ASIA-PACIFIC

TUGAY FORESTS OF THE TIGROVAYA BALKA NATURE RESERVE

TAJIKISTAN

Tugay Forests of the Tigrovaya Balka Nature Reserve © IUCN / Chimed-Ochir Bazarsad

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

TUGAY FORESTS OF THE TIGROVAYA BALKA NATURE RESERVE (TAJIKISTAN) – ID N° 1685

IUCN RECOMMENDATION TO WORLD HERITAGE COMMITTEE: To inscribe the nominated property under natural criterion (ix)

Key paragraphs of Operational Guidelines:
Paragraph 77: Nominated property meets World Heritage criterion (ix), but not (x).
Paragraph 78: Nominated property meets integrity requirements and protection and management requirements.

1. DOCUMENTATION

a) Date nomination received by IUCN: February 2022

b) Additional information officially requested from and provided by the State Party: Following the session of the IUCN World Heritage Panel, a progress report was sent to the State Party on 25 January 2023. This letter advised on the status of the evaluation process and requested supplementary information on the proposed buffer zone, including legal documentation of its protection status; the State Party's commitment and action to secure a hydrological regime in the nominated property, including regular water supply from the Vakhsh River; and an up-to-date list of species of plants and animals recorded at the nominated property, including global conservation status and distribution. The supplementary information was provided by the State Party on 21 February 2023.

c) Additional literature consulted: IUCN's evaluation consulted a wide array of relevant reference material for the biology, ecology, protection and management as well as the comparative values of the nominated property. References included: Bannikov, A. (1978). The present status of the Bactrian deer (Cervus elaphus bactrianus). In: Threatened Deer: Proceedings of a Working Meeting of the Deer Specialist Group of the Survival Service Commission on the IUCN Threatened Deer Programme and a Dossier on the Planning of Restoration Programmes for Threatened Mammals with Special Reference to Deer, Held at Longview, Washington State, USA, 26 September-1 October, 1977 (p. 159). IUCN.; BirdLife International (2023). Important Bird Areas factsheet: Tigrovaya Balka Nature Reserve. Downloaded from http://www.birdlife.org on 27/03/2023; Kotowski, M.A., Świerszcz, S., Khoury, C.K., Laldjebaev, M., Palavonshanbieva, B. and Nowak, A. (2022). The primal garden: Tajikistan as a biodiversity hotspot of food crop wild relatives. Agronomy for Sustainable Development, 42, 6, 1-14.; Jungius, H., (2012). Final evaluation report of the project Integrated River Basin Management and Nature Protection in the Tigrovaja Balka of Tajikistan Amudarya River Basin, WWF Russia; Lethier, H. (2020). World Heritage thematic study for Central Asia. Priority sites for World Heritage nomination under criteria (ix) and (x). Gland, Switzerland and Belgrade, Serbia: IUCN and IUCN ECARO. xii+103pp; Muratov, R.S. and Talbonov, K.M. (2022). The near-extirpation of the Great Bustard Otis tarda tarda as a wintering and breeding species in Tajikistan. Great Bustard Special Issue, p.80.; Nikol'skii, A.A., (2014). Ecological inheritance in the biological signal field of mammals. Russian Journal of Ecology, 45, 1, 76; Normatov, I.S., Muminov, A. and Normatov, P.I. (2016). The Impact of Water Reservoirs on Biodiversity and Food Security and the Creation of Adaptation Mechanisms. International Journal of Environmental and Ecological Engineering, 10, 5, 601-607; Treshkin, S.Y. (2001). The Tugai forests of floodplain of the Amudarya River: ecology, dynamics and their conservation. In: Sustainable land use in deserts, 95-102. Springer, Berlin, Heidelberg; Weichert, A. (2019) with contributions of Qumriya Vafodorova and Tobias Garstecki. The Report of feasibility mission in the framework of the "Ecosystem-based Adaptation to Climate Change in High Mountainous Regions of Central Asia" for the Tigrovaya Balka natural reserve, on behalf of the Michael Succow Foundation funded by GIZ/BMU; Zeng, Y., Zhao, C., Kundzewicz, Z.W. (2022). Distribution pattern of Tugai forests species diversity and their relationship to environmental factors in an arid area of China. PLoS One. 15,5, e0232907, doi: 10.1371/journal.pone.0232907; Zwahlen, R. (2022). Downstream Impacts. Assessing the Environmental Impacts of Hydropower Projects, 419-433.

