

Geographical Features in the Landscape Planning of Recreational Areas in the Alakol Basin

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Abstract: In the article, the problems of landscape planning in environmental protection measures were considered. Landscape planning (LP) is a scientific direction in landscape science that studies the spatio-temporal organization of community life in certain geographical areas. Aiming to achieve the maximum adaptation of the functional areas of the farm to the landscape structure and create new optimal anthropogenic and cultural landscapes. The theory and practice of economic development, as well as the placement of environmental prerequisites and constraints that are characteristic of regional landscape features.

The relevance of the work is the development of a landscape management system adapted to the natural environment of the local area, the preservation of large areas of special protection, the reproduction and protection of unique plants that are declining, the modeling of an aesthetic artistic and cultural landscape in the territory of tourist recreation zones and private residential buildings, the greening of cities and villages - in other words, the ecological organization of nature. The relationship between man and nature is a coordination problem with art and beauty.

This study presents a landscape design plan for the "Merry Resort" tourist recreation zone near Lake Alakol in Kazakhstan. The plan prioritizes ecological sustainability, aesthetic appeal, and the integration of local flora and fauna. Utilizing the Realtime Landscaping PRO application, the study models a diverse range of zones, including recreation areas, accommodation zones, and ecologically sensitive areas. Particular emphasis is placed on the cultivation of declining plant species, such as the Sievers apple tree, and the creation of an alpine-style landscape. The research incorporates theoretical frameworks of landscape planning, considering the region's unique geographical and climatic conditions, including the impact of strong winds and water characteristics. The findings contribute to sustainable tourism development in the Alakol region, enhancing both the aesthetic and ecological value of the area.

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1. Introduction

The integration of increasingly available remotely sensed data and crowdsourced big data provides opportunities to quantify the continuum of urbanity in a spatially explicit way. Remotely sensed data have long been used to map urbanized areas (Lian Zhu et al., 2021) and to quantify urbanization-related indicators such as population density and socio-economic profile of urbanized areas (Li et al., 2020; Zhang, H. et al., 2018; Zheng et al., 2023).

Merrey is located in the village of Akshi, which is part of Yrgayty rural district, Alakol district, Zhetysu region, Republic of Kazakhstan. Resort: the territory of the tourist recreation zone. Based on the plan/ning of this area, develop a model of landscape design. Since the village is situated on the shore of Lake Alakol, it offers numerous tourist and recreational areas. Our experimenter, "Merry Resort" tourist recreation zone, is located 100 m east of Lake Alakol.

The purpose of the work is the aesthetic and cultural landscape design of a comfortable and picturesque natural living area in the recreation area, beautifying the landscaping area, correctly planning recreation and green areas, and rational placement of objects in the recreation area. The object of research is "Merry The task was set to effectively plan therapeutic and recreational resources in the territory of the "Resort" tourist recreation zone and to create a model of landscape design by collecting flora species adapted to this area, beautifully in the shape of the alpine slope of the relief (Anvar et al., 2020).

The increasing availability of remotely sensed data and crowdsourced information provides valuable insights for urban planning and landscape design. This study leverages these data sources to inform the creation of a comprehensive landscape plan for the "Merry Resort" recreation zone, situated on the shores of Lake Alakol. The unique characteristics of the area, including its location within the Balkhash-Alakol basin and the presence of Lake Alakol's unique geochemistry and microclimate, are crucial factors in designing a sustainable and aesthetically pleasing environment. This research aims to create a model that balances recreational opportunities with environmental conservation.

Research methods: Realtime Landscaping PRO is a modeling method in a landscape design planner application. Plan the area by dividing it into zones using the program's visualization options and 3D features.

The study employs a multi-faceted approach. First, existing data on the geographical and ecological characteristics of the Alakol region, including topographical maps, soil analysis, and plant species inventories, are gathered. Secondly, the Realtime Landscaping PRO application is used to model the landscape design, simulating different zones (e.g., recreation, accommodation, ecological zones). The plan is designed to effectively manage therapeutic and recreational resources while considering the aesthetic integration of various landscape elements, such as alpine slopes, and incorporating local plant species.

Another component of the destination image is the affective component, which refers to the emotional and attitudinal responses that an individual has toward a destination. (Fuchs & Reichel, 2006) maintained that emotional attachment to a destination positively influenced tourists' loyalty to that destination, and argued that emotional responses such as enjoyment and satisfaction were significant predictors of tourists' intention to revisit. Similarly, researchers have found that tourists' emotional experiences, such as nostalgia and awe, play a crucial role in shaping their overall experience of a heritage destination (Reyes & Dael, 2023).

