



OTTER CONSERVATION ACTION PLAN FOR NEPAL

(2026-2035)



Government of Nepal
Ministry of Forests and Environment



**Department of Forests
and Soil Conservation**

Babarmahal, Kathmandu



**Department of National Parks
and Wildlife Conservation**

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2026



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March 2026

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Technical and financial support from WWF Nepal and SMCRF funded from Darwin Initiative

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Department of National Parks and Wildlife Conservation (DNPWC) and Department of Forests and Soil Conservation (DFSC), Babarmahal, Kathmandu, Nepal

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SUGGESTED CITATION

DNPWC & DFSC (2026). Otter Conservation Action Plan for Nepal (2026-2035). Department of National Parks and Wildlife Conservation (DNPWC) and Department of Forests and Soil Conservation (DFSC), Babarmahal, Kathmandu, Nepal.

FRONT COVER PHOTO: © Saroj Khadka/DNPWC: A pair of smooth-coated otters in Bardia National Park

Foreword

As a Party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Government of Nepal is committed to conserving all three otter species recorded in the country, each listed under Appendix I. While the smooth-coated otter is largely confined to protected areas such as Koshi Tappu, Chitwan, Bardia, and Suklaphanta, the Eurasian otter occurs widely across Nepal's middle and high mountain regions. However, the populations of otters have been threatened by increasing pressures on freshwater ecosystems from infrastructure development, river training works, hydropower projects.

The Otter Conservation Action Plan for Nepal (2026–2035) provides a strategic framework for the long-term conservation of otters through habitat protection, wetland restoration, research, monitoring, and evidence-based conservations. Its implementation will not only support otter conservation but also benefits to other threatened aquatic species, including the critically endangered Gharial and the endangered Ganges River Dolphin, while strengthening the resilience of Nepal's freshwater ecosystems.

We extend our sincere appreciation to the technical team of the Department of National Parks and Wildlife Conservation (DNPWC) and the Department of Forests and Soil Conservation (DFSC) for their dedication, expertise, and commitment in the preparation of this action plan. We gratefully acknowledge the financial support provided by the Darwin Initiative and WWF. We express our special thanks to Mr. Bed Kumar Dhakal, Mr. Hari Bhadra Acharya, Dr. Ganesh Pant, Dr. Shyam Kumar Shah, Mr. Rishi Ram Dhakal and Ms. Sabnam Pathak for their invaluable guidance and contributions throughout the planning process. We acknowledge the technical support provided by Mr. Rajesh Sada of WWF Nepal and Mr. Sanjan Thapa of the SMCRF. Our sincere gratitude is further extended to Dr. Nicole Duplaix, Prof. Anna Loy, and Dr. Melissa Savage of the IUCN SSC Otter Specialist Group for their expert guidance, constructive review, and continued encouragement.

DNPWC and DFSC look forward to the continued collaboration of government agencies, conservation organizations, academic institutions, local communities, and other stakeholders to ensure the effective implementation of this action plan and secure a sustainable future for Nepal's otters and their habitats.



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Acronyms

ACA	Annapurna Conservation Area
ASCO	Asian small-clawed otter
BNP	Bardiya National Park
BS	Bikram Sambat
BZMC	Buffer Zone Management Council
BZUC	Buffer Zone Users Committee
CBAPU	Community-based Anti-Poaching Unit
CBO	Community-based Organization
CFUG	Community Forest Users Group
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CNP	Chitwan National Park
CSO	Community Service Organization
DD	Data Deficient
DFO	Division Forest Office
DHR	Dhorpatan Hunting Reserve
DNPWC	Department of National Parks and Wildlife Conservation
DoA	Department of Agriculture
DoR	Department of Roads
DoED	Department of Electricity Development
DFSC	Department of Forest and Soil Conservation
EN	Endangered
EO	Eurasian otter
HON	Himalayan Otter Network
GoN	Government of Nepal
IUCN	International Union for Conservation of Nature

KPIs	Key Performance Indicators
KTWR	Koshi Tappu Wildlife Reserve
LNP	Lamtang National Park
NARC	Nepal Agricultural Research Council
NBSAP	National Biodiversity Strategy and Action Plan
NT	Near Threatened
OCAP	Otter Conservation Action Plan for Nepal
OSG	Otter Specialist Group
PAs	Protected Areas
RM	Rural Municipality
SCO	smooth-coated otter
ShNP	Shuklaphanta National Park
SMCRF	Small Mammals Conservation and Research Foundation
SSC	Species Survival Commission
VU	Vulnerable
WWF	World Wildlife Fund

Executive Summary

Otters are one of the top carnivores of the aquatic ecosystems and serves as the indicator of freshwater ecosystem health since they depend on clean water, abundant aquatic prey, undisturbed habitat and pure vegetation. Out of 14 species worldwide, three species of otters, smooth-coated otter (SCO), Eurasian otter (EO) and Asian small-clawed otter (ASCO) occur in Nepal. SCO is distributed in Tarai and Inner-Tarai physiogeographic regions while EO in hills and mountains. ASCO has been very recently recorded after a gap of 185 years in Dadeldhura District. EO has a larger distribution across Nepal, but occurs solitarily. SCO has a stronghold in western Tarai, west from the Babai River. However, the species has been recorded recently from the Saptakoshi River in Koshi Tappu Wildlife Reserve (KTWR) and East Rapti River in the Chitwan National Park (CNP). Although several records have been documented since Hodgson (1839) and several otter focused studies has been conducted thus far since 1984, population of otters has yet to be estimated and therefore, nation-wide monitoring of otters' population is lacking.

