DEVELOPMENT OF A GEOGRAPHICAL INFORMATION SYSTEM FOR OPTIMIZING TOURIST ROUTES IN THE ULYTAU NATIONAL NATURAL PARK

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Abstract: This article analyzes the development of ecotourism in the Ulytau Nature Park using innovative Geographic information systems technologies. The main purpose of the study is to create a favorable and innovative environment for the development of the tourist experience, including the search and discovery of historical sites, the development of optimal routes and infrastructure improvements. The use of GIS maps in ecological tourism contributes to the development of optimal routes, improvement of tourist infrastructure and provision of informative services. The analysis of the study makes it possible to identify recommendations for public and private organizations in the field of using GIS technologies for the sustainable development of ecotourism. The created GIS map provides information about the park's territory, the location of objects and routes, which contributes to a more informative and oriented tourist experience. The experience of working with GIS technologies enhances the ability of tourists to navigate, discover and obtain information about historical sites and attractions in ecotourism and help enrich the tourist experience.

Key words: Geographic Information System (GIS), tourist routes optimization, Ulytau National Nature Park, sustainable tourism, resource management, tourism potential, tourist maps.

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INTRODUCTION

Creation of GIS maps of tourist routes in the Ulytau Natural Park is a unique and multifaceted approach to organizing and managing the tourist flow in this significant region. Ulytau is not only a representation of natural wealth and ecosystems, but also a place of historical and cultural value for the Kazakh people (Kadirbayeva and Tuleshova, 2015).

Ulytau was of great importance on the Silk Road, the ancient trade route between China and Europe, providing travelers with fresh water and food, as one of the most important links in the network of goods and culture exchange between different regions. It highlights the rich historical heritage of Ulytau, providing tourists with the opportunity to visit and explore places associated with important events and periods in the history of the country. The purpose of this study is to develop and implement innovative technologies based on geographic information systems (GIS) in the Ulytau Nature Park using world experience and best practices in the field of tourism. The main objectives of the research are the creation of GIS infrastructure and the development of interactive GIS maps containing information about natural and cultural attractions, tourist routes and services and their subsequent integration into the global GIS system (Berdenov et al., 2017).

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The study will analyze the best international practices in the field of GIS technologies and their use in tourism. Successful approaches and methods used to create GIS maps and innovative technologies in tourism will be studied and applied to achieve the goals and objectives of the research in the Ulytau Nature Park. As a result of the research, it is planned to develop and implement GIS technologies that will improve information accessibility and management of tourist resources in the park. The created interactive GIS maps will provide tourists with relevant and useful information about natural and cultural sites, routes and services necessary for a better and more comfortable tourist experience.

In the process of developing and applying GIS technologies, the study will take into account and analyze world experience and best practices in the field of tourism. Successful approaches to the creation of GIS maps and the use of innovative technologies in tourism will be analyzed in order to apply relevant and effective methods in the Ulytau Nature Park. The application of geographic information systems (GIS) in the development of tourist routes makes it possible to harmoniously combine travel and exploration with the conservation of nature and cultural heritage (Vuković, 2022).

An important prerequisite for creating GIS maps of tourist routes in the Ulytau Nature Park is the systematization of data and directions related to the history, culture, and natural resources of the region (Zhuspekova and Maymurunova, 2015). The structuring of tourist routes included consideration of the development of metallurgy in the Kazakh steppes, analysis of the Golden Horde khanates, the study of petroglyphs, natural resources, and the history of the space harbor. These destinations add depth and content to the itineraries, making the travel experience more interesting and cognitive.

The integration of GIS technologies into the development of tourist route maps gives them a new dimension. The creation of interactive maps and virtual tours provides visitors with the opportunity to familiarize themselves with the area and attractions of the park in advance. This contributes to a deeper understanding of the territory and allows tourists to plan their route based on their interests and preferences (Omarzadeh et al., 2022). One of the key benefits of using GIS in tourism is route personalization. Tourists can choose routes and attractions according to their preferences and physical fitness. Accurate maps and navigation through mobile apps enable confident navigation and help avoid confusion, thus enriching the travel experience (Chlachula, 2019). Additionally, GIS allows to create interactive educational programs. Visitors can explore the biodiversity, geology, climate, and other aspects of nature in the reserve in a playful and entertaining way. This promotes environmental awareness and helps tourists interact more deeply with the environment.

However, in addition to tourism benefits, the application of GIS technologies in the Ulytau Nature Park has environmental significance. Monitoring and managing the load of tourist flows can prevent congestion and overload in certain areas, minimizing negative impacts on nature and biodiversity (Seidaliyeva et al., 2021). In addition, GIS allows you to quickly respond to threats such as forest fires or floods, which ensures the safety of visitors and preserves the integrity of ecosystems. This is important for the long-term sustainability of tourism and the conservation of the region's natural resources. The creation of GIS maps of tourist routes in the Ulytau Natural Park also contributes to the popularization and preservation of cultural heritage. The region has a special meaning for the Kazakhs, symbolizing their history, traditions, and national identity. GIS highlights key historical and cultural points of interest, enriching travel itineraries and allowing visitors to better understand and connect with the region's heritage.