d) Consultations: 9 desk reviews received. The mission was able to meet with the Committee for Environmental Protection, the Center for Biodiversity and Biosafety, the National Center for Environmental Protection, the Environmental Protection Agency of the District of Dusti, the Tigrovaya Balka Nature Reserve, local government officials, technical authorities, chief rangers and international experts.

e) Field Visit: Chimed-Ochir Bazarsad, 11-15 October 2022

f) Date of IUCN approval of this report: April 2023

2. SUMMARY OF NATURAL VALUES

The Tigrovaya Balka Nature Reserve is located in the interfluve of the Vakhsh and Panj rivers in southwestern

Tajikistan at the border of Afghanistan. The confluence continues as the Amu Darya, the largest river in Central Asia, running to the Aral Sea. The Reserve includes extensive riparian tugay ecosystems, the sandy Kashka-Kum desert, the Buritau peak, as well as the low (1,000-1,200 m.a.s.l.) mountains of the southern spurs of the Aruktau range – the Hodja-Kaziyon mountains. The area of the Tigrovaya Balka Nature Reserve is 49,786 hectares (ha) and its buffer zone is 17,672 ha.

The nominated property is composed of a series of floodplain terraces covered by alluvial soils, comprising tugay riverine forests with very specific biodiversity in the valley. There are several habitats in the reserve: tugay riverine forests, freshwater bodies and marshes, semi-deserts, takirs and solonchaks. Tugay are riparian woodlands – usually dominated by poplars, willows and tamarix – alternating with wet meadows and marshes and associated with fluvial areas in semi-arid and desert climates of Central Asia. Significantly, the nominated property preserves a natural Asiatic poplar tugay vegetation complex. The complex features water-resistant and thermophilic, salt-tolerant trees and shrubs such as the Asiatic Poplar or Blue Poplar (*Populus pruinosa*, NT), the Oleaster (*Elaesgnus angustifolia*, LC), and the Multiramose Tamarix (*Tamarix ramosissima*; LC), which provide habitat for rare and endangered animals such as the Bactrian Deer (*Cervus hanglu bactrianus*, a subspecies of the Tarim Red Deer, *Cervus hanglu*, LC), whose population in the reserve has grown to 300, Goitered Gazelle (*Gazella subgutturosa*, VU), Tajik Black-and-Gold Pheasant (*Phasianus colchicus bianchii*), and many migratory waterfowl birds. Reports vary of the occurrence of Caucasian Leopard (*Panthera pardus ciscaucasica*), a subspecies of the Persian Leopard (*Panthera pardus*, VU). The vegetation complex has evolved in response to particular climatic fluctuations.

The nomination dossier asserts that the 24,100 hectares of tugay forests in the reserve represent the largest and most intact tugay forest in Central Asia, and this is the only place in the world where the Asiatic poplar tugay ecosystem has been preserved in its original state over such a large area.

3. COMPARISONS WITH OTHER AREAS

The comparative analysis provided in the nomination dossier was based on values of Central Asian riparian woodlands and Bactrian Deer. Tugay is one of Central Asia's "keystone" aquatic ecosystems, which occurs only along the floodplains of Central Asian rivers and river deltas. Tugay is completely different in structure and dynamics and relatively independent from the surrounding environment. It represents the most diverse landscapes of Central Asia. The centre of the range of Tugay vegetation is the Tarim Basin in north-western China, where the Tarim Huyanglin nature reserve in the middle reaches of the Tarim River holds the largest total of intact Tugay forests, with an estimate of about 61% of the total. The Central Asian countries hold another 31%, with smaller areas remaining in the Middle East, Pakistan and the Caucasus. All of the ecosystems described have been greatly reduced and fragmented due to anthropogenic activities.