Altogether 23 threats to otter species primarily EO and SCO in Nepal were assessed through literature review of 13 studies during a period of 1984-2021. Also, community consultations at 14 sites were conducted inside and outside the PAs, which included eight sites for EO in hills and mountains and six sites for SCO in Tarai and Inner-Tarai. Such consultations were conducted in seven protected areas and remaining seven sites outside the protected areas. In addition, threats were ranked for western channel of lower Karnali River. Water pollution due to industrial effluents, municipal sewage and solid waste, barrage construction over the river along India-Nepal border and hydropower dam construction in rivers and water flow reduction due to diversion through irrigation canals and unreleasing 10-35% of water flow in rivers by hydropower stations specially during the dry seasons impedes fish migration and movement which in turn may reduce fish availability to otters. Furthermore, impact of linear infrastructures, for example, construction of dams and roads along the river beds causes habitat loss and destruction. Overfishing, excessive extraction of river aggregates without proper environmental studies, washing off ashes due to wild fire during rain and deposition into wetlands and rivers, changes in forest types, destruction of riparian habitat, human disturbances, eutrophication, sedimentation and succession of wetlands, livestock grazing and feral dogs are potential threats to the otters' survival.

Despite facing severe threats and experiencing declining population globally, none of Nepal's three species of otters are listed as protected mammals under the National Parks and Wildlife Conservation (NPWC) Act, 2029 BS. Although Aquatic Life Protection (ALP) Act, 2017 BS provides legal protection for aquatic animals and their habitat, it does not specify otter. Global conservation status is assessed by the International Union for Conservation of Nature Red List for: *Lutra lutra* as Near Threatened (NT), *Lutrogale perspicillata* as Vulnerable (VU) and *Aonyx cinereus* as VU. National conservation status for Nepal is assessed for *Lutra lutra* as NT, *Lutrogale perspicillata* as Endangered (EN) and *Aonyx cinereus* as Data Deficient (DD). All three species of otters are included in Appendix I of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

The recently published Global Otter Conservation Strategy has drawn attention to the plight of otter species worldwide and describes steps to protect and restore their populations locally. Hence, conservation should be prioritized based on the status and conservation needs of key aquatic animals like otters. The national conservation action plan has become crucial for the long-term survival of the species. This conservation action plan provides a strategic guidance for sustainability of otter conservation in Nepal. Therefore, the Otter Conservation Action Plan for Nepal (OCAP) (2026-2035) envisions long term conservation of otter population in landscape approach and targets with three objectives; 1. safeguard, restore, and manage critical otter habitats to sustain thriving populations, 2. foster strong community stewardship and stakeholder collaboration and cooperation to advance otter conservation initiatives and 3. enhance knowledge on otter distribution, critical habitats and threats.

1.1 Relevance of Action Plan

Three species of otters inhabit Nepal: Eurasian otter (EO) *Lutra lutra*, smooth-coated otter (SCO) *Lutrogale perspicillata* and Asian small-clawed otter (ASCO) *Aonyx cinereus* (Thapa 2020; Acharya et al. 2022; Shrestha et al. 2025). Global conservation status is assessed by the International Union for Conservation of Nature (IUCN) Red List for *Lutra lutra* as Near Threatened (NT) (Loy et al. 2020), *Lutrogale perspicillata* as Vulnerable (VU) (Khoo et al. 2020) and *Aonyx cinereus* as VU (Wright et al. 2020). National conservation status for Nepal is assessed for *Lutra lutra* as NT, *Lutrogale perspicillata* as Endangered (EN) and *Aonyx cinereus* as Data Deficient (DD) (Jnawali et al. 2011). All three species of otters are included in Appendix I of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (CITES 1977; 2019). These assessments need to be revised as information have been collated in the recent years. Although several researches have been undertaken for two species of otters, otter conservation has yet to be prioritized.

There have been several empirical records of the EO in recent years from 2020. The viable population of SCO may be apparently restricted to the southwestern Tarai, west to Bardia National Park. However, from 2020 few observations of SCO have been documented from their historical ranges such as from KTW (Mishra et al. 2022) and observed in CNP (Milan Tamang pers. comm. 2024). ASCO has been recently recorded after a gap of 185 years (Shrestha et al. 2025). This situation gives hope towards the sustainable conservation of otters of Nepal. Most surveys have utilized indirect evidence such as sign surveys and Participatory Rural Appraisal (PRA) methods, which are often inconclusive because of the difficulty in identifying species. Population of the otters has yet to be estimated.

The recently published Global Otter Conservation Strategy has drawn attention to the plight of otter species worldwide and describes steps to protect and restore their populations locally (Duplaix & Savage 2018). Therefore, the national conservation action plan had been solicited since a long time ago (Acharya & Lamsal 2010; Kafle 2009).

National Biodiversity Strategy and Action Plan (NBSAP) 2014-2020 supports the protection of aquatic species and prioritizes wetland management and also explicitly provides strategic framework for preparing and implementing action plans. It highlights the need for preparing conservation action plans for 20 species to address their status and threats. Sections 8.4 and 8.5 of National Forest Policy 2018 of Nepal emphasize the protection of vulnerable, endangered, and rare species through both habitat-based management (in-situ) and external methods such as zoos (ex-situ). National wetlands policy 2069 BS targets conservation, restoration and effective management of wetlands for the biodiversity and environment conservation. The National Environment Policy 2019 focuses on broad, overarching goals like sustainable development, pollution control, and natural resource management. The National Climate Change Policy 2019 emphasizes biodiversity and watershed conservation. Protected Area Management Strategy (2022-2030) aims in conserving biodiversity in

climate resilient ecosystems and self-sustaining protected areas. Chitwan Annapurna Landscape strategy and action plan 2016-2025 aims to conserve river corridors that important for north south linkage of biodiversity including otters. Nepal's National Adaptation Plan 2021-2050 envisions reducing climate change impacts and risks on ecosystem by integrating adaptive strategy across all levels and sectors of the government.

