

PAPER • OPEN ACCESS

The Natural Potential of the Sharyn River Basin as the Basis for Developing Health Tourism in Kazakhstan

To cite this article: B S Kerimbay *et al* 2021 *IOP Conf. Ser.: Earth Environ. Sci.* **670** 012021

View the [article online](#) for updates and enhancements.

You may also like

- [Mapping and modeling the impact of climate change on recreational ecosystem services using machine learning and big data](#)
Kyle Manley and Benis N Egho
- [Using of the methods of landscape research in determining allowable recreational pressure](#)
A E Astashin, N I Astashina, E A Vasilieva et al.
- [Mapping and monitoring recreational disturbance of the territory for the recreational nature management](#)
T E Isachenko, G A Isachenko, M V Bocharnikova et al.



ECS The Electrochemical Society
Advancing solid state & electrochemical science & technology

242nd ECS Meeting

Oct 9 – 13, 2022 • Atlanta, GA, US

Early hotel & registration pricing ends September 12

Presenting more than 2,400 technical abstracts in 50 symposia

The meeting for industry & researchers in
BATTERIES
ENERGY TECHNOLOGY
SENSORS AND MORE!

 Register now!

  **ECS Plenary Lecture featuring M. Stanley Whittingham,** Binghamton University
Nobel Laureate – 2019 Nobel Prize in Chemistry



The Natural Potential of the Sharyn River Basin as the Basis for Developing Health Tourism in Kazakhstan

B S Kerimbay^{1*}, A N Dunets² and O N Baryshnikova²

¹ L.N. Gumilyov Eurasian National University (ENU), 2 Satpayev str., Nur-Sultan 010008 Kazakhstan

² Altai State University, 61 Lenina pr., Barnaul 656049 Russia

E-mail: bayan.kerimbay.65@mail.ru

Abstract. The paper analyzes the tourist and recreational potential of the Sharyn River basin, which can serve the basis for further development of health tourism centers. The research is based on field studies of landscapes conducted in summer 2019 in the Sharyn River basin. Four key sections were laid along the Sarytugay, Moyyntukay, Temirlik, and Shonzhy routes. A digital thematic map was created in ArcGIS 10.1. The landscapes of the Sharyn River basin have a significant natural potential for developing a combined type of tourism, which includes the medical and recreational aspects of providing tourism services. Transport accessibility, a long warm season, the prevalence of clear weather in summer, attractive landscapes and water bodies, and significant biodiversity make this territory a very promising place for organizing ecological, educational, and recreational tourism. The authors note that the Sharyn State National Natural Park and the UNESCO Sharyn Biosphere Reserve are located in the studied region, and this fact guarantees preserving natural recreational resources and developing tourist routes. The sparsely populated area allows to observe animals and plants in their natural habitat. The complex of the piedmont plain *Ketmen* allows providing a wide range of sanatorium services, including thermal waters for heating buildings and organizing greenhouses. To prevent negative consequences of unorganized tourism and justify further investments in recreational resources development, the authors provided recommendations that would ensure the sustainable development of medical tourism. This fact creates prerequisites for forming a new health and tourist cluster of international importance in Kazakhstan.

Keywords: Recreational potential of landscapes · Recreational resources · Sharyn river basin · Shonzhy thermal springs · Medical tourism · Ecotourism

1. Introduction

The research area is located in the Uyghur district, Almaty region, the Republic of Kazakhstan. The administrative center is the village of Shonzhy. The town is located 346 km away from the regional center, Taldykorgan, and 243 km away from Almaty. Despite the considerable distance from transport hubs, a significant number of tourists visit the studied area. In 2010, the number of tourists amounted to 3,700 people. In 2018, this figure increased to 4,400 people due to the considerable tourist and recreational potential of Sharyn. One can see picturesque canyons and sites with relict and red book plants in the Sharyn National Nature Park. Popular tourist routes pass near the Sharyn River. Deposits of medicinal thermal waters were discovered in the foothills. These features of local landscapes are enough to initiate the creation of a recreational territory of international importance.