One of the notable features of GIS technologies in this context is their ability to continuously evolve. The system can be constantly updated and supplemented with new data, as well as adapted to the changing needs of tourists and environmental conditions. This keeps itineraries relevant and efficient, providing a better experience for future generations of visitors (Ruda, 2016). The creation of GIS maps of tourist routes in the Ulytau Natural Park is of great importance for the development of sustainable tourism, and conservation of natural and cultural heritage. This technological innovation combines historical, cultural, and natural aspects of the region into one harmonious tourist experience. GIS technologies provide visitors with the opportunity to better understand and interact with the environment, as well as contribute to the effective management of tourist flows and the protection of natural resources. Thus, the creation of GIS maps of tourist routes in the Ulytau Natural Park is becoming a key element of modern tourism infrastructure, contributing to the development of the region and enriching the tourist experience.

The study is focused on identifying the tourism potential and promising areas for the development of natural tourism. At the same time, the results obtained can be used to develop recommendations and strategies in the leisure and tourism industry, including winter tourism at the regional level. The research methodology includes employing of field, descriptive and cartographic methods, which allows for a comprehensive assessment and analysis of the tourism opportunities in this region. Based on the data obtained, a winter route was developed that embodies the potential of the territory into a sustainable tourist destination. An important part of the work is represented by the created three-day route map, which serves as a planning and orientation tool for future tourists. This study is aimed at studying the prospects for the development of winter tourism in the Karkaraly Mountains and providing analysis and planning methods for the effective use of tourism potential (Keukenov et al., 2023). The authors (Sumarmi et al., 2021) in their work analyze the ecological environment, the interests of tourists and the opportunities of the local community in Peravan Beach using GIS and data on natural places. The main goal is to create a tourist map covering natural attractions. The publication by the authors (Agybetova et al., 2023) considers the recreational potential of Lake Alakol in the Urdzhar region. The methodology evaluates the possibilities of developing a variety of recreational activities. The results of the work resulted in recommendations for improving infrastructure, stimulating border tourism with China, constantly monitoring the environmental situation, creating landfills for solid and liquid household waste, and organizing systematic cleaning of beaches. Based on a comprehensive understanding of sustainability principles, the authors of the article, Boers and Cottrell, 2007, focus on the development of a GIS-based STIP (Sustainable Tourism Infrastructure Planning) model that contributes to the harmonious interaction of tourism with the environment and cultural aspects (Boers and Cottrell, 2007).

The structure of STIP includes the stages of visitor segmentation, zoning and transport infrastructure planning. Applying the model to a trail planning example in the Sinharaja Nature Reserve (Sri Lanka) using sustainability criteria and GIS methodology identified optimal locations for trails, ensuring balanced tourism and minimizing environmental impact. The integration of GIS into sustainable tourism infrastructure planning ensures the efficient use of resources and the conservation of natural and cultural values (Suleimenov et al., 2022). The application of GIS in tourism research is a methodological approach with significant potential for enhancing analytical capabilities in the study of the spatial aspects of tourism phenomena. GIS provides the means to efficiently collect, manage, analyze and visualize spatial data, which provides a deep understanding of tourism dynamics, environmental impacts and social interactions (Mason, 2015).

Geographic Information Systems (GIS) (Bozdağ, 2022) play a key role in tourism research, covering a wide range of important aspects. They are used to optimize routes and place tourist infrastructure, taking into account the preferences of tourists and environmental restrictions. GIS is also being used to assess the impact of tourism on the environment and develop mitigation measures. The interaction of tourists and local communities is also explored through GIS (Bennett and Armstrong, 2001), analyzing socio-cultural aspects. These systems help develop marketing strategies, analyze the behavior of tourists, as well as coordinate crisis situations and ensure security. Geostatistics, on the other hand, enriches the analysis of spatial data (Burrough, 2001). It allows you to evaluate the structure, correlations and distribution of quantities on the geographical surface. The combined use of GIS and geostatistics allows more accurate analysis of geographic data, considering spatial dependencies and interpolation of values. The article "Methodology for Developing Cultural Tourist Routes using Geographic Information Systems (GIS)" (Calderón-Puerta and Arcila-Garrido, 2020) presents a methodology for developing cultural tourist routes using Geographic Information Systems (GIS).

The work focuses on the theoretical analysis of the role of GIS in tourism and the distinction between the concepts of "tourist routes" and "cultural routes". The methodology includes two stages: a quantitative study of the cultural heritage of the late Middle Ages and an analysis of the potential for tourism using GIS. The study was conducted in the Spanish province of Cadiz. The results confirm the effectiveness of the methodology and justify the choice of places to include in the route, considering accessibility and cultural values. The work of Kazakh researchers (Taukebayev et al., 2021) is devoted to the problem of developing a map-scheme of routes and infrastructure along the Ayusai Gorge for the sustainable development of tourist and recreational activities in the Ile-Alatau National Park using GIS technologies, to stimulate tourism activity and support cultural development, based on a common history spanning several centuries.