1.2 Action Plan Development Process

Department of National Parks and Wildlife Conservation (DNPWC) have approved the Terms of Reference (ToR) for the preparation and drafting of Otter Conservation Action Plan for Nepal (OCAP) on March 10 2024. A technical committee under the leadership of Senior Ecologist of DNPWC has been formed for the development of the plan. In this regard hearing from the communities in the ground regarding the scenario and issues on otter occurrence and threats to otters and their habitat, their willingness and expectations was necessary.

Altogether 14 sites covering all seven provinces, seven each inside and outside PAs across Nepal were selected for the community consultation (Figure 1, Appendix I). Altogether eight sites were targeted for EO and within the hilly and mountain region (Figure 1) during March 2024. Remaining six sites were targeted for SCO within Tarai and Inner-Tarai physiographic ranges during May-September 2024. At least one site each in three provinces (Sudurpaschim, Bagmati and Koshi provinces were selected for the duration of May-June 2024, however, two sites were selected for Lumbini Province (Figure 1). Madhesh Province was represented during the community consultation conducted at KTRW. Fisher and river dependent communities, CFUGs member, nature guide, game scouts, rangers and senior officials, Division Forest Office officials and staffs, local government (municipalities and rural municipalities) leaders and staffs, NGOs and CSOs staffs were the targeted participants. Altogether, 345 individuals participated during the community consultations. Gender wise the participants constitutes 31% female and 69% male and social group wise includes 36% indigenous and ethnic, 10% Dalit, 15% marginalised and 39% Brahmin-Chhetri. Only one participant belonging to the Muslim religion and also a part of fisher and river dependent community attended (Appendix I).

A team of otter experts reviewed available reports focusing and including otter studies to collate required information on current status, threats and occurrences and distribution of species. Threats to otters across Nepal, as well as threats specific to SCO within their western distribution range (from BNP to ShNP, including the Babai to Mahakali rivers) were assessed through a comprehensive literature review of 13 studies during a period of 1984-2021. Direct and indirect threats (n=16) to otters including SCO from different parts of the country has been reviewed. Additionally, threats perceived by local communities and those directly observed during field assessments at 14 community consultation sites were listed. Also, site specific threats to otters (in the western channel of lower Karnali River) were ranked.

