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Journal

IUCN Otter Specialist Group Bulletin, 43(2)

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Publication Date

2026

Peer reviewed

ARTICLE

THE STATUS OF THE CENTRAL ASIAN SUBSPECIES OF THE EURASIAN OTTER (*Lutra lutra subsp. seistanica*) IN KAZAKHSTAN

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(Received 11th February 2026, accepted 3rd May 2026)

Abstract: The Central Asian subspecies of the Eurasian otter (*Lutra lutra subsp. seistanica*) is among the most threatened otter taxa within its global range. In Kazakhstan, its status remains poorly documented despite legal protection. We assessed the current distribution and conservation status of the subspecies based on field surveys conducted in 2024–2026, complemented by historical data and verified reports.

Surveys following standard IUCN Otter Specialist Group protocols were conducted primarily within the Ili River Basin. The results indicate that *L. l. seistanica* persists in Kazakhstan as a small population with a fragmented distribution. Contemporary records are concentrated within the Ili River system, including sections of the Chilik River, parts of the Ili River within Altyn-Emel National Park, and localized areas along the Kapchagay Reservoir. Outside the Ili Basin, presence was confirmed only in the Karatal River.

Major threats include hydrological alteration, degradation of riparian habitats, disturbance, illegal fishing, invasion of American mink, and increasing interactions with aquaculture facilities. These findings indicate a high risk of further decline and highlight the urgent need for targeted monitoring, habitat protection, and conflict-mitigation measures.

Citation: Oleynikov, A., Mustafa, E., Grachev, A., Linnik, A., Konysbayev, T., and Savage, M. (2026) The Status of the Central Asian Subspecies of the Eurasian Otter (*Lutra lutra seistanica*) in Kazakhstan. *IUCN Otter Spec. Group Bull.* **43** (2): 109 - 123

Keywords: Central Asian otter, *Lutra lutra seistanica*, distribution, Ili River Basin, human-wildlife conflict, aquaculture, conservation status

INTRODUCTION

The Central Asian otter, *Lutra lutra subsp. seistanica* Birula, 1912, is a distinct subspecies of the Eurasian otter adapted to arid and strongly continental conditions in mountain and foothill landscapes. It is associated primarily with permanent rivers, lakes, and reservoirs that retain well-developed riparian vegetation and reliable prey resources.

Historically, *L. l. seistanica* occurred across the basins of the Ili, Chu, Karatal, Lepsy, Aksu, and Syr Darya Rivers and their tributaries, as well as in water bodies of Kyrgyzstan, Uzbekistan, Turkmenistan, Tajikistan, and Afghanistan (Sludsky, 1939; Heptner et al., 1998). During the twentieth century, the subspecies underwent rapid range and population decline due to agricultural transformation of river valleys, flow regulation, degradation of floodplain ecosystems, and trapping for fur. By the 1980s it had become extremely rare across much of Central Asia and persisted mainly in

fragmented refugia, particularly within the Ili River Basin in Kazakhstan (Sludsky, 1939; Afanasyev et al., 1953; Savage et al., 2025).

In Kazakhstan, *L. l. seistanica* is listed in the Red Data Book of the Republic of Kazakhstan (Shaimardanov and Lobachev, 2010) as a rare and declining subspecies. Listing in the national Red Data Book provides the subspecies with full legal protection, including a formal ban on hunting, capture, or persecution. However, enforcement of this protection is largely indirect and focused on general biodiversity legislation, with no targeted monitoring, recovery programs, or conflict-mitigation measures currently implemented specifically for otters.

Confirmed contemporary records are concentrated in the Almaty region, where otters persist in isolated sections of the Ili River and its tributaries, including the Chilik, Charyn, Turgen, Talgar, and Omba Rivers. Outside the Ili Basin, a single extant focus is known from the Karatal River; the most recent confirmed record dates to March 2024 and was documented by video.

The conservation importance of this subspecies is high. While Eurasian otter populations have recovered in many parts of Europe (Loy et al., 2021), *L. l. seistanica* remains among the most threatened subspecies of *Lutra lutra*. It is listed in national Red Data Books throughout Central Asia countries, yet systematic field-based assessments remain limited (Savage et al., 2025). Here, we provide a concise update on the current distribution of the Central Asian otter in Kazakhstan based on recent field surveys and collated evidence, and we summarize key threats relevant to practical conservation.

Recent pressures on the subspecies include rapid expansion of aquaculture (especially trout farms along Tien Shan rivers) and continuing changes in the ichthyofauna of the Ili Basin driven by introductions of non-native species, reduced water levels, and declining water quality. These processes may affect the prey base and increase the risk of conflict between otters and fish farms.

The primary objective of this study is to clarify the contemporary distribution of Central Asian otter in Kazakhstan, assess habitat conditions at confirmed sites, and identify the main threat factors that should be considered in conservation planning. Because otters function as bioindicators of aquatic and riparian ecosystem integrity, their status also reflects broader floodplain resilience under increasing water scarcity in Central Asia (Baos et al., 2023; Oleynikov and Bizhanova, 2025).

MATERIALS AND METHODS

Field surveys were conducted during 2024–2026 within the Ili River Basin in Almaty Region, Kazakhstan, which currently represents the core area of the subspecies' national distribution. The Ili Basin includes diverse habitat types from mountain tributaries of the western Tien Shan to lowland floodplains and the shoreline of the Kapchagay Reservoir. Fieldwork took place in June and October 2024, February, March, April, June and September 2025, and January 2026.

Surveys were conducted on foot along riverbanks, using visual searches for tracks, spraints, dens, and other signs of otter activity. Standard field protocols recommended by the IUCN/SSC Otter Specialist Group were used (Reuther et al, 2000). Approximately 70 km of shoreline were surveyed. The main survey areas included the lower and middle reaches of the Chilik River (near its confluence with the Kapchagay Reservoir, the vicinity of Zhanasharua village, and an upstream gorge section), a stretch of the Ili River from the Almaty-Zharkent highway bridge to the mouth of the Omba River, and the lower Omba River. Additional surveys were conducted on the left bank of the Ili upstream of the Kapchagay Reservoir and on the

right bank within Altyn-Emel National Park, from the reservoir backwater zone to the Small Kalkan rock formations (Figure 1, 2).



Figure 1. Eurasian otter habitats in the Chilik and Ili Rivers and field confirmation of presence through local interviews and track records.