2. Materials and methods

A field of activity based on the integration of geography, landscape science, territorial planning, and land management. The geographical landscape is a relatively homogeneous part of the geographical shell, which includes natural constituents (topography, climate, water, soil, plant communities, and animals) and morphological parts (facies, settlements, and local areas) and has its own structure. The term "Landschaft" (German: Land, schaft, a suffix denoting interconnection) was coined by the Russian scientist L. S. Berg. The main indicators characteristic of the geographical

landscape includes the homogeneous nature of the territories, the complex nature and unity of the constituents, stability, and homogeneity of matter and energy exchange (Ian Smalley et. al., 2010).

The term geographic landscape has a definition of "a natural complex that is constantly developing while preserving its historical formation and integrity" or "a natural geosystem." Landscapes are classified into types, subtypes, and species. The classification of landscapes takes into account the conditions of emergence, moisture supply, and geobotanical signs. The set of all landscapes on the globe is called a sphere. As a result of landscape clusters and landscape maps of various scales, mathematical models of geographical landscapes are now created, and information about them is processed by computers. A landscape changed by human activity is called an anthropogenic landscape.

Cultural landscape. It is a man-made work of art made from natural space. UNESCO defines it as "the joint image of nature and human creativity." In the 2000 landscape convention of the Council of Europe, it is defined as "the result of the action and interaction of natural and/or human factors".

Planting trees in the cultural landscape creates a microclimate, affects the quality of the soil, determines the hydrological processes in this area, and plays an important ecological role. Territories protected by such plantings are better for use in economic activities than open areas. Forest plantations around water bodies protect them from shoreline erosion with fine particles of sand and soil. The weakening of the wind and the cultural and artistic design of the landscape, especially in the recreation areas, directly affect the mood of tourists.

The goal of the LP theory is to ensure sustainable (balanced) use of nature, preserving the main functions of natural landscapes and their components as a separate system of the biosphere. Within the framework of the regional policy of the state, LP is a component of territorial planning and serves as a means of environmental protection. The design levels of LP are implemented in different hierarchies of territory organization.

The LP is to create a project based on the applied programs in accordance with the landscape program of the territory development, to create a landscape plan (on a scale of 1:200,000 to 1:100,000) and a large-scale landscape plan (1:25,000 and above). includes the development of regulatory documents for the implementation of landscape plans and monitoring their implementation.

The algorithm for performing scientifically interrelated procedures in modern LP, based on the concept of landscape planning, consists of five stages (Getting Started with Realtime Landscaping Pro, 2024).

1. The context of preliminary inventory and analysis of landscape and ecological problems of the territory aimed at collecting and summarizing all available information about the natural environment of the territory, its social and economic conditions, the structure and peculiarities of land use, as well as getting ideas about the main contradictions of land use.

2. Assessment of the importance and sensitivity of the current natural conditions of the planning territory, as well as assessment of the nature of land use.

3. Creating targeted concepts of natural resource use for individual natural environments.

4. Development of a comprehensive target concept of land use (land use concept).

5. Formulation of the concept of the main directions of action and modeling.

Modern landscape design is a set of activities, the goal of which is to create a landscape plan that is adapted to specific environmental conditions and meets all customer requirements.

Lawns and flower beds, natural fences and water ponds, stone paths, large trees and shrubs, planting flowers - all the attributes of living nature familiar to such eyes should perfectly adapt to local conditions and please the owners with their vitality for a long time.

Landscaping gives future owners confidence that they are the owners of a truly unique space. Any landscape projects are carried out in close dialogue with the customer, whose opinion determines the individual intonation of the outdoor environment, which should be reflected in a specific decorative form.

Based on professional landscape design, first of all, it is necessary to carefully consider all available factors: topography (plains, mountains, slopes, etc.), soil quality and structure, and climatic

conditions. After the customer and the landscape designer come to a joint, clearly formulated decision, specialists begin to create plans and models of the future landscape.

Landscape design is a unique art based on the artistic decoration and improvement of residential gardens, recreation areas, landscape gardening, and architectural objects.

It is urbanized, observing the rules of landscape design. With macroforms, you can beautify almost any part of the land, creating the landscape harmony of nature. Programs offered on the Internet for both professional and amateur design of summer cottages by the owners help to solve this problem.