This paper studies the tourist and recreational potential of the Sharyn River and the current conditions for its use. The study objective is to identify factors affecting the development of health tourism in Sharyn.

Preliminary studies showed that the tourist and recreational potential of the Sharyn River could become the basis for forming a medical tourism center or resort since hot springs allow them to provide balneological services all year round. Mineral thermal water deposits are widely used. Hotel complexes with pools, water parks, low-rise pensions, guest houses, and other facilities are being built. To prevent the negative consequences of unorganized tourism and justify further investments in recreational resources development, it is necessary to conduct their comprehensive assessment and formulate recommendations, which will ensure the sustainable development of medical tourism.

2. Materials and Methods

The popularization of tourism and its role in sustainable development have great importance for developing countries. Regional monitoring aimed at detecting challenges and finding solutions is required to accelerate domestic tourism [9].

The Sharyn River's recreational potential includes landscape, geological, geomorphological, hydro-geological, hydro-climatic, faunistic, and floristic resources allowing to develop health tourism.

Health tourism provides relaxation, allows people to visit new and attractive places, and get body, mental, and spiritual treatment. This type of tourism is considered a spiritual and physical healing concept aimed at harmonizing a person's relationship with the environment based on natural and artificial factors, the predominance of water procedures, a healthy diet, and physical activity [1, 2, 8].

Health tourism is considered a combined type of tourism. It includes medical services and sightseeing. Recreants involved in medical tourism can be absolutely healthy or have certain diseases [10, 11]. Thus, medical tourism involves creating hotel infrastructure and the use of balneological properties of landscapes and tourist routes [3].

New destinations are becoming interesting travel routes for international tourists, including several developing countries, contributing to the country's economy.

For these purposes, the authors carried out a component-wise and comprehensive assessment of the recreational potential of the studied areas and established their features. These features are due to the location of the Sharyn River in the Tien Shan's foothills and low mountains. This location determined the conditions for conserving relict elements of landscapes, significant biodiversity, and the formation of deposits of thermal mineral waters and the climate's balneological properties.

Tourism associated with thermal and healing waters was known since ancient times. However, mineral water should be used in medical and health procedures under medical supervision. Balneological waters are divided into (1) highly mineralized ($M = 10\text{--}35$ g/l); (2) brine ($M = 35\text{--}150$ g/l); (3) strong brines ($M = 150\text{--}160$ g/l); (4) very strong brines ($M > 600$ g/l). Brines with $M > 150$ g/l can be diluted with fresh water to the mineralization required during treatment. Water temperature is important for preserving gases [15].

An essential resource for developing medical tourism is a relatively comfortable climate for living and recreation. The average annual air temperature is from $8\text{--}8.5$ °C. The warm period in the foothills lasts about eight months. The growing season (with an average daily temperature above 5 °C) in the foothills and low mountains lasts 205–225 days. The summer is hot and dry; the average temperature of the hottest month (July) is from $+20$ °C to $+25$ °C. Winter is cold. On some days, the temperature can drop up to -40 °C. Nevertheless, the duration of the period, with weather conditions not limiting tourist activities, is 310–320 days [5].

The combination of mountain and mountain-valley landscapes related to the desert, steppe, forest-steppe, forest, and meadow types creates an aesthetic appeal of this territory. The woods are confined to river valleys and northern expositions of mountain slopes. Desert and steppe landscapes correspond to the foothills' watershed surfaces, low mountains, and southern slopes. Lowland meadows are found in floodplains. Alpine meadows are confined to the remnant peaks of the middle mountains. Significant biological diversity is observed because the Sharyn River valley is a quaternary refugium. More than

1,500 species of plants grow in it, 17 of which are listed in the Red Book of the Republic of Kazakhstan [RK]. There are 62 species of mammals, 103 species of birds, and 25 species of reptiles. Such diversity has a beneficial emotional effect on tourists. There are certain guarantees of its preservation. The Sharyn State National Natural Park is located 7 km west of the village of Shonzhy on the Sharyn River. There were discovered relic plants and paleontological finds. In 2018, the Sharyn was included in the international network of biosphere reserves of UNESCO. The Sharyn Biosphere Reserve combines the Sharyn and Temirlik canyons, as well as the relic Sarytugay grove into a single whole. Sogdian ash (*Fraxinus Sogdiana*) has been preserved in this grove since Paleogene times [12].