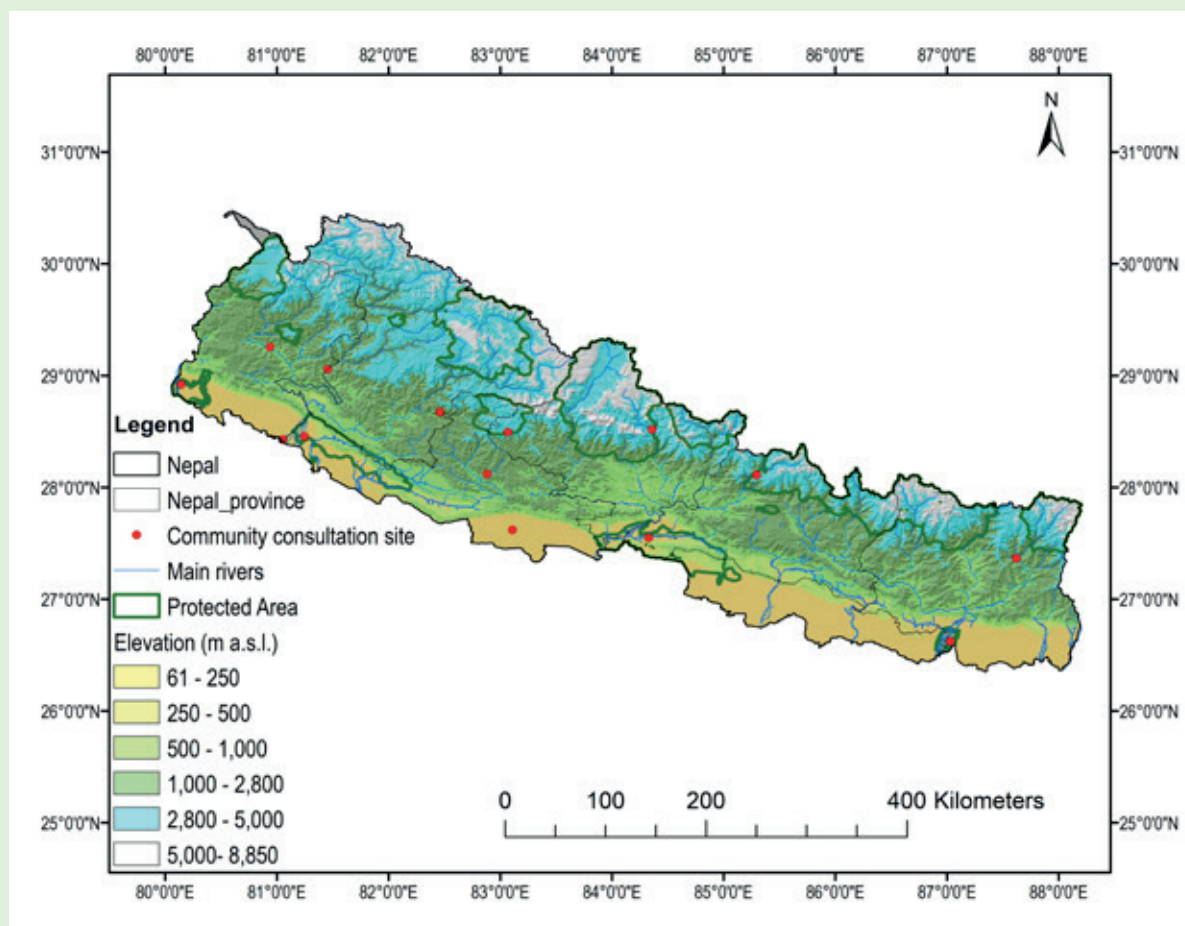


Figure 1: Community consultation sites in different parts of Nepal

Based up on information gaps and appropriate strategies need, the team drafted on goals, objectives, activities, budget, implementation plan and monitoring and output of the OCAP. A reviewed outline draft was discussed with experts on 30-31 October, 2025. The comprehensive draft report was presented and/or submitted to the national review committee formed by DNPWC, national park officials and national and international partners and agencies, academia, international experts associated with IUCN Otter Specialists Group (OSG) during a national level workshop. Based upon input, feedbacks, suggestion and comments from the invited delegates and participants during the workshop and from the reviewers a comprehensive draft was prepared, revised and finalized. A final draft was submitted to the national review committee, and following its approval from the review committee and the DNPWC, the conservation action plan was designed and printed. The final action plan was owned by the government of Nepal (Figure 2).



Figure 2: Action plan development process

1.3 Scope of Action Plan

Despite facing severe threats and experiencing declining population globally, none of Nepal's three species of otters are listed as protected mammals under the National Parks and Wildlife Conservation (NPWC) Act, 2029 BS. Although Aquatic Life Protection Act, 2017 BS provides legal protection for aquatic animals and their habitat, it does not specify otter. Several laws and policies including that of wetlands broadly includes habitat conservation which supports otter, however, these policies and laws does not include otter directly, for example, Aquatic Animal Protection Act, 2017 BS and National Parks and Wildlife Conservation Act, 2029 BS. Hence, conservation should be prioritized based on the status and conservation needs of key aquatic animals like otters. Given the limited research and conservation priority on otters in Nepal, this represents the country's first comprehensive conservation plan dedicated to otter species and their habitat.

This conservation action plan provides a strategic guidance for sustainability of otter conservation in Nepal. This action plan prioritizes safeguarding otters in their natural habitat in alignment with national and international conservation policies and guidelines including the National Wetlands Policy 2069 BS, National Biodiversity Strategy and Action Plan (2014-2020), National Forest Policy (2018), National Environment Policy (2019), Nepal Climate Change Policy (2019), Terai Arc Landscape Strategy and Action Plan (2015-2025), Chitwan Annapurna Landscape Protected Area Management Strategy (2022-2030), Nepal National Adaptation Plan 2021-2050 and Management plans of Protected Areas.

A few PAs (BNP and ShNP) harbours a strong hold for the SCO. On the other hand, EO is distributed across the country and in the human dominated landscape outside the PAs, so conservation strategy is necessary to foster conservation priorities for a large area. Although DNPWC is the focal organization for the wildlife and its habitat management and conservation, other government agencies such as DFSC, provincial government, local government such as municipalities and municipalities, Division Forest Offices (DFOs), security agencies and other conservation partners and more importantly local communities are equally important for the long-term conservation of the otters in Nepal. Hence, agencies and institutions related with enforcement and other supporting conservation partners and all the concerned stakeholders are guided by the conservation strategy. The action plan bridges the conservation gaps and challenges and develop priorities, strategies and opportunities.

This plan primarily focusses on reducing the competition for food to otters and human pressure in their habitats and therefore, promotes local communities' stewardship. As a top carnivore and indicator species of freshwater ecosystem, implementation of this action plan is expected to restore the freshwater ecosystem, riparian habitats and the river corridors. Although SCO's occupancy and abundance are known in its strongholds, its lacking for two other species. In addition, population estimate for all three species of otters are still unknown. Monitoring and patrolling of otters will be prioritized based upon this plan, may help to estimate the population of one or more species. The plan will be implemented across Nepal; however, a few interventions will specifically be implemented in three physio-geographic regions (Tarai or Inner-Tarai, Middle Mountains and Higher Himalayas). One or more actions or activities will be intervened in one or more site/s of all seven provinces of Nepal.

2

Distribution and Ecology of Otter

2.1 Background

Otter is an animal living in both water and land and lies in the class Mammalia, order Carnivora and family Mustelidae and subfamily Lutrinae. It appears more or less similar as civet, marten and weasel and therefore, confused upon by the local communities in Nepal for otters. Otters are one of the top predators and keystone species in freshwater ecosystems and are considered important biological indicators of freshwater ecosystem health as they depend on clean water, abundant aquatic prey, undisturbed habitat and pure vegetation (Kruuk 2006).

There are 14 species of otters extant globally (Duplaix & Savage 2018; De Ferran et al. 2024), out of which three species; Eurasian otter, smooth-coated otter and Asian small-clawed otter are recorded from Nepal (Thapa 2020; Acharya et al. 2022; Shrestha et al. 2025) (Figure 3).