Several authors (Da Silva and Da Rocha, 2012; Karas et al., 2021) have dedicated their research to the use of web-enabled mobile applications, which are gaining new and important significance for the tourism industry (Zharkenova et al., 2023). The authors believe that a more detailed analysis of mobile applications in the tourism sector: accommodation, ticketing, vehicle rental, route planning navigation will contribute to a more efficient and comprehensive improvement of the tourism experience, as well as enriching the functionality of the tourism industry.

Spatial Route Modeling in GIS (Iovanovis and Negush, 2008) presents a methodology for spatial route modeling using Geographic Information Systems (GIS). The model allows us to analyze the density of the tourist flow in different areas and periods of time, and determine the peaks of the load and demand for services. The basis is geographic data, road infrastructure, attractions. Parameters, including travel time and modes of transport, are weighted by importance. Routing algorithms (such as Dijkstra or A*) calculate the best routes given the particular parameters. The resulting routes are available to tourists through applications or web services. The methodology contributes to the optimization of movement between points, improving the quality of the tourist experience and the efficiency of transport infrastructure.

Research (Nieto et al, 2014) considers a methodology for spatial route modeling in GIS using network applications for tourism promotion. The model aims to optimize the attractiveness and effectiveness of tourism offerings by integrating geographic data and network technologies. GIS analysis is based on spatial data, including geographic parameters and the creation of predictive models. The application of GIS analytical methods reveals hidden spatial patterns, contributing to a deeper understanding of the geographical environment and optimization of tourism aspects.

The model also emphasizes the importance of integrating modern networked applications, ensuring active interaction between tourists and local resources. This provides tourists with navigation functions, route planning and access to up-to-date information about local attractions. All this helps to optimize the tourist experience and improve the interaction between visitors and the surrounding geographical environment. The use of GPS technology in studying the behavioral aspects of individual travelers has revolutionary potential. GPS allows to accurately track routes, timeslots and locations, enriching analysis with real-time data. This eliminates the disadvantages of traditional data collection methods such as limited coverage and inaccuracy. In the context of assessing the impact of transport management strategies and technologies on travel behavior, the authors propose a new approach based on the use of GPS, personal mobile phone system (PHS) and geographic information system (GIS) (Ohmori et al., 2000). The analysis of information obtained using GPS and PHS allows a deeper assessment of how effective these technologies are in the field of collecting information on travel behavior and reveals the potential for improving the quality of the analysis of behavioral patterns in this context.

"Smart Tourism: foundations and developments" (Gretzel, 2015), published in the journal "Electronic Markets", analyzes the concept of smart tourism and its evolution in the context of modern information and communication technologies. The authors (Matos et al., 2019) highlight the role of digital innovation in changing the travel experience, looking at the impact of information technologies such as mobile apps and geolocation systems on infrastructure renewal and service customization. Examples of practical applications are given, including interactive maps and mobile guides, and challenges and prospects for implementing smart tourism are discussed, including aspects of privacy and standardization. The essence of this study is to analyze the significance of smart tourism in the modern world and its

contribution to the tourism industry. GPS technology has significantly changed the collection of movement data (Wu et al., 2016). The use of built-in GPS sensors in smartphones makes it possible to accurately measure spatial and temporal characteristics, overtaking the limitations of traditional methods. This provides new perspectives for research (Shen and Stopher, 2014). Despite the availability of literature, reviews of methods for determining movement modes based on smartphone GPS data remain limited. Rahayuningsih et al., 2016 explores GIS to assess cultural resources and their distribution in tourism activities. The methodology includes the collection of data on natural and socio-cultural objects, geocoding, and visualization. The developed GIS structures the spatial distribution into seven categories: a) high attractiveness and accessibility, b) high attractiveness and medium accessibility, c) high attractiveness and low accessibility, d) medium attractiveness and high accessibility, e) medium attractiveness and accessibility, f) medium attractiveness and low availability, g) low attractiveness and availability. The application of GIS reveals patterns in site placement and potential for tourism infrastructure. The paper presents a methodological approach to the use of GIS for the analysis and management of resources, considering the potential for tourism development and emphasizing the importance of planning based on spatial resource data. The work (Ghorbanzadeh et al., 2019) analyzed the geographical factors in Iran, divided into four clusters: "water attractions", "forest attractions", "mountain attractions" and "scenic places". The GIS made it possible to visualize the data, identifying places with high attendance (red) and areas with low tourist significance (dark). The results can be used to identify sustainable tourist sites and classify them according to their level of importance, taking into account economic, social and environmental aspects.