On the reserve territory, there are turanga light forests, groves from Afghan poplar (*Populus afghanica*), sesoliform (*P. Pruinosa*), variegated (*P. Heterophylla*), overgrowth of Iliya barberry (*Berberis iliensis*), Ili honeysuckle (*Lonicera iliensis, semenovii*), Dzungarian reyurim (*Reaumuria songarica*), Iliysky saxulchik (*Arthrophytum iliense*), etc. In total, 61 species of rare and endemic plants, including those listed in the Red Book of the Republic of Kazakhstan, were found. In the study area, there are gazelles (*Gazella subgutturosa*), Central Asian frog (*Rana asiatica*), and mottled round-headed (*Phrynocephalus Versicolor*). The avifauna of the park and its immediate surroundings is diverse (130 birds, including three species listed in the Red Book of the Republic of Kazakhstan: osprey (*Pandion haliaetus*), burial eagle (*Aquila heliaca*), peregrine falcon (*Falco peregrinus*)) [13, 14]. Avifauna also includes sajah (*Syrhaptes paradoxus*), serpent eater (*Circaetus gallicus* or *Circaetus ferox*), black stork (*Ciconia nigra*), eagle owl (*Bubo bubo*), saker (*Falco cherrug*), vulture (*Neophron*), etc. Currently, there were two tourist routes: (1) “Castle Valley” (Sharyn Canyons) and (2) Sarytugay “Ashen Grove.” One more route, “Temirlik Canyons,” is being developed [12].

In the summer of 2018, field landscape studies were conducted along the Sarytugay-Moyyntukay-Temirlik route. The research program included a relief profile, description of geobotanical objects, and the laying and description of sections.

The critical area No. 1, Ashen Grove (43°30.972/N, 079-15.046/E; altitude 787 m), is located on the northern outskirts of the village of Bahar, Uyghur district in the Sarytugay tract (figure 1), 50 meters from the highway. This site is located in the Sarytugay Valley. It is composed of pebble-sand and loamy deposits. Their surface is finely tuberous with numerous beams. The bottom of the valley is the floodplain of the Sharyn River. There are preserved communities of Sogdian ash (*Fraxinus Sogdiana*) and Turan groves from Asian poplar (*Populus Simonii*) formed in the Ice Age.

Sea buckthorn willow thickets grow in the coastal part of the floodplain due to excessive moisture. Sucker willow tugai with different grass cover prevails in the elevated areas. Ash undergrowth is well developed. The primary type of vegetation is ash wood (figure 2), which accounts for about 35% of the forested area. Ash forms pure stands and communities with the participation of poplar.

A geobotanical site was laid in the ground cover on the northern outskirts of an ash-tree tugai forest with mixed grass meadows. Its vegetative cover is formed by ash (*Fraxinus Sogdiana*), in the lower tier, sparse thickets of *Asparagus Officinalis* and *Ribes saxatile* → sea buckthorn-willow-sucker (*Elaeagnus ochusarra*, *Salix angustifolia*, *S.alba*, *hippophae rhamnoides*) → topoglio *Populus nigra*, *P.alba*) with a shrub layer from (*Rosa iliensis*, *Lonicera iliensis*, *Berberis iliensis*) → sucker-shrub (*Elaeagnus ochusagra*, *Salix alba*, *S. kirillovii*, *Hippophae rhamnoides*, *Clematis Orientalis*) [13, 14].

The design coverage reaches 85%. The soils in the near-river part of the floodplain are alluvial, primitive stratified, and sod-stratified in the central part alluvial (tugai).