The dominant objects in the spatial structure of the landscape composition are residential buildings, recreation areas, communal buildings, and other buildings. Around them are all the other pieces. Programs for creating landscape compositions usually include advice on the location of the following elements in the designed area:

- lawns that create a general background for the landscape of the plot on the slope.
- green spaces: trees, flowers, bushes, grass.
- decorative sculptures, lighting lamps, and fences.
- architectural forms: benches, stairs, gazebos on the square, bridges.
- alpine slopes, fountains, streams, and cascades (Figure 1).
- water ponds, artificial small lakes, or ditches (Figure 2).



Figure 1. Landscape design, example of an alpine slope with cascading water

In cases where the water bodies do not exceed the permissible value, forest strips protecting the main (longitudinal) field are located horizontally in the direction of more dangerous winds (causing dry winds, blizzards, and dust storms).

Forms of research. Alakol is a bitter-salty lake located in the south-east of Kazakhstan, on the border of the Abai and Zhetysu regions, in the Balkhash-Alakol pothole. Known as "healing lake." Balkhash-Alakol crater is a large tectonic structure. It is bounded in the north by Saryarka, in the east by the Tarbagatai ridge, in the south by the Zhetysu and Ile Alatau mountains, and in the west by the Zheltau and Aitau mountains.

Kazanshunkyr is divided into Balkhash and Alakol depressions. The total length is 800 km. Its width is 300 km near Lake Balkhash and 100 km near Sasykkol. The bottom of Kazanshunkyr is formed from folded Paleozoic sediments, igneous rocks, and intrusive rocks. They are covered by continental loose rocks from the Cretaceous, Paleogene, Neogene, and Quaternary periods. The majority of the territory is occupied by quaternary sand fields such as Sary-esik-atyrau, (Lekkum), and Taukum, with an absolute height of 342–600 m.

Alakol Lake can be considered truly unique; there are mountains and steppes around the lake, and between the mountains. In the south-east of the lake is the "Dzungar Gate" pass, which stretches for about 10 kilometers (Figure 2).



Figure 2. Dzungar Gate

Due to its unique nature, strong winds often blow in Alakol. That's why there are real sea storms in Alakol. The storm starts suddenly and develops very quickly.

There is a reason why the lake is called "Ala Kol" in Kazakh. The color of Lake Alakol changes from light blue to dark brown during storms, depending on the weather, time of day, and season. The resort villages of Akshi and Koktuma are located on the western shore of the lake, about 60 kilometers from the Kazakh Chinese border.

Hydrography. It is located in the semi-desert region in the east of the Balkhash-Alakol basin, near the coal deposit, at an altitude of 343 meters. It stretches from west to east; the area (with islands) is 2696 km²; the length is 104 km; the maximum width is 52 km; the depth is up to 54 m; and the water volume is 58.56 km³. The annual fluctuation of the level is 1.2 m. Freezing continues until January or April. The diving season lasts about 3.5 months (June to mid-September). Water contains sodium chloride.

Urzhar, Katynsu, Emelkuysa, Zhamanotkel, and Jamaty rivers flow into it. Alakol and shallow Koshkarkol, Sasykkol, and Jalanashkol lakes make up a system of lakes with an area of up to 55,000 km². The amount of fluorine and bromine in Alakol water has increased. According to one of the scientific assumptions, in the early geological ages, there was a single wide lake in place of a number of lakes. The hypothesis is based on geological drilling data that found lacustrine sediments in the now dry areas surrounding the lakes.

The composition of the water in Alakol. The composition of the water in Alakol is as salty as that of the sea. In terms of composition, sodium chloride and sodium chloride-sulfate water can be compared with the water of the Black Sea. By the water area of water mineralization from 1.2 to 11.6 g/l until it swings. Alakol Valley's moisture is not enough for the region, which is an excellent climatic resort. In Alakol, the bathing season of season in the middle opens. Amazing, the coast is healing; see Malta stones. of the lake, the bottom Malta stoned of the coast, some points muddy, coastal day from heat received in May, gravel stones closed. Holy from the water, other here hydrogen sulfide clay, and of the field mineral with saturated clean, dry air.

Groundwater is mostly concentrated in Neogene and Quaternary formations. In terms of ionic composition, groundwater is divided into sulfate-chloride, sodium-calcium, and sulfate-chloride sodium-magnesium. They are different in terms of productivity, degree of mineralization, and chemical composition (Asmelash & Kumar, 2019).

Climate. The climate in the Alakol region is sharply continental: dry summers and relatively cold, snowless, windy winters. The average annual air temperature varies between +6.2 and 7.2°C. In July, the average air temperature at the Zhetysu gate is +25.3°C, +24.1°C in the Usharal district, and the absolute maximum is +42°C. Most of the precipitation falls in April–May and November–December.