Chhetri and Arrowsmith, 2008 analyze the use of GIS to assess the recreational potential of natural tourist destinations. The applied method was developed for the Grampians National Park in Australia. The use of regression modeling made it possible to create scenic attractiveness predictors based on data obtained from student surveys. The results are integrated with the "potential of recreational opportunities" in the region. A spatial model of "recreational potential" was formed, identifying areas of high potential around popular hiking trails. Alternate strategic points are also highlighted to reduce congestion on heavily used routes. Despite sampling limitations, the method provides a tool for predicting recreational opportunities in parks for tourism management.

MATERIALS AND METHODS

The methodology of this study is based on the method of geographical information analysis. This method involves the use of geospatial data and geographic information systems (GIS) to analyze the spatial characteristics of tourist sites and their interaction with the environment. Two stages were carried out in the research process: field research and digitization of analog tour routes into a GIS system. Field research included the collection of data from primary sources such as observations, interviews with local residents and experts, questionnaires, as well as the collection of geographical information on the spot, using photographs, geolocation devices (GPS) and mobile devices with applications for recording routes. At the stage of creating spatial databases, geographical and attribute data on tourist sites were noted, which allowed structuring information for subsequent analysis and visualization. The data obtained made it possible to classify tourist sites and determine their distribution, accessibility, potential for development and interrelation with other factors (Kvamme, 1999). Graphical maps and diagrams created using a geographic information system were used to analyze and visualize the results. GIS provides opportunities for creating and editing maps, managing geodata, conducting spatial analysis, modeling, 3D visualization and time series analysis. Digitization of the maps has made it possible to create a spatial representation of routes and provide ease of use and navigation opportunities for tourists.

Thus, the use of the method of geographical information analysis and GIS technologies allowed researchers to analyze the spatial characteristics of tourist sites, the distribution and interrelationships between them, as well as to determine the potential for the development of the tourism sector. The research report is presented in the form of graphic maps and diagrams that allow you to visually present the results obtained. For the development of GIS maps of tourist routes of the Ulytau National Natural, geospatial data such as topographic geodata, satellite imagery and digital elevation models were integrated to accurately determine the geographical situation and characteristics of the routes.

Modern technological solutions, such as mobile devices, geolocation services, virtual and augmented reality, QR codes, contribute to the addition of interactive elements to the map, thereby enriching the visual and informational experience of tourists (Mínguez, 2020). The methodology includes three key stages: the first is a detailed study of the geographical area, including the collection and analysis of a variety of data on cultural, environmental, and infrastructural aspects; the second is the analysis of the potential of the territory using geographic information and a contrasting potential index; the third is the development of tourist routes based on the integration of data and previously calculated tourist potential.

For the successful implementation of the project to create GIS maps of tourist routes of the Ulytau National Natural Reserve, the following sources were used: Official maps, topographic data, satellite images and aerial photographs of the Ulytau territory provided by government organizations and international sources, data on biological diversity, ecosystems, geological features, climate and other aspects of nature obtained through research and scientific sources. Information about cultural attractions, ethnographic features, historical facts, and customs of the local population, available from archives, scientific research and local sources. State-of-the-art GIS software ArcGIS, QGIS for creating and analyzing maps, as well as geodata processing tools, and collaborating with local governments, scientists, experts, and the community to get up-to-date data and actionable information. To build a digital elevation model (DEM), an open geoinformation system QGIS (Borràs et al., 2014) is used. As a basic tool for the final visualization of cartographic data, the vector graphics editor Adobe Illustrator is used. When preparing a tourist map of the Ulytau Natural Reserve, a set of cartographic image methods was used. The main method was the sign method (Tikunov and Eremchenko, 2015), used to display objects of historical

and cultural significance, historical and cultural monuments, other buildings and structures. The database of the system for monitoring the tourist activity of the Ulytau Natural Park was structured and is a systematic set of tourist routes (Figure 1).
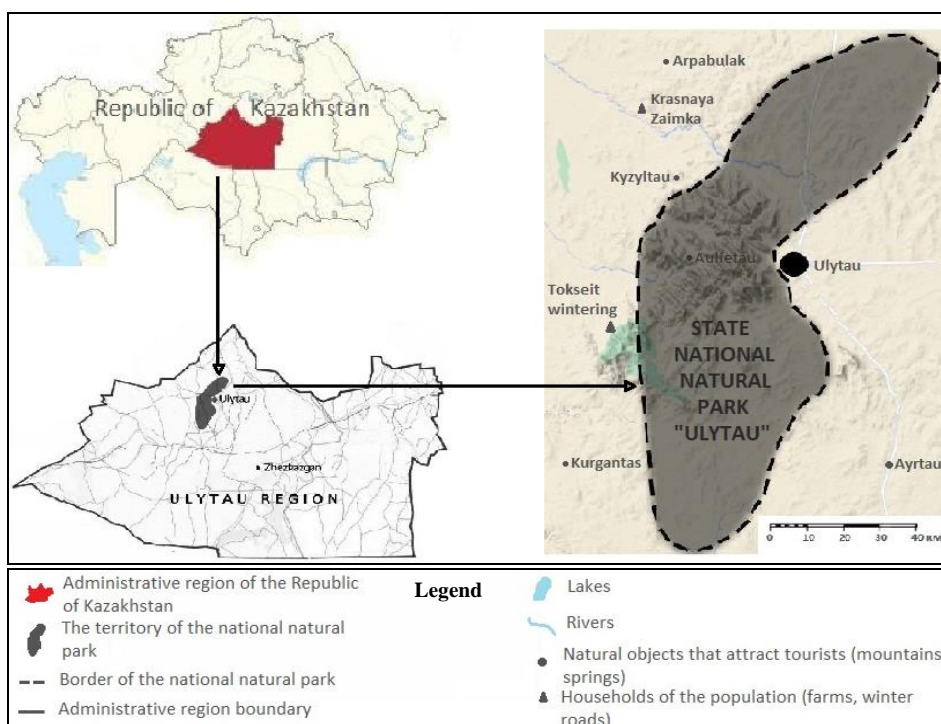