The comparative analysis lists major sites with the same or similar types of riparian forests. Key potential areas are listed, but some may be missing, e.g. remnants of riparian woodlands along the Tarim River in China. The comparison mainly refers to the aspects of size of the riparian woodlands where the declared size of such woodlands in Tigrovaya Balka indeed appears to be outstanding. All remaining riparian tugay ecosystems in Central Asia are influenced by upstream reservoirs and water withdrawal. However, it is not clear from the nomination document if these impacts are similar for all sites or if some sites may have better preserved riparian dynamics with their hydrological, pedological and geomorphological impacts. For instance, in the sites in Afghanistan natural river dynamics in the free-flowing Panj River are better preserved than in the nominated property, which is dependent on the regulated Vakhsh River. On the other hand, these sites do not harbour similar areas of Tugay forests.

In terms of Bactrian Deer, the nominated property is indeed the largest area with a native, i.e. not reintroduced, population. Thus the reserve is of particular value for the preservation of the genetic diversity of the subspecies. The largest population is now in Lower Amudarya Biosphere Reserve (core zone Baday Tugay), where the estimated population was 2,112 deer in 2019. However, this population originates from reintroductions and may thus be of lower genetic diversity and its number is clearly above the carrying capacity of the habitat, threatening the ecosystem and its own survival. The Caspian tiger (*Panthera tigris virgata*), which Tigrovaya Balka ("Tiger Gorge") was named after, is extinct and the nomination dossier suggests that the continued presence of Leopard (*Panthera pardus)* is doubtful as it has not been recorded in the Hodja-Kaziyon foothills for a long time. Typical predators in the tugay are jackel (*Canis aureu*) and Jungle cat (*Felis chaus*), but numbers are very low as a result of anthropogenic pressures.

An IUCN World Heritage thematic study for Central Asia identified the property as a gap in 2005. A follow-up study published in 2020 states that Tigrovaya Balka is considered the most important protected area in Tajikistan, in terms of ecosystem diversity and values for species. It is situated within the Global 200 Priority Ecoregion "Middle Asian Montane Woodlands and Steppes", represented on the World Heritage List only by Xinjiang Tianshan and Western Tien Shan. However, the nominated property bears features that are distinct from these two properties, and it contains, arguably, the largest and most intact tugay forest massif in Central Asia.

IUCN, in collaboration with UNEP-WCMC, has undertaken supplementary comparative analysis with regards to criteria (ix) and (x), based on spatial analyses and literature review. The WCMC Comparative Analysis supports the case for global significance under criterion (ix), which is deemed justified by uniqueness of the vegetation to Central Asia and lack of representation of the ecoregions in the World Heritage List. The

nominated property overlaps with the Hindu-Kush Highlands Udvardy biogeographical province, Badghyz and Karabil semi-desert terrestrial ecoregion, and Middle Amu Darya freshwater ecoregion, all of which are currently not represented on the World Heritage List.

Global significance under criterion (x) is considered in light of the presence of globally threatened mammal, bird, reptile and fish species and a high number of endemic or rare plant species. The WCMC analysis notes that whilst the nominated property is undoubtedly important for the conservation of mammal, bird and amphibians, it does not appear to stand out from other World Heritage properties in the Mountains of Central Asia biodiversity hotspot and/or Paleartic Temperate Grasslands, Savannas and Shrublands, and Deserts and Xeric Shrublands biorealms. The species numbers may be significant, but the number of threatened species appears to be lower than suggested in the nomination dossier. This is also confirmed through supplementary information from the State Party, which lists fewer numbers of threatened species than suggested in the nomination dossier. For instance, only nine globally threatened bird species are included in the species list of the supplementary information whereas the nomination dossier suggested the presence of 55 globally threatened birds. Unlike in the nomination dossier, the Tajikistan Even-fingered Gecko (*Alsophylax tadjikiensis*, CR) is not reported to be present according to the supplementary information. Therefore, IUCN considers that the currently available documentation does not adequately demonstrate the nominated property to contain the most important and significant habitats for in-situ conservation of threatened species.

Overall, IUCN considers that the nominated property demonstrates global significance under criterion (ix) but currently not under (x).