At each site, we recorded habitat attributes (vegetation type, channel morphology, water level, water clarity, presence of winter ice-free areas, current stream velocity, and anthropogenic disturbance). All otter records were documented with GPS coordinates (WGS 84) and photographic evidence. Signs of other riparian mammals were also recorded, including American mink (*Neovison vison*), muskrat (*Ondatra zibethicus*), golden jackal (*Canis aureus*), red fox (*Vulpes vulpes*), and Siberian roe deer (*Capreolus pygargus*).

Because fish farms may serve as conflict hotspots, several aquaculture facilities near survey routes were inspected, including the “Khalyk-Balyk” pond farm (Koldy village), a pond farm Sirlybay in Baidybek Bi village, and private trout ponds in the Chilik Valley. Interviews were conducted with staff of aquaculture facilities and residents. In addition to field observations, we compiled and systematized information on aquaculture facilities in Almaty Region using official data from the Fisheries Committee of the Ministry of Agriculture of Kazakhstan (provided upon request). Farms were grouped into salmonid (primarily rainbow trout *Oncorhynchus mykiss*), carp (Cyprinidae spp.), and mixed systems. At two sites, targeted observations assessed shoreline condition, fencing, pond accessibility for otters, and evidence of otter visits (Figure 3). Spatial analyses and map production were conducted in QGIS (version 3.3.4). Historical and contemporary distribution was reconstructed using published sources and museum collections (Sludsky, 1939; Shnitnikov, 1936; Afanasyev et al., 1953; Heptner et al., 1998; Sludsky et al., 1982; Bazhanov, 1939; Lobachev, 1981, 1991; Shaimardanov, 2011, 2016; Akhmetov & Baitanayev, 2016; Savage et al., 2025), and interview reports were checked during fieldwork.

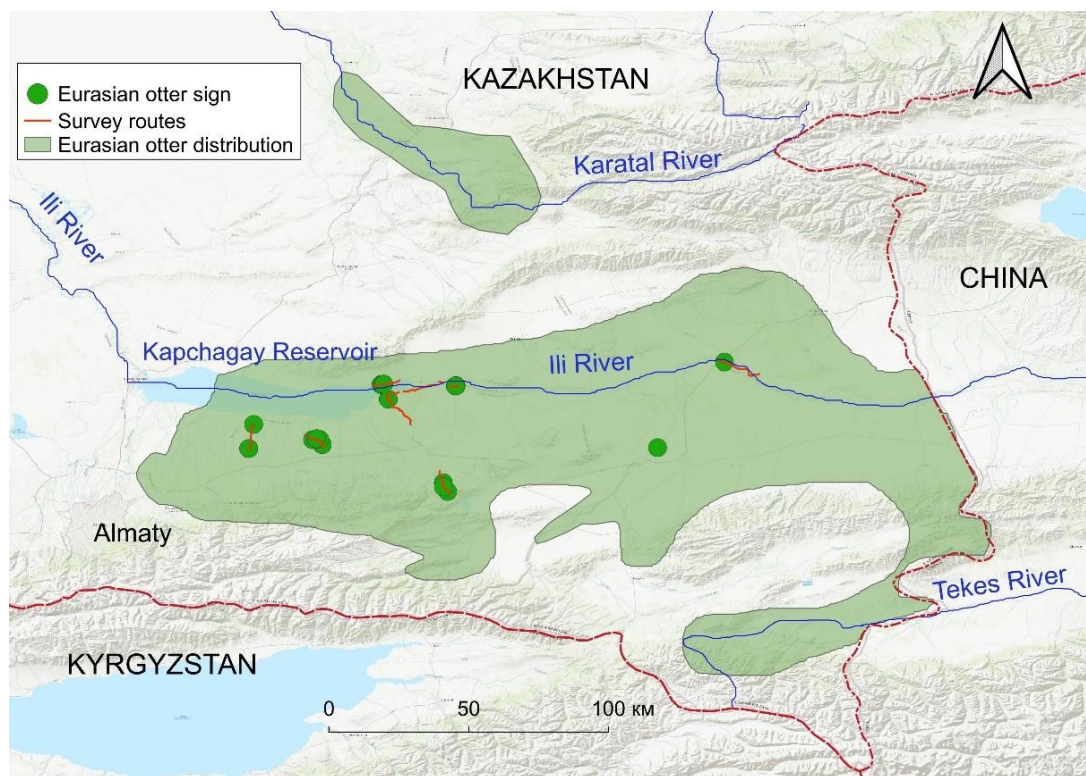


Figure 2. Surveyed sections within the Ili River Basin and recorded signs of otter presence (Almaty Region, Kazakhstan).

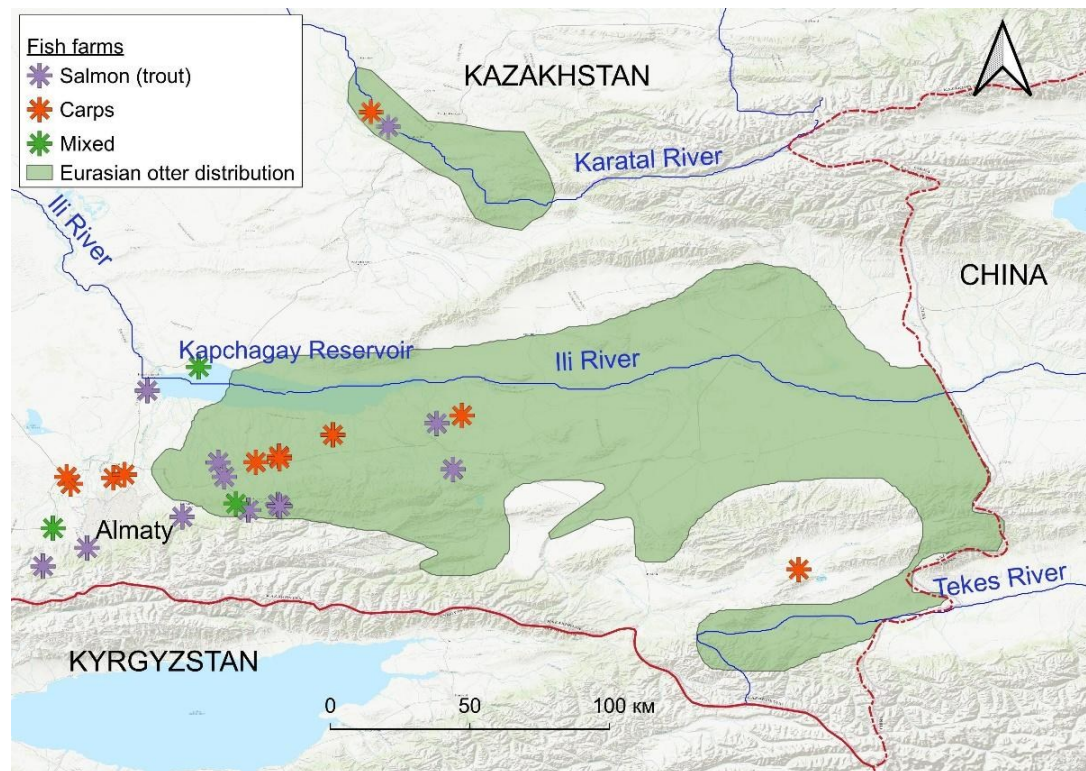


Figure 3. Aquaculture facilities of three types, salmon, carps, and mixed, in Almaty Region.