Figure 1. Map of the State National Natural Park "Ulytau" Note: the figure was compiled by the authors based on the ARGIS program

Tour route 1 (Figure 2): Zhezkazgan - Terekty village - Terekty rock paintings (94 km). Geographic coordinates of the Terekty tract: N48°12'46.02" E68°37'08.07".

Tourist route 2 (Figure 3): The historical and cultural part of the route is represented by tourist route 2.

Tour route 3 (Figure 4): Zhezkazgan - Ulytau village - Aulietau peak - Edyge peak.

Tour route 4: Route "Zhezkazgan-Zhezdy-Karsakpai-Baikonur".

Important sources of information in the preparation of the tourist route are represented by the documents of the Ulytau National Natural Park: data from the Historical and Industrial Museum named after K.I. Satpayev Corporation "Kazakhmys" (Zhezkazgan), Historical and Archaeological Museum with the exhibition hall "History of the Development of Cosmonautics" (Zhezkazgan), Museum of the History of Mining and Smelting named after M. Toregeldin (Zhezda), House-Museum of Kanysh Satpayev (Karsakpay), Museum school number 17 (Baikonyr). The map shows tourist resources and cultural heritage sites.

RESULTS AND DISCUSSION

The need to study the tourist routes of the Ulytau Natural Park and create GIS maps is due to several factors that have a significant impact on the management of natural resources and the tourism infrastructure of this territory.

Firstly, the existing tourist routes have not been studied enough and are little systematized. This leads to inconvenience for visitors who face insufficient information and limited options for choosing and planning routes. The lack of a clear system of signage and orientation in space creates difficulties for tourists and can negatively affect their visiting experience. Secondly, the creation of GIS maps of tourist routes allows to collect, aggregate, and visualize a variety of data, such as geographic information, environmental parameters, cultural heritage and other key factors. This provides a completer and more accurate picture of the area's unique aspects and its potential for tourism.

Thirdly, GIS maps make it possible to more effectively manage tourist flows and infrastructure. They allow to optimize routes, evenly distribute visitors, and prevent negative impacts on vulnerable ecosystems and biodiversity. This contributes to the sustainable development of tourism, minimization of environmental impact and conservation of natural resources. Fourth, the creation of GIS route maps promotes research and knowledge sharing. It provides a platform for data collection, trend analysis and development strategies. GIS-based research can provide valuable information about the impact of tourism on the environment, socio-cultural aspects, and economic performance (Singh, 2015).

In the process of structuring tourist routes in the Ulytau National Natural Park, data were systematized in several key areas (Shuptar, 2016). One of these areas was the study of the development of metallurgy in the Kazakh steppes, which is a significant aspect of the historical and cultural heritage of the region. This study allows a deeper understanding of the evolution of metallurgical technologies and their impact on the appearance of the region in different historical periods.

Another important aspect of the structuring of tourist routes was the analysis of the Golden Horde khanates, which played a significant role in shaping the cultural and socio-economic aspects of the territory. This direction enriches the understanding of historical events and the dynamics of power in this area.

Also, the inclusion of natural resources of the Ulytau Park into the route structure gives them additional depth and significance. The analysis of petroglyphs, archaeological research and art objects reveals the unique artifacts of ancient civilizations and contributes to the understanding of the historical dynamics of the region.