Soil and vegetation. Most of the land in Alakol district is made up of gray soil from the desert belt and dark brown and pale brown soil from the mountain slopes and valleys. In the sandy valleys, there are some and saline soil types.

In the vegetation cover of the steppes, sagebrush, sorghum, willow, blackberry, bramble, and sedge, reed, wheatgrass, and grain plants grow along the river valleys. High mountain slopes and valleys are covered with spruce-pine forest. River valleys and sand hills are used as winter cattle pastures, and plains on mountain slopes are used as irrigated fields.

The flora of this place comes in the following types:

- Siberian fir is a coniferous tree belonging to the pine family.
- The Sievers apple tree is the ancestor of the domestic apple tree.
- The Niedzwieki apple tree is a tree that looks like a Japanese cherry blossom with its pink flowers.
- Ostrovsky tulips: a bright red flower with sharp leaves.
- Kolpakovsky iridodicii: pale purple gray iris;
- Altai holosemyannigi is a medicinal plant.
- Adonis is a unique plant whose leaves resemble pine needles.

Fauna. As for the fauna, in the central part of the lake, there is an archipelago consisting of three islands, where the Alakol State Nature Reserve was established in 1998. Alakol is considered to be a very important road junction for birds flying from Central Asia to spend the winter in India and Africa. Hundreds of thousands of birds find shelter and rest here; most of them are listed in the Red Book. Among them are pink and curled terns, whooper swans, white-ailed ducks, white-tailed eagles, white-tailed cranes, duadaks, relict gulls, flamingos, etc.

The coastal area is inhabited by many birds: blackbirds, swans, eagles, herons, etc. The main attractions for tourists are: relict seagull, black-necked seagull, Birds belonging to the order of Tatra, the family of seagulls

Alakol is rich in fish; there are up to 80 species of zooplankton. White perch, Ottoman (Odnatsvetny gubach), lake and river bream, carp, pike, and mullet. Fishermen are interested in catching marinka, gubach, perch, pike, and carp.

"Alakol-Arasan" mud treatment center is working in the village of Aktubek for the development of health and wellness tourism in the region. If we believe in modern medicine, clay and salt water

give healing properties to Alakol water. Clay treatment for joint and skin diseases, radiculitis, and injury. The clay contains a lot of silicon and is able to strengthen immunity. The water on the north-eastern side of the lake is salty. It contains a lot of chlorine and sodium salts, chlorine, sodium sulfate, fluorine, and bromine. This property of water is good for calming the nervous system and treating skin diseases. The water in Alaköl is warm in the summer, +27–28°C. In 2018, scientists from D. Serikbaev State Technical University and the Tomsk Research Institute of Spa Resorts and Physiotherapy studied the water of Alaköl and found out that it contains a lot of radons. Such a composition of radon water is a treatment for dermatology, gynecology, diseases of the endocrine system, the gastrointestinal tract, and back and lower back diseases to prevent joint, lumbar, and back diseases.

- Osteochondrosis.
- cardiosclerosis.
- chronic thrombophlebitis.
- Skin diseases (eczema, neurodermatitis);
- diseases of the central nervous system (radiculitis, vegetative neurosis, thinning of the nervous system, neurosis).

There are more than 20 recreation centers in Alakol district on the shores of Lake Alakol, which receive from 10 to 130 people per day. A significant number of tourists stay in private hotels. In 2004, 11,000 people rested on the southern shore of Lake Alakol, and in 2005, the number of tourists reached 12,000. In 2012, the total number of tourists is expected to be about 25 thousand, and many people prefer to reach the resort area by their own car and stay in the camps. At present, Lake Alakol is the most rapidly developing summer and seasonal tourist center in Kazakhstan.

1. Background and Literature Review

Summarize relevant literature on landscape planning, ecological principles, and the specific characteristics of the Alakol region. Focus on the theory of cultural landscapes, anthropogenic impacts, and sustainable approaches to landscape design. Incorporate citations.

2. Case Study: The "Merry Resort" Recreation Zone.

Provide a detailed description of the "Merry Resort" zone, including its location, size, existing infrastructure, and environmental constraints. Highlight the unique aspects of the region's flora (Sievers apple tree, other endemic or threatened species) and fauna.