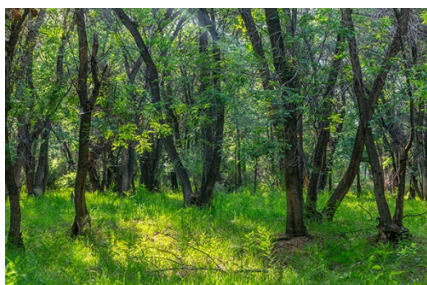


Figure 1. Natural boundary Sarytogay.
Source: (Photographed by the authors).



Figure 2. Relict Grove ash Sogdian.
Source: (Scientific Department of Sharyn State National Natural Park).

The critical area No. 2, the Moyyntokay Valley ($43^{\circ}24.231/N$; $79^{\circ}10.218/E$), is located 1,121 m above sea level. Sharyn canyons in the tract of Moyyntokay (figure 3) with morphological sculptures (figure 4) are found from the Sharyn River's exit from the gorge to the mouth of Temirlik. Streams cut canyons and narrow valleys into sedimentary rocks aged about 12 million years. The height of the steep walls of the canyons reaches 150–300 m. Some canyons are oriented perpendicular to the strike of the Sharyn River valley. The length of one of the most picturesque canyons, the Red Canyon, is about 3 km, a width – 20–130 m, a depth – 100–200 m [6].



Figure 3. Moyntukay Valley with Canyons.
Source: (Compiled by the authors).



Figure 4. The Red Canyon of Sharyn.
Source: (Compiled by the authors).

The vegetation cover of this site is represented by sparse xerophytic-cereal-shrub vegetation on alluvial meadow soils. The vegetation cover of the geobotanical site is formed by *Astragalus Sharynsky*, *Libanotis iliensis*, *Populus pruinosa*, and *Kolpakovsky tulip* [13, 14]. In some areas, design coverage can reach 55%.

The critical area No. 3, Temirlik canyon ($43^{\circ}05.918/N$; $79^{\circ}25.762/E$; altitude 1,099 m), is located 3.5 km from the A-7 Shonzhy-Kegen highway on the western outskirts of the village of Temirlik, Kegen district. This site is located in the Middle Temirlik lowlands, on the diluvial deposits of the Temirlik River (figure 5). Canyons (figure 6) formed in the river's valley paved it in the deposits of ophiolites (serpentinite), pyroxenites, gabbro, porphyrites, and diorites, which are considered the remains of the ancient oceanic crust of the Cambrian Paleocene raised to the surface. To the south of the ophiolites, there lies a stratum of bright green fuchsite – chromic mica. In some areas, Temirlik canyons abruptly break off to the Temirlik River. Sometimes they are buried under diluvial loops [5].

There prevail feather grass fescue communities on mountain chestnut soils in this crucial area's vegetation cover.

The key area No. 4, Shonzhy plain ($43^{\circ}24.507/N$; $79^{\circ}04.194/E$; altitude 1,078 m), is located 200 m from the highway Almaty-Shonzhi on the southern part of the recreation area "Tumar," Uyghur district.

This site is located in the South Shonzhy inclined plain with small mounds composed of loamy deposits. This plain section is distinguished by an aquifer between the northern slope of the Ketmen ridge and the plain of the Ili depression.

The groundwater lies here at depths of 300–600 m. The thickness of individual water-bearing interlayers is 1–45 m. The levels of water pressure are set at 20–70 m above the surface. The productivity of self-flowing wells varies between 10–140 dm³/s. The waters are usually fresh (up to 1 g/dm³); their macro component composition varies from calcium bicarbonate to mixed sodium and calcium. The reservoir water temperature ranges from 20 °C to 60 °C. In the central part of the complex, there are deep wells in the depth intervals from 1,400 to 2,300 m. High-pressure waters have an overpressure of +170–+240 m. The well discharge equals to 22–60 dm³/s. Water with a salinity of 0.4–0.9 g/l has a hydrocarbonate-sulfate or chloride-hydrocarbonate sodium composition with a slightly alkaline reaction. The water temperature at the mouth is 47–102 °C [4].