An equally important direction was the study of the space harbor, associated with a historical event, when the first cosmonaut visited the Kazakh land for the first time. This direction allows to understand the modern connections of mankind with space and the introduction of innovations in the field of tourism more deeply. Thus, the structuring of tourist routes in the Ulytau National Natural Park based on these directions provides a unique opportunity for a comprehensive study of the cultural, historical, natural and innovative heritage of the region, enriches the experience of tourists and contributes to the preservation and promotion of its unique aspects (Aldybayev et al. 2021).
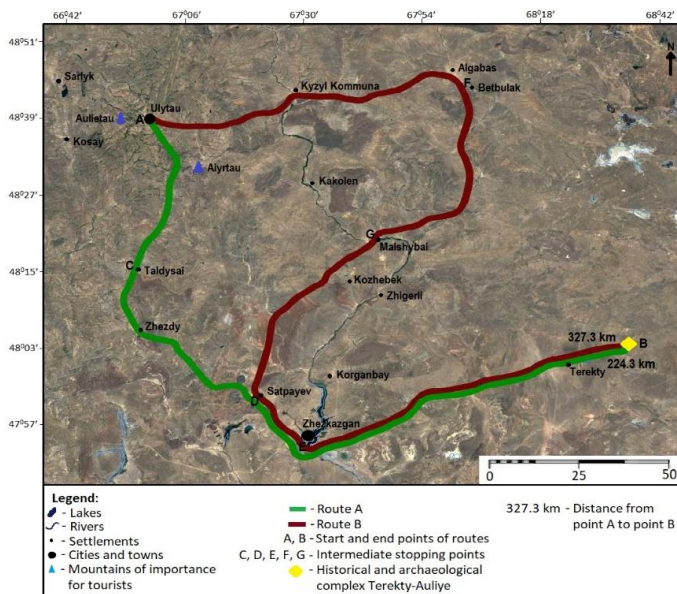

Figure 2. Tour route 1: Zhezkazgan
- the archaeological complex of Terekty-Aulie
Note: the figure was compiled
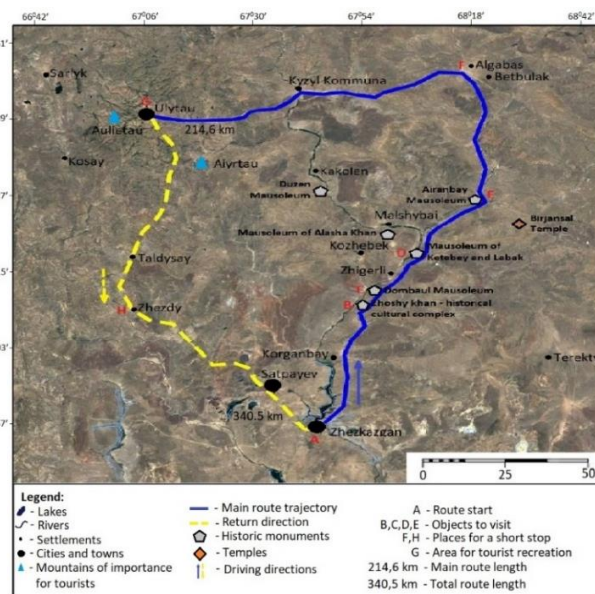by the authors based on the ARGIS program

Figure 3. Route 2: Zhezkazgan - Zhoshy Khan mausoleum
(50 km), - Dombauyl mausoleum (5 km) - Ketebay and Labak
mausoleum (20 km) - Alasha Khan mausoleum - Duzen Sandybay
necropolis (23 km) - Aiyrtau village - Ulytau village (58km)

Tour route 1 (Figure 2): Zhezkazgan - Terekty village - Terekty rock paintings (94 km). Geographic coordinates of the Terekty tract: N48°12'46.02" E68°37'08.07". The historical and archaeological complex of Terekty-Aulie consists of a gallery of rock paintings - a Neolithic site, settlements and necropolises of the Bronze Age, burial mounds of the early Iron Age, the remains of horizontal and vertical adits, in which ores and semi-precious minerals were mined, mazars of the 9th-19th centuries. Petroglyphs of the Terekty are located on the tops of three granite hills, stretched in a chain from west to east. Images of animals are carved on the stones, which can be attributed to the Saka animal style, to the Bronze Age (III - I millennium BC), early Iron Age (IX century BC - III century AD) and to the Middle Ages.

Tour route 2 (Figure 3): "Zhezkazgan - the mausoleum of Zhoshy Khan (50 km), - the mausoleum of Dombauyl (5 km) - the mausoleum of Ketebay and Labak (20 km) - the mausoleum of Alasha Khan - the Duzen Sandybay necropolis (23 km) - the village of Aiyrtau - the village of Ulytau (58 km)". For the first time, the mausoleum of Zhoshi Khan was mentioned in the notes of Hafiz Tanysh (XVI century). In 1946, an archaeological expedition led by A. Margulan during excavations discovered two burials in the mausoleum. According to scientists, one of them belongs to Zhochi Khan, the other - to his elder wife Bektumysh. Mausoleum of the Hun period Dombauyl (5 km). One of the largest stone structures in Kazakhstan, built in the pre-Islamic period, VIII - IX centuries. The mausoleum is a tall cone-shaped structure on a base close to a square. The Labak mausoleum was built in 1874, it is a portal-dome structure with dimensions in terms of 7.25×8.25 m, height 6.45 m. Here is also the mausoleum of Ketebay (XIX century). The mausoleum of Ketebay was built of raw brick and lined with burnt bricks. This is one of the best examples of mausoleums of the 19th century in Central Kazakhstan. The dome is destroyed, restoration work was not carried out. The Mausoleum of Alasha Khan (15 km), erected in the first half of the 13th century, was built of good-fired square bricks, has a portal-dome structure. The outer laying of the mausoleum imitates a carpet with alai patterns. According to folk legend, Alasha Khan was a fair ruler, a brave leader of the Kazakh tribes. The mausoleum of Duzen Sandybayuly was built in the middle of the 19th century in 1863 - 1866 by the Kazakh master Seraly Elamanuly, commissioned by a large feudal lord Erdyn from the Naiman clan, over the grave of his brother Zhuzden. It is a poor copy of the mausoleum of Alasha Khan. The mausoleum was built of burnt bricks on clay-adobe mortar. According to the stories of old-timers, sheep's milk was added to make bricks for its strength. The building is cubic with a hemispherical dome.