4. INTEGRITY, PROTECTION AND MANAGEMENT

4.1. Protection

The nominated property has the legal status of a Nature Reserve since its establishment in 1938. The Reserve is subject to the Law of the Republic of Tajikistan on Specially Protected Natural Areas of 2011, defining it as "a land or the water body withdrawn completely from economic activity, intended for preserving and studying of typical and unique natural complexes, gene pool of plants and animals, carrying out monitoring of dynamics of natural processes and the phenomena". Therefore, the nominated property adheres to IUCN Protected Area Category Ia. Local government authorities have no jurisdiction, except in the buffer zone (so-called "Protective Zone"). According to law, the purpose of the buffer zone of the nominated property is to prevent or mitigate negative impacts on the nominated property. Its size and management regime are determined by the authorized state body.

Therefore, the Protected Area administration and other relevant authorities responsible for protected areas have the legal authority to reduce and/or mitigate negative impacts that arise from outside the boundaries of the reserve, including from irrigation. A 2021 order allows for "limited agricultural activities" but prohibits most other land uses in the buffer zone of the nominated property. Supplementary information provided by the State Party confirms the legal status of the buffer zone and its effective functioning as added layer of protection.

IUCN considers that the protection status of the nominated property meets the requirements of the *Operational Guidelines*.

4.2 Boundaries

The nominated property is located in the districts of Kabodien (right bank of Vakhsh) and Dusti (left bank of Vakhsh) of Khatlon Region. The boundary of the nominated property is clearly defined and adequate.

The size of the Nature Reserve changed several times since its establishment in 1938. The initial area of the Nature Reserve was 50,000 ha, but in 1946 was reduced to a tenth of that size. Many other expansions and reductions ensued until 1970, when a maximum size of 52,200 ha was reached. The current alignment of the Nature Reserve was established in 2008, after a part of the Nature Reserve was converted into agricultural land. The establishment of the Nature Reserve and frequent changes to its size reflect the development in the region, especially regarding agriculture and related infrastructure, e.g. railway and irrigation channels. In spite of these changes over more than 80 years, the nominated property maintains an adequate level of integrity within its current boundaries. The nominated property encompasses a series of floodplain terraces and tugay riverine forests in the valley with freshwater bodies, marshes, semi-deserts, takirs and solonchaks. However, in regard to criterion (x), the limited size of the nominated property would not be sufficient to encompass the required habitat to protect the mostly wide-ranging species proposed to be considered under criterion (x).

The buffer zone of the nominated property is intended to minimize impacts from agricultural development from areas outside the reserve boundaries. In supplementary information, the State Party provided documentation of a 2021 order establishing a protective zone for the reserve, forbidding hunting, fishing, tree cutting, and "irrigation works that lead to changes in the hydrological regime and drainage of swamps." The order thus limits agricultural activity around the nominated property. Supplementary information also reports a 50% reduction in water consumption for irrigation since 2016, suggesting that regulation in the buffer zone and adjacent areas is addressing the greatest threat to the integrity of the reserve.

IUCN considers that the boundaries of the nominated property and buffer zones meet the requirements of the *Operational Guidelines*.

4.3 Management

The Tigrovaya Balka Nature Reserve is a subdivision of the State Committee for Environmental Protection under the Government of the Republic of Tajikistan and operates in accordance with the Law of the Republic of Tajikistan On Specially Protected Natural Territories of 2014. Reserve administration currently comprise 57 staff, including of 30 rangers and 5 senior rangers, who conduct daily rounds and night raid patrols operating 15 check points across the reserve. The staff is sufficient for management and enforcement within the relatively small nature reserve. Due to its location on the border to Afghanistan, around 30 percent of the nominated property is under the jurisdiction of border security forces of Tajikistan.

Operational protection and preservation of the proposed Outstanding Universal Value is carried out by reserve managers according to medium-term management plans. Thus, the "Management Plan of the state reserve Tigrovaya Balka and the adjacent territory for the period 2022-2026" defines specific measures for protection, scientific research, monitoring of the state of conservation, environmental education and interaction with the local population, the timing of their implementation, actors, sources of funding and expected results. The management plan covers a wider landscape and addresses threats from lands adjacent to the Nature Reserve. The Tigrovaya Balka Nature Reserve is funded from the state budget (Committee for Environmental Protection). The nomination dossier indicates that the budget of the reserve is growing.

