

"Agreed"

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"Specially Protected Natural Areas"

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"Approved"

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Tajikistan

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2024

Management plan of the State Nature Reserve "Zorkul" for 2025-2029.



State Institution of Specially Protected Natural Areas

Prepared by the public organization "Tabiati Yoboi" within the framework of the "Tajikistan Resilient Landscape Restoration Project (P171524)" financed by the World Bank under the "RESILANDCA+" Program.

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ABBREVIATIONS

CEP	Committee for Environmental Protection under the Government of the Republic of Tajikistan
AFUGRT	Agency of Forestry under the Government of the Republic of Tajikistan
ALRI	Agency for Land Reclamation and Irrigation under the Government of the Republic of Tajikistan
CEP	Committee for Environmental Protection under the Government of the Republic of Tajikistan
DF	Dekhkan farms
GBAO	Gorno-Badakhshan Autonomous Oblast
IFN	Inter-farm network
IO	International organizations
IUCN	International Union for Conservation of Nature
KDN	Collector-drainage network
MoA	Ministry of Agriculture of the Republic of Tajikistan
MP	Management Plan
NAST	National Academy of Sciences of Tajikistan
OO	Public organization
RIF	Research Institute of Forestry of the Agency Forestry under Government of the Republic of Tajikistan
RO	Representative lake
RT	Republic of Tajikistan
SCLMG RT	State Committee for Land Management and Geodesy of the Republic of Tajikistan
SISPNA	State Institution of Specially Protected Natural Areas
SNR “Zorkul”	State Nature Reserve “Zorkul”
SPNA	Specially Protected Natural Areas
SWMD	State water management department
TRLRP	Tajikistan Resilient Landscape Restoration Project
UNESCO	United Nations Educational, Scientific and Cultural Organization
WMS	Water metering structures
WUA	Water Users Associations

INTRODUCTION

Maintaining the life-supporting functions of natural systems necessary for the sustainable development of society and ensuring the environmental safety of the country is one of the strategic goals of the state policy of Tajikistan in the field of environmental protection.

Specially protected natural areas (SPNA) are state property - the common property of all the people of the Republic of Tajikistan and they form a single functional system designed to preserve and study natural diversity, maintain ecological balance and carry out environmental monitoring.

This medium-term management plan for the State Nature Reserve “Zorkul” (SNR “Zorkul”) for 2025-2029, developed by experts from the Public Organization (PO) “Tabiati Yoboi” in collaboration with employees of the State Institution of Specially Protected Natural Areas (SISPNA) of the Committee for Environmental Protection under the Government of the Republic of Tajikistan (CEP) and the National Academy of Sciences of Tajikistan (NAST). The development was based on the “Guidelines for the Development of Management Plans for Specially Protected Natural Areas”, published within the framework of the “Sustainable Landscape Restoration Project in Tajikistan (SLRTP) (P171524)” financed by the World Bank under the RESILAND CA+ Program.

A management plan is a medium-term development program consisting of measures aimed at preserving natural specially protected natural areas through scientific research, monitoring, environmental education and environmental protection activities.

The purpose of developing the SNR “Zorkul” Management Plan is to ensure the improvement of public management and planning in the field of organizing and conducting the activities of the SNR “Zorkul” in accordance with the law of the Republic of Tajikistan “On Specially Protected Natural Areas” dated December 26, 2011. The international obligations of the Republic of Tajikistan for the conservation of biological diversity and other international documents are also taken into account.

The management plan is intended to play an important role in informing the public about the activities of the SNR “Zorkul”, as well as in promoting environmental knowledge among the population in the SNR “Zorkul” zone; the main task is to instill in people a caring attitude towards nature, and the formation of a sense of personal responsibility for the state of the environment.

The basic basis for drawing up the Management Plan was the existing information about the resources of the SNR “Zorkul”, an analysis of its practical activities, as well as the study and analysis of existing problems in the process of operation. The initial data for the work were specially conducted research, stock materials and developments.

An important component of this work was interaction with the local population, regional government bodies and local governments, landowners and land users, scientific institutions, and non-governmental environmental organizations. For this purpose, working meetings were held with the invitation of representatives of third-party interested organizations and the local population, at which the main directions and opportunities for further development of the SNR “Zorkul” were determined and consensus was reached on the issues under consideration.

In 2001, Lake Zorkul was included in the list wetlands covered by Ramsar Convention ^[1]. In 2006, the State Committee for Environmental Protection and Forestry of the Republic of Tajikistan included the SNR “Zorkul” as a candidate for list of UNESCO World Heritage Sites .

The list of participants in the working group for developing the management plan of the SNR “Zorkul” is provided in Annex 1.

SECTION 1. BASIC INFORMATION ABOUT THE SNR “ZORKUL”

Status and features of the SNR “ZORKUL”

Name of the specially protected area: State Nature Reserve “Zorkul”

Control: State institution of specially protected natural areas (SISPNA) of the Committee for Environmental Protection under the Government of the Republic of Tajikistan (CEP).

National category: Nature reserve.

IUCN Categories: I

Date of preparation of the Management Plan: May 2024.

Management Plan Period (5 years): 2025-2029

Purpose and objectives of the SNR “ZORKUL”: The main goal of creating the Zorkulsky Reserve is to maintain ecological balance, preserve the biological diversity of the Eastern Pamirs, obtain scientific information and data on the course of natural processes in nature and use this information for the purposes of environmental education and propaganda.

Head office location: Republic of Tajikistan, Khorog, st. Sokhibnazarov 22. Phone: +(992) 905906082; E-mail: firdawas.khudoyorov95@mail.ru

Date of foundation: SNR “Zorkul” was created in 2000 on the basis of the existing Zorkul Nature Reserve with a total area of 87.7 thousand hectares located on the territory of the Murghab and Ishkashim regions of the Gorno-Badakhshan Autonomous Region. Organized with the aim of preserving the unique East Pamir natural complex and practically the last large enough nesting colony of mountain geese, which are included in the Red Book of the Republic of Tajikistan. The reserve covers the surrounding area and waters of the Pamir Lake Zorkul and borders the Republic of Afghanistan in the south.

1.1. Location and brief description

According to the Decree of the Government of the Republic of Tajikistan dated March 14, 2000, No. 120, the Zorkul State Nature Reserve was created in order to preserve the population of the Indian mountain goose, Pamir Mountain sheep (argali), Central Asian Mountain goat, as well as the high-mountainous East Pamir natural complex.

Area: Currently, the area of land assigned to the Zorkul Nature Reserve is 87,700 hectares.

Management Goals

The main goal of creating the SNR “Zorkul” is to maintain ecological balance, preserve the biological diversity of the Eastern Pamirs, obtain scientific information and data on the course of natural processes in nature and use this information for the purposes of environmental education and propaganda.

Brief description of boundaries

The territory of the Zorkul Nature Reserve is located in the highlands. The territory of the reserve (average heights - 4100-4200 m above sea level) belongs to the Central Asian region, covering the surrounding area and the waters of the Pamir Lake Zorkul. The lake is a border lake, behind it to the south is the territory of the Republic of Afghanistan, the so-called Afghan Badakhshan. Within the

boundaries of the reserve there are three more relatively small lakes under the general name Chakankuli, which stretch along one of the gorges of the Wakhan ridge. The upper reaches of this gorge also belong to the territory of the reserve up to the peak of Concord, the height of which is 6000 m. The typical Pamir Plateau is a system of wide lake basins and river valleys, raised to a height of 3600-4200 m above sea level and separated by small ridges, up to 1-2 km relative height, heavily destroyed by denudation processes. Most of the ridges extend from east to west and are highest in the western parts.

Geographically, the Zorkul gas processing plant belongs to the Murgab and Ishkashim districts of the Gorno-Badakhshan Autonomous Region of the Republic of Tajikistan.

Coordinates of the territory of the SNR “Zorkul”:

1. extreme northern point: 73 ° 41' 30" E; 37 ° 28' 50" N;
2. extreme southern point: 73 ° 45' 00" E; 37 ° 19' 50" N;
3. extreme western point: 73 ° 34' 30" E; 37 ° 27' 15" N;
4. extreme eastern point: 73 ° 45' 40" E; 37 ° 21' 00" N

Transport accessibility

There is a good road from the city of Dushanbe to the central estate of the reserve - the distance is about 460 km, and the territory of the SNR “Zorkul” reserve is located 180 km from the city of Khorog. There are country roads that are open for 7 months of the year; in winter, the territory of the reserve can be reached on foot or by horseback, as well as by helicopter.

1.2. The purpose and objectives of the SNR “Zorkul”

The main goal of creating the SNR “Zorkul” is to maintain ecological balance, preserve the biological diversity of the Eastern Pamirs, obtain scientific information and data on the course of natural processes in nature and use this information for the purposes of environmental education and propaganda.

The management and development of the reserve is carried out in accordance with consolidated and special planning documents and individual decrees of the Government of the Republic.

Control over the activities and compliance with legislation on the territory of the reserve is carried out by the SISNPA. Measures to ensure the protection of specially protected natural areas and the territory of the reserve are determined by the Law of the Republic of Tajikistan “On Specially Protected Natural Areas” No. 788 of December 26, 2011.

The activities of the reserve are carried out in the following areas:

- Legislative direction: choice of conservation policy and its main directions (establishment of protective, protective and other regimes, establishment of rules for environmental management).
- Territorial planning (general, special and detailed): selection of functional zones, priorities for protection, recreation or other types of activities, local protection measures. Any kind of activity must be carried out in accordance with the provisions of territorial planning.
- Economic: regulation of the number of visitors.
- Scientific: selection of materials for territorial planning, monitoring, other specific measures.

It is also planned to involve public inspections, as well as specialized volunteer squads, in protecting the territory of the reserve. In matters of ensuring protection, the administration of the reserve and its services interact with state bodies for the protection of water resources, fisheries protection, hunting supervision and internal affairs bodies.

1.3. Legal status and history of the creation of protected areas

The SNR “Zorkul” is a natural protected area of national importance. Its legal status is determined by the following state legislative acts:

- Law of the Republic of Tajikistan “On Specially Protected Natural Areas” No. 788 dated December 26, 2011.
- Decision of the Government of Tajikistan No. 267 of July 20, 1992 “On the creation of the Tajik National Park.”
- Order of the State Institution of Specially Protected Natural Areas No. 147 dated 09.11.05 “On the location of the protected area.”

Control over the activities and compliance with the law concerning the territory of the reserve is assigned to the SISPNA.

The powers to protect the SNR “Zorkul” are reflected in the description found in the “Natural reserve fund of the Republic of Tajikistan” (Appendices 58 and 59, Article 9 of the Law on Nature Protection dated 01.02.96 No. 223; 10.05.02 No. 30; 02.12.02 No. 75; and 07.15.04 No. 58). This law states that state natural complexes are aimed at protecting natural complexes, preserving and promoting the growth of wild vegetation and fauna, and studying the laws of nature (No. 223 of 02/01/96). In addition, under this law, this area cannot be used for economic development, and will not be used for any other purpose.

The SNR “Zorkul” was created on March 14, 2000. And despite numerous territorial changes (transfer of part of the land to agricultural authorities and their subsequent return to the reserve), the transfer of the reserve for management to various departments, its status has always remained unchanged - it has always been state-owned nature reserve).

1.4. Management plan for the SNR “Zorkul”

This management plan is a strategic document developed specifically for the SNR “Zorkul” in accordance with the requirements of UNESCO. Given the unique integrity of the reserve's ecosystems, the document covers activities related to the management of the entire territory of the reserve.