3. Landscape Design Zones.

Describe the planned zones of the recreation area. Include details on specific design elements, such as the proposed alpine slope zones, tree planting strategies for wind protection, and the location of accommodation and recreation facilities. This section should be more concise and focused on the key features of the design.

4. Plant Selection and Integration.

Focus on justification for selecting specific plant species, considering their adaptation to the local climate and soil conditions, their aesthetic value, and their potential ecological benefits (e.g., windbreaks, biodiversity). Specific examples of trees, shrubs, and ground cover should be included.

5. Water Management and Hydrological Considerations.

Address the unique hydrology of the area, specifically Lake Alakol and its impacts on the design. This includes water resource management, potential water features (e.g., ponds, waterfalls), and considerations related to the area's moisture levels. (Bramwell, B. and Lane, B., 2015).

3. Results

Real-time planning in the Landscaping PRO application. Realtime Landscaping Pro is a professional landscape design planning program. Offers good visualization options for modeling a yard or garden. Since the program uses 3D capabilities, the design looks very realistic. The database contains many different types of garden decor elements. As a result, the garden can be planned down to the smallest detail. The application can be used by both novice designers and professional masters of their work. Realtime Landscaping Pro works in English and can save a project (Getting Started with Realtime Landscaping Pro).

Powerful and professional design, all in real time. Landscaping is an application program that includes many powerful visual tools to help you develop landscape design ideas professionally.

To simplify the process of creating a landscape design model, you can upload a photo of the exterior and work with it in a full 3D environment. The program includes more than 11,000 elements, as well as 5,500 different plants and shrubs, which allows you to accurately represent ideas on the screen. With online tutorials available, the entire design process is suitable for both beginners and professionals and therefore does not require much experience.

Landscape design of a garden plot means the arrangement of natural landscape elements in different areas. Landscape design for beginners: starting with the size of the site, regardless of the parameters of the summer cottage, when it comes to its improvement, every millimeter can be used as rationally as possible. Therefore, it is necessary to approach the placement of various elements as responsibly as possible, observing various principles.

Let's take a closer look at the planning features of the area near the recreation area based on its parameters. The landscaping of a 10-hectare garden plot can turn into a well-equipped area that will bring pleasure and joy to its owners. During planning, four main areas should be considered: residential, communal, landscaping, and recreation areas.

The most optimal option for space design is to place objects according to the rectangular principle. Central and side areas are usually used for landscaping. Landscaping may include additional buildings. A popular solution for landscaping a summer residence is to build a gazebo (gazebo) on the territory. It serves as a perfect vacation spot. The landscape design of a summer cottage or a private house plays a major role in the surrounding landscape.

Beautiful flowers, decorative trees, and interesting sculptures provide an aesthetic impression to the vacationers as opposed to the boring and dull concrete walls. But trends in landscape design do not stand still. Shrubs and classic flower beds are replaced by a new type of decorative decoration: a rock garden. Often, a competent, aesthetic combination of dome-shaped stone and small plants is called an alpine slope.

Features of the placement of the alpine slope. Placing an alpine slope in a recreation area does not cause any problems. It is a specific feature of the terrain that corresponds to the composition of possible species; the surface stones represent the top of the alpine meadows and vegetation. Landscaping should give the impression of natural rock outcrops.

For the flower garden, you should choose a high place so that the whole alpine composition gets good sunlight. Landscape elements should not be placed near or under trees; this will have a bad effect on plants. On cold, rainy days, moisture in the leaves overwaters open areas of the mountain. This can cause plant stress. Fallen leaves in autumn not only spoil the appearance but also turn delicate flowers into a pile of leaves.

4. Discussion

Owners of summer recreation areas, before placing an Alpine slope in the garden, dig a foundation pit, fill it with drainage, and only then start designing. In fact, the arrangement of the alpine slope does not require such complicated work because the rain that falls on the top of the hill flows immediately to the feet, and the plants do not feel an excess of moisture. Some installation tips are provided (Coelho et. al., 2018).

1. Mountain slope (stone): open rocks with a minimum amount of vegetation. It can be built only on a steep slope.
2. Alpine meadow: stony soil, low vegetation.
3. The mountain valley is a rocky garden. Large rocks partially sticking out of the ground are surrounded by decorative alpine.
4. Waterfall (mountain spring).
5. The mountain gorge is the most impressive composition. It can be placed in a natural pit, covered with stones, and planted with alpine flora.

Mountain landscape, in such a small copy of a natural relief, stones are combined with several small plants and dwarf trees.

What plants are suitable for a rock garden on alpine slopes?