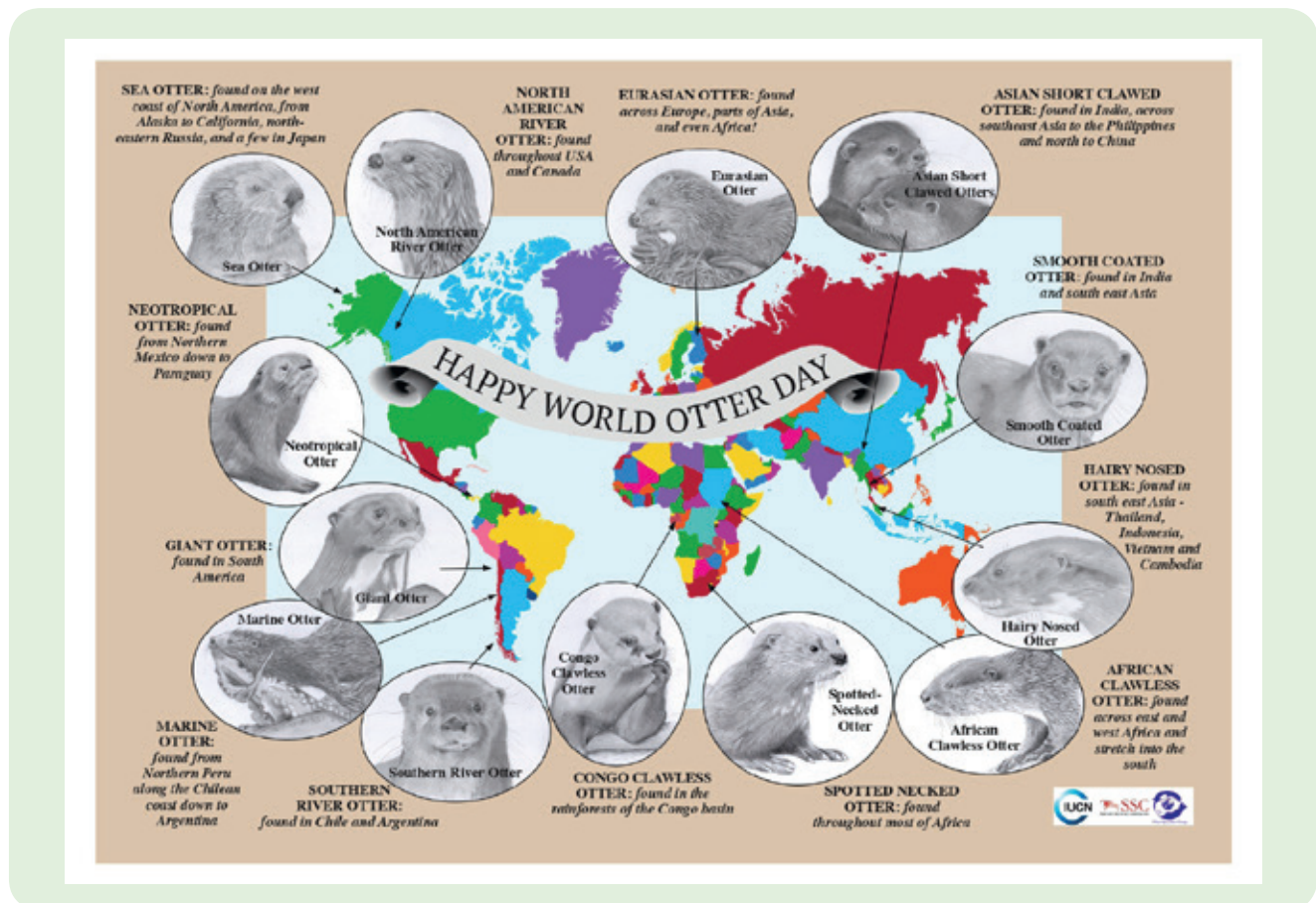


Figure 3: Map showing all otter species geographic ranges (Source: IUCN OSG)

2.2 Morphology

Otters are characterized by generally long, streamlined bodies with fine, dense hair and scent glands at the base of the tail (Kruuk 2006). Male is larger than female in size. Foot are short, fore-foot are shorter than hind foot. It has webbed foot, and toes either lack or have longer claws. The head and neck are nearly equal in width. Fur is short, thick and smooth and brown in colour. Dorsal pelage is darker than the ventral pelage. Its tail is wider and more flat than other animals. Its rhinarium (nose) is more or less “V”- shaped to rounded or “U”- shaped when observed from front. Three species of otters found in Nepal can be differentiated based upon their morphological characteristics (Figure 4).



Figure 4: Differentiation of three species of otters found in Nepal

Table 1: Natural history of otter species found in Nepal

Characters	smooth-coated otter	Eurasian otter	Asian small-clawed otter
Head and body length	59-64 cm	57-95 cm	48-61 cm
Tail length	37-43 cm	35-45 cm	25-35 cm
Tail shape	Flat	Cylindrical	Flat
Whole body length	96-130 cm	90-135 cm	73- 96 cm
Body weight	7-11 kg	7-12 kg	2-5 kg
Head shape	Blunt, dog head sized	Flat	Blunt, cat head sized
Sought shape	Trapezoid	Square	Trapezoid
Claw	Visible	Visible	Invisible
Distribution in Nepal	Tarai, Bhabar, Chure and inner Tarai	Mountain and hilly regions	not known
Scat	With fish scales and bones	With fish scales and bones	With crab shell and fish scales, bone less than that of other otters
Scat smell	Strong scent like dry fish	Dry grass and dry fish	Strong scent like dry fish
Track	Can see claw impression on paw mark	Can see claw impression on paw mark	Cannot see claw impression on paw mark, size smaller than in other otters
Behaviour	Usually found in group	Usually sighted alone	Usually found in group
Major diet	Fish, frog, insect	Fish, frog, insect	Crab, snail, fish
Global conservation status	Vulnerable	Near Threatened	Vulnerable
Conservation status in Nepal	Endangered	Near Threatened	Data Deficient
Listed in CITES	Appendix I	Appendix I	Appendix I

2.3 Global Distribution

Otters are distributed on every continent except Australia and Antarctica (Doroff et al. 2003) dwelling in a diverse array of aquatic environments from freshwater rivers to coastal marine areas, with 14 different species spread across the globe (Figure 3). While some, such as the sea otter, are true marine inhabitants, others such as the Eurasian otter are more adaptable and can be found in both freshwater and marine habitats (Kruuk et al. 1994).

