This territory does not have a conservation status	This territory is part of a nature reserve of regional significance	This territory is part of the state nature reserve	This territory is part of the state reserve	This territory is included in the UNESCO World Natural Heritage List	0.05
IV	Less than 5% of the total number of species in the region occurs	It occurs from 5 to 10% of the total number of species in the region	It occurs from 10 to 20 % of the total number of species in the region	It occurs from 20 to 50 % of the total number of species in the region	There are more than 50 % of the total number of species in the region	0.23
V	There are no large concentrations of waterfowl and near-water birds on this territory	Large accumulations of waterfowl and near-water birds from 500 to 1000 individuals are regularly found on this territory	Large accumulations of waterfowl and near-water birds from 1000 to 5000 individuals are regularly found on this territory	Large accumulations of waterfowl and near-water birds from 5,000 to 10,000 individuals are regularly found on this territory	Large accumulations of waterfowl and near-water birds more than 10,000 individuals are regularly found on this territory	0.1
VI	There are no globally threatened species in this territory	From 1 to 3 species are regularly found on this territory	From 4 to 6 species are regularly found on this territory	From 7 to 10 species are regularly found on this territory	More than 10 species are regularly found on this territory	0.1
VII	There are no species from the Red Book on this territory	From 1 to 3 species are regularly found on this territory	From 4 to 6 species are regularly found on this territory	From 7 to 10 species are regularly found on this territory	More than 10 species are regularly found on this territory	0.1
VIII	Most of the shoreline of the lake is covered with vegetation, there are no elevated places for observation	Most of the shoreline of the lake is covered with vegetation, there are elevated places	The shoreline of the lake is open for observation at 25-50 %	The shoreline of the lake is open for observation at 50 – 75 %	The shoreline of the lake is open for observation at 75 - 100%	0.15
IX	Weak expressiveness of the relief	Monotonous landscape	Expressive landscape	Picturesque views of the landscape	Bright multifaceted picturesque views of the landscape	0.07
X	Minor landscaping	Additional improvement of beaches	Additional food items	Places to stay overnight	Capital structures	0.05



The assessment of the Important Bird Area made it possible to identify the properties that are of the greatest importance. The greatest value has a property that directly determines the basis of ornithological tourism, this is the species diversity of birds. Its value is 0.23. Further down the ranking, it takes the availability of observations, with a coefficient of 0.15. It determines the availability of optimally accessible places for placement and observation. The coefficient of 0.1 is characterized by three properties that determine the number and species diversity, this is a cluster of birds, globally threatened bird species, as well as species listed in the Red Book of Kazakhstan.

Less than 1.0 of the weighting coefficient obtained properties characterizing the anthropogenic load – 0.08. The diversity of landscapes and the development of the transport network has a coefficient of 0.07. The coefficient of 0.05 have properties that emphasize the degree of improvement and the environmental status of the studied territories. Analyzing the values of the coefficients obtained, it becomes possible to assume that for the organization of ornithological tourism, the properties characterizing the degree of landscaping and development of the territory are not decisive. On the contrary, the coefficients characterizing species diversity, the presence of rare and endangered birds, which have received maximum values, allow us to talk about the need for a minimum degree of human development of the territory. A comprehensive assessment of the tourism potential of key ornithological territories revealed the most promising natural objects within the borders of the North Kazakhstan region for further research and development of ecological tourism (Table 3).

Table 3. Comprehensive assessment of the tourism potential of the IBA of the North Kazakhstan region (Source: the authors' own calculations)

IBA	I	II	III	IV	V	VI	VII	VIII	IX	X	Total	Total
												k, taking into account (ai)
Sorbalyk-Maybalyk Group of lakes	3	3	1	3	3	4	5	2	4	1	29	3.02
Lake Bol'shoy Kak	4	3	1	2	3	6	5	5	2	1	32	3.37
Lake Aksuat	5	4	2	3	3	4	5	2	2	1	31	3.15
Lake Zhaltyr	3	3	1	3	5	4	4	3	2	1	29	3.13
Lake Maly Kak	4	4	2	3	5	4	4	5	2	1	34	3.63
Lake Terenkul	5	3	3	2	3	4	3	4	3	1	31	3.06
Lake Zhylandy	2	3	3	3	3	3	3	1	2	1	24	2.46
Lake Balykty	2	3	3	3	5	4	4	4	3	1	32	3.38
Lake Shaglyteniz	5	3	1	3	5	4	4	1	2	1	29	2.97
Lake Teke	5	2	1	2	5	3	3	5	1	1	28	2.99

A comprehensive assessment of the allocated territories revealed a high coefficient of tourist potential. The average value is above 3. The minimum value is Lake Zhylandy (Akkajyn district) - 2.46. Natural territories with coefficients from 3 to 3.5 prevail - these are the lakes Sorbalyk-Maybalyk group of lakes (Zhambyl district), Lake Terenkul (Akkajyn district), Lake Zhaltyr (Shal Akyn district), Lake Aksuat (Timiryazev district), Lake Bol'shoy Kak (Timiryazev district), Lake Balykty (Akkajyn district). The largest coefficient of the obtained belongs to Lake Maly Kak (Timiryazevsky district) - 3.63. Almost all of the selected ecosystems are known as objects for eco-tourism.