The document was developed by experts from the Public Organization “Tabiati Yoboi” in close collaboration with specialists from the SISPNA from October 2023 to May 2024 and with the participation of a group of national experts from Tajikistan (*Table 1, Figure 1*).

Table 1 : Activities for the development of the Management Plan at the SNR “Zorkul”, October 2023 -May 2024.

Date	Event	Participants
12/28/2023	Seminar "Discussion of the structure and content of the management plan of the SNR “Zorkul”	30 people: SISPNA, CEP, NAST, FAUGRT, PO “Tabiati Yoboi”, representatives of the SNR “Zorkul” and a working group of experts

01/12/2024	Round table “Discussion and state of the reserve’s ecosystems, problems and barriers, list of rare and endangered species of plants and animals recommended for inclusion in the Management Plan”	35 people: SISPNA, CEP, NAST, FAUGRT, PO “Tabiati Yoboi”, representatives of the SNR “Zorkul” and a working group of experts
02/20/2024	Round table "Discussion of the status of protection and categorization of rare and endangered species of plants and animals according to the requirements of the IUCN and the Ramsar Convention"	38 people: SISPNA, CEP, NAST, FAUGRT, PO “Tabiati Yoboi”, representatives of the SNR “Zorkul” and a working group of experts
03/12/2024	Meeting of a working group of experts from the local population to discuss the developed management plan for the SNR “Zorkul” for 2025-2029.	A total of 51 people (15 women)

The main goal of developing a management plan is to achieve a reasonable balance between the need to preserve and protect the natural resources of the SNR “Zorkul” and the need to meet the needs and traditional uses of the local population using resources in the buffer zone of the reserve without causing damage to the unique ecosystems of the reserve.

The first two sections of the document describe the physical and geographical characteristics of the SNR “Zorkul”, the third section describes the administrative resources of the reserve. The fourth section is devoted to a description of factors, threat analysis and response measures for the conservation of the reserve and the backlog of the reserve management plan, timing and monitoring of the implementation of activities on the territory of the SNR “Zorkul” for the period 2025–2029.



Figure 1: Participants of the seminar “Discussion of the structure and content of the management plan of the SNR “Zorkul”, December 28, 2023 (photo by PO Tabiati Yoboi)”

SECTION 2. DESCRIPTION OF THE NATURAL CONDITIONS OF THE SNR “ZORKUL”

This section provides an ecological description and the main characteristics of the Zorkul Nature Reserve. Considering the uniqueness and dynamics of development of the reserve's ecosystems, all natural objects of the reserve are described as a single whole.

2.1. Climatic conditions

Zorkul Nature Reserve belongs to the high mountain zone. According to its natural, climatic and plant conditions, it belongs to the Eastern Pamirs, occupying about 84.7% of the territory of the Gorno-Badakhshan Autonomous Region, covering only the Murgab region. The territory of the Eastern Pamirs consists of rocky and sandy scree.

The climate of the Pamirs, as a high-mountain desert, is sharply continental and is characterized by negligible precipitation, very low average annual temperatures and intense solar radiation. Average annual air temperature according to the weather station on the lake Zorkul is 3.8°C . The highest average monthly air temperature is 8.7°C in July, the maximum monthly average is 18°C in January. The maximum air temperature in Murgab reaches 33°C , in Zorkul 28°C . The average duration of the frost-free period in Murgab is 64 days, in Karakul - 0, i.e. Almost all morning frosts occur in all months. The growing season lasts about 180 days.

The average precipitation in the highlands is very low. The high dryness of the highlands is due to the fact that the surrounding mountain ranges intercept almost all precipitation. In the Pamirs in summer there is almost three times more precipitation than in winter. Moreover, they often fall in the form of snow. Thus, in the Pamirs precipitation falls only about 100 mm per year or less, Murgab - 73, Bulunkul - 86, Karakul - 78 mm. Only at altitudes more than 4000-4500 m above sea level does the amount of precipitation increase to 200 mm more, so there is glaciation on the tops of the ridges (Muzkol and Severo-Alichursky ridges), but the snow line usually does not fall below 5000 m above sea level.

In the highlands of the Pamirs, uneven accumulation of snow cover occurs. Its power increases as the absolute altitude increases. From 4-16 cm at an altitude of 3860 m above sea level to 1-2 m at an altitude of 4760 m. A stable snowy winter is observed from an altitude of 4200-4300 m. The wind and slope exposures have a great influence on the snow cover in the mountains (Gubsky, 1967). Winter here is harsh and has little snow. The absolute minimum air temperature reaches -50°C , even in summer the air temperature drops to -20°C . According to long-term data, the annual precipitation is in the range of 73-103 mm. They fall mainly in the spring and summer. As a result, air humidity is low (on average 41.6%).

2.2. Relief

The relief of the surroundings of the Zorkul nature reserve, as well as the entire Pamirs, is a system of wide lake basins and river valleys, raised to a height of 3600-4200 m above sea level and separated by relatively low smoothed ridges, up to 1-2 km of relative height, heavily destroyed by denudation processes. Outwardly it resembles the middle mountains. Most of the ridges stretch from east to west and are highest in the western parts. The basin and valley of Lake Zorkul are filled with products of mountain destruction - fine earth, crushed stone, pebbles, sand, and a pile of ancient glacial moraines. Permafrost is found in the soils.

2.3. Brief description of the zones of the SNR “Zorkul”

The Zorkul Nature Reserve is a single natural complex, the main components of which are inextricably linked by their common origin and the dynamics of natural development. The reserve is an integral conservation area, currently 87.7 thousand hectares in size, which should ensure the sustainable functioning of high-mountain ecosystems.

The territory of the reserve is not only a place of distribution of endangered rare, endemic and relict species of plants and animals, but also represents a natural and unmodified habitat of vulnerable

representatives of the fauna, such as the Pamir argali, Central Asian mountain goat, tolai hare, long-tailed (red) marmot, wolf, fox, ermine, solongoi, silver vole, gray hamster, big-eared pika, snow leopard.

Ecosystems of the high mountain zone. Within the republic, highland ecosystems are concentrated in the spurs of Gissar-Darvaza, Pamir-Alai and Badakhshan, at altitudes of 2500-4200 m. Highland ecosystems differ from all previous ones in their harsh climatic and ecological living conditions, allowing only the most adapted organisms to survive and develop. The highlands are characterized by short, cool summers, harsh, snowy winters, and a large range of seasonal and daily temperatures. Subalpine and alpine vegetation predominates here. The most typical birds of the high-altitude zone are the great pink lark, red-winged lark, juniper and alpine finch, red-capped finch, linnet, alpine jackdaw, raven, horned lark, bearded vulture, golden eagle, kumai, Himalayan and Tibetan snowcock, Tibetan sajjá, bar-headed goose, Himalayan merganser and others. Among the mammals found here are the silverback, juniper and Pamir voles, the red and big-eared pika, the long-tailed marmot, the tolai hare, the fox, the wolf, the ermine, the solongoi, the snow leopard, the Siberian ibex, the argali, the mustachioed bat, the great horseshoe bat, etc.

Ecosystems of the nival zone. By its nature and ecological features, the nival altitude zone can be considered the upper limit of the distribution and habitat of biodiversity in Tajikistan. The altitudes characteristic of the nival zone exceed 4000 m above sea level. The average annual temperature here is mostly negative. The extremely harsh climate, sparse vegetation cover, and sharp temperature fluctuations limit the diversity and development of the local fauna. Most animals come here during the summer period of vertical migration or spend most of their lives in shelters or hibernation. Amphibians and reptiles are absent in the ecosystems of the nival zone or occur very sporadically. Birds here include the Himalayan and Tibetan snowcock, kumai, bearded vulture, alpine jackdaw, mountain goose, etc. Mammals include the red and big-eared pika, Pamir vole, long-tailed marmot, Siberian ibex, argali, and snow leopard.

Based on the results of ecological zoning, it is advisable to divide the territory of the SNR "Zorkul" into three ecological zones, which differ significantly in terms of ecological characteristics and anthropogenic pressures. The forest management plan for the reserve's, developed by the State Forestry Committee of the Tajik SSR, and the results of comprehensive ecological studies were used as the basis for this division.

Buffer zone. Currently, the SNR "Zorkul" is directly adjacent to the territory of the Murgab and Ishkashim districts of the Gorno-Badakhshan Autonomous Region, the territory of which is the buffer zone of the reserve.

2.4. Flora of the SNR "Zorkul"

The vegetation is xerophytic and cold-resistant; trees and shrubs are completely absent. As a result of the high altitude, sharp continentality and extreme dryness of the climate, the vegetation of the eastern Pamirs is cryophytic in nature, impoverished and sparse. Teresken, wormwood, and ayan deserts, cushion forests, and sparse low-grass steppes dominate here. Meadows are represented only by isolated spots. The Eastern Pamirs are characterized by two belts (Stanyukovich, 1949), of which the most important is the belt of hemiocryphytic deserts (3550-4200 m above sea level) of tereskens, roseate wormwood, and in places steppe. Most of this belt is occupied by teresken deserts, in which the main codominant is wormwood roseate. In the more humid areas, in Alichur, Zorkul and Kzyl-Rabat, where there is snow cover in winter, wormwood deserts are located with the dominance of Leman wormwood. On somewhat sandy gravelly soils, especially along alluvial fans, deserts with the dominance of Pamir xylanthetum are common. On steep rocky scree, primitive unformed communities with wormwood are common. Desert plants in the Zorkul area are low, squat, no higher than 10-20 cm, the total cover usually does not exceed 8-10%. The species composition is poor. Common codominants are low turf grasses (pebble feather grass, oriental feather grass) and cushion plants from the genera *Acantholimon* and *Acantholimon*. In places with high humidity, sazs are quite common, where giant

hummocks of black-flowered sedge dominate. *Rhodiola* grows in small gorges where there is sufficient moisture. There are also: *Kobresia cupilliformis*, *Carex pseudo-foetida*, *Primula nivalis*. In some places you can find cushion plants (*acantholimons*, *ayanii*), and there is also mesophilic vegetation (legumes, cereals, sedges, *cobresias*). During the soil-hydrological assessment of GBAO pasture lands, a geobotanical survey and selective geobotanical mapping of the Pamir valley massifs suitable for phytomelioration were carried out. The Zorkul-Kzylrabat geobotanical region is the highest elevated and most humidified region of the Eastern Pamirs; snow cover is always available on the northern slopes, and it also remains for quite a long time on the southern slopes. The bottom of the valleys is located here at altitudes of 4100 m, i.e. Here the vegetation of one eucryophyte belt is presented. The vegetation is quite unique due to contact with the western Pamirs and increased rainfall. The surroundings of Lake Zorkul are relatively flat intermountain spaces located in the altitude range of 4100-4300 m. Springs often emerge near rivers and in depressions near the lake. The lower sloping part of the territory is used as summer pasture and is heavily overgrazed in summer.

The dominant type of vegetation is cushion plants, formed by communities of *Acantholimon diapensiiformes*, green wormwood, Paulsen's snakehead and cushion-shaped *teresken*. In areas with finer soil, some steppe is observed (Litvinov's bluegrass, downy-eared grass, *angustifolia* sedge). The projective cover of these phytocenoses is 30-40% in *teresken* and *acantholimon* formations and 50-60% in wormwood. The remaining insignificant part of the territory - 180 hectares - consists of small areas of meadows along the banks of rivers and at the outlets of springs (*cobresia* hairy, round sedge, black-sedge) - projective cover 90-100%.