Therefore, IUCN concludes that the nominated property is currently subject to a robust management regime.

IUCN considers the management of the nominated property meets the requirements of the *Operational Guidelines*.

4.4 Community

The proposed property is a State Nature Reserve since 1938, with economic activities being prohibited. Accordingly, there are no people living inside the boundaries other than rangers at five border control stations. Entrance to the nature reserve is by permission only. According to the nomination dossier, up to 1,000 permanent residents are present in the buffer zone.

Overall, and based on the information provided to IUCN and evident to the field mission, there do not appear to be any concerns in relation to traditional rights by communities. Nevertheless, the field mission recommended that the capacity of the Nature Reserve would be enhanced with a special focus on public participation and public relations.

4.5 Threats

The nomination dossier identified the following threats, mostly from areas adjacent to the nominated property: (1) unregulated discharge of wastewater from agricultural lands and the associated release of pesticides into the reservoirs of the reserve; (2) interruption of periodic floods through the regulation of the Vakhsh River runoff by a number of hydroelectric power plants, which leads to a lower water level; and (3) rise in groundwater level through intensive irrigation during May-September, a period of high evaporation, which increases soil salinity.

The most serious threat and long-lasting impact is the altered hydrological regime of Vakhsh River due to dams and water offtake for irrigation. Before the regulation of the river flow in late 1960s the valley would flood in summer, an important ecosystem requirement. Tugay forests are now supported by channelled surface water and underground flows only. A significant part of the runoff of the Vakhsh (about one third) is used for irrigation and one fifth of the river runoff in the lower reaches is formed by wastewater, which leads to an increase in mineralization and pollution of river waters, according to the nomination dossier.

Direct threats inside of the nominated property, e.g. grazing, poaching, fire, change of protection status, etc., are considered low. Only threats from outside, e.g. irrigation related to agriculture and dams in the upper watershed pose high threats to the tugay forest ecosystem. In addition, increased climate change impacts on the hydrological regime as well as increased water demands for irrigation and electricity production make the future of Tugai forest unpredictable. However, if technologies to improve water efficiency for irrigation in the vicinity of the nominated property are adopted and the waterflow regime for existing dams are continuously scrutinised to secure a hydrological regime in the nominated property that ensures the long-term maintenance of its natural values, the relatively small natural tugay forest may be able to adapt to changing environmental conditions. In this regard, it is welcome that supplementary information reports an improvement of the hydrological regime and of the reserve since 2016 and a 50% reduction in water consumption for irrigation since 2016. In this regard, it will be important to ensure that no further river modifications, such as additional dams, are built in the upstream areas of the nominated property as such structures would exacerbate the threats to the natural values of the nominated property.

Overall, IUCN concludes that the nominated property is subject to a strict protection and management regime, supported by a functional buffer zone. Nevertheless, to ensure the nominated property's integrity in the long-term IUCN recommends the State Party to ensure there are no disruptions to the natural hydrological regime of the nominated property, and to consider expanding the buffer zone in future.

In summary, IUCN considers that the integrity requirements and protection and management requirements of the *Operational Guidelines* are met.

5. ADDITIONAL COMMENTS

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6. APPLICATION OF CRITERIA

The Tugay forests of the Tigrovaya Balka Nature Reserve (Republic of Tajikistan) has been nominated under natural criteria (ix) and (x).

Criterion (ix): Ecosystems/communities and ecological/biological processes

The nominated property would close an important gap on the World Heritage List as it overlaps with the Middle Amu Darya freshwater ecoregion, the Badghyz and Karabil semi-desert terrestrial ecoregion and the Hindu-Kush Highlands Udvardy biogeographical province, all of which are currently not represented on the World Heritage List.