The analysis of the obtained coefficients of the integrated assessment made it possible to construct a graph visually reflecting the significance of the level of tourist potential and the ranking of IBA (Figure 1). The identified tourist potential of key ornithological territories is quite high and this makes it possible to form and develop routes for the organization of ornithological tourism in the North Kazakhstan region.

On the one hand, the development of the transport network, the border position, the compactness of the location of most of the studied natural ornithological objects in the region determines their logistical features. The uniqueness of the ecosystem complex with its unique faunal and floral diversity, the presence of rare and endangered species, and the relative undevelopment by humans, on the other hand, makes these territories attractive for wildlife lovers. The location of IBA in forest-steppe and steppe natural zones is characterized by unique landscapes, which also bring aesthetic pleasure. The proximity of IBA to lakes makes it possible to use them not only for ornithological, but also for recreational tourism, as well as fishing. The presence of roads makes it possible to travel in all directions from Petropavlovsk, which is the regional center and transport hub, which is the main tourist center (Dmitriyev et al., 2021b; Dmitriyev et al., 2022).

The comprehensive studies carried out made it possible to visualize the results obtained in the form of a cartographic diagram (Figure 2). The placement of the selected ornithological territories confirms their compact placement, their proximity to lakes, and their location in a number of administrative districts. The map chart reflects the well-developed

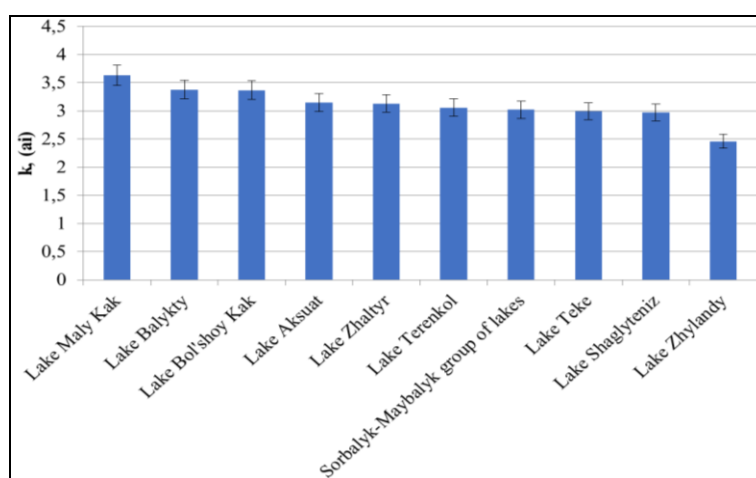


Figure 1. The level of tourist potential of the selected ornithological territories of the North Kazakhstan region (k), taking into account the margin of error with relative errors (Source: based on the authors' calculations)

road network of the studied region. Although it should be noted that most of the highways directed directly to the IBA do not have a good asphalt surface, they belong to unpaved and field roads (Dmitriyev et al., 2021a).

This fact is explained by the insignificant degree of development of the territory, which at the same time contributes to the preservation of unique ecosystems. Analyzing the spatial placement of IBAS, we came to the conclusion about their uneven placement in the North Kazakhstan region. The main part of the lakes is located within the boundaries of the administrative districts of Timiryazev, Esil and Akkajyn. In a number of districts, such as Gabit Musrepov, Ajyrtau, Kyzylzhar, Akzhar, Mamlyut and Magzhan Zhumabaev, there are no designated natural ornithological objects.

This can be explained by the fact that the species diversity of ornithological territories is confined to the migration and nesting routes of birds. This makes it necessary to conduct annual monitoring studies of the territory of the studied region in order to identify and develop possible routes for ornithological tourism.