Tour route 3 (Figure 4) Zhezkazgan - Ulytau village - Aulietau peak - Edyge Peak. Aulietau summit is located 2 km west of Ulytau village. Oral creativity of the local population brings us that the top of Mount Aulietau (1133 m) is closest to the sky, it is there that Heaven and Earth meet, therefore, since ancient times, the mountain was considered a sacred place, the abode of gods and spirits, a place of constantly operating sacred forces and rituals a place of connection between man and nature.
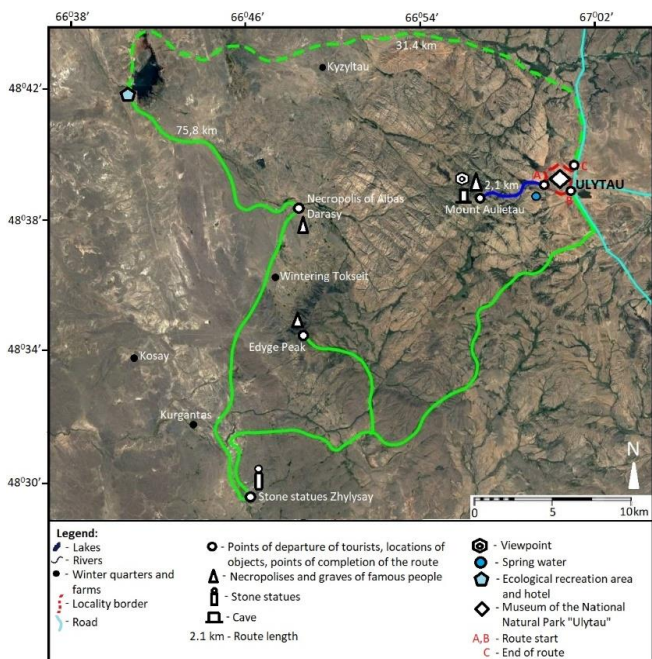
Figure 4. Tour route 3: Zhezkazgan - Ulytau village - Aulietau Peak - Edyge Peak (Note: the figure was compiled by the authors based on the ARGIS program)
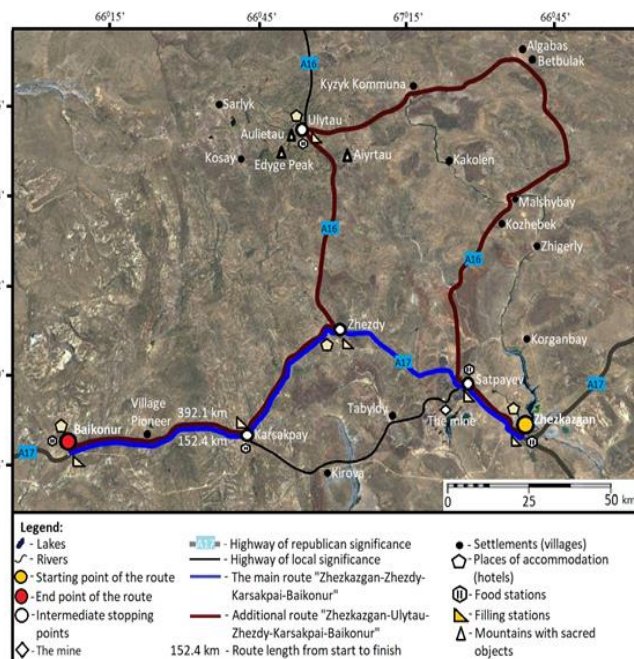

Figure 5. Tour route 4: Zhezkazgan-Zhezdy-Karsakpai-Baikonur (Note: the figure was compiled by the authors based on the ARGIS program)

Edyge Peak, located 35 km west of the village of Ulytau. At its top is the burial place of the famous Khan of the Golden Horde Tokhtamysh (Toktamys). At the top of the sacred Ulytau, the respected Edyge hakim was buried, whose name the mountain later began to be called. He was a contemporary of Tokhtamysh Khan, who ruled the Golden Horde in 1380-1395, the cities of Sauran and Syganak were considered the central cities. Edyge's body was buried in the Ulytau mountains, setting a tombstone over the grave. Since then, the places "Mountain Edyge", "Edyge Grave" have appeared here. The birthplace of Edyge himself is the Ulytau area, namely Kishitau (a small mountain).