RESULTS

Field surveys conducted between 2024 and 2026 confirmed the continued presence of Central Asian otter in several sections of the Ili River Basin in Almaty Region. Evidence indicates a fragmented distribution, with otters persisting in a limited number of local refugia associated with the most favorable sections of major watercourses.

Within Altyn-Emel National Park (right bank of the Ili River), otter presence was confirmed upstream of the Kapchagay Reservoir and in the vicinity of the Small Kalkan rock formations. Fresh and old spraints, trackways, and one shelter beneath a rock overhang close to the water were recorded. No evidence of otter presence was found in other parts of the park surveyed. On the left bank of the Ili, upstream of the Kapchagay Reservoir, and in the lower reaches of the Omba River, no otter signs were detected; only signs of American mink were recorded near the mouth of the Omba.

Otter sign was detected along the Chilik River in the lower reaches near the confluence with the Kapchagay Reservoir and in the gorge section upstream of Zhanasharua village. These sites retained sufficient water levels, rocky banks, and remnants of woody and shrubby riparian vegetation for otters. Individual spraints and marking latrines of varying age were recorded; some were attributed to the winter and early spring period of 2024–2025.

Evidence of otter activity was also documented at aquaculture facilities associated with the “Khalyk-Balyk” fish farm (vicinity of Koldy village) and the adjacent Zharsu River. In 2025, tracks of Eurasian otter and American mink were recorded on the farm premises, and a camera-trap photograph of a single otter was obtained near the facility in January 2026. During the same period, farm personnel and our field observations indicated repeated visits by a group of five otters (presumably an adult female with four juveniles) to a small (1.3 ha) pond of the neighbouring Ak Balyk fish farm. These visits occurred mainly at night. Following such events, partially consumed common carp (*Cyprinus carpio*) weighing 1.7–2.5 kg were repeatedly found along the shoreline.

According to oral accounts from farm personnel, the Eurasian otter has been sporadically recorded on the premises since the late 1990s. The Zharsu River, which receives discharge water from the “Khalyk-Balyk” farm, is regarded as permanent otter habitat; it is characterised by well-developed riparian vegetation, including extensive reed beds and shrub communities that provide favourable conditions for otter.

Additional records were obtained from other sites. A trout pond near the Chilik River upstream of Zhanasharua village was visited by an otter in winter 2025, as verified by video footage provided by the owners. Otter tracks were recorded at a pond farm in Baidybek Bi village in January 2026. By contrast, no otter sign was detected during a summer-2025 survey at the Kapchagay Hatchery and Rearing Facility in Akzhal village. Unconfirmed reports of otter presence west of the main study area (Karachingil hunting area) were obtained via personal communication (I. Bevza).

Based on confirmed evidence, the current distribution in Almaty Region is confined to the Ili River Basin, from the Kapchagay Reservoir upstream to the border with China, as well as the middle reaches of the Karatal River. No records were confirmed outside the Ili and Karatal Basins during the study period.

According to compiled official and field-verified information, at least 27 aquaculture facilities operate within or adjacent to the Ili Basin in Almaty Region. Approximately half specialize in rainbow trout production, while the remainder focus

on carp species or mixed systems. Trout farms are concentrated mainly in foothill valleys (Turgen, Issyk, Chilik and tributaries), whereas carp and mixed ponds are more common in lowland areas and near the floodplain of the Kapchagay Reservoir. Spatial overlap between fish farms and the current otter range is substantial: 15 of 27 mapped facilities are located within the contemporary otter distribution, including areas where otters were confirmed during 2024-2025 surveys (Figure 3). A map of historical and contemporary records is presented in Figure 4.

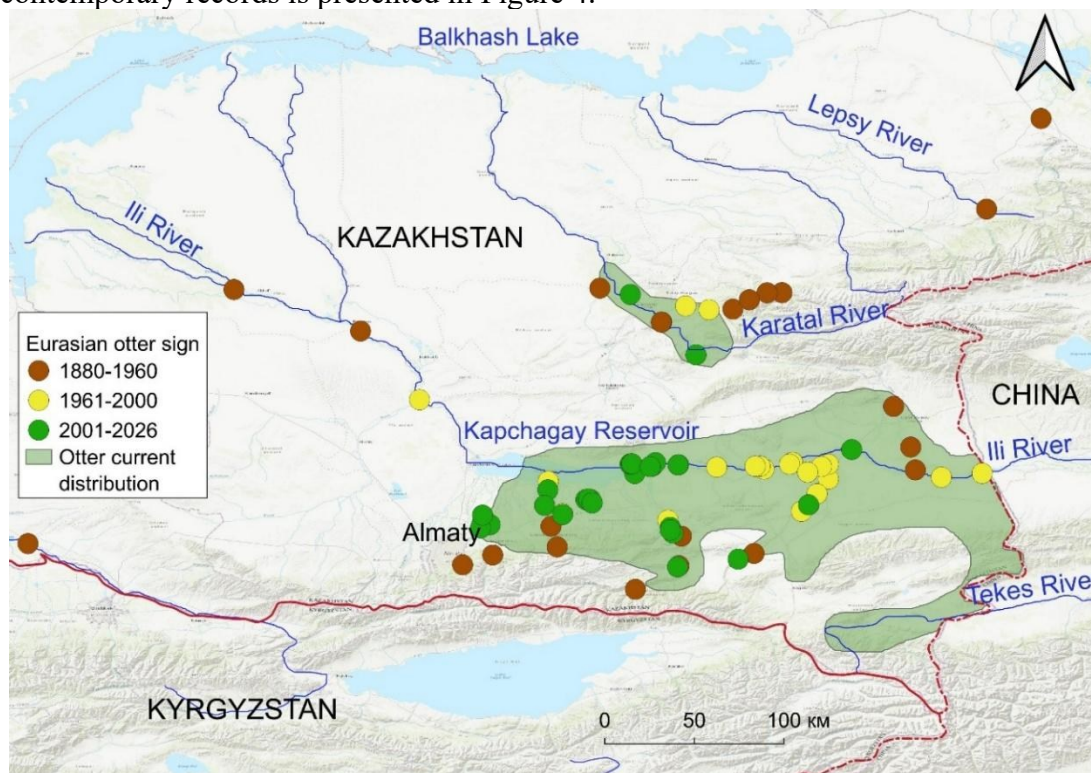


Figure 4. Historical and current distribution of the Central Asian otter in Kazakhstan.