The natural complex of Tigrovaya Balka is an outstanding example of continuous ecological and biological processes taking place in the evolution and development of desert-tugay biocenoses and their characteristic plant and animal communities. Tugay is one of Central Asia's "keystone" aquatic ecosystems, which occurs only along the floodplains of Central Asian rivers and river deltas, relatively independent from the surrounding environment. Whilst the Tugay ecosystems have been greatly reduced and fragmented as a result of anthropogenic activities, the nominated property represents a rare case of intact Tugay Forest. The reserve hosts various ecological units, not only tugay lowland forests, but also steppe and semi-desert areas and their various ecotones where many stenoeceous species of flora are found. The reserve's forests, sandy and saline semi-deserts, piedmont semi-savannas, and various wetlands are dynamically adapting to changes in the hydrological regime of the territory. The nominated property is also distinguished by its native, i.e. not reintroduced, population of Bactrian Deer.

IUCN considers that the nominated property meets this criterion.

Criterion (x): Biodiversity and threatened species

Tugay habitats, riparian forest and wetlands are endemic to Central Asian semi-arid and arid climates, though highly fragmented and degraded due to deforestation, grazing, land conversion, irrigation and dam construction. The nomination dossier lists important species as Bactrian Deer (*Cervus hanglu bactrianus*), the Goitered Gazelle (*Gazella subgutturosa*), the Persian Leopard *(Panthera pardus ciscaucasica)*, and the Striped Hyena (*Hyaena hyaena*). However, the limited size of the nominated property does not provide for an adequate representation of these wide-ranging species. The Caspian Tiger (*Panthera tigris virgata*), for which Tigrovaya Balka ("Tiger Gorge") was named, is extinct and the continued presence of Caucasian Leopard (*Panthera pardus ciscaucasica*) is doubtful as it has not been recorded in the Hodja-Kaziyon foothills for a long time. Typical predators in the tugay are Jackel (*Canis aureu*) and Jungle Cat (*Felis chaus*), but as a result of anthropogenic pressure the number of predators is very low.

Overall, the nominated property demonstrates similar levels of biodiversity to other World Heritage properties located in the Mountains of Central Asia biodiversity hotspot and relevant biorealms. In conclusion, IUCN considers that the values proposed under criterion (x) would be best recognised under criterion (ix) as part of the intact Tugay ecosystem.

IUCN considers that the nominated property does not meet this criterion.

7. RECOMMENDATIONS

IUCN recommends that the World Heritage Committee adopts the following draft decision:

The World Heritage Committee,

1. Having examined Documents WHC/23/45.COM/8B and WHC/23/45.COM/INF.8B2;

2. Inscribes the **Tugay Forests of the Tigrovaya Balka Nature Reserve (Tajikistan)** on the World Heritage List under criterion (ix);

3. Adopts the following Statement of Outstanding Universal Value:

Brief synthesis

The Tugay Forests of the Tigrovaya Balka Nature Reserve is located in the interfluve of the Vakhsh and Panj rivers in southwestern Tajikistan at the border of Afghanistan. The confluence continues as the Amu Darya, the largest river in Central Asia, running to the Aral Sea. The Reserve includes extensive riparian tugay ecosystems, the sandy Kashka-Kum desert, the Buritau peak, as well as the low (1,000-1,200 m a.s.l.) mountains of the southern spurs of the Aruktau range – the Hodja-Kaziyon mountains. The area of the Tigrovaya Balka Nature Reserve is 49,786 hectares (ha) and its buffer zone is 17,672 ha. The property is composed of a series of floodplain terraces covered by alluvial soils, comprising tugay riverine forests with very specific biodiversity in the valley. Significantly, the property preserves a natural Asiatic poplar tugay vegetation complex.

Criterion (ix)

The natural complex of Tigrovaya Balka is an outstanding example of continuous ecological and biological processes taking place in the evolution and development of desert-tugay biocenoses and their characteristic plant and animal communities. The reserve hosts various ecological units, not only tugay lowland forests, but also steppe and semi-desert areas and their various ecotones where many stenoeceous species of flora are found. The reserve's forests, sandy and saline semi-deserts, piedmont semi-savannas, and various wetlands are dynamically adapting to changes in the hydrological regime of the territory. There are several habitats in the reserve: tugay riverine forests, freshwater bodies and marshes, semi-deserts, takirs and solonchaks.