From an economic point of view, the pastures in Lake Zorkul are low-yielding and of little value, because the bulk of the herbage consists of inedible cushions of *acantholimon* and poorly edible Paulsen's snakehead and deep-growing grass. In addition, the territories are not very suitable for watering, because the relief is an alternation of moraine hills with depressions. Some improvement of xerophytic pastures can be achieved by underseeding valuable wild species (Litvinov's and tremulous bluegrass, squat grass, green and white-haired wormwood, capitate capitate, Tien-shan sageweed, etc.). Most of the Pamir pastures are xerophytic in nature.

The first step toward improving the productivity of these pastures is irrigation, especially since in many areas, during the peak of vegetation growth, there is a sufficient amount of water due to the intense melting of snow at this time. From the work of N.A. Raikova and Kh. Yusupbekov (1963, 1965), it has been shown that after 4-5 years of irrigation, xerophytic pastures begin to take on a meadow-like appearance. Xerophytic species disappear, and meadow-steppe species, followed by meadow species, become dominant. All xerophytic pastures are divided into three groups depending on the availability of irrigated water. From this, it is clear that the plant resources are quite limited, but in terms of nutritional quality, they slightly surpass the plants of lower-altitude communities. The high nutritional value attracts numerous herds of argali and Siberian ibex, which graze here in the winter.

At altitudes from 4400 to 4500 m, desert and semi-desert vegetation predominates (wormwood and *teresken*), above from 4800 to 4900 m there is an alpine stage with cushion vegetation, at 4800-4900 m there is a nival stage with single hypercryophyte plants. The territory of the SNR "Zorkul" is in a cold high-mountain zone (from 3700 to 4800 m above sea level). Here there are small areas of short-grass steppes, meadows, and cushion forests. Above lies the nivation zone, which is almost devoid of vegetation. The main area here is occupied by scree and rocks.

The Western Pamirs belong to the Western Asian floristic region, and the Eastern Pamirs belong to the Central Asian floristic region. The territory of the nominated site belongs to the Central Pamir physical-geographical region, which covers the northern part of the Eastern Pamirs. In the Central Pamirs, 57 families, 248 genera and 639 plant species have been identified. The largest families of vegetation in the nominated area are grasses (32 genera, 92 species), Asteraceae (118 species), and cruciferous plants (34 genera, 64 species). Next come the legumes, rosaceae, borage, carnation,

goosefoot, rush, labiaceae, lily, buckwheat, primrose, noricaceae and umbelliferae. The remaining families contain a limited number of species, sometimes one at a time.

The vegetation of the Pamirs is xerophilic in nature. Insignificant amounts of precipitation, very low temperatures in winter, which causes deep freezing of the soil, severe insolation and constant winds are factors that give the Pamirs the appearance of a high-mountain desert. The general characteristic of the vegetation cover of the nominated territory is desert. In its central part there are sparse grass steppes. On the slopes of the mountains and especially along the bottom of the sais, desert vegetation is somewhat richer, due to better moisture. Here you can find steppe elements of feather grass and onions.

The territory of the reserve is characterized by vegetation zones. As throughout the Pamirs, three vertical belts are also distinguished here: nival, alpine and subalpine.

The nival belt occupies the slopes of mountain ranges at altitudes of more than 4800 m and is very poor in vegetation. The most cold-resistant plants grow here - *Melandrium apetalum*, *Cistrastium cistrastoides*, *Tanacetum xyllorhiisum* and in some places *Sibbaldia tetranda* is found.

The Alpine belt occupies areas at altitudes from 4200 to 4800 m above sea level. This belt is characterized by the dominance of the subshrub *Tanacetum xyllorhiisum*. Wetter habitats with precipitation of 100-350 mm are characterized by the dominance of cryophytes: *Oxytropis immerse*, *Oxytropis poncinsii*, *Smelovskia calicina*, etc. In depressions, the dominance of the desert formation with a predominance of *Eurotia ceratoides*, *Artemisia skornjakovii* and *Tanacetum xyllorhiisum* is characteristic.

Subalpine belt. Within the nominated territory, its upper limit reaches 4100-4200 m. It is dominated mainly by *terresken* deserts and sparse grass feather grass steppes.

According to the dominant life forms, both throughout the Pamirs and within the territory of the reserve, 6 types of vegetation are distinguished: deserts, cushion lands, thorny cushion lands, steppes, meadows and shrubs. The dominant position in these landscapes is occupied by *terresken* and wormwood deserts; Large areas are occupied by scree and rocks with a peculiar flora. Minor areas are under steppes and meadows.

In desert-steppe communities, the background species are gray *terresken* - *Ceratoides paposa*, rose-flowered wormwood - *Artemisia rhodantha*, Tibetan *ajania* - *Ajania tibetica*, *Acantholimon diapensioides*, deep-rooted wormwood - *Oxytropis immerse*, *Subbaldia tetranda*, grooved fescue - *Festuca sulcata*, pebble feather grass - *Stipa glareosa*, eastern feather grass - *Stipa oritntalis*, thick-leaved *Christolea* - *Christolea crassifolia*.

In the meadows, the dominant species are: black-flowered sedge - *Carex melanantha*, false-smelling sedge - *C. pseudo-foetida*, rounded sedge *C. orbicularis*, hairy *cabresia* - *Kobresia capilliformis*, narrow-fruited *cabresia* - *K. stenocarpa*, etc.

The stony-talus vegetation is represented by wormwood: *rutifolia* - *Artemisia rutifolia*, *santolinifolia* - *Artemisia santolinifolia*, *Waldheimia ujkjq* - *Waldheimia rutifolia*, bitter glacial - *Saussurea glacialis*, coloring *macrotomia* - *Macrotomia euchroma*, *capitate capitate* - *Hedisarum cephalotes*, Pamir *acantholimon* - *Acantholimon pamiricum* and others.

Within the territory of the reserve and in its buffer, zone grow plants included in the Red Book of the Republic of Tajikistan: *Desmatodon altipes*, *Ostrowskia magnifica*, Pamir *dysederia* (*Desideria pamirica*), *Oxytropis Hedini*, *Kostychev's lumbago* (*Pulsatilla Kostyczewii*), *Acantholimon Varivtzevae*, *Saxifraga pulvinaria*, *Bunium persicum*.

The list of plants of the SNR "Zorkul" is given in Annex 2.

2.5. Fauna of the SNR "Zorkul"

According to the flora, the fauna of the reserve is not numerous in terms of species. A complete list of animal species in the reserve is given in Annex 3.

Insects and other important invertebrates

No special studies have been carried out to study the invertebrate fauna in the reserve. However, some scientists worked in the river valley. Pamir or Lake Zorkul. This is how we know about the presence of some species of mites of the genera *Oribotritia*, *Trhypochthonicus*, *Tectocephus*. Academician M.N.

Narzikulov found several species of aphids living on teresken (*Eichinaphis spp.*) and sedge (*Chaetosiphella spp.*). Several species of horseflies (*Tabanidae*) and gadflies (genera *Oestrus*, *Crivellia*, *Oestromya*) were found here, which parasitize mountain goats, argali, and marmots. In the area of the Zorkul Nature Reserve, several species of Lepidoptera, dragonflies, Orthoptera, Coleoptera and other insects have been recorded.

Fish

The main, widespread fish species in Lake Zorkul and the Pamir River is the Pseudo-Ottoman, which is numerous here. In addition to the Ottoman, Pamir char is also found in the lake.

Birds

Birds. The group of nesting birds of the SNR “Zorkul” includes species that have adapted to the harsh conditions of the highlands. Among them, notable is the horned lark, desert wheatear, mountain redpoll, red finch, pearl finch, snow finch, chough, alpine jackdaw, crow, kumai, golden eagle, bearded vulture, firebuck, grasshopper, merganser, common tern, bar-headed goose, Tibetan and Himalayan snowcocks (*Figure 2*), Tibetan sajja, Mongolian saker falcon. Some of these birds even remain to spend the winter in the harsh conditions of the winter Pamirs. Lake Zorkul has the largest colony of bar-headed geese, with up to 250 pairs of breeding birds (*Figure 3*). If in the spring Lake Zorkul is covered with a thick layer of ice and is inaccessible to migrating birds, then from August to October tens of thousands of waterfowl and semi-aquatic birds gather here, finding food and a place to rest here. In the summer, birds of northern latitudes that wander and do not breed during this season (various ducks, copepods, waders, gulls, terns, etc.) are not uncommon here, since the conditions of Zorkul in their climatic characteristics are very similar to the conditions of the northern Palearctic.



Figure 2: A group of Himalayan snowcocks, two adults and one chick (camera trap image, Fauna and Flora International, 2011)



Figure 3: Indian goose on Lake Zorkul,
(camera trap image, Fauna and Flora International, 2011)

Mammals

Mammals. No more than 15 species of mammals have been recorded here. The background species for the Zorkul Nature Reserve are the Pamir argali, the Central Asian Mountain goat, the tolai hare, the long-tailed (red) marmot, the wolf, the fox, the ermine, the solongoi, the silver vole, the gray hamster, the big-eared pika, and the snow leopard. The red wolf also comes here occasionally. He, as well as argali, leopard, ermine, brown bear, and lynx are taken here under state protection, as they are included in the Red Book of the Republic.

Endemics: From the above list of mammals *Microtus juldaschi* Sev., *Lepus tolai* pamirensis, *Ovis omoni* poli Bluth. and *Ursus arctos* pamirensis are endemic species and subspecies.

Pamir vole (*Microtus juldaschi* Sev.). It is found in all meadows of floodplain valleys, as well as in subalpine and alpine meadows. Numerous within the nominated area. Body length on average is 103 mm in males, 106 mm in females. The general color is light grayish ocher, less often dark gray. Like a typical earth-digger, he leads a sedentary lifestyle. She is strictly attached to her holes. The Pamir vole is characterized by a mosaic or mosaic diffuse type of settlement. The habitats of this mesophilic vole are confined to meadows of floodplain valleys, as well as meadows of subalpine and alpine meadows.

Argali or Marco Polo ram (*Ovis amoni* poli Bluth.). One of the world's largest species of wild sheep, it has the world's most massive spiral horns, sometimes exceeding 70 inches in length. Listed in the Red Book of Tajikistan and Central Asia. The body length is up to 150 cm, and the weight of males reaches 200 kg or more (Figure 4). Distributed only in the Pamirs and surrounding areas. Within the nominated zone, it is found in the spurs of the Pshartsky, North Alichursky, Muzkolsky, Zulumartsky, Trans-Alai ridges. The total number within the territory of the reserve is more than 3000 individuals.

White-clawed bear (*Ursus arctos* pamirensis). Within Tajikistan there are two subspecies *Ursus arctos* isobelinus and *Ursus arctos* pamirensis, the latter of which is endemic to subspecies rank. Found in the upper reaches of the river. Bartang and Vanch. The subspecies *isobelinus* occurs within the southern part of the GPZZ. The number is low, it is listed in the Red Book of Tajikistan.



Figure 4: Argali or Marco Polo ram (*Ovis amoni poli* Bluth.) (photo by Sh. Gulayyozov)

Snow leopard (*Uncia uncia*). A unique representative of the cat family, adapted to high mountain conditions (Figure 5). It hunts mainly ungulates and is an important factor of natural selection in the populations of ungulates in the Pamirs. The total number in the Pamirs is about 300 individuals, of which more than 150 individuals are found in the protected areas of GBAO.