DISCUSSION

Current Population Status and Range Dynamics

Our surveys confirm that the Central Asian otter currently persists in Kazakhstan in two highly fragmented subpopulations. The main subpopulation is confined to the Ili River Basin, while a second, small and isolated fragment persists in the middle reaches of the Karatal River. Within the Ili Basin, the species is retained in most left-bank tributaries upstream of Almaty and is present from the Talgar River upstream in all major tributaries. However, confirmed contemporary records are concentrated in the lower and middle reaches of the Chilik River, along the right bank of the Ili within Altyn-Emel National Park, and in isolated sections of the Kapchagay Reservoir shoreline. This spatial pattern indicates a severely fragmented population structure, with the total number of individuals remaining low, plausibly not exceeding several dozen animals.

Comparison with historical sources suggests a major contraction of range. In the first half of the twentieth century, otters were reported from most major watercourses of south-eastern Kazakhstan (Shnitnikov, 1936; Sludsky et al., 1939; Sludsky et al., 1982; Savage et al., 2025), whereas current confirmed presence is restricted to the Ili Basin and, outside it, a single remnant focus on the Karatal River (March 2024 video record).

The isolated status of the current population poses a risk of genetic and demographic impoverishment, as exchange with other remaining populations of the subspecies in Central Asia has effectively ceased. Within the Ili Basin, further fragmentation is driven by anthropogenic barriers, including dams (notably the Kapchagay Hydropower Station), densely populated areas (the Almaty urban agglomeration and the planned “Alatau City” development), and ongoing degradation of riparian vegetation. Similar processes of local isolation have been reported in Kyrgyzstan and Uzbekistan (Savage et al., 2025), indicating that this is a region-wide conservation issue.

Despite low otter population density, some sections within the study area remain suitable for their long-term persistence. These sites retain fragments of natural floodplain vegetation and adequate prey resources. Use of Ili tributaries appears to be seasonal and closely linked to hydrological conditions; during droughts and periods of intensive water abstraction for irrigation, otters likely concentrate near permanent water bodies, reservoirs, and lower river reaches that do not dry out.

Drivers of Population Decline and Habitat Degradation

Hydrological alteration of the Ili River system appears to be a key driver of habitat degradation for the Central Asian otter. Hydrological alteration of the Ili River system, particularly through water abstraction for irrigation which suppresses spring flooding, along with flow regulation and reservoir construction (Kapchagay, Bartogay), is a key driver of habitat degradation for the Central Asian otter. These changes have modified channel structure and riparian vegetation, likely reducing the availability of critical side channels, backwaters, and floodplain habitats (Mamilov et al., 2024).

Additional pressures documented across survey sites include degradation of riparian vegetation (clearing and burning), livestock grazing (often with dogs), recreational disturbance, shoreline pollution, and illegal fishing, all of which can reduce prey availability and increase chronic disturbance. The introduced American mink was detected more frequently than otters during surveys, suggesting potential competition, and the increasing abundance of golden jackal along the Ili floodplain may add predation risk for juveniles.

The potential impact of road infrastructure on Eurasian otter populations in the region remains poorly studied and currently appears to be of secondary importance. Within the study area, a 337-km section of the international highway Western Europe–Western China extends from the city of Almaty to the border with the People’s Republic of China. Numerous private recreational fishing ponds, aquaculture facilities, and small water courses are located along this transport corridor, which may increase the likelihood of interactions between semi-aquatic mammals and vehicular traffic.

To date, only a single confirmed case of road mortality involving a Eurasian otter has been documented in the region. According to reports from game wardens, an adult male Eurasian otter was killed by a vehicle in April 2022 on the Kuldza Tract near the Ashysai settlement (Figure 5). The total body length of the individual, including the tail, was 125 cm. While this isolated record does not indicate a widespread threat, it highlights a potential emerging risk that warrants attention, particularly in areas where transport infrastructure intersects river valleys and aquaculture sites.

Collectively, these pressures support the conclusion that the subspecies remains critically vulnerable, and recent local records should not be interpreted as evidence of population recovery.



Figure 5. Adult Eurasian otter killed as a result of a vehicle collision on the Kuldzha Tract near Ashysai settlement.

Effects of Aquaculture Development and Changes in Fish Communities

Following the adoption of the State Program for the Development of Fisheries of the Republic of Kazakhstan for 2021–2030, the number of fish-farming enterprises has increased markedly across the country. The most rapid growth has occurred in the Almaty and South Kazakhstan regions, where aquaculture facilities have expanded severalfold in recent years and continue to proliferate.

This expansion has direct implications for otter conservation in the Almaty Region. The expansion of aquaculture is becoming increasingly relevant for otter conservation in the Almaty Region. Numerous facilities are situated within the remaining otter range, and ponds with high fish densities can attract otters, particularly in winter when access to natural prey is restricted by ice. This seasonal attraction to fish farms and the associated human–wildlife conflict has been widely documented for Eurasian otters across their range (Mason and Macdonald, 1986; Kruuk, 2006).

Our observations of repeated otter visits, including a family group, and the consequent damage to stocked fish at farms such as Khalyk-Balyk and Ak Balyk confirm that this widespread conflict pattern is already manifesting in the Ili Basin. The proximity of these facilities to permanent watercourses like the Zharsu and Chilik Rivers increases the likelihood of sustained otter presence and recurrent economic losses.

However, inadequate fencing and the high economic value of stocked fish can intensify such conflicts, increasing the risk of illegal persecution. A confirmed otter visit to a trout pond near Zhanasharua village during the winter of 2024–2025 illustrates the dual role of these facilities as both artificial foraging sites and high-risk conflict hotspots.