SCO is widely distributed from Iraq in the west to Vietnam in the east, India in the north to Indonesia in the south. Its range expands into south and Southeast Asia, with distribution ranging from Indonesia to southwestern China, Bhutan, Nepal, India, and Pakistan. An isolated occurrence is located in Iraq (Khoo et al. 2020) (Figure 5). EO is widely distributed from Portugal and North Africa in the west to Russia in the east and north to Indonesia in the south. It has a large range across Europe (from central Denmark towards east and Spain towards west and southern Italy), much of Asia (including the Near and Middle East into South Asia, and eastward through Southeast Asia), and parts of North Africa (Morocco, Algeria, Tunisia) (Loy et al. 2020) (Figure 5). ASCO is globally distributed across South and Southeast Asia, with a range extending from India in the west to the Philippines and Taiwan in the east, and southern China in the north. This includes countries such as Pakistan, Bangladesh, Nepal, Bhutan, Myanmar, Laos, Malaysia, Vietnam, Indonesia (including Sumatra, Java, and Borneo), Thailand, Cambodia, and Brunei. It has also been introduced to the United Kingdom and are commonly found as pets in Japan (Wright et al. 2020) (Figure 5).

As otters are elusive and generally nocturnal reliable estimates of the species' population are not available. In Southeast Asia SCO found in large groups (Foster-Turley 1992; Hussain 2013) where the basic family group consists of an adult female and her offspring, the father of the offspring, and older siblings may often join the group (Lekagul & Mcneely 1977). Group size varies considerably between months and seasons, the group being largest during the monsoon season (Hussain 2013). It can be found singly, in pair or in families of 3-24 individuals (Khoo & Sivasothi 2018). The population status of the EO remains poorly known across large portions of its range, particularly in North Africa and Central and Southeast Asia. Reported densities vary from 0.01 to 0.04 individuals/km in recently recolonized areas (Bonesi & Macdonald 2004; Erlinge 1967; Fernández-Morán et al. 2002), and from 0.15 to 0.72 individuals/km in established populations, largely influenced by prey availability (Freitas et al. 2007; Hauer et al. 2002; Hung et al. 2004; Jansman et al. 2001; Prigioni et al. 2006; Ruiz-Olmo et al. 2001). The minimum viable population has been estimated at approximately 4,500 individuals (Loy et al. 2019). Population trends seems to be decreasing, however, the overall global population of EO is best estimated between 57,880-361,140 individuals (Loy et al. 2020).

ASCO are found in smaller groups of 2-4 individuals and up to 15 individuals (Hussain et al. 2011). A reliable population estimate of the ASCO is lacking. The population seems to be very small and declining. The combined effects of ongoing threats are believed to have led to a population decline exceeding 30% over the past 30 years (equivalent to three generations, as defined by Pacifici et al. (2013) and are projected to result in a similar decline over the next 30 years (Duplaix & Savage 2018; Wright et al. 2020).

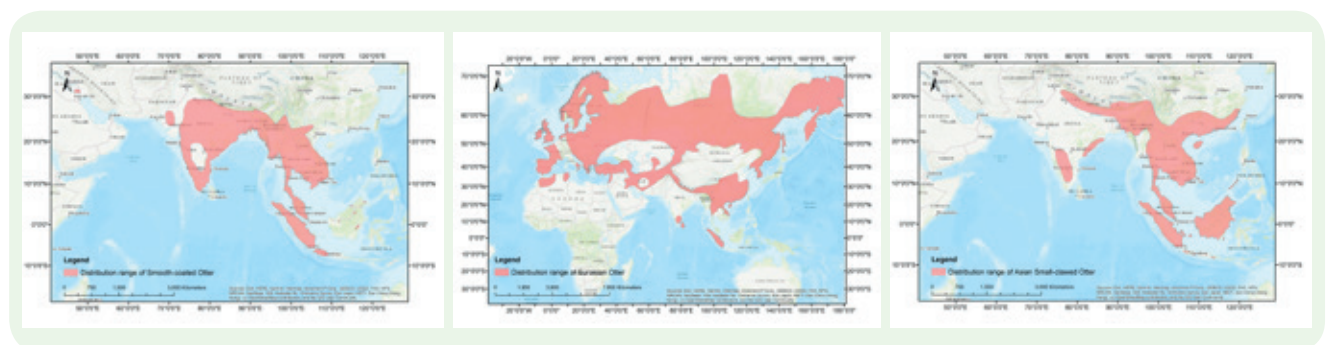


Figure 5: Global distribution map of smooth-coated otter (left), Asian small-clawed otter (centre) and Eurasian otter (right) (Source: IUCN Red List)

2.4 National Distribution

The current distribution of the three species of otter apparently known to inhabit the rivers and wetlands of Nepal is fairly documented (Figure 6). The presence of otters has been confirmed in more than 24 districts from lowland, hilly and mountainous regions of Nepal (Kafle 2011; Shrestha et al. 2025; Thapa and Lama 2025). SCO is distributed in lowland Tarai and specially restricted in BNP and ShNP, but recently recorded from KTWR (Mishra et al. 2022) and East Rapti River in the CNP (Milan Tamang pers. comm 2020). EO has been recently recorded at higher elevations after three decades with evidences from camera trap images and morphometric studies from Jajarkot, East and West Rukum and Kavrepalanchok districts (Shrestha et al. 2021a, 2021b, 2022) and recently to Humla (Thapa & Lama 2025). Eurasian otter killed by dog recorded from Kathmandu valley is another surprising report (Shrestha et al. 2023). The species have been reported from several rivers across Nepal such as, Mai River, Ilam District, Tandi River, Rasuwa District, Badigad River, Baglung District, different sections and branches of Karnali River, West Seti River, Doti District, etc. In addition, the species has been confirmed from Tamakoshi, Kaligandaki, Budhiganga River, Sanfebagar, Achham (Thapa 2020; Tejab Pun and Pravin Giri personal communications, 2025). More importantly, ASCO has been recently confirmed after a gap of 185 years from Dadeldhura district in western hills of Nepal (Shrestha et al. 2025). Furthermore, otters have been recently surveyed and confirmed from four out of 10 rivers across the Tarai and Inner-Tarai physiographic regions.