This vegetation cover is represented by ephemeral saltwort wormwood vegetation on meadow soils and sierozem soils.

3. Results

During the research, we studied the Sharyn River in the Shonzhy district. We compiled a map diagram with key areas and the boundary of the distribution area of thermal sources (figure 7). The factors affecting the development of health tourism in this area are identified.

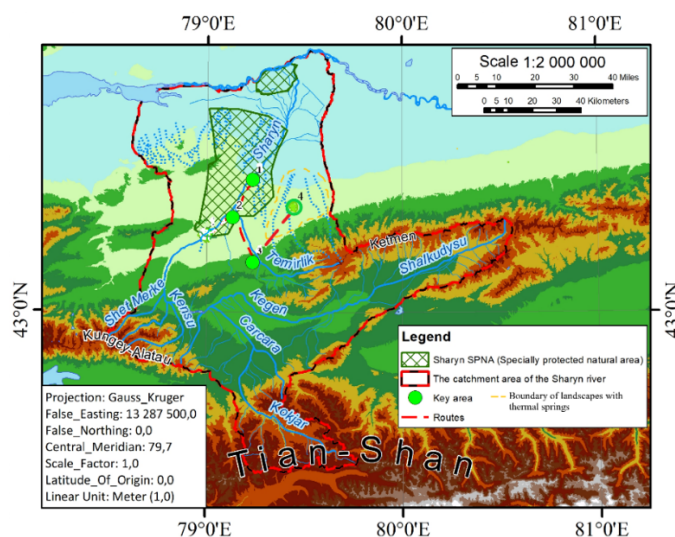


Figure 5. A schematic map of the Sharyn River basin with critical sections and the distribution of the thermal spring distribution area. *Source:* (Compiled by the authors).

These deposits are located at the foot of the northern slope of the Ketmen ridge. The aquiferous complex of the piedmont plain Ketmen has many ascending mineral springs confined to tectonic faults. The water properties of these deposits are formed at considerable depths during the interaction with rocks, which rises with depth. The thermal mineral springs of the study area are divided into (1) warm (20–37 °C), (2) hot (37–50 °C), and (3) scorching (50–100 °C). The brines are not inferior in chemical composition, and sometimes even surpass many well-known mineral waters. The chemical composition of mineral waters varies from west to east, from hydrocarbonate-chloride-sulfate and calcium-sodium to chloride-sulfate and sodium-calcium with a total salinity of 0.8 to 3.1 g/l [7].

Hot springs with a water temperature of 37–50 °C prevail near Shonzhy. The chemical composition of these waters, the degree of mineralization, and the content of gas components and biologically active substances vary. Water with different properties has a specific therapeutic effect on the human body. Their most valuable part is radon, which, in small doses, has a significant healing effect. Radon and its decay products have analgesic properties and normalize the function of the endocrine system.

The spatial change in water properties in the study area corresponds to a change in the physical, geographical, hydro-geological, geochemical, geothermal conditions, and the degree of hydrodynamic activity. Based on these patterns of the field's environment, we can distinguish two areas: (1) low-mountain and (2) mountain-valley. The low-mountain region covers the southern part of the basin. It is confined to young tectonic fault zones. Its waters are marked with low mineralization. They are divided into three balneological groups: (1) without "specific" components and properties, (2) containing radon, and (3) thermal.

Currently, the infrastructure for medical tourism is gradually being created in the region of thermal springs in Shonzy. We established several factors contributing to further development or limiting it (table 1).

Table 1. Factors affecting the development of health tourism in the Sharyn region.