Beyond direct mortality, indirect impacts of aquaculture may also be significant. Water abstraction for ponds can reduce discharge in small tributaries, while effluents may contribute to eutrophication, siltation, and riparian degradation -all of which diminish habitat quality for both otters and their remaining native prey.

Given the small and fragmented population within the Ili Basin, even occasional mortality at fish farms could have disproportionate effects on the subspecies' viability. As established in fundamental conservation studies, anthropogenic mortality is often the critical determinant of extinction risk for small and isolated carnivore populations (Woodroffe and Ginsberg, 1998). Consequently, practical mitigation should prioritize conflict prevention and improvements in operational standards at facilities located within key otter habitats (see [Conservation Recommendations](#)).

Fish Community Transformation and Implications for Otters

The ichthyofauna of the Ili River Basin has undergone marked transformation under long-term anthropogenic influence. According to Mamilov and co-authors (2011, 2024), the Ili Basin is among the most altered aquatic systems in Central Asia, having experienced intensive acclimatization and introduction of fish species over the past half-century. These processes have fundamentally changed species composition, trophic structure, and fish productivity, with direct consequences for the prey base of semi-aquatic mammals, including otters.

Historically, the fish fauna of the basin was relatively species-poor but characterized by a high proportion of endemic and specialized taxa adapted to local conditions. Dominant native species in the Ili River and lowland sections of its tributaries included Balkhash perch (*Perca schrenkii*) and Balkhash marinka (*Schizothorax argentatus*), while foothill and mountain tributaries were characterized by naked osman (*Gymnodiptychus dybowskii*) and stone loaches of the genus *Triplophysa*. These taxa likely formed the core prey base for otters prior to large-scale fish introductions into the Balkhash–Alakol Basin.

From the mid-twentieth century onward, fish communities changed substantially due to deliberate stocking and economic exploitation of water bodies. Large-scale introductions of common carp, silver carp (*Hypophthalmichthys molitrix*), grass carp (*Ctenopharyngodon idella*), and rainbow trout (*Oncorhynchus mykiss*) displaced native species and altered trophic structure (Dukravets and Mitrofanov, 1992). Although overall species richness increased, native fish were displaced from many major habitats; even in foothill and mountain tributaries that now function as refugia, introductions of rainbow trout have caused marked declines in native taxa. The most conspicuous changes have occurred in the mountain and foothill reaches of the Chilik, Türgen, and Issyk Rivers.

Introduced salmonids, particularly rainbow trout, are associated with cold, well-oxygenated waters and relatively stable discharge conditions, which are characteristic of some mountain and foothill streams and have also favored the development of trout aquaculture in mountain valleys. These facilities create local areas of high fish density but do not contribute to the recovery of native fish communities. In several river sections, strong declines in marinka and osman have been documented, and in some tributaries these species have nearly disappeared (Mamilov et al., 2011). Similar patterns elsewhere indicate that introductions of predatory fish can reduce overall native fish biomass and productivity rather than compensate for lost prey diversity (Baxter et al., 2004).

The decline of native fish likely affects the availability and spatial distribution of traditional prey for otters, primarily through reductions in overall prey biomass and habitat suitability rather than through replacement by alternative species. Native Schizothoracinae and Nemacheilidae historically formed an important component of the otter diet in major water bodies, whereas currently dominant introduced taxa may be less consistently available under natural conditions. This may force otters to forage increasingly near fish farms, where prey capture can be energetically profitable but the risk of human–wildlife conflict and persecution is higher.

Ichthyological surveys conducted in the upper Ili River and its tributaries during 2023–2025 recorded 49 fish species from 18 families and 9 orders, of which only 12 species (24.5%) were native (Linnik, 2023; Linnik and Kurochkina, 2025). Notably, this area also showed the highest frequency of otter records during our fieldwork, suggesting persistence of the species under conditions of a substantially altered prey base.

Overall, the current state of fish communities indicates degradation of the subspecies' natural prey base. Major drivers include flow regulation, hydrological alteration associated with the Kapchagay Reservoir, water pollution, illegal fishing, and competitive displacement of native taxa by introduced species. Taken together, these processes likely constrain otter abundance within the Ili Basin.

Accordingly, degradation of the native ichthyofauna of the Ili Basin should be considered one of the key factors underlying the decline of *Lutra lutra seistanica*. In our view, conservation of the subspecies in Kazakhstan will not be possible without stabilization and recovery of native fish populations and maintenance of the natural structure of aquatic ecosystems, requiring coordinated measures in water management, protection of water bodies, and regulation of aquaculture.

Role of Protected Areas

Protected areas play an important but uneven role in the conservation of *L. l. seistanica* in Kazakhstan. Confirmed contemporary otter presence was obtained within Altyn-Emel National Park (right-bank Ili River and the Kapchagay Reservoir backwater zone). Additional confirmed modern records from our surveys are associated with the Chilik River system, which is partially covered by existing protected areas and adjacent conservation lands (including Almaty Zakaznik and Kolsai Kolderi National Park in the broader catchment), while historical records indicate the Ili delta as a potentially suitable area. The Ile-Balkhash State Nature Reserve (established in 2018) protects the Ili delta and coastal ecosystems of Lake Balkhash and may represent a priority site for targeted surveys and camera-trap deployment to assess potential persistence or recolonisation. Other protected areas in the region (e.g., Charyn National Park; Ile-Alatau National Park; Almaty Nature Reserve) contribute primarily to headwater protection and water quality but generally provide limited stable otter habitat due to cold, fast-flowing mountain rivers and lower prey availability. Overall, the existing protected area network only partly overlaps the remaining otter range and does not fully encompass key floodplain habitats essential for the long-term persistence of the subspecies. Similar gaps between protected area coverage and functional otter habitats have been documented elsewhere in Central Asia, highlighting the limitations of formal protection in the absence of targeted management and monitoring (Savage et al., 2025).

Impacts of Small Hydropower Development and Future Prospects

Kazakhstan has prioritized the development of renewable energy, resulting in a rapid expansion of hydropower infrastructure within the Balkhash Lake Basin. According to national development programs and environmental assessments, the basin currently contains 27 small and one large hydropower plant, with eight additional facilities under construction and a further 25 projects at various planning stages (UNIDO and ICSHP, 2022; Ministry of Energy of the Republic of Kazakhstan, 2023). This expansion is increasingly relevant for riverine biodiversity and may impose additional pressure on the already fragmented habitats of the Central Asian otter.