Red wolf (*Cuon alpinus*). The rarest species of predator in the Pamirs. Unlike the gray wolf, it leads an exclusively pack lifestyle. In recent years, no sightings have been recorded and there is no data on numbers.

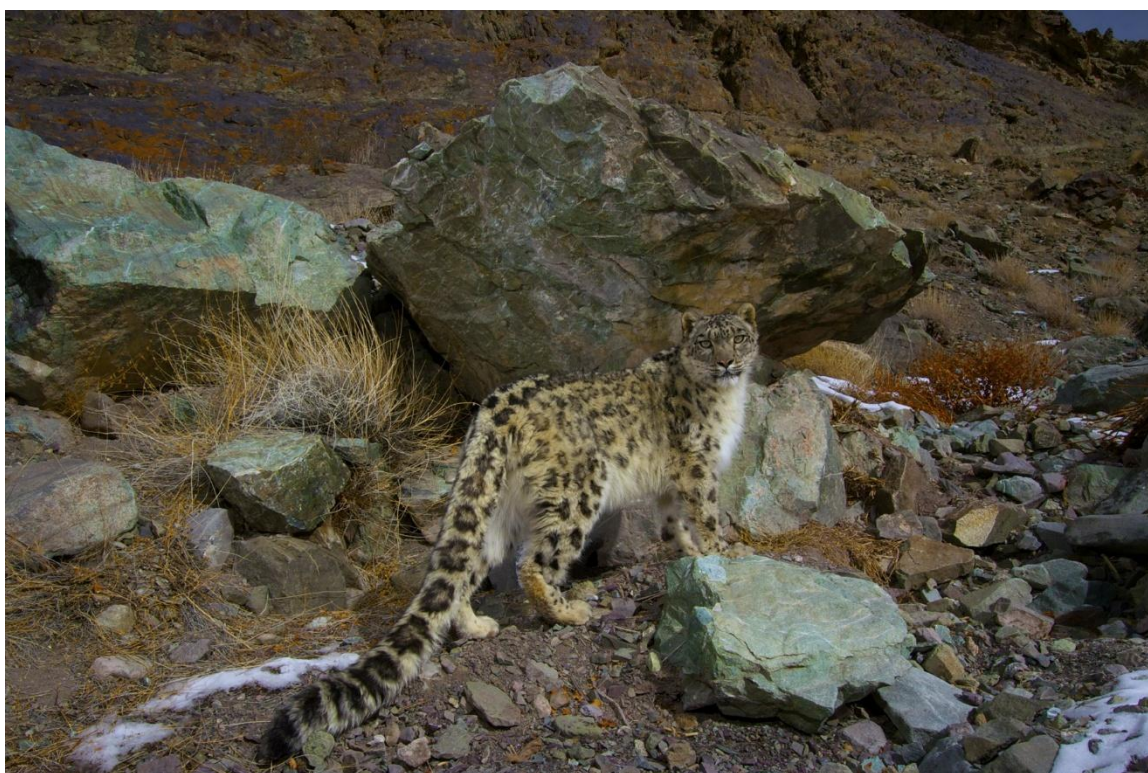


Figure 5: Snow leopard (*Uncia uncia*, (camera trap image, Fauna and Flora International, 2011)

Other important aspects of protected areas

The SNR “Zorkul” is a unique corner of nature, unique in its diversity of natural landscapes; the

complex of animal and plant communities in this protected area fully reflect the landscape and biological diversity of the Eastern Pamirs.

The reserve is the only protected area where the populations of the Indian mountain goose, the Pamir Mountain sheep (argali), the Central Asian Mountain goat, and also the highland mountain goat are protected.

2.6.Socio-economic conditions and environmental management

Direct land use and location

Features of the culture of the local population (customs and monuments). The Pamirs can be roughly divided into three parts: western, northwestern and eastern. The western part of the region is characterized by a variety of ethnic groups: these Shugnans, Rushans, Ishkashims, Yazguloms, Bartans, Wakhans, Khufians, Bachuis, who differ in their everyday characteristics and language. These ethnic groups are united by a common religion - Islam. The Pamir people, except the Yazgulam people, are Shiites. Tajiks also live in the northwestern region (Darvoz, Vanj). But compared to the Pamir peoples, the population of these areas are Sunnis. The Eastern Pamirs are mainly inhabited by Kyrgyz people. The Pamir Kyrgyz, in comparison with the Kyrgyz living in other regions of Central Asia, differ significantly in their everyday characteristics and linguistic dialect.

Indirect land use and location

Agriculture remains the main economic activity of the territory, and the activities of farms are aimed at more intensive farming to increase its economic benefits and efficiency.

Land use is one of the main forms of economic activity in the reserve. At the same time, land use is directly related to reclamation measures and water use systems. This generally affects not only the ecological state of the land, but also water resources and is a source of possible pollution, affecting the state of the near-water ecosystem of the entire territory, including the Zorkul Nature Reserve.

significant in the adjacent territory, which has a negative impact on other components of the environment, especially water resources. As a result of severe erosion and land degradation, water turbidity increases sharply and thereby its quality decreases.

Comments on the impact of land use on protected areas (if any) available)

The natural ecosystems of the reserve are very vulnerable, and any negative impact on them, namely livestock grazing, poaching, cutting down trees and bushes, and especially forest fires, have a very detrimental effect on natural ecosystems, lead to disruption of the ecological balance in nature, and, as a rule, contribute to degradation basic elements of ecosystems: soil, water, vegetation and wildlife.

The indirect negative impact of farms, among other things, is that they are potential poachers - there have been numerous cases when they were detained with weapons in a protected area or in the buffer zone of a reserve.

The main use of biological resources (wood fuel, timber, timber, etc.

Grazing of livestock in the protected area contributes to the spread of diseases among wild ungulates. Illegal grazing of livestock in the reserve area is a source of the spread of epizootics for wild artiodactyls living in the reserve. As well as illegal uprooting of teresken and collection of medicinal plants.

SECTION 3. ADMINISTRATION AND RESOURCES OF THE SNR “ZORKUL”

SNR “Zorkul” is a legal entity. The SNR “Zorkul” is subordinated to the SISPNA of the Committee for Environmental Protection under the Government of the Republic of Tajikistan (CEP).

The reserve is headed by a director appointed to the head of the Main Protected Area under the approval of the Chairman of the CEP. The director manages the reserve based on a combination of the principles of unity of command and collegiality, bears full responsibility for the activities of the reserve, ensures compliance with the law, state discipline and the implementation of approved plans.

The general structure (diagram) of the reserve's management is given in *Annex 4*.

Security. The reserve is protected by a special inspection service. The Special Inspection Service is part of the reserve's staff and is headed by its director. The director of the reserve is the chief state inspector for nature protection in his territory.

Buildings. The reserve has an office. Within the framework of the Tajikistan Resilient Landscape Restoration Project (TRLRP), Central Asia Resilient Landscape Restoration Program financed by the World Bank under the RESILAND CA+ Program (P171524), it is planned to create an information center for the SNR “Zorkul”.

3.1. The composition of the staff of the SNR “Zorkul” according to data for 2024 is presented in Table 2.

Table 2.

According to staffing schedule	Actual	
	Total	Including those with higher education
Total number of employees of the SNR “Zorkul”		
45	40	5
Management		
3	2	2
Heads of departments of the SNR “Zorkul”		
3	2	2
Main specialists		
3	2	2
Leading specialists		
3	2	2
Security workers of the SNR “Zorkul”		
31	31	0
Accounting and planning workers		
1	1	1
Service staff		
1	1	0

3.2. Financial support for the activities of the SNR “Zorkul”.

The structure of funds received to support the main activities of the SNR “Zorkul” according to data for 2024 is presented in Table 3.

Table 3.

Source of funding	In somoni
Funds received from the state budget of the Republic of Tajikistan	
including: Salaries of employees of the SNR “Zorkul”	593,154.00
Household goods	7,000.00
Fuel consumption (gasoline, diesel)	12,000.00

Building renovation	1,300.00
Household expenses	3,700.00
Utility and heating costs	3,520.00
Annual biotech events	32,050.00
Internet service costs	3,000.00
Total:	655,724.00

3.3. Infrastructure of the SNR “Zorkul”.

The infrastructure of the Zorkul gas processing plant is currently insufficient.

Table 4.

Name	Quantity	State
Buildings:		
SNR “Zorkul” Administration Office	1	The main office of the SNR “Zorkul” administration is located in the city of Khorog, GBAO
Car Niva	1	Working
Telephones – office	1	Working
Mobile	All employees	
Uniform	70% security	
Weapon	-	-
Binoculars	2	Working
Computers	3	Working
Digital camera	1	Working
GPS navigation device	1	Working
Camera trap	12	Working
Drone	0	Working

3.4. The main stakeholders, with the exception of SISPNA, are presented in Table 5.

Table 5.

No	Stakeholders
1	Committee for Environmental Protection under the Government of the Republic of Tajikistan
2	Ministry of Economic Development and Trade of the Republic of Tatarstan
3	Ministry of Foreign Affairs of the Republic of Tatarstan
4	Committee for Tourism Development under the Government of the Republic of Tajikistan
5	National Academy of Sciences of Tajikistan
6	Local executive authorities
7	Local population living around the SNR “Zorkul”
8	International environmental organizations

The protection of the SNR “Zorkul” and its protective zones is carried out by state inspectors permanently residing directly on the territory of the reserve, as well as by employees of the nature

conservation departments of the Gorno-Badakhshan Autonomous Oblast (GBAO) districts located around the reserve.

The main types of violations are illegal hunting and fishing, illegal presence and travel through the territory of the reserve.

Scientific research and environmental monitoring on the territory of the SNR “Zorkul” are organized and carried out by staff members together with NAST scientists according to approved joint plans throughout the year. Basically, scientific work includes: registration and condition of wild animals, birds, phenological observations of plants, determination of food reserves, time of arrival and departure of birds.

Environmental educational activities are carried out by the staff of the reserve and the department of science and eco-education of the The main stakeholders, with the exception of SISPNA, with the involvement of public organizations and international organizations.