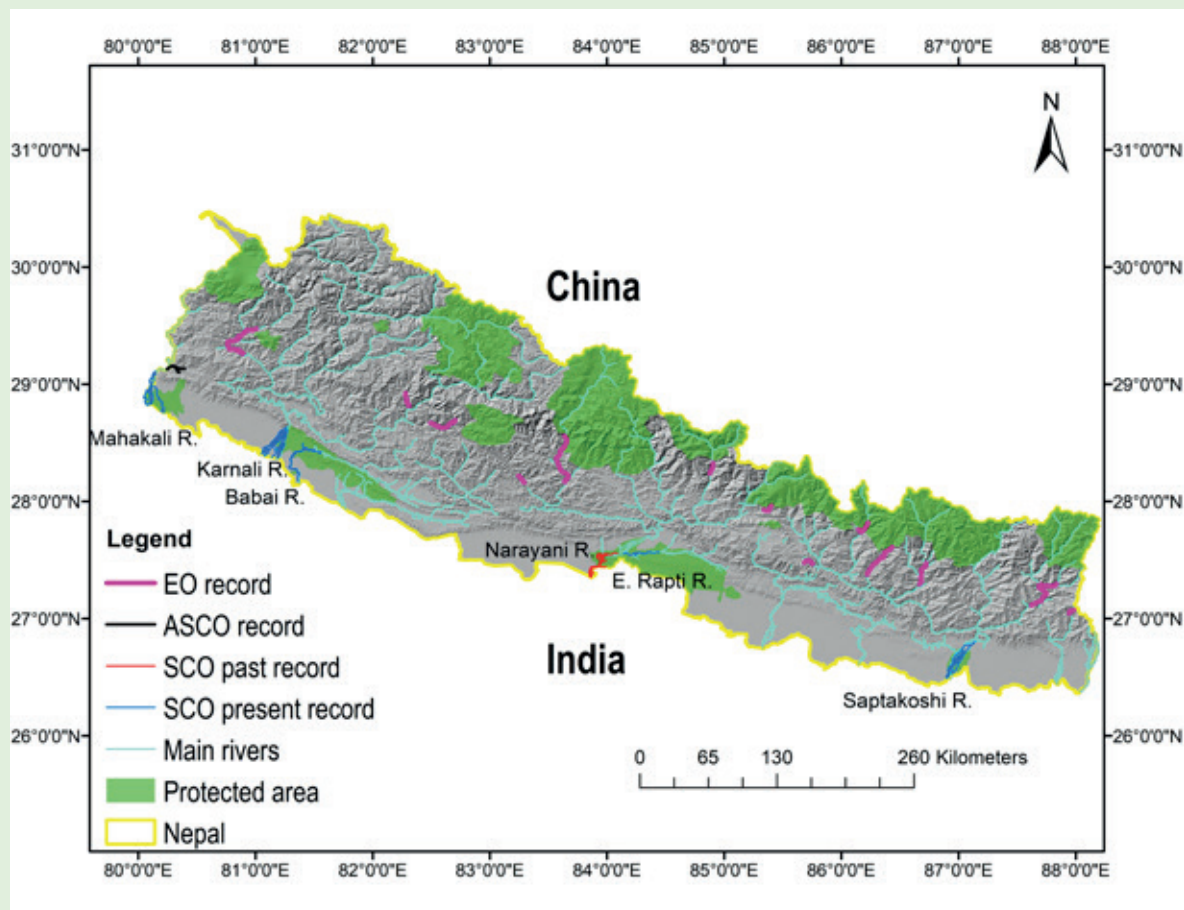


Figure 6: Distribution of three species of otters in Nepal

2.5 Ecology

a. Habitat

Perennial water sources with abundant fishes such as larger rivers, lakes and wetlands, forests along the lakes and riparian habitats are the habitats for otters. However, the animals have been found travelling a larger distance between one to another places. Habitat such as banks of river, rivulet, stream, lake, large pond, dam and islet in river are suitable areas for otters. ASCO inhabits a variety of freshwater and coastal environments such as freshwater wetlands, rivers, streams including mountain streams, marshes, sea coasts and mangrove swamps and they are also seen near rice cultivation (Melisch et al. 1996; Shariff 1984; Nor 1989; Sanyal 1991; Sivasothi & Nor 1994). In the Western Ghats, similar occupancy has been recorded in protected areas as well as in tea and coffee plantations (Prakash et al. 2012). The SCO primarily are found in and around large rivers, lakes, estuaries, and coastal mangrove swamps especially in undisturbed riparian forests or scrub with ample bankside vegetation for cover and dens and also rice cultivation (Foster-Turley 1992; Kruuk 2006). In addition, the species also prefers rocky stretches that are suitable for denning and resting (Hussain & Choudhury 1997; Hussain 2013). The EO is also found in a wide variety of aquatic habitats including freshwater rivers, lakes, streams, marshes, and even brackish and saltwater environments like estuaries and coastlines (Loy et al. 2024). High and optimal suitability of habitat of SCO in Nepal is limited to protected areas and especially in the western Tarai of the country (Acharya et al. 2023).