Small hydropower plants can affect river ecosystems through alterations of natural flow regimes, increased human access to riparian zones, and changes in channel morphology and habitat structure. Many projects in the region employ diversion-type designs, in which water is abstracted into pipelines, resulting in reduced discharge along bypassed river sections. Such flow reductions represent a key risk for lotic ecosystems in Central Asia, potentially leading to the loss of shallow slow-flowing habitats, backwaters, and riparian cover used by otters (UNIDO and ICSHP, 2022).

At the same time, studies from Southern Europe indicate that hydropower impacts on otters vary substantially depending on project design, scale, and mitigation measures (Prenda et al., 2001; Pedroso et al., 2014). In regulated river systems, otters may persist or recolonize where prey availability is maintained and longitudinal connectivity is not completely disrupted. These findings suggest that hydropower development does not necessarily lead to otter decline, but that ecological outcomes depend on the extent of hydrological alteration and habitat fragmentation.

Indirect effects may also arise through impacts on fish communities. Inadequate or absent fish passage at hydropower facilities can restrict fish movements and contribute to local declines in native species, thereby reducing prey availability for semi-aquatic predators (Mamilov et al., 2011). Such effects are likely to be amplified where multiple diversion structures occur within the same catchment.

The cumulative consequences of long-term flow regulation are illustrated by the lower Ili River downstream of the Kapchagay Hydropower Plant, where hydrological alteration and floodplain transformation coincided with the disappearance of the otter from this river section (Shaimardanov and Lobachev, 2010). Although causality cannot be attributed to hydropower development alone, this case highlights the vulnerability of otter populations to sustained large-scale hydrological change.

Given current development trajectories, additional hydropower projects - if implemented without adequate environmental safeguards—may further fragment remaining otter habitats within the Ili River Basin. From a precautionary perspective, planning and permitting of small hydropower facilities in key tributaries should incorporate minimum environmental flow requirements, protection of riparian corridors, and measures to maintain longitudinal connectivity, which are likely to be critical for conserving the last remaining populations of the Central Asian otter in Kazakhstan.

Conservation Recommendations

Given the extremely small size and fragmented structure of the Central Asian otter population in Kazakhstan, conservation efforts should focus on safeguarding key refugia and maintaining functional connectivity within the Ili River Basin. Standardized monitoring should be implemented at all confirmed sites, including the lower and middle Chilik River, the right bank of the Ili River within Altyn-Emel National Park, and sections of the Kapchagay Reservoir shoreline, using a combination of winter track and spraint surveys, camera trapping, and targeted training of field staff to improve detection and data comparability.

Additional priority surveys are required in the Karatal River and its tributaries, the lower Ili downstream of the Kapchagay Reservoir, the Ili River section between the Omba River and the border with China, and in the Talgar and Charyn Rivers, to refine current distribution limits and identify potential refugia.

Aquaculture facilities within the otter's range should adopt conflict-prevention measures, including physical exclusion where feasible (*e.g.*, fencing or protective netting), non-lethal response guidelines, and awareness-raising among operators regarding the legal protection and conservation significance of the subspecies. Effective water management remains critical, particularly the maintenance of minimum environmental flows and the protection of riparian vegetation and floodplain habitats essential for otter persistence.

CONCLUSIONS

The Central Asian otter persists in Kazakhstan as a highly fragmented and apparently very small population restricted to the Ili River Basin. Confirmed evidence from surveys conducted in 2024–2026 was restricted to a few isolated sections within the Ili River Basin, including parts of the Chilik River system, the right bank of the Ili within Altyn-Emel National Park, and limited shoreline sections of the Kapchagay Reservoir. No otter sign was detected in the Omba River or in surveyed sections of the upper Ili. This spatial pattern, together with the scarcity of recent records across much of the historical range, indicates an unstable population composed of small, discontinuous units.

Within the remaining range, the subspecies is exposed to multiple interacting threats, including hydrological alteration of river systems, degradation of riparian vegetation, chronic disturbance associated with livestock grazing and recreation, pollution, and illegal fishing, with additional pressure from the invasive American mink and the increasing abundance of golden jackal. Aquaculture represents a key management-relevant factor, as many facilities overlap the otter's remaining range, simultaneously providing attractive foraging opportunities and increasing the risk of human–otter conflict and persecution.

Overall, the available evidence indicates that *Lutra lutra seistanica* in Kazakhstan remains at high risk of further decline. Without targeted conservation action focused on maintaining habitat quality and connectivity within the Ili River Basin, the subspecies will likely face local extinction in the national fauna within the coming decades.

Acknowledgements - This study was financially supported by the Four Corners Institute. Co-funding and technical support were provided by the Association for the Conservation of Biodiversity of Kazakhstan (ACBK). We gratefully acknowledge the contributions of ichthyologist Meirambek Pazylbekov, President of the Kazakhstan Sport Fishing Federation, Roman Botabekov, zoologist Ivan Bevza, local resident Asylseyit Slamzhanov, and volunteers Ansar Satbek, Azat Nurgali, Ayaulym Mukhametkali, and Damir Berikbol for their valuable assistance in collecting data for this study.

REFERENCES

- Afanasyev, A.V., Bazhanov, V.S., Korelov, M.N., Sludsky, A.A., Strautman, E.I. (1953). *Animals of Kazakhstan*. Publishing House of the Academy of Sciences of the USSR, Alma-Ata. [In Russian]
- Akhmetov, Kh.A., Baitanaev, O.A. (2016). Annotated list of mammals of Altyn-Emel State National Natural Park. *Proceedings of Altyn-Emel State National Natural Park*, **2**: 201. [In Kazakh and Russian]
- Baos, R., Cabezas, S., González, M.J., Jiménez, B., Delibes, M. (2022). Eurasian otter (*Lutra lutra*) as sentinel species for the long-term biomonitoring of the Guadamar River after the Aznalcóllar mine spill. *Science of the Total Environment*, **802**: 149669
<https://doi.org/10.1016/j.scitotenv.2021.149669>
- Baxter, C.V., Fausch, K.D., Murakami, M., Chapman, P.L. (2004). Fish invasion restructures stream and forest food webs by interrupting reciprocal prey subsidies. *Ecology*, **85**(10): 2656–2663.
<https://doi.org/10.1890/04-138>
- Bazhanov, V.S. (1939). Otter in the rivers of the Balkhash system. *Izvestiya KazFAN SSR, Ser. Zoological*, **1**: 1–5. [In Russian]
- Dukravets, G.M., Mitrofanov, V.P. (1992). History of fish acclimatization in Kazakhstan. pp. 6–44 in: *Fishes of Kazakhstan*, Vol. 5. Gylym, Alma-Ata. [In Russian]
- Gvozdev, E. V. (Ed). (1986). *The rare species of animals of Kazakhstan*. Alma-Ata: Science 253 pp. [In Russian]
- Heptner, V.G., Naumov, N.P. (1998). *Mammals of the Soviet Union. Sirenia and Carnivora (sea cows, wolves, and bears)*. Vol. 2(1a). Science Publishers, Washington, D.C.