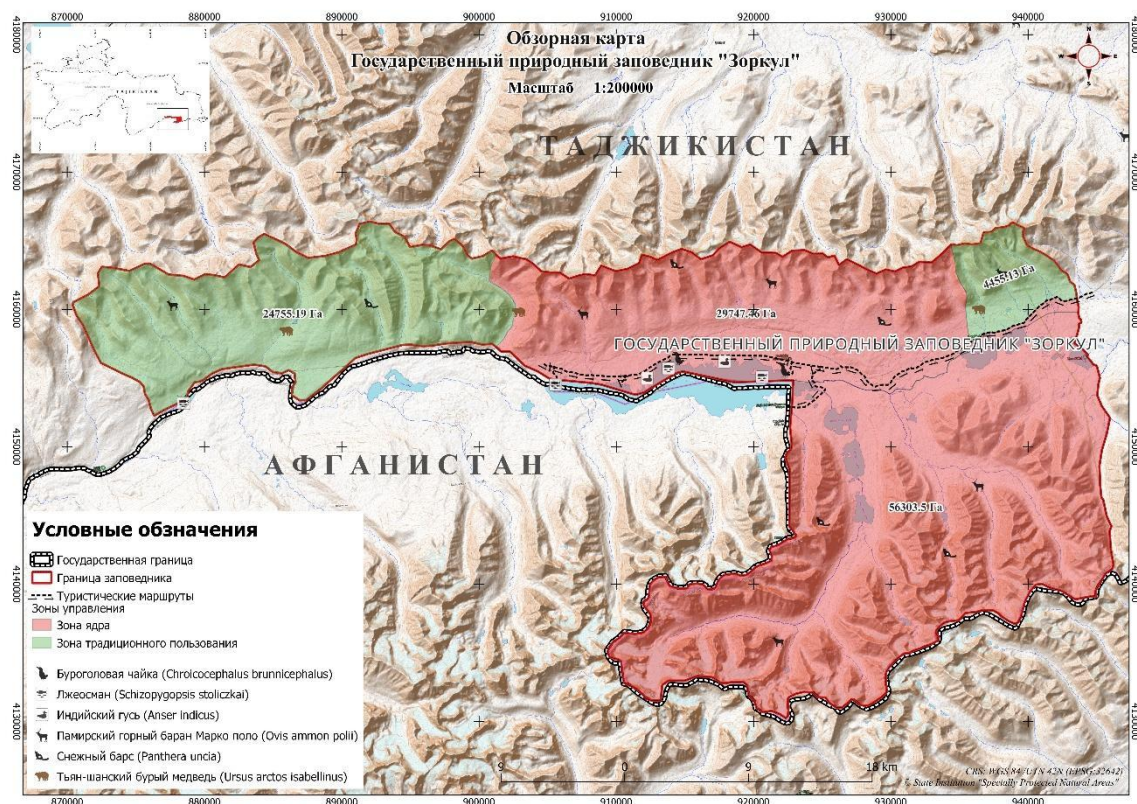
SECTION 4: THREAT ANALYSIS AND RESPONSE MEASURES

4.1. Main threats to protected areas

Threat 1.	Weak material and technical base - which does not ensure the normal functioning of the SNR “Zorkul”.
Threat 2	Decrease in ecosystem productivity, growth and development of tereskens and degradation of ecosystems, as well as degradation of pasture lands for wild animals.
Threat 3	Poaching and decline in the number of rare and valuable species of fauna, deterioration of their habitats
Threat 4	Negative anthropogenic impact on the natural complexes of the reserve due to illegal poaching, collection of teresken by the population living near the territory of the reserve, unregulated grazing of livestock in the buffer zones of the reserve.
Threat 5	Low environmental consciousness of the population.
Threat 6	Intensive land use in the buffer area near the reserve in violation of agrotechnical requirements.
Indigenous reasons threats	• Weak material and technical base of protected areas. • High level of poverty among the population living in the project area. • Lack of application of advanced agricultural soil conservation technologies. • Lack of alternative energy sources. • Low level of environmental education of the population.

4.2.Plans for restoration of degraded pastures in the SNR “Zorkul”

Within the framework of the Tajikistan Resilient Landscape Restoration Project (TRLRP), Central Asia Resilient Landscape Restoration Program financed by the World Bank under the RESILAND CA+ Program (P171524), work will be carried out on reforestation and degraded pastures in order to preserve biodiversity in the SNR “Zorkul” and adjacent buffer zones to the reserve. The territory for work on degraded pastures in the reserve is given in the developed *map 1*. These maps show that, within the framework of the TRLRP, activities will be carried out in the reserve to restore degraded pastures on an area of more than 3000 hectares during 2025-2027.



Map 1: Territory for the restoration of degraded pastures in the Zorkul State Nature Reserve

4.3.REGIME of the reserve (according to the law on protected areas)

Prohibited: On the territory of the SNR “Zorkul” it is prohibited:

- Activities that threaten the existence of natural complexes and historical and cultural sites taken under protection;
- Geological exploration and development of mineral resources;
- Cutting down trees, bushes, unsystematic use of flora and fauna; activities of enterprises that pose a particular environmental hazard;
- Actions that change the hydrological regime;
- Construction of main roads, pipelines, power lines and other communications not related to the activities of the reserve;
- Placing living organisms for the purpose of acclimatization.

The regulations on state natural reserves may prohibit or restrict other types of activities that entail a decrease in the natural, scientific, aesthetic and cultural value of the reserve territory.

Allowed: In accordance with the regulations on the SNR “Zorkul”, it is permitted to carry out work that does not contradict the objectives of the environmental protection activities of the reserve, namely:

- Carrying out measures to restore natural complexes disturbed as a result of anthropogenic impact;
- Carrying out research work aimed at preserving biodiversity in the protected area;
- Carrying out fire-fighting and sanitary measures necessary to preserve and improve the condition of natural complexes;
- Carrying out biotechnical activities (planting tree species natural for a given ecosystem, clearing watering places, constructing feeding areas, laying out salt licks, etc.).

4.4.Goals and objectives of the reserve management (in response to threats)

The SNR “Zorkul” is assigned the following tasks:

- ☐ Preservation of natural complexes of reference and unique sites and natural objects;
- ☐ Preservation of natural landscapes, ensuring the filling of lakes and other water bodies with water to optimal levels and ensuring the conservation and restoration of biodiversity;
- ☐ Organization of research work in the reserve;
- ☐ Development and implementation of scientific methods of nature conservation;
- ☐ Organization of environmental education of the population and carried out in the Educational Center of the reserve.

Table 6 provides a task plan for eliminating the threat in the SNR “Zorkul”.

Table 6

Tasks to achieve the goal:	Tasks	Targeted threat
Task 1	Strengthening the infrastructure of the reserve, maintaining and developing the administrative, technical potential and resources of the reserve.	Threat 1
Task 2	Maintaining and improving the ecological condition of the reserve through the implementation of environmental measures and activities aimed at preserving biodiversity and restoring the environment and carrying out ongoing monitoring.	Threat 3
Task 3	Improving the condition of natural ecosystems and habitats of protected animal species.	Threat 2
Task 4	Organization of research work in the reserve with the participation of research institutes and leading scientists from the country's universities	Threat 4
Task 5	Conducting environmental education of the population in the reserve area in order to increase the level of consciousness and understanding of the values of the reserve and the potential benefits that the preservation of unique natural complexes can provide, increasing the level of support from the local population.	Threat 5
Task 6	Improving territorial management in the buffer zone of the SNR “Zorkul” in the Murgab and Ishkashim districts.	Threat 4, Threat 6

4.5. Specific restrictions for effective management of the SNR “Zorkul”

Restrictions	Rationale	Solutions
Staff technical knowledge/training	Managerial and engineering personnel, as well as rangers, are deprived of the opportunity to improve their qualifications and the level of professional and technical knowledge. Young specialists entering the workforce after graduating from universities, as a rule, have a very low level of knowledge and lack of practical work skills.	Organization of thematic seminars and trainings for engineering and technical workers of the SNR “Zorkul” with the involvement of scientific staff of the Scientific Research Institute of Botany, Zoology and Parasitology of the National Academy of Sciences and employees of the SISNPA, as well as international organizations.
Equipment	Due to a lack of funds, new types of machinery and equipment have not been acquired for many years, and old machinery and equipment, received back in the Soviet years, have completely worn out and are written off. Currently, the SNR “Zorkul” needs, first of all, off-road vehicles.	Resolving issues regarding the main infrastructure and equipment of the SNR “Zorkul”.
Financing	Limited funding from the state budget (for infrastructure improvements, purchases of fuels and lubricants, etc.). complicates management actions and opportunities.	Development of a business plan, with identifying financial needs and sources of financing.
Monitoring	Lack of a mechanism for monitoring the effectiveness of management and its positive and negative impact on the achievement of the goals and objectives of the SNR “Zorkul”.	Monitoring management effectiveness based on indicators developed in the Management Plan.

SECTION 5. MANAGEMENT PLAN FOR 2025-2029 (FOR 5 YEARS): MAIN MANAGEMENT GOALS AND THREAT PREVENTION ACTIVITIES

BLOCK 1. ACTIVITIES IN THE SNR “ZORKUL”

Program for the Reserve – “Preservation of the unique ecosystems of the reserve and its components

Goal of the program: Implementation by the reserve of the functions of a regional environmental, scientific, practical and propaganda center for the conservation of the region’s ecosystems and their components.

Expected results: reduction of violations of the reserve protection regime; increasing the efficiency and quality of inspection work; reduction of violations of environmental legislation in the region; application of rational environmental management in the territories adjacent to the reserve.

Tasks and activities	Actions	Deadlines	Executor	Indicators	Financial costs, thousand Tajik somoni	Sources of financing
Task 1	Strengthening the infrastructure of the reserve and strengthening the material and technical base, by maintaining and developing administrative, technical potential and resources in					
Activity 1.1	Purchase of vehicles, individual vehicles for the security service, provision of uniforms, night vision binoculars, and communications equipment for the security service, solar panels and other equipment.	2025-2029	SISPNA, SNR “Zorkul”	Provision of security services with transport, uniform, communications equipment	300.00	Donors and budget
Activity 1.2	Ensuring systematic patrolling by rangers in areas where wild animals and eco-corridors gather during their migrations.	2025-2029	SISPNA, SNR “Zorkul”	Reducing cases of poaching and other crimes	100.00	Donors and budget
Activity 1.3	Purchase of camera traps, office equipment and other equipment	2025-2029	CEP, SISPNA, SNR “Zorkul”	Improving the efficiency of reserve management and ensuring monitoring of key species	100.00	Donors and budget
Activity 1.4	Installation of pillars with appropriate inscriptions	2025-2029	SISPNA, SNR “Zorkul”	Increasing the degree of protection of the reserve (especially from grazing of domestic animals, logging)	20.00	Donors and budget

Activity 1.5	Creation of 2 huntsman cordons.	2025-2029	SISPNA, SNR “Zorkul”	Increasing the efficiency of protection of the reserve, improving conditions for scientific work	200.00	Donors and budget
Activity 1.6	Repair of dirt roads in the right bank part of the reserve on a site with a total length of 60 km	2025-2029	SISPNA, SNR “Zorkul”, Local Government (LG)	1. Availability of repaired roads 2. Improving the protection regime of the reserve	500.00	Donors and budget
Activity 1.7	Construction of observation points in places in the amount of 2 pcs. and equipping them with communications equipment.	2025-2029	SISPNA, SNR “Zorkul”	Strengthening security effectiveness	100.00	Donors and budget
Task 2	Maintaining and improving the ecological condition of the reserve through the implementation of environmental measures and activities aimed at preserving biodiversity and restoring the environment					
Activity 2.1	Restoration of the reserve ecosystems by taking measures to plant tereska on for degraded desert ecosystems annually on an area of 20 hectares.	2025-2029	SISPNA, SNR “Zorkul”	Volumes of work performed by year - desert lands overgrown with tereskent	150.00	Donors and budget
Activity 2.2	Annual implementation of biotechnical activities strictly in the buffer zone (on allocated lands from the Murghab region) to improve the habitats of wild animals: • making hay for wild ungulates – 20 tons, • preparation of succulent feed - 5 tons and laying out in winter, • arrangement of feeding platforms – 30 pcs., • laying out salt licks – 30 pcs.	2025-2029	SISPNA, SNR “Zorkul”	Increase in the number of valuable and rare species of wild animals	100.00	Donors and budget
Activity 2.3	Restoring the population of rare and endangered species of fauna, such as: Pamir argali (<i>Ovis ammon polii</i>), snow leopards (<i>Uncia uncia</i>), marmot (<i>Marmota caudata</i>), great-eared pika (<i>Ochotona macrotia</i>), golden eagle (<i>Aquila chrysaetus</i>), bearded vulture (<i>Gypaetus barbatus</i>), kumai (<i>Gyps himalayensis</i>), Tibetan sajja (<i>Syrrhaptes tibetana</i>), Mongolian	2025-2029	SISPNA, SNR “Zorkul”	Achieving optimal numbers and improving the condition of populations of rare and valuable animal species	100.00	Donors and budget

	saker falcon (<i>Falko cherrug milvipes</i>), bar-headed goose (<i>Anser indicus</i>), Tibetan common tern (<i>Sterna hirundo tibetana</i>), Mongolian plover (<i>Charadrius mongolus pamirensis</i>), firebuck (<i>Casarca ferruginea</i>), and other birds. Organization of ongoing monitoring of the condition of rare and valuable species of animals.					
Activity 2.4	Carrying out biotechnical measures to improve the number of wild animals in the reserve	2025-2029	SISPNA, SNR "Zorkul"	Increasing numbers of key wildlife	80.00	Donors and budget
Activity 2.5	Organization of ongoing monitoring of the condition of rare and valuable plant species.	2025-2029	SISPNA, SNR "Zorkul"	Availability of prepared maps and scientific publications	50.00	Donors and budget
Activity 2.6	Improving the habitats of argali, as well as Siberian ibex (<i>Capra ibex</i>) and snow leopard (<i>Uncia uncia</i>), by limiting or prohibiting livestock grazing and limiting local visits to the habitats of these rare species in order to prevent poaching, as well as working to restore natural ranges for wild animals	2025-2029	SISPNA, SNR "Zorkul"	Increase in the number of wild animals	300.00	Donors and budget
Task 3	Carrying out organizational measures to improve the condition of natural ecosystems and performing biotechnical measures.					
Activity 3.1	Installation of environmental protection signs, 25 pieces	2025-2029	SISPNA, SNR "Zorkul"	Work plans	20.00	Donors and budget
Activity 3.2	Equipment of equipment, availability of the necessary supply of fuels and lubricants, availability of equipped fire-fighting panels in all ranger patrols	2025-2029	SISPNA, SNR "Zorkul"	Preparedness	150.00	Donors and budget
Program "Development of Scientific Research and Environmental Monitoring" <u>Program goal:</u> Development of scientific foundations for the conservation and restoration of the reserve's ecosystems <u>Expected result:</u> obtaining data on ecosystem components; to increase mobility, increase the volume and improve the quality of work; increasing the volume of information about the state of the region's ecosystems and their components; improving the ability to analyze data; more complete and high-quality collection and analysis of information on the state and changes in the reserve's ecosystems in order to adjust its conservation regime.						
Task 4	Organization and conduct of scientific research in the Zorkul Nature Reserve					

Activity 4.1.	Keeping ranger diaries and conducting phenological observations of indicator species of animals and plants and systematic (annual) assessment of the state of the animal and plant world based on the data of the annual registration of animals and inventory of rare plant species.	2025-2029	SISPNA, SNR “Zorkul”, NAST	1.Scientific report on the dynamics of changes in the state of fauna and flora. 2.Annual prepared	50.00	Donors and budget
Activity 4.2.	Together with the Institute of Zoology and Parasitology of the NAST, conducting scientific research on the following topics: • “Study of the state of artiodactyls (Pamir argali) in the reserve and development of measures to bring their numbers to optimal.” • “Assessment of the status of the bar-headed goose population. • “Counting the number of Pamir argali and snow leopards.	2025-2029	SISPNA, SNR “Zorkul”, NAST	Prepared scientific research reports and practical recommendations - data on the state of ecosystems and its components	100.00	Donors and budget
Activity 4.3	Together with the Research Institute of Forest of the AFUGRT conducting scientific research on the following topics: • "Study of the state and dynamics of changes in codfish." • “Conducting an inspection and determining the current sanitary condition of forest plantations in the SNR “Zorkul”.	2025-2029	SISPNA, SNR “Zorkul”, Research Institute Forest (RIF)	Prepared Research Reports and Practical Recommendations	50.00	Donors and budget
Activity 4.4	Together with the Institute of Botany of the National Academy of Sciences, conducting scientific research on the following topics: • Establishment of indicator species and determination of succession processes in various ecosystems of the reserve; • Determination of the species composition of phytocenoses of low-grass semi-savannas, meadows and grassy swamps; • Identification of the main pests of indicator	2025-2029	SISPNA, SNR “Zorkul”, NAST	Prepared Research Reports and Practical Recommendations	50.00	Donors and budget

	species in phytocenoses.					
Activity 4.5	Introduction of scientific developments and prepared recommendations into the practice of conducting environmental and scientific-educational activities	2025-2029	SISPNA, SNR “Zorkul”, NAST	Prepared Research Reports and Practical Recommendations	50.00	Donors and budget
Activity 4.6	Keeping a book - Chronicle of nature of the SNR “Zorkul”	2025-2029	SISPNA, SNR “Zorkul”, NAST	Keeping a book - Chronicle of nature of the Zorkul nature reserve	50.00	Donors and budget
Activity 4.7	Training in modern research methods: ☐ Inviting specialists, holding seminars, business trips to exchange work experience, participation in scientific conferences and meetings; ☐ Inviting specialists from abroad	2025-2029	SISPNA, SNR “Zorkul”, NAST	Improving the quality of work Obtaining data on unexplored components of ecosystems	150.00	Donors and budget
Activity 4.8	Purchase of scientific equipment and instruments	2025-2029	CEP, SISPNA	Increased mobility, increased volume and improved quality of work	100.00	Donors and budget
Task 5	Implementation of environmental monitoring of the state of natural ecosystems of the reserve and adjacent territories (buffer zone)					
Activity 5.1	Development of monitoring guidelines for reserve staff	2025-2029	SISPNA, SNR “Zorkul”, NAST NANT	Availability of prepared monitoring guidelines	50.00	Donors and budget
Activity 5.2	Organization of an optimal network of constant observation points and improvement of the system for collecting primary data (regularity, reliability).	2025-2029	SISPNA, SNR “Zorkul”, NAST	Availability of a network of observation points - Improving the quality and volume of information on the state of the region’s ecosystems and their components	30.00	Donors and budget
Activity 5.3	Ensure annual systematic observations of wild animals and the state of their habitat.	2025-2029	SISPNA, SNR “Zorkul”, NAST	Obtaining data on the state of wild animal populations	100.00	Donors and budget
Activity 5.4	Annual comprehensive monitoring of the reserve’s ecosystems (pastures, water, swamps, high-mountain cold deserts, etc.)	2025-2029	SISPNA, SNR	Availability of monitoring data to adjust the territory management system	100.00	Donors and budget

			“Zorkul”, NAST			
Task 6	Advanced training of scientific personnel and specialists in the field of environmental protection					
Activity 6.1	Preparation of training programs for scientific, engineering and technical workers of the reserve on the following topics: • “Rights and responsibilities of officials and rangers of the reserve.” • “Conducting environmental monitoring within the framework of the national environmental monitoring system” lasting 6 hours. • “Rules for conducting observations of wild animals, taking into account their species characteristics,” lasting 8 hours. • “Recording of wild animals of the reserve in their natural habitat.” • "Keeping the Book of the Chronicle of Nature". • “Museum business and modern possibilities for its further development” • “Possibilities for the development of ecotourism in protected areas and rules for working with ecotourists.” • “Ecosystem approach to the management of protected areas” • “Legislative and legal mechanisms regulating the environmental activities of protected areas.” • “The Red Book – indicator species of flora and fauna for the reserve.” • Exchange of experience in conservation management with other reserves in Tajikistan, the CIS and the Russian Federation.	2025-2029	SISPNA, SNR “Zorkul”, NAST	Availability of prepared programs for training researchers and engineers of the reserve	300.00	Donors and budget
Activity 6.2.	Annual holding of classes and educational training seminars with scientific, engineering	2025-2029	SISPNA, SNR	Improving the quality of work	100.00	Donors and budget

	and technical workers of the reserve on the basis of the Information Center at the reserve on developed relevant topics		“Zorkul”, NAST	Indicator - Number of classes conducted and number of employees trained		
Program "Development of Environmental Education"						
Goal of the program: To increase the public importance of the SNR “Zorkul” and ensure its support among broad sections of the population as an object of national heritage. Expected result: increased public awareness; increasing awareness of the local population about the reserve, forming a positive opinion; increasing public awareness of local nature; increasing environmental awareness of visitors; the use of environmentally efficient farming methods by the local population; organization of ecological routes strictly in buffer zones						
Task 7	Conducting environmental educational work with the population, environmental propaganda and development of educational excursion visits to specially prepared environmental educational routes strictly in the buffer zone of the reserve.					
Activity 7.1	Conducting trainings and short-term courses for the preparation and training of trainers to work with the population on the basic rules of attitude towards wildlife and sustainable environmental management in the buffer zone of the reserve	2025-2029	SISPNA, SNR “Zorkul”, NAST	Improving the quality of work Indicator - Number of events held and number of trained trainers	50.00	Donors and budget
Activity 7.2.	To study the possibilities of educational ecotourism, determine excursion routes, determine the procedure and rules for visiting excursion routes in the buffer zone of the reserve	2025-2029	CEP, SISPNA, SNR “Zorkul”	Statement excursion routes, rules and tariffs for visiting ecological routes in the buffer zone	20.00	Donors and budget
Activity 7.3	Preparation of ecological routes (“ecological trails”) on the ground (in the buffer zone of the reserve), technical equipment, provision of information materials	2025-2029	CEP, SISPNA, SNR “Zorkul”	Availability of approved excursion routes	100.00	Donors and budget
Activity 7.4.	Conducting environmental education work with the local population through conversations, trainings and seminars on issues of nature conservation, restoration of lost biodiversity and the ecosystem approach to the use of natural resources.	2025-2029	SISPNA, SNR “Zorkul”	Application of rational environmental management in the territories adjacent to the reserve Indicator - Number of activities carried out and number of persons trained	50.00	Donors and budget
Activity 7.5	Prepare and publish an illustrated booklet about ecological routes and advertising brochures	2025-2029	SISPNA, SNR “Zorkul”	Availability of advertising booklets about ecological	50.00	Donors and budget

				routes in the buffer zone of the reserve		
Activity 7. 6	Popularization of the Zorkul Nature Reserve through the media	2025-2029	SISPNA, SNR "Zorkul"	Information about the reserve is regularly published in the media Raising local awareness	10.00	Budget
Activity 7. 7	Regular informing of the local population about the activities of the reserve through local authorities	2025-2029	SISPNA, SNR "Zorkul"	Increasing environmental education of the population and tourists	10.00	Budget
Activity 7. 8	Museum development - Reconstruct the museum, create new exhibitions and new exhibits	2025-2029	CEP, SISPNA, SNR "Zorkul"	Increasing the number of visitors, attracting tourists	100.00	Donors and budget
BLOCK 2. INTERACTION WITH THE ADMINISTRATION OF THE ENTIRE TERRITORY ADJACENT TO THE SNR "ZORKUL" (for the region as a whole)						
Problem 8.1	Improving territorial management in the buffer zone of the Zorkul nature reserve in the Murgab and Ishkashim districts					
	Agriculture. The goal is to increase the efficiency of land use					
Activity 8.1.1	Conducting trainings with farmers of Murghab and Ishkashim regions on the following topics: "Training in the rules of growing crops" "Permissible loads of livestock grazing in the buffer zone of the reserve and measures to increase pasture productivity" "Carrying out measures to increase the productivity of haylands"	2025-2029	CEP, SISPNA, SNR "Zorkul"	Sustainable management of land resources in the buffer zone of the reserve without negative impact on nature	50.00	Donors
Activity 8.1.2	Measures to regulate livestock grazing in the buffer zone of the reserve: Determination of the productivity of pasture lands (cadastral assessment) in the buffer zone of the reserve. Determination of pasture capacity and permissible loads on pastures by season Determination and establishment of pasture boundaries on the ground and installation of boundary pillars and identification of permanent and temporary pasture users Monitoring the correct use of pasture lands	2025-2029	CEP, SISPNA, SNR "Zorkul", NAST	Improving the condition of pastures	100.00	Donors

	by users and compliance with norms of load on pastures Designing activities to implement measures to ensure increased productivity of pasture lands and compliance with pasture rotation.					
Activity 8.1.3	Cultivation of medicinal plants – demonstration plots – 2 in each district	2025-2029	Association of Dekhkan Farm (ADF) SNR “Zorkul”, SISPNA	Increasing incomes of the population and reducing pressure on the reserve	300.00	LG, WUAs, land users, Donors, Public Organization (PO)
Activity 8.1.4	Introduction of cost-effective, energy-saving technologies for processing agricultural products (solar dryers, kitchens, etc.)	2025-2029	AD, SNR “Zorkul”, SISPNA	Reducing pressure on the resources of the reserve, increasing the income of the population around the reserve	300.00	LG, WUAs, land users, Donors, PO
Activity 8.1.5	Carrying out anti-erosion measures (terracing, forest reclamation, etc.)	2025-2029	AD, SNR “Zorkul”, SISPNA, PO	Improving the state of land resources	200.00	LG, WUAs, land users, Donors, PO
Problem 8.2						
Activity 8.2.1	- Installation of solar panels on the territory of the buffer zone of the reserve in farms of the Murgab and Ishkashim districts in an amount of 2-4 pcs. - Installation of a mini-hydroelectric power station on the territory of the buffer zone of the reserve in the Murghab and Ishkashim regions.	2025-2029	SNR “Zorkul”, SISPNA, PO	Provision of electricity to the population	300.00	LG, WUAs, land users, Donors, PO
Problem 8.3						
Improving forest resources and biodiversity in areas adjacent to the reserve						
Action 8.3.1.	Creation of forest belts	2025-2029	SNR “Zorkul”, SISPNA, PO	Increase in area covered by forests	300.00	LG, WUAs, land users, Donors, PO

Action 8.3.2.	Creation of nurseries for fast-growing, highly productive forest species (poplar) – development of a forest management system based on management by local communities	2025-2029	SNR “Zorkul”, SISPNA, PO	Reduced cases of trees being cut down from the reserve	300.00	LG, WUAs, land users, Donors, PO
Action 8.3.3.	Carrying out forest reclamation activities	2025-2029	SNR “Zorkul”, SISPNA, PO	Improvement of natural resources	300.00	LG, WUAs, land users, Donors, PO
Action 8.3.4.	Strengthening slopes with trees	2025-2029	SNR “Zorkul”, SISPNA, PO	Increasing the area covered by forests, reducing land degradation	300.00	LG, WUAs, land users, Donors, PO

Approved by
Chairman of the Committee
Environmental Protection under the
Government of the Republic of Tajikistan

_____ Sheralizoda B. A.

" _____ " September 2024

5.1. APPROVED ANNUAL PLAN FOR 2025

Activity	Responsible authorities	Indicators	Financing, in Tajik somoni (TJS)	
			Budget	Donors
Organizing continuous monitoring of the state of the natural environment	SNR "Zorkul"	Maintaining the Chronicle of Nature the SNR "Zorkul"	0.00	50,000.00
Providing security services with vehicles, uniforms, communications equipment, weapons, binoculars, cameras	SISPNA	Availability of vehicles, uniforms, communications equipment, weapons, binoculars, cameras, etc.	0.00	50,000.00
Carrying out a cadastral assessment of the state of the food supply of wild artiodactyls in their permanent habitats in the territory of the State Nature Reserve	SISPNA, SNR "Zorkul"	Availability of a cadastral assessment of pasture lands of wild artiodactyls on the territory of the SNR "Zorkul"	0.00	50,000.00
Identification of bird nesting sites around Lake Zorkul and restrictions on land use in these areas	SISPNA, SNR "Zorkul"	Availability of a prepared map showing the habitats and nesting places of birds	0.00	50,000.00
Establishment of argali wintering sites and lambing campaigns in areas of its range and restriction of land use in these areas	SISPNA, SNR "Zorkul"	Availability of a prepared map showing the habitats and places of argali hunting campaigns	0.00	50,000.00
Preparation of a simple and practical monitoring methodology for tracking key indicator species of flora and fauna	SISPNA, SNR "Zorkul"	Availability of a Monitoring Methodology	0.00	50,000.00
Conducting training for engineering and technical workers (E&T) of TNP to develop practical skills in monitoring the species diversity of flora and fauna and natural resources	SISPNA, SNR "Zorkul"	Number of seminars, trainings, topics and persons trained in specialties	0.00	30,000.00

Conducting spring and autumn censuses of wild animals on the territory of the SNR "Zorkul" and surveying the productivity of areas and habitats of animals	SISPNA, SNR "Zorkul"	Availability of reliable data on counting the number of wild animals	0.00	50,000.00
Development of tourist routes on the territory of the SNR "Zorkul"	SISPNA, SNR "Zorkul"	Availability of tourist routes developed and approved by the management of the State Protected Area on the territory of the State Natural Reserve	0.00	10,000.00
Setting up guest houses and training the population in the reception and rules of servicing foreign tourists	SISPNA, SNR "Zorkul"	Number of equipped guest houses and their capacity to receive guests	0.00	100,000.00
Production of advertising brochures, maps with tourist routes, natural, historical and cultural attractions, etc.	SISPNA, SNR "Zorkul"	Availability of advertising brochures	0.00	10,000.00
Purchase of vehicles, ATVs, motorcycles and motor boats necessary for the development of tourism, as well as tents, sleeping bags and other equipment and materials	SISPNA, SNR "Zorkul"	Availability of vehicles, motor boats, tents and other tourist equipment on the balance sheet of the GPZZ	0.00	200,000.00
Ensuring systematic patrolling by rangers of areas where wild animals congregate and eco-corridors during their migrations	SISPNA, SNR "Zorkul"	Reducing the level of poaching in the TNP territory	0.00	50,000.00
Drawing up a module, program and plan for conducting environmental education work with the population, schoolchildren and government officials about the significance of the SNR "Zorkul" and its historical and natural values.	SISPNA, SNR "Zorkul"	Number of seminars, trainings, topics and persons trained by category	0.00	10,000.00
Providing the local population with pasture and hayfields	SISPNA, SNR "Zorkul"	List of persons and total area of allocated plots	0.00	0.00
Periodic appearances in the media by management, researchers and specialists on issues of biodiversity conservation and SNR "Zorkul" activities	SISPNA, SNR "Zorkul"	Number of articles, speeches, etc.	0.00	0.00
Analysis of the implementation of the standard annual action plan for SNR "Zorkul" activities	SISPNA, SNR "Zorkul"	Assessment of the activities of the SNR "Zorkul" for the reporting year	0.00	0.00
Purchasing uniforms			0.00	50,000.00
Salary of SNR "Zorkul" employees			593,154.00	0.00
Household goods			7,000.00	0.00
Fuel consumption (gasoline, diesel)			12,000.00	0.00
Building renovation			1,300.00	0.00
Household expenses			3,700.00	0.00

Utility and heating costs			3,520.00	0.00
From funds for a set of biotechnical measures and pasture restoration to improve the habitat of wild animals			32,050.00	100,000.00
Internet service expenses			3,000.00	0.00
TOTAL:			655,724.00	910,000.00

Head of the SISPNA

Khurshed Shamsiddinzoda

ANNEX 1.

LIST OF PARTICIPANTS OF THE WORKING GROUP FOR DEVELOPING THE MANAGEMENT PLAN FOR THE SNR "ZORKUL"

- Shamsiddinov Kh. – Head of the State Institution of Specially Protected Natural Areas (SISPNA) of the Committee for Environmental Protection under the Government of the Republic of Tajikistan (CEP).
- Gozibekov M. – Director of the SNR “Zorkul”, GBAO of the Republic of Tajikistan.
- Nachmidinov N. - Project manager from the PO “Tabiati Yoboi”.
- Khudoyorzoda F. – employee of the PO “Tabiati Yoboi”.
- Fattoev Kh. - employee of the PO “Tabiati Yoboi”.
- Faizulloev S. - employee of the PO "Tabiati Yoboi".
- Saidov N. - Specialist in natural protected area management and biodiversity conservation of TRLRP.
- Abdulnazarov A. – Director of the botanical garden of the Biological Institute of the Pamirs NAST, Khorog city, GBAO of the Republic of Tajikistan.
- Navruzshoev D. – Chief Researcher of the Biological Institute of the Pamirs NAST, Khorog city, GBAO of the Republic of Tajikistan.
- Ustyan I.P. – Chief specialist of the Research Institute of Forestry, Tajikistan.
- Murodov R. – Senior Researcher at the Institute of Zoology and Parasitology of the National Academy of Sciences.
- Ilazarov Bekhruz – Cartographer and GIS consultant.

List of plant species of the SNR “Zorkul”

1. Grey Teresken - *Ceratoides paposa*
2. Rosy-flowered Wormwood - *Artemisia rhodantha*
3. Tibetan Ajania - *Ajania tibetica*
4. Diapensia-like Acantholimon - *Acantholimon diapensioides*
5. Deep-rooted Oxytropis - *Oxytropis immerse*
6. Four-stamen Sibbaldia - *Sibbaldia tetrandra*
7. Grooved Fescue - *Festuca sulcata*
8. Pebbly Feather Grass - *Stipa glareosa*
9. Eastern Feather Grass - *Stipa orientalis*
10. Thick-leaved Christolea - *Christolea crassifolia*
11. Black-flowered Sedge - *Carex melanantha*
12. False-scented Sedge - *Carex pseudo-foetida*
13. Round Sedge - *Carex orbicularis*
14. Hair-like Kobresia - *Kobresia capilliformis*
15. Narrow-fruited Kobresia - *Kobresia stenocarpa*
16. Rue-leaved Wormwood - *Artemisia rutifolia*
17. Santolina-leaved Wormwood - *Artemisia santolinifolia*
18. Rue-leaved Waldheimia - *Waldheimia rutifolia*
19. Glacier Saussurea - *Saussurea glacialis*
20. Dye-producing Macrotomia - *Macrotomia euchroma*
21. Headed Hedysarum - *Hedysarum cephalotes*
22. Pamir Acantholimon - *Acantholimon pamiricum*
23. High-stemmed Desmatodon - *Desmatodon altipes*
24. Majestic Ostrowskia - *Ostrowskia magnifica*
25. Pamir Desideria - *Desideria pamirica*
26. Hedin's Oxytropis - *Oxytropis hedinii*
27. Kostychev's Pasqueflower - *Pulsatilla kostyeczewii*
28. Varivtseva's Acantholimon - *Acantholimon varivtzevae*
29. Cushion Saxifrage - *Saxifraga pulvinaria*
30. Persian Bunium - *Bunium persicum*

List of animal species of the SNR “Zorkul”

Class OSTEICHTHYES - BONY FISH

- Order: Cypriniformes (Carp-like fish)

1. *Schizopygopsis stoliczkai* – Pamir false Osman
2. *Schizothorax intermedius* – Marinka

Class AMPHIBIA - AMPHIBIANS - None

Class REPTILIA - REPTILES - None

Class AVES - BIRDS

- Order: Podicipitiformes (Grebes)
Family: Podicipitidae (Grebes)

1. *Tachybaptus ruficollis* – Little Grebe (resident)
2. *Podiceps cristatus* – Great Crested Grebe (resident)
3. *Podiceps nigricollis* – Black-necked Grebe (resident)

- Order: Pelecaniformes (Pelicans)

Family: Phalacrocoracidae (Cormorants)

4. *Phalacrocorax carbo* – Great Cormorant (resident)

- Order: Ciconiiformes (Hérons)
Family: Ardeidae (Hérons)

5. *Ardea cinerea* – Grey Heron (resident)

- Order: Anseriformes (Waterfowl)

Family: Anatidae (Ducks, Geese, and Swans)

6. *Anser indicus* – Bar-headed Goose
7. *Tadorna ferruginea* – Ruddy Shelduck
8. *Anas penelope* – Eurasian Wigeon (resident)
9. *Anas strepera* – Gadwall (resident)
10. *Anas crecca* – Common Teal (resident)
11. *Anas clypeata* – Northern Shoveler (resident)
12. *Anas platyrhynchos* – Mallard (resident)
13. *Anas querquedula* – Garganey (resident)
14. *Anas clypeata* – Northern Shoveler (resident)
15. *Aythya nyroca* – Ferruginous Duck (resident)
16. *Aythya ferina* – Common Pochard (resident)
17. *Bucephala clangula* – Common Goldeneye (resident)
18. *Mergellus merganser* – Common Merganser
19. *Larus genei* – Slender-billed Gull
20. *Sterna hirundo* – Common Tern
21. *Sterna albifrons* – Little Tern

- Order: Falconiformes (Falcons)
 - Family: Accipitridae (Hawks, Eagles, and Kites)
 - 22. *Pandion haliaetus* – Osprey
 - 23. *Haliaeetus leucoryphus* – Pallas's Fish Eagle
 - 24. *Aquila chrysaetos* – Golden Eagle
 - 25. *Gypaetus barbatus* – Bearded Vulture
 - 26. *Aegypius monachus* – Cinereous Vulture
 - 27. *Gyps fulvus* – Griffon Vulture
 - 28. *Gyps himalayensis* – Himalayan Vulture

Family: Falconidae (Falcons)

- 29. *Falco cherrug* – Saker Falcon
- 30. *Falco peregrinus* – Peregrine Falcon
- 31. *Falco subbuteo* – Eurasian Hobby
- 32. *Falco tinnunculus* – Common Kestrel

- Order: Galliformes (Game Birds)
 - Family: Phasianidae (Pheasants and Allies)
 - 33. *Tetraogallus himalayensis* – Himalayan Snowcock
 - 34. *Tetraogallus tibetanus* – Tibetan Snowcock
- Order: Gruiformes (Cranes)
 - Family: Rallidae (Rails, Gallinules, and Coots)
 - 35. *Fulica atra* – Eurasian Coot
- Order: Charadriiformes (Shorebirds)
 - Family: Charadriidae (Plovers)
 - 36. *Charadrius mongolus* – Lesser Sand Plover
 - 37. *Pluvialis apricaria* – European Golden Plover (resident)
 - 38. *Calidris minuta* – Little Stint
 - 39. *Philomachus pugnax* – Ruff
 - 40. *Gallinago gallinago* – Common Snipe
 - 41. *Tringa erythropus* – Spotted Redshank
 - 42. *Tringa tetanus* – Common Redshank
 - 43. *Tringa stagnatilis* – Marsh Sandpiper
 - 44. *Tringa nebularia* – Common Greenshank
 - 45. *Tringa ochropus* – Green Sandpiper
 - 46. *Tringa glareola* – Wood Sandpiper
 - 47. *Himantopus himantopus* – Black-winged Stilt
 - 48. *Actitis hypoleucos* – Common Sandpiper
 - 49. *Phalaropus lobatus* – Red-necked Phalarope

Family: Laridae (Gulls)

- 50. *Larus ichthyaetus* – Pallas's Gull
- 51. *Larus ridibundus* – Black-headed Gull

- Order: Columbiformes (Pigeons and Doves)
 - Family: Columbidae (Pigeons and Doves)
 - 52. *Columba rupestris* – Hill Pigeon

Family: Pteroclididae (Sandgrouse)

- 53. *Syrrhaptes tibetanus* – Tibetan Sandgrouse

- Order: Passeriformes (Perching Birds)
 Family: Alaudidae (Larks)
 54. *Eremophila alpestris* – Horned Lark

Family: Hirundinidae (Swallows)
 55. *Riparia riparia* – Sand Martin
 56. *Hirundo rustica* – Barn Swallow
 57. *Ptyonoprogne rupestris* – Eurasian Crag Martin

Family: Motacillidae (Wagtails and Pipits)
 58. *Motacilla flava* – Yellow Wagtail
 59. *Motacilla lutea* – Citrine Wagtail
 60. *Motacilla cinerea* – Grey Wagtail
 61. *Motacilla alba* – White Wagtail
 62. *Motacilla citreola* – Citrine Wagtail
 63. *Anthus spinoletta* – Water Pipit

Family: Prunellidae (Accentors)
 64. *Prunella collaris* – Alpine Accentor

Family: Turdidae (Thrushes)
 65. *Phoenicurus erythrogaster* – G黚denst鋎t's Redstart
 66. *Chaimarrornis leucocephalus* – White-capped Redstart
 67. *Saxicola torquata* – European Stonechat
 68. *Oenanthe deserti* – Desert Wheatear

Family: Oriolidae (Orioles)
 69. *Oriolus oriolus* – Eurasian Golden Oriole

Family: Laniidae (Shrikes)
 70. *Lanius schach* – Long-tailed Shrike

Family: Fringillidae (Finches)
 71. *Leucosticte nemoricola* – Plain Mountain Finch
 72. *Leucosticte brandti* – Black-headed Mountain Finch
 73. *Carpodacus rubicilla* – Great Rosefinch
 74. *Pyrrhospiza punicea* – Red-fronted Rosefinch
 75. *Montifringilla nivalis* – White-winged Snowfinch

Family: Corvidae (Crows, Ravens, and Jays)
 76. *Corvus corax* – Common Raven
 77. *Pyrrhocorax pyrrhocorax* – Red-billed Chough
 78. *Pyrrhocorax graculus* – Alpine Chough

Class MAMMALIA - MAMMALS

- **Order: Carnivora (Carnivores)**

Family: Canidae (Dog family)

1. *Canis lupus* – Wolf
2. *Vulpes vulpes* – Red Fox

Family: Mustelidae (Weasels)

3. *Mustela altaica* – Mountain Weasel
4. *Mustela erminea* – Stoat (Ermine)

Family: Felidae (Cats)

5. *Uncia uncia* – Snow Leopard (also known as Irbis)

- **Order: Artiodactyla (Even-toed Ungulates)**

Family: Bovidae (Hollow-horned ruminants)

6. *Capra sibirica* – Siberian Ibex

- **Order: Rodentia (Rodents)**

Family: Sciuridae (Squirrels)

7. *Marmota caudata* – Long-tailed Marmot

Family: Muridae (Mice and Rats)

8. *Sylvaemus sylvaticus* – Wood Mouse
9. *Mus musculus* – House Mouse
10. *Rattus turkestanicus* – Turkestan Rat

- **Order: Lagomorpha (Lagomorphs)**

Family: Leporidae (Hares and Rabbits)

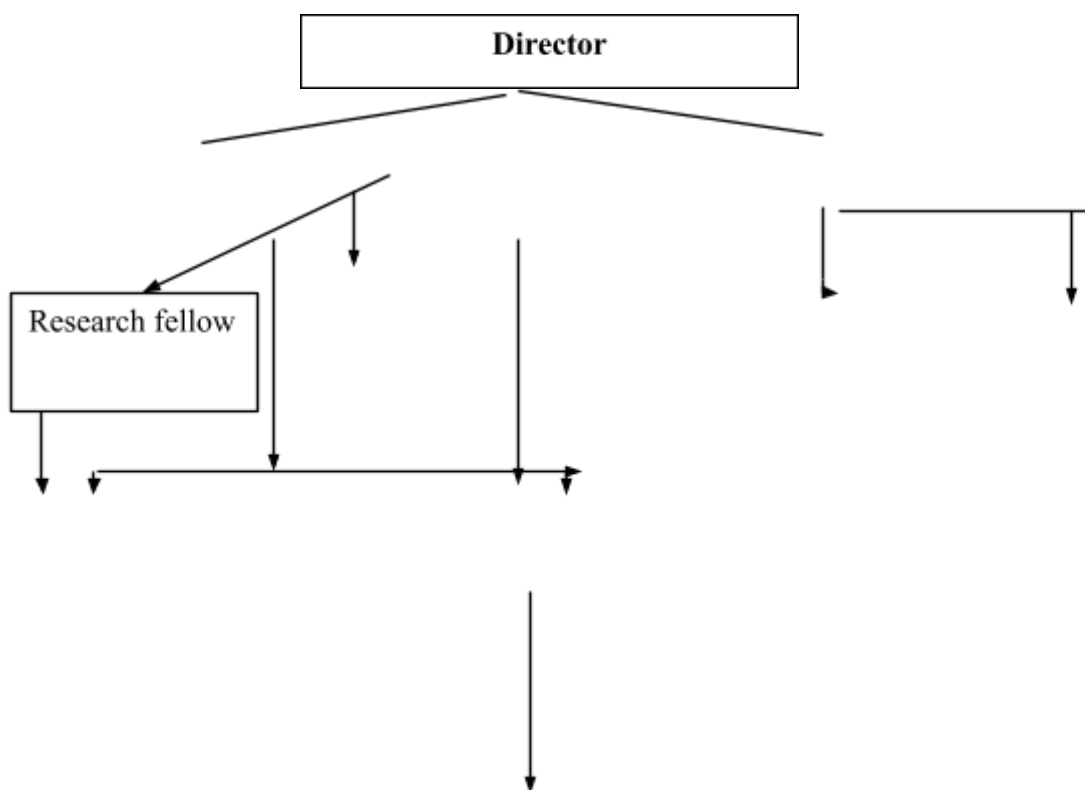
11. *Lepus capensis* – Cape Hare (Tolai Hare)

Species included in the Red Book of the Republic of Tajikistan

The following species (up to 15) are listed:

1. Pamir Argali (wild sheep)
2. Tolai Hare
3. Stoat
4. Mongolian Saker Falcon
5. Snow Leopard
6. Brown Bear
7. Lynx
8. Gray Hamster
9. Large-eared Pika
10. Bar-headed Goose
11. Tibetan Snowcock

Diagram of the management structure of the State Nature Reserve “Zorkul”



Human resources department
Supply manager
Game manager

Chief accountant
Deputy Director for Science
Flora and Fauna Engineer
Senior gamekeepers

laboratory research assistant
Gamekeepers
Economist

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