b. Diet

SCO feeds primarily on fish (90% of its diet), however, it also feeds on birds (5%), frogs (2%), molluscs (1%) and crabs (1%), insects, earthworms and rodents. Insect and reptile constitute less than 15 of its diet (Baskaran et al., 2022; Nawab & Hussain, 2012). EO feed on variety of diet including fish, crustaceans, amphibians and sometimes reptiles, birds, eggs, insects and worms (Loy et al., 2020). Otter chases fishes and hunts solitarily (EO) or in group (SCO and ASCO) and the chased fishes are also preyed upon by kingfishers, cormorant, darter etc. Otter feeds on 800-1800 gm of fish each day (Kruuk 2006). They catch their prey by their mouth and forelimbs and feed on fishes either from heads or from tail. They travel a long distance for foraging. ASCO feeds primarily on crabs, crustaceans, snails, mollusks, frogs, and fish (Foster-Turley 1992) and rarely on octopus (Duplaix & Savage 2018).

c. Behaviour

Otters lives solitarily (EO) or in group (SCO and ASCO) which is called family. The family of SCO is led by female while by a pair in ASCO. Otter communicate with their own family members by looking, touching and shaking their body while communicate with other family members using special scent (Kean et al. 2011). Such scent gland is located below the tail and they spray these scents on trees trunk, rocks, and river banks and also defecate to establish territory (Leuchtenberger & Mourão 2009). Sometimes, one family enters into the territory of other families and fight and conflict between otters occur. Size of the territory depends upon availability of diet, if the diet is enough, the territory is smaller. In contrast, if the diet is scarce, the territory is larger (Lélias et al. 2021). SCO can be seen resting, playing, foraging and travelling singly, in pair or in families of 3-24 individuals (Shivram et al. 2023). SCO can travel a long distance up to few kilometres in a day (Hussain et al. 2011; Sivasothi & Nor 1994). Although the species is nocturnal in habit, it can be observed during the day time (Awasthi et al. 2024). EO are primarily solitary, and shows nocturnal and crepuscular activity, and also playful behaviours and marking territories with scent. From a single individual to a family or group of more

than 15 individuals of ASCO has been observed in different parts of its range (Hussain et al. 2011) and some distances through the river channels and waterways. ASCO exhibit highly social and playful behaviour, living in close-knit family groups. They communicate with other members through a variety of vocalizations and physical interactions like grooming and play-fighting (Loy et al. 2024). The species has been found travelling more than 13 km (Kruuk 2006).

SCO is generally monogamous (Bungum et al. 2022). They mate inside water and which normally occurs once for less than a minute. Though they can mate throughout the year, they are usually found impregnated for 60-62 days and breeds in between the months of October to February. Annually, a female breeds two to five pups and feeds on milk for three months. Pups are with their parents for a year. Generally, SCO becomes adult and sexually active after 2-3 years of their age (Desai 1974; Hussain 2013). In natural habitat SCO has been found to live for less than 10 years while in well managed zoo, the species has been recorded to live up to 20 years. ASCO live more than 10 years in wild and more than 20 years in captivity (Righton et al. 2025). EO live up to more than 15 years in wild and captivity both (Kruuk 2006).

EO are polygynous and might also be polyandrous and can mate throughout the year, but most births take place between May and August. Following a gestation period of about nine weeks, females give birth to litters of two to three pups, which are born blind. The mother raises the cubs on her own, caring for them for over a year until they become independent. They typically reach sexual maturity at around two years of age and may live up to 10 years in the wild (Loy et al. 2024). ASCO typically form lifelong monogamous pairs and breed throughout the year (Wilson & Mittermeier 2009). Following a gestation period of about 60 to 64 days, females can produce one or two litters and 2-7 pups annually (Foster-Turley 1992). Otter pups, born in burrows and rely heavily on maternal care. They begin to gain independence at around four to six months of age.

3

Conservation Efforts and Achievements

3.1 Policy

Although NPWC Act, 2029 BS conserve all species including otters, none of the three species of otters are included in the list of protected mammals. Also, Aquatic Animals Protection Act (AAPA), 2017 BS provides legal protection to habitat of aquatic animals, but do not mention otters. Furthermore, implementing agency of the AAPA is not explicit and, therefore, resulting no persecution carried out under its provisions. However, recently the local government has started to adopt the law locally and protocols provisions has been by the local government (municipalities and rural municipalities).

Hence, Forestry Sector Strategy 2016-2025, National Environment Policy 2019, Aquatic Life Protection Act 2017 BS, Soil and Watershed Conservation Act 1982 and wetland concerned acts and policies should incorporate responsible agencies, regular coordination between stakeholders and sustainable conservation and management with systematic monitoring and enforcement for long term otter conservation inside and outside the PAs. Otters should be included as a key indicator species for the river basins and wetlands related policies, EIA framework and Aichi Biodiversity Targets.

3.2 Program and Activity

Although otters have been reported from Nepal since Hodgson (1839), otter focused surveys were conducted by native researchers after 1990s and extensively after late 2010s. In late 2020s, Himalayan region specially Nepal has been actively working for otter conservation. Several small projects and surveys have been thus far conducted gathering information of otters' occurrences and distribution, ecology, diet and threats.

Several conservation programs and activities have been undertaken so far resulting in notable achievements specially in confirming the distribution of species across Nepal. Recently ASCO has been re-reported after a gap of 185 years since Hodgson (1839). EO has been recorded after 1991 and its distribution has been thus far known from more than 10 rivers and districts. Similarly, SCO has been re-reported from its previously recorded areas such as; East Rapti river, CNP and KTWR. Preliminarily, Nepal Otter Action Plan (NOAP) Research Phase I (2020-2022) has been prepared and seven sites in seven provinces has been explored for otter surveys as recommended by the NOAP. More importantly, long term otter conservation "Strengthening communities' livelihood and stewardship to conserve otters in Karnali" in the lower region of Karnali river has been initiated. Community based otter monitoring protocol and identification manual has been published and potential SCO occurring rivers in Tarai and Inner Tarai regions has been surveyed to confirm the species' presence