- Koelewijn, H.P., Perez-Haro, M., Jansman, H.A.H., Boerwinkel, M.C., Bovenschen, J., Lammertsma, D.R., Niewold, F.J.J., Kuiters, A.T. (2010). The effect of road mortality on the uncertainty of the persistence of the otter (*Lutra lutra*) in the Netherlands. *Lutra*, **53**: 69–76.
- Kruuk, H. (2006). *Otters: Ecology, Behaviour and Conservation*. Oxford University Press, Oxford. ISBN: 9780198565871 <https://doi.org/10.1093/acprof:oso/9780198565871.001.0001>
- Linnik, A.S. (2023). Problems of conservation of native fish species of Northern Tien Shan water bodies. pp. 184–189 in: *Materials of the international scientific conference: "Fisheries research: Experience, problems and development prospects"*. Balkhash. [In Russian]
- Linnik, A.S., Kurochkina, T.F. (2025). Problems of maintaining the cadastre of ichthyofauna as part of the animal world in Kazakhstan. pp. 62–68 in: *Materials of the IV International Scientific and Practical Conference "Environmental, Industrial and Fire Safety"*. Astrakhan. [In Russian]
- Lobachev, Y.S. (1981). Eurasian otter. p. 264 in: *Mammals of Kazakhstan*. Vol. 3, Part 2. Predators (ferrets, cats). Nauka, Alma-Ata. [In Russian]
- Lobachev, Y.S. (1991). *Lutra lutra*. pp. 60–62 in: *Red Data Book of the Kazakh SSR*. Vol. 1. Animals. Gylm, Alma-Ata. [In Russian]
- Loy, A., Bucci, L., Carranza, M.L., De Castro, G., Di Marzio, P., Minotti, M. (2021). Recovery of the Eurasian otter (*Lutra lutra*) in Europe: A review of evidence from surveys and research. *Mammal Review*, **51**(2): 143–160. <https://doi.org/10.1111/mam.12226>
- Mamilov, N.S., Balabiyeva, G.K., Mitrofanov, I.V. (2011). *Problems of conservation of the native ichthyofauna of the Ili-Balkhash basin*. KazNU, Almaty. [In Russian]
- Mamilov, N.S., Tursynali, M., Khassengazyeva, G.K., Urban, J., Bartunek, D., Sharakhmetov, S.E., Levin, B. (2024). Alien Rainbow Trout *Oncorhynchus mykiss* in the Balkhash Basin (Kazakhstan, Central Asia): 50 Years of Naturalization. *Animals*, **14**(20): 3013. <https://doi.org/10.3390/ani14203013>
- Mason, C.F., Macdonald, S.M. (1986). *Otters: Ecology and Conservation*. Cambridge University Press, Cambridge. ISBN: 9780521101349
- Ministry of Energy of the Republic of Kazakhstan. (2025). Official website. Available at: <https://www.gov.kz/memleket/entities/energo> [Accessed 15 December 2025].
- Oleynikov, A., Bizhanova, N. (2025). Semi-aquatic mammals of the Irtysh River floodplain as bioindicator species and their ecosystem services. *Eurasian Journal of Ecology*, **83**(2): 1–14. <https://doi.org/10.26577/EJE2025832014>
- Oleynikov, A.Y. (2024). Otter distribution and status in Kazakhstan. *OTTER, Journal of the International Otter Survival Fund*, **10**: 121–127. https://www.otter.org/s/IOSF-JOURNAL-2024_web.pdf
- Pedroso, N.M., Marques, T.A., Santos-Reis, M. (2014). The response of otters to environmental changes imposed by the construction of large dams. *Aquatic Conservation: Marine and Freshwater Ecosystems*, **24**(1): 66–80. <https://doi.org/10.1002/aqc.2379>
- Prenda, J., López-Nieves, P., Bravo, R. (2001). Conservation of otter (*Lutra lutra*) in a Mediterranean area: The importance of habitat quality and temporal variation in water availability. *Aquatic Conservation: Marine and Freshwater Ecosystems*, **11**(5): 343–355. <https://doi.org/10.1002/aqc.454>
- Reuther, C., Dolch, D., Green, R., Jahrl, J., Jefferies, D., Krekemeyer, A., Kucerova, M., Madsen, A.B., Romanowski, J., Roche, K., Ruiz-Olmo, J., Teubner, J., Trindade, A. (2000). *Guidelines for surveying and monitoring Eurasian otter (Lutra lutra) populations*. IUCN/SSC Otter Specialist Group, Hankensbüttel. <https://portals.iucn.org/library/node/7962>
- Savage, M., Oleynikov, A., Sedash, G., Li, F. (2025). The status of Eurasian otters in Central Asia: A literature review. *IUCN Otter Spec. Group Bull*, **42**(3): 106–119. https://www.iucnosgbull.org/Volume42/Savage_et_al_2025.html
- Shaimardanov, R.T. (2011). Some observations on the Central Asian River otter – *Lutra lutra seistanica* – in the Ili Valley. pp. 303–304 in: *Meldebekov, A.M. (Ed.). Zoological Studies for 20 Years of Independence of the Republic of Kazakhstan*. Almaty. [In Russian]
- Shaimardanov, R.T. (2016). *Lutra lutra seistanica* Birula, 1912 in Kazakhstan. *Selevinia*, **24**: 138–140. [In Kazakh and Russian] https://backend.selevinia.kz/storage/archives_files/JfUjHJKMJ2T9QBW0YZSWqNkA8ookiAxIS14R3P9.pdf
- Shaimardanov, R.T., Lobachev, Y.S. (2010). Central Asian Otter *Lutra lutra seistanica* Birula 1912. pp. 248–249 in: *The Red Data Book of the Republic of Kazakhstan*. Vol. 1. Animals. Part 1. Vertebrates. DPS Print, Almaty. [In Kazakh and Russian]
- Shnitnikov, V.N. (1936). *Mammals of Semirechye*. Publishing House of the Academy of Sciences of the USSR, Moscow-Leningrad. 323 pp. [In Russian]