Factors increasing the health and tourist attractiveness of the territory	Factors limiting the territory's health tourism attractiveness
<i>Healing factors</i>	
The presence of thermal water deposits with a therapeutic effect on the human body; Private guesthouses with indoor and outdoor thermal pools.	The lack of hydropathic facilities with qualified medical staff; The lack of facilities for drinking (pump room) above the wells; The lack of professional medical support during the use of mineral water; Poorly developed catering network.
<i>Recreational factors</i>	
Long warm period (205–225 days), the prevalence of clear weather in summer; The presence of natural forest stands in the floodplains of rivers and ponds for swimming; Landscape appeal and landscape diversity (from deserts to forests); The presence of natural (canyons, relic groves) and cultural and historical (traditional buildings, national farming methods, and traditional cuisine, etc.) attractions; The presence of rare species of avifauna; Rare and endemic species of flora; The low population of the territory.	Considerable remoteness from large settlements and insufficient development of transport infrastructure; In the canyons of Sharyn and Temirlik, there are not many convenient recreation areas (equipped parking for tourists, places for safe swimming, green spaces, gazebos, protecting from the summer heat, etc.); The lack of guides capable of conducting specialized tours in several languages; Weak information support for health tourism (no product advertising in foreign languages, etc.)

Source: Compiled by the authors.

4. Discussion

The sites discussed above are available for excursions and attract many tourists. However, the development of health tourism should consider the main motive of the trip – the receipt of health services. There are excellent opportunities for providing them in the studied territory. These are local health-improving procedures (Saki baths, koumiss, ayran, healing "spring water") and deposits of hot thermal waters.

The authors developed several recommendations to optimize health tourism in the Sharyn River basin. The most important of them is setting the transport infrastructure and creating information support for tourism. This may involve creating a single website for ensuring the significant interaction of all recreation areas and participants in health tourism. Using this website, one can advertise, book permits, transportation services, and excursions. The website should include a tourist map showing the routes, information on natural, cultural, and historical sights, information on medicinal waters' properties, and their use rules.

Sharyn Natural Park created its symbolism. We believe it is also necessary to develop symbolism using images of a recreation area with thermal waters and relict natural objects. It is required to make greater use of the opportunities presented regarding these symbols. The manufacture and sale of souvenirs with symbols (each visitor seeks to preserve the memory of the places of visit) allow advertising this territory. Souvenirs with symbols include badges, postcards, small booklets, publications about the park, and consumer goods (dishes, a cap, a T-shirt, etc.)

For the sustainable development of health tourism, it is necessary to create special facilities for drinking mineral water (pump rooms) over wells and hydropathic institutions with qualified medical staff. It is also essential to ensure the provision of constant health support during the use of mineral water. Thermal waters can be used for space heating. Therefore, it is necessary to develop a technology for the integrated use of waste hot thermal waters for heating buildings and organizing greenhouses.

The essential component is creating a catering network and developing excursion routes for visiting the Sharyn and Temirlik canyons and relict ash groves. It is necessary to develop an ecological tour for birdwatching. The tourist accommodation territory should be landscaped, equipped with parking places, places for safe swimming, etc. To successfully implement tourism activities, it is necessary to prepare highly qualified guides who can work in several languages.

To increase the tourist attractiveness, it is proposed to place a summer tourist-complex on the right side of the Almaty-Shonzhik highway, before reaching the bridge over the river Sharyn, in a plot with a total area of 15 hectares. The tourist complex must consist of a catering block, a residential complex of yurts (the home of the ancient Kazakhs), a Saks bath, a sports ground, and a safe swimming place. Additionally, it is necessary to construct premises for keeping and demonstrating domestic animals in the open air (cows, horses, goats, etc.), the processes of feeding, milking, and making healing drinks “kumys” and “ayran,” kurts, and other national dishes), i.e., traditional indigenous activities. At will, tourists themselves can take part in this process. The creation of such a tourist complex must be carried out, taking into account the existing natural landscapes, i.e., there will be no uprooting of trees and shrubs; on the contrary, the placement of certain parts of the complex will be adapted to the existing natural landscape. There is electricity in this area. A well is needed for drinking water.