The wonderful landscape is emphasized by various mountain plants, but the climatic conditions of the region should be taken into account when arranging the landscape composition of the summer recreation area. Plants for the rock garden are selected to adapt to the conditions of the climatic zone.

Alpine slopes are famous for the harmony of the delicacy of flowers with the inaccessibility of stone elements, so to achieve the maximum natural similarity, it is necessary to use only low-growing grassy plants.

Garden waterfall.

A garden waterfall can not only transform the garden but also make it functional. In such a place, you can relax by watching the flowing water and listening to its sound. This significantly improves the moral and psychological condition of a person. Doctors in many European countries say so.

In addition, water structures can repeatedly improve the visual characteristics of any landscape and give it a natural look. A waterfall plays one of the first roles in landscape design. This simple element is incredibly popular in many cultures and styles, especially in Chinese and Japanese design. It was the inhabitants of these countries who were great lovers of all aspects of nature. So over time, they have come up with a way to create artificial waterfalls that can easily be placed in their homes.

Types of garden waterfalls.

A fountain made of stones. Natural stone is considered the best material for these installations. Stylists say it's a great choice. The stone is practically indestructible, so it can serve you for decades. The stone version with cascades is one of the most popular types of waterfalls in our time.

It is better not to have trees above the waterfall; many leaves fall from them in autumn. You should choose a place where you can see the waterfall from a window, porch, terrace, or usually from a sitting area in the garden. The waterfall pump should be near the power source (Coelho, M.S. et al., 2018).

"Merry, the territory of the landscape design of the resort "recreation zone:

- 11 natural landscapes (1–10, 15);
- 4 large tourist accommodation and economic zones (11–14);
- We divided the flint footpath (16) into zones (Figure 3).

"Merry Zones of Landscape Design of the Resort » recreation zone:

- Siberian fir-growing zone.
- Stone rose Alpine slope zones.
- Various floral planting zones.
- Samaljal zone.
- Ornithofaunal wastewater zone.
- A fountain made of stones.
- The zone where the healing mud barrels are located.
- Coniferous and diverse vegetation zone.
- Coniferous, shrubby plant zone.
- Japanese maple garden zone.
- "Merry "Resort" recreation zone residence.
- Car parking.
- Barbecue zone.
- Warehouse.
- Sievers apple orchard zone.
- Flint footpath.



Figure 3. "Merry Resort is an example of the landscape design of a recreation area.

In the south of the territory, between the parking lot and the storage block, 2 rows of (1) Siberian fir will be planted. In addition to this place, Siberian fir is also planted in large numbers in zones (3, 4, 6, 8, 9, and 15). This is because the Siberian fir does not tolerate water stagnation, soil salinity, or dryness and prefers well-drained, sandy, and clay soils. It is very resistant to frost and cold; it lives for 300–500 years. Plants are grown as single specimens or in rows.

Siberian fir (*Abies sibirica* Ledeb): up to 30 m in height, very pointed head, straight trunk, thick bunch of branches, grows smoothly. A slow-growing coniferous tree belonging to the pine family. As they grow, they spread out, so they should be at least 6 meters away from each other or other trees. For this reason, it is better to plant it in recreation areas with a wide yard than in narrow yards.

Spruce bark contains 8–15% fatty substances; its bark contains vitamin C, ascorbic acid, and essential oil; and its fruit contains 25–29% liquid oil. Due to its special air-purifying properties, this "Merry Resort plans to sow a lot in the recreation area. Because, in addition to its healing properties, it beautifies the recreation areas very well.

In zone (15), which occupies a large part of the territory due to the favorable natural and climatic conditions and soil of the region, many Sievers apple trees (*Málus sievérsii*) are planted. The Sievers apple is a declining species in the Rosaceae family, a valuable edible tree, a supporter of mountain slopes, and a wild relative of many cultivated varieties. A wild fruit of apple trees in the foothills of Central Asia and Kazakhstan. It blooms in April–May, and apples ripen in August–September.

In the zones (2, 3, 4, 5, 6, 8, 9) of the territory, on the Alpine slopes, it is planned to grow a large number of stone roses along with miniature rose plants. Stone rose, *Echeveria*—this plant is an indispensable solution for flower growers and landscape designers. This is because, despite all its decorative qualities, growing a rock rose is easy and simple. Stone rose is a low-growing herb with fleshy rosette leaves and belongs to the perennial Tolstyankov family. Rock rose grows in rocky soil

and sandstone where other plants cannot survive. Value: decorative effect and ease of cultivation. This explains the wide use of stone roses in landscape design, such as for decorating alpine slopes and flower beds.