Route 4: (Figure 5) Route Zhezkazgan-Zhezdy-Karsakpai-Baikonur (Bakytova and Medeuova, 2023). Tour route 4 is interesting because the history of the space harbor and the development of smelting in the steppes of Ulytau are intertwined in this direction (Figure 5). The route includes the following points of visit:

Zhezkazgan - "Dzhezkazgan - a space harbor" (Zhezkazgan Historical and Archaeological Museum, Exhibition Hall "History of the Development of Cosmonautics", Garyshkerler (Spacemen) Boulevard, Walk of Fame, House with Greetings, Houses with Panels on Garyshkerler (Spacemen) Boulevard Street, Monument to the Conquerors of Space, Historical - Production Museum named after K.I. Satpayev at Kazakhmys Corporation LLP), the Monument to "Three Heroes" in the village of Shalginsky, Terekty district, presumably 9 km away was the measuring point 7-T, which was the base for tracking space rockets before its departure into outer space.

Zhezdy - the village of Zhezdy, and earlier the village of Marganets, where the Museum of the History of Mining and Smelting named after Maken Toregeldin, the museum exposition reveals the history of the development of the mining and smelting industry in the Kazakh steppes are located (Baipakov, 1998).

Karsakpai - Karsakpai copper plant, House-Museum of K.I. Satpaeva, Baikonur - (school museum in the village of Baikonyr, petroglyphs of Baikonyr and Bileuti, the historical landscape of the Battle of Bulanty, Uytas, Batyrlar Korymy, Tandai, Kokalazhar, the historical working settlement of Baikonyr).

Mosque Dulygaly (on request) 90 km from the village of Baikonyr, "Dulygaly". Geographic coordinates of the Dulygaly mosque: N48°32'12.30" E65°42'34.69". Mosque. It is located on the right bank of the Dulygaly River, 170 km west of the village of Ulytau. Built at the end of the 19th century. The well-known traditional healer Kazi Ishan, who lived in the 70s of the XX century, rests in the necropolis next to the mosque.

Ulytau Natural Park occupies a special place among nature reserves due to its outstanding significance and uniqueness. This park has a rich biodiversity, including a variety of plant, animal, and ecosystem species, which makes it an exceptional site for research and conservation of rare and endangered species.

But the significance of the Ulytau Natural Park extends far beyond biodiversity. This place also has a deep historical and cultural heritage that reconnects us with ancient times and allows us to better understand the evolution of our planet and the shape of the region throughout history. Archaeological monuments, petroglyphs and sacred places reveal their secrets right here, giving us a look into the past. Ulytau Park also plays a key ecological role in conserving natural resources and maintaining ecosystems. Its significance becomes especially relevant in the context of biodiversity conservation and the balance of natural processes in the modern world, which is exposed to many threats.

Ecotourism and educational programs offered in Ulytau Park promote awareness of natural issues and inspire people to learn and care for the environment. Tourists can immerse themselves in natural beauty while exploring unique ecosystems and supporting the region's sustainable development. Thus, the Ulytau Natural Park combines the richness of

nature, deep cultural heritage, and importance for environmental sustainability. It is a place where history, nature and mankind meet in harmony, continuing to inspire and delight generation after generation.

CONCLUSION

The study and structuring of tourist routes in the Ulytau National Natural Park are a complex and multifaceted task, which was solved by systematizing data in several key areas. The analysis of the conducted studies allows us to draw the following conclusions. Firstly, the study of the metallurgy development in the Kazakh steppes is an important component of structured routes. It allows a deeper understanding of the technological and economic progress of the region throughout history, as well as its impact on the appearance and cultural heritage of the area.

Secondly, the analysis of the Golden Horde khanates reveals to researchers and tourists a wealth of cultural and socio-economic aspects of the past. This direction contributes to a deep understanding of historical processes, the influence of rulers and the dynamics of power on the formation of social structure. Thirdly, the inclusion of the natural resources of Ulytau Park in the routes enriches the experience of visitors. The analysis of petroglyphs and archaeological objects reveals to them the unique artifacts of the history, nature, and culture of this area.

And, finally, the exploration of the space harbor testifies to the connection of the region with the space history of mankind. This destination opens new horizons for the tourist experience, allowing visitors to better understand and appreciate humanity's role in space exploration. Thus, the systematization of tourist routes in the Ulytau National Natural Park within the framework of the above directions contributes to a deeper and more comprehensive understanding of the historical, cultural, and natural heritage of the region. It enriches the experience of tourists, helps to preserve the unique aspects of the place, and promotes it among visitors, leaving an unforgettable mark on their memories and perceptions.

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