- Sludskiy, A.A. (1939). *Fur-bearing animals of Kazakhstan*. Kazizdat, Alma-Ata. 242 pp. [In Russian]
- Sludskiy, A.A., Afanasyev, Yu.G., Bekenov, A., Grachev, Yu.A., Lobachev, Yu.S., Makhmudov, S., Strautman, E.I., Fedosenko, A.K., Shubin, I.G. (Eds. Gvozdev, E.V., Strautman, E.I. (1982). *Mammals of Kazakhstan. Vol. 3, Part 2: Carnivores (Mustelids, Felids).*). Nauka KazSSR, Alma-Ata. 264 pp. [In Russian]
- UNIDO, ICSHP. (2022). *World Small Hydropower Development Report 2022: Central Asia*. UNIDO & ICSHP, Vienna/Hangzhou. <https://www.unido.org/sites/default/files/files/2023-08/CENTRAL%20Asia-2022.pdf>
- Woodroffe, R., Ginsberg, J.R. (1998). Edge effects and the extinction of populations inside protected areas. *Science*, **280**: 2126–2128. <https://doi.org/10.1126/science.280.5372.2126>

RÉSUMÉ : LE STATUT DE LA SOUS-ESPÈCE D'ASIE CENTRALE DE LA LOUTRE EURASIENNE (*LUTRA LUTRA SUBSP. SEISTANICA*) AU KAZAKHSTAN

La sous-espèce d'Asie centrale de la loutre Eurasiennne (*Lutra lutra subsp. seistanica*) figure parmi les taxons de loutres les plus menacés au sein de son aire de répartition mondiale. Au Kazakhstan, son statut reste mal documenté malgré une protection légale. Nous avons évalué la distribution actuelle et l'état de conservation de cette sous-espèce à partir d'études de terrain menées entre 2024 et 2026, complétées par des données historiques et des signalements confirmés.

Les études, réalisées selon les protocoles standards du « Otter Specialist Group » de l'UICN, ont été principalement menées dans le bassin de l'Ili. Les résultats indiquent que *L. l. subsp. seistanica* persiste au Kazakhstan sous la forme d'une petite population à distribution fragmentée. Les observations actuelles sont concentrées dans le système fluvial de l'Ili, notamment dans certains tronçons de la rivière Chilik, dans des parties de l'Ili situées dans le parc national d'Altyn-Emel et dans des zones localisées le long du réservoir de Kapchagay. En dehors du bassin de l'Ili, sa présence n'a été confirmée que dans la rivière Karatal. Les principales menaces comprennent les modifications hydrologiques, la dégradation des habitats riverains, les perturbations, la pêche illégale, la prolifération du vison d'Amérique et les interactions croissantes avec les installations aquacoles. Ces constats indiquent un risque élevé de déclin supplémentaire et soulignent l'urgence d'un suivi ciblé, de la protection des habitats et de mesures d'atténuation des conflits.

RESUMEN : EL STATUS DE LA SUBESPECIE DE ASIA CENTRAL DE LA NUTRIA EURASIÁTICA (*LUTRA LUTRA SUBSP. SEISTANICA*) EN KAZAKHSTAN

La subespecie de Asia Central de la nutria Eurasiática (*Lutra lutra seistanica*) está entre los taxones más amenazados dentro de la distribución global de la especie. En Kazakhstan, su status sigue estando pobremente documentado a pesar de tener protección legal. Evaluamos la distribución y estado de conservación actual de la subespecie, en base a relevamientos de terreno conducidos en 2024-2026, complementados por datos históricos y reportes verificados.

Los relevamientos siguiendo los protocolos estándar del Grupo de Especialistas en Nutrias de UICN, fueron conducidos primariamente en la Cuenca del Río Ili. Los resultados indican que *L. l. seistanica* persiste en Kazakhstan como una pequeña población con una distribución fragmentada. Los registros contemporáneos están concentrados en el sistema del Río Ili, incluyendo secciones del Río Chilik, partes del Río Ili dentro del Parque Nacional Altyn-Emel, y áreas localizadas a lo largo del Reservorio Kapchagay. Fuera de la Cuenca Ili, la presencia fue confirmada solamente en el Río Karatal.

Las principales amenazas incluyen la alteración hidrológica, la degradación de los hábitats riparios, el disturbio, la pesca ilegal, la invasión de visón Americano, y las crecientes interacciones con las instalaciones de acuicultura. Estos hallazgos indican un alto riesgo de declinación ulterior y destacan la urgente necesidad de realizar monitoreo focalizado, protección del hábitat, y medidas de mitigación de conflictos.

РЕЗЮМЕ (РУССКИЙ): ЦЕНТРАЛЬНОАЗИАТСКИЙ ПОДВИД ВЫДРЫ ОБЫКНОВЕННОЙ (*Lutra lutra seistanica*) ОТНОСИТСЯ К ЧИСЛУ НАИБОЛЕЕ УЯЗВИМЫХ ТАКСОНОВ ВЫДР В ПРЕДЕЛАХ АРЕАЛА ВИДА.

Несмотря на формальную охрану, современное состояние подвида в Казахстане остается недостаточно изученным. В работе представлена оценка современного распространения и состояния подвида на основе полевых исследований 2024–2026 гг., с привлечением исторических данных и проверенных сообщений.

Полевые обследования проводились преимущественно в бассейне р. Или с использованием стандартных методик Группы специалистов МСОП по выдрам. Установлено, что *L. l. seistanica* сохраняется в Казахстане в виде малочисленной популяции с разорванным ареалом. Основные современные находки сосредоточены в бассейне р. Или, включая участки р. Чилик, правобережье Или в пределах национального парка «Алтын-Эмель» и отдельные участки побережья Капчагайского водохранилища. За пределами бассейна Или присутствие подвида подтверждено только на р. Каратал.

К основным угрозам относятся гидрологическая трансформация рек, деградация пойменных местообитаний, антропогенное беспокойство, незаконный лов рыбы, конкуренция с американской норкой и конфликты с рыбоводными хозяйствами. Полученные данные указывают на высокий риск дальнейшего сокращения численности подвида и необходимость принятия мер по мониторингу и сохранению мест обитания.