Our recreational specialty in the recreation area is the healing mud located in Zhalanashkol, 30 km from the village of Akshi. If we believe in modern medicine, clay and salt water give healing properties to Alakol water. Clay treatment for joint and skin diseases, radiculitis, and injury. Clay contains a lot of silicon and can strengthen immunity. Healing mud is very popular among tourists and is in great demand. At the moment, healing mud is spontaneously sold to vacationers on the coast for 500 tenge per kg in cellophane bags.

And we suggest planning to make wooden barrels in the western part of the Alpine slope in the territory of landscape design, dig a pool, and fill the wooden barrels with healing mud. It is recommended to install 2 pools with a length of 2 meters, a width of 1 meter, and a height of 1.5 meters, transport them every 15 days with a special vehicle, and renew the mud. In this zone, sanitary showers will be installed for those who receive healing mud. And in zone (16), instead of concrete pavements, natural flints will be brought in, and a pink flint pavement will be made. These stones can be brought from Shybindy Mountain, 30 km from Akshi village, which is financially beneficial.

Researchers and local governments have constructed urban redevelopment models by combining the SSI and GI theories, incorporating both residents' activities and physical changes in communities. Undoubtedly, GIS has become ubiquitous for scientists to comprehend urban redevelopment by linking data to demographic and socioeconomic characteristics. However, current research on urban redevelopment identification sometimes faces challenges in delivering timely and precise information for various reasons.

Present the output of the Realtime Landscaping PRO model and its key features. Evaluate the suitability of the proposed plan in terms of its ecological impact, aesthetic appeal, and potential for sustainable tourism.

5. Conclusion

The purpose of the research work was to design a cultural landscape design of a comfortable and beautiful natural living area in the recreation area that matches the taste of tourists, to beautify the landscaping area, to properly plan recreation and green areas, to divide them into zones, and to place objects rationally.

For this, the concept of landscape planning, as well as its development trends and general importance in the system of environmental protection measures and the physical-geographical situation of the Alakol lake basin, were considered. After determining its biogeography, it was found that it is rich in flora and fauna. It is possible to grow Sievers apple trees, conifers, and all the birds that fly to the warmer regions.

Research object: "Merry In the territory of the "Resort" tourist recreation zone, we have effectively placed medical and recreational resources and created a landscape design model by collecting flora adapted to the Akshi rural district in the form of an alpine slope. According to this model, we have divided the recreation area into 16 zones. Merry, the area where the landscape design of the resort zone will be created is mainly natural landscape zones, tourist accommodation, and business zones. We divided the flint into footpath zones. It is planned to place a zone of wooden barrels in our recreation area, preserving the composition of healing mud, which is characteristic of Alakol Lake.

In general, in the course of this work, we planned to study the "Merry Resort" recreation area, create favorable conditions for tourists, and heal with therapeutic water and mud. The aesthetic effect of the beautiful natural landscape and the high emotional mood were guided. In addition, the ecological importance of growing, multiplying, and protecting the dwindling Sievers apple orchards in Zhetysu Alatau was also considered.

The study demonstrates that ecologically based landscape planning promotes biodiversity, enhances water and soil sustainability, and facilitates climate regulation, while also creating aesthetically diverse and restorative environments. The proposed design illustrates how sustainable

resource management can strike a balance between ecological resilience and cultural and recreational values. For similar contexts, future research should quantify ecosystem services, integrate local participation, and assess adaptive strategies under climate change scenarios.

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7. Author Contributions

Conceptualization, methodology development, supervision – N.K.; methodology development, software and project management – B.K.; methodology development, research material provision, supervision – K.B; methodology development, research material provision, supervision – Ye.T.; text preparation and editing – A.I.; analysis – N.K., B.K.

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Алакөл ойпатындағы рекреациялық аймақтарды ландшафттық жоспарлаудағы географиялық ерекшеліктер

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Аңдатпа. Мақалада қоршаған ортаны қорғау шараларындағы ландшафтты жоспарлау мәселелері қарастырылды. Ландшафттық жоспарлау (LP) – белгілі бір географиялық аймақтардағы қауымдастық өмірінің кеңістіктік-уақыттық ұйымдастырылуын зерттейтін ландшафттанудағы ғылыми бағыт. Шаруашылықтың функционалдық аймақтарының ландшафттық құрылымға барынша бейімделуіне қол жеткізу және жаңа онтайлы антропогендік және мәдени ландшафттарды құру. Аймақтардың ландшафттық ерекшеліктеріне тән экологиялық алғышарттар мен шектеулерді орналастыру және экономикалық дамуды жүзеге асырудың теориясы мен практикасы.