5. Conclusions

The landscapes of the river basin Sharyn have a significant natural potential for developing tourism, combining the health and recreational aspects of providing tourism services. Transport accessibility, a long warm period (205 to 225 days), the prevalence of clear weather in summer, landscape attractiveness, water bodies, and significant biodiversity make this territory promising for organizing ecological, educational, and recreational tourism.

The location on the territory of the Sharyn State National Natural Park and the UNESCO Sharyn Biosphere Reserve creates guarantees for the preservation of natural recreational resources and the possibility of developing tourist routes. The sparsely populated area allows organizing the observation of animals and plants.

The aquiferous complex of the piedmont plain Ketmen allows us to provide a range of sanatorium services and use thermal waters for heating buildings and organizing greenhouses. This creates the prerequisites for forming a new health and tourist cluster of international importance on Kazakhstan's territory.

References

- [1] Avram E M, and Ratiu M P 2014 Healthy tourism – A real need in today's challenging society *Journal of Medicine and Life* **7**(Special Issue 38)
- [2] Burmenko T A 2016 To the question of the content of the concept of “Health tourism” *Izvestiya of Irkutsk State Economics Academy* **26**(1) pp 42-49
- [3] Dunets A, Penkova A, Potekhina E, Gribkova O, Nikolaeva A, and Smirnov D 2019 Cluster as a form of resort development: Organizational and managerial structure *International Journal of Innovative Technology and Exploring Engineering (IJITEE)* **9**(1) pp 3662-3668

- [4] Iminova D E, and Nurkhalykov I A 2016 Analysis of the chemical composition of the water of the thermal spring “Arshan” of the Uigur region of the Republic of Kazakhstan *Young Scientist* **29** pp 4-8
- [5] Kerimbay N N 2015 *Rational use of landscapes of geosystems of the Sharyn river basin* (Saarbrücken, Germany: Lambert Academic Publishing)
- [6] Kerimbay B S, Janaleyeva K M, and Kerimbay N N 2020 Tourist and recreational potential of landscapes of the specially protected natural area of Sharyn of the republic of Kazakhstan *GeoJournal of Tourism and Geosites* **28**(1) pp 67-79
- [7] Kerimbay N N, Kerimbay B S, Mazarzhanova K M, Kazangapova N B, Makash K K, Akhmetov E M, ... Nysanbaeva G N 2020 *The current state of the recreational potential of the natural environment of the Sharyn state national natural park* (Nur-Sultan, Kazakhstan: Ilchenko)
- [8] Lautier M 2014 International trade of health services: Global trends and local impact *Health Policy* **118**(1) pp 105-113
- [9] Mirzekhanova Z G, and Koltsova A A 2013 Geoecological analysis of the use of the recreational potential for the development of health tourism on the example of the Khabarovsk Territory *Problems of Regional Ecology* **6** pp 203-208
- [10] Muller H, and Lanz K E 2001 Wellness tourism: Market analysis of an exceptional health tourism segment and implications for the hotel industry *Journal of Vacation Marketing* **7**(1) pp 5-17
- [11] Sandberg D S 2017 Health tourism: An emerging global healthcare industry *International Journal of Healthcare Management* **10**(4) pp 281-288
- [12] Scientific Department of Sharyn State National Natural Park 2015 *The management plan of the RGU Sharyn State National Natural Park for 2015-2019* (January 15 2015 No. 14) (Shoongy, Kazakhstan)
- [13] Scientific Department of Sharyn State National Natural Park 2018 *Changes in the surface topography on the Sharyn SNNP for 2006-2018. The state and dynamics of changes in the elements of the abiotic environment.* (Chronicle of nature, § 1) (Shoongy, Kazakhstan: Tau-Kainar)
- [14] Scientific Department of Sharyn State National Natural Park 2018 *State and dynamics of change of elements biological complex on the Sharyn SNNP “for 2006-2018.” Rare and endangered plant species, endemic and relics* (Chronicle of nature, § 2) (Shoongy, Kazakhstan: Tau-Kainar)
- [15] Vetitnev A M, and Kuskov A S 2010 *Health tourism* (Moscow, Russia: Forum Publishing House)