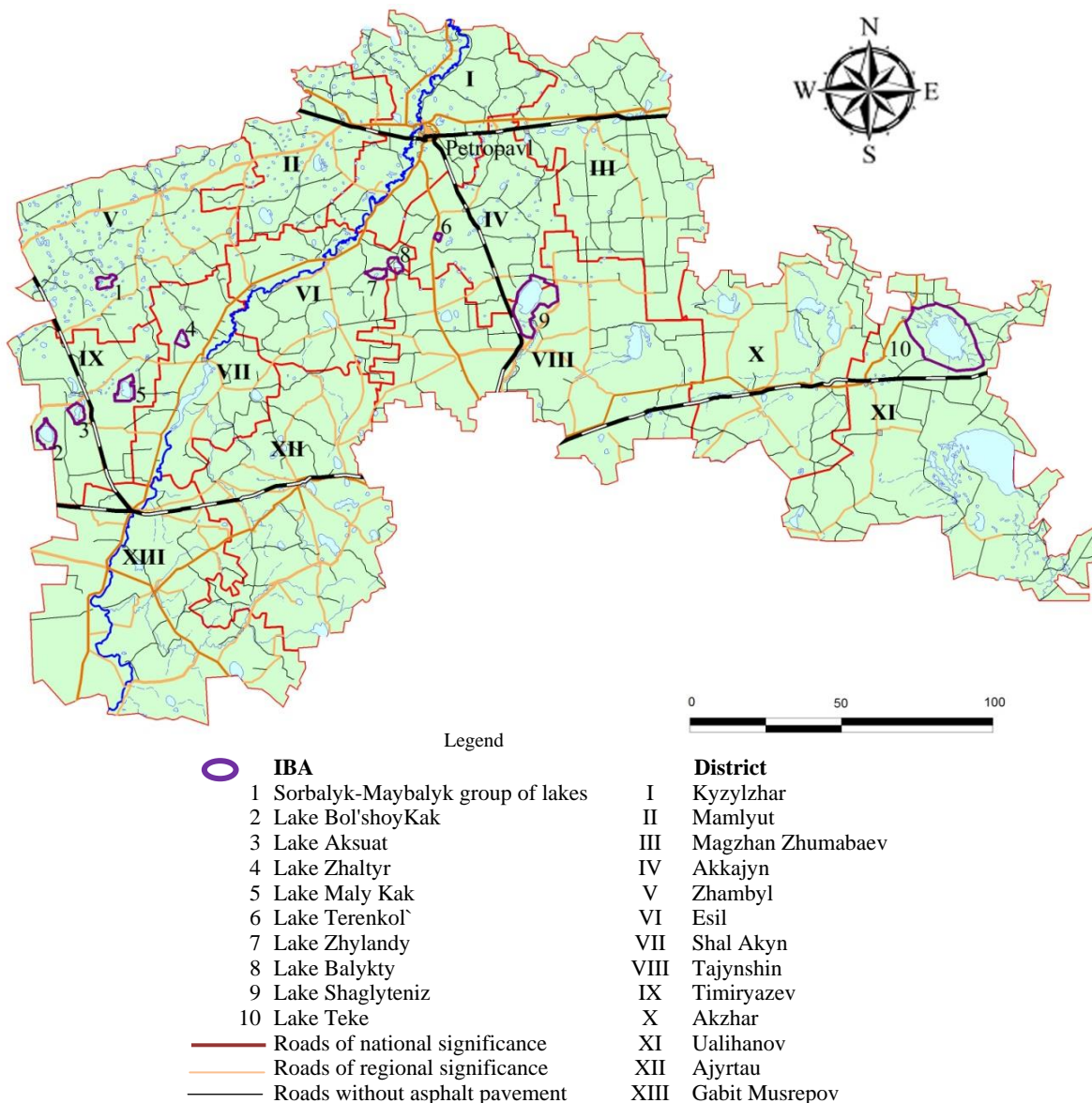


Figure 2. Layout of the IBA within the boundaries of the region (Source: own elaboration)

## CONCLUSION

As a result of long-term domestic and international ornithological studies based on generally accepted methods, IBA have been identified within the administrative boundaries of the North Kazakhstan region. The selected IBA are confined to lake ecosystems that are on the way of migrations and nesting of birds. The uniqueness of the allocated territories is confirmed by the faunal and floral diversity provided by the landscapes of the forest-steppe and steppe zones of the studied region. The development of the road network provides possible access for ornithologists and tourists to ecosystems not only from Kazakhstan, but also from border regions and far abroad. The possibility of using the allocated territories not only for ornithological, but also for recreational and educational tourism, as well as amateur fishing is noted.

The results of the resource potential assessment confirm its high level, the need for modern comprehensive research. To do this, it is important to conduct annual monitoring of the IBA. Along with the development of the tourism industry, it is necessary to implement environmental measures aimed at preserving the uniqueness of ecosystems (Dmitriyev et

al., 2021b; Dmitriyev et al., 2022). The assessment of the IBA tourism potential carried out during the study revealed their level and prospects. Most ecosystems are located on the territory of the Timiryazevsky, Yesilsky and Akkayinsky districts. It is necessary to study in detail their natural resource and recreational potential, conduct monitoring studies, make a forecast of the development of routes. The development of promising areas of the tourism industry will attract interest from the state and private investors, which will lead to the development of the region's economy (Zhidkoblinova, 2013; Akbar et al., 2020; Wendt, 2020; Syzdykova et al., 2022). Compliance with environmental legislation will contribute to the preservation of floral and faunal diversity, natural landscapes. All this is aimed at sustainable development of territories will lead to the formation of ecological and recreational tourism, will interest wildlife lovers, tourists from the republic, as well as from near and far abroad. Thus, the allocated IBAS of the North Kazakhstan region are natural objects for scientific research and use as objects for ecological tourism.

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