Жұмыстың өзектілігі жергілікті жердің табиғи ортасына бейімделген ландшафтты басқару жүйесін әзірлеу, ерекше қорғалатын кең аумақтарды сақтау, азайып бара жатқан бірегей өсімдіктерді көбейту және қорғау, туристік демалыс аймақтары мен жеке тұрғын үй құрылыстары аумағында эстетикалық көркем-мәдени ландшафтты модельдеу, қалалар мен ауылдарды көгалдандыру, басқаша айтқанда табиғатты ұйымдастыру және т.б. Адам мен табиғаттың қарым-қатынасы өнер мен сұлулықты үйлестіру мәселесі болып табылады.

Бұл зерттеу Қазақстандағы Алакөл көлінің жанындағы «Көңілді демалыс орны» туристік демалыс аймағының ландшафты дизайн жоспарын ұсынады. Жоспар экологиялық тұрақтылыққа, эстетикалық тартымдылыққа және жергілікті флора мен фаунаның интеграциясына басымдық береді. Realtime Landscaping PRO қолданбасын пайдалана отырып, зерттеу демалыс аймақтарын, тұру аймақтарын және экологиялық сезімтал аймақтарды қоса алғанда, алуан түрлі аймақтарды үлгілейді. Сиверс алма ағашы сияқты азайып бара жатқан өсімдік түрлерін өсіруге және альпілік үлгідегі ландшафт жасауға ерекше мән беріледі. Зерттеу аймақтың бірегей географиялық және климаттық жағдайларын, соның ішінде күшті желдің әсері мен су сипаттамаларын ескере отырып, ландшафтты жоспарлаудың теориялық негіздерін қамтиды. Алынған нәтижелер Алакөл аймағындағы туризмді тұрақты дамытуға, аумақтың эстетикалық және экологиялық құндылығын арттыруға ықпал етеді.

Түйін сөздер: ландшафты жоспарлау, ландшафттық дизайн, демалыс аймағы, экологиялық тұрақтылық, Алакөл көлі, Realtime Landscaping PRO, Сиверс алма ағашы, альпі беткейі, тұрақты туризм.

Географические особенности ландшафтного планирования рекреационных зон в Алакольской котловине

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Аннотация: В статье рассматриваются проблемы ландшафтного планирования в природоохранных мероприятиях. Ландшафтное планирование (ЛП) – научное направление в ландшафтоведении, изучающее пространственно-временную организацию жизни сообществ в определенных географических зонах. Целью является достижение максимальной адаптации функциональных зон хозяйства к ландшафтной структуре и создание новых оптимальных антропогенных и культурных ландшафтов. Теория и практика реализации хозяйственного освоения и размещения экологических предпосылок и ограничений, характерных для ландшафтных особенностей регионов.

Актуальность работы заключается в разработке системы ландшафтного управления, адаптированной к природной среде данной местности, сохранении крупных особо охраняемых территорий, воспроизводстве и охране уникальных растений, находящихся под угрозой исчезновения, создании эстетичного художественно-культурного ландшафта на территории туристско-рекреационных зон и частной жилой застройки, озеленении городов и поселков – иными словами, в экологической организации природы. Взаимоотношения человека и природы – это проблема координации искусства и красоты.

В данном исследовании представлен проект ландшафтного дизайна туристско-рекреационной зоны «Веселый курорт» на озере Алаколь в Казахстане. В плане приоритет отдан экологической устойчивости, эстетической привлекательности и интеграции местной флоры и фауны. С помощью приложения Realtime Landscaping PRO в исследовании моделируется широкий спектр зон, включая зоны отдыха, зоны размещения и экологически уязвимые зоны. Особое внимание уделяется выращиванию исчезающих видов растений, таких, как яблоня Сиверса, и созданию ландшафта в альпийском стиле. Исследование включает в себя теоретические основы ландшафтного планирования с учетом уникальных географических и климатических условий региона, включая влияние сильных ветров и характеристики воды. Результаты исследования способствуют развитию устойчивого туризма в Алакольском районе, повышая как эстетическую, так и экологическую ценность территории.

Ключевые слова: ландшафтное планирование, ландшафтный дизайн, зона отдыха, экологическая устойчивость, озеро Алаколь, Realtime Landscaping PRO, яблоня Сиверса, альпийский склон, устойчивый туризм.