The complex features water-resistant and thermophilic, salt-tolerant trees and shrubs such as the Asiatic Poplar or Blue Poplar, the Dzhida or Oleaster, the Multiramose Tamarix. Wildlife includes Bactrian Deer, whose population in the reserve exceeds 300; Goitered Gazelle, Striped Hyena, Gray Monitor, Tajik Black-and-gold Pheasant, and many waterfowl, completing the largely intact tugay ecosystem. The 24,100 ha of tugay forests in the reserve represent the largest and most intact tugay forest of this type in Central Asia, and this is the only place in the world where the Asiatic poplar tugay ecosystem has been preserved in its original state over an area of this size.

Integrity

The Tigrovaya Balka Nature Reserve is an integral natural complex, the main components of which are inseparably associated with each other by the common origin and dynamics of natural development, and includes the elements necessary to express its Outstanding Universal Value. The reserve presents ecosystems of tugay floodplain forests, sandy and saline semi-deserts, foothill low-grass semi-savannas and wetlands, with the spectrum of characteristic flora and fauna. The size of the property (49,786 ha) is sufficient to support the sustainable functioning of tugay ecosystems. The buffer zone of the reserve (17,672 ha), though narrow in places, provides additional guarantees of the integrity of the property.

The integrity of the site depends on the riparian dynamics of the Vakhsh and Panj rivers, with the Vakhsh being the most important but also the most modified by eight dams. These dams change inter-seasonal and inter-annual flow dynamics reducing the flooding on which riparian tugay ecosystems depend. Only the section along the Panj river is still under some influence of natural riparian dynamics but their riparian woodlands are of limited size. The water balance is now partly supported by secondary water sources from irrigation systems. The water regime within the property has been restored to the extent that the property's integrity is ensured, but the matter requires constant attention and action.

Biophysical processes and properties of the natural landscape of the Tigrovaya Balka Nature Reserve are indirectly affected by economic activities (irrigated agriculture and cattle grazing) conducted in adjacent lands, but at the time of inscription they have not significantly impacted the property and their water footprint has been greatly reduced.

Protection and management requirements

The property has had the status of a state nature reserve since 1938, the highest nature protection status of Tajikistan, corresponding to IUCN category Ia. The Tigrovaya Balka Nature Reserve is a structural subdivision of the State Committee for Environmental Protection under the Government of the Republic of Tajikistan and operates in accordance with the Law of the Republic of Tajikistan "On Specially Protected Natural Territories" of 27 November 2014. The protection of the reserve is the responsibility of a special inspection service, consisting of 30 rangers and 5 senior rangers, who conduct daily rounds and night patrols. Agriculture, animal husbandry and other economic activities are strictly forbidden within the property's boundaries, but do occur in the adjacent territories. The nature protection institution for the Tigrovaya Balka Nature Reserve has the necessary material and human resources to ensure undisturbed natural processes within the property.

Operational protection and preservation of the property's Outstanding Universal Value is carried out by reserve managers according to medium-term management plans, which define specific measures for protection, scientific research, monitoring of the state of conservation, environmental education and interaction with the local population, the timing of their implementation, actors, sources of funding and expected results. Reserve managers undertake a wide range of active management projects to counter the disruption of the hydrological regime due to upstream dams. Central to this is regular clearing of channels to deliver water from the Vaksh River to and among the lakes. Maintenance of the Outstanding Universal Value is contingent on regular supply of water from upstream sources.

4. Encourages the States Parties of Tajikistan and Afghanistan to coordinate and secure water flows from the Panj River to maintain the hydrological regime of the property.

5. Requests the State Party to
   a) secure and maintain a natural hydrological regime for the property with sufficient provision of water to the property to maintain its Outstanding Universal Value,
   b) assess regularly the management effectiveness of the property, including research on the hydrological regime of the Vakhsh River in relation to the property,
   c) enhance management capacity of the Nature Reserve with special focus on community engagement.

Map 1: Nominated property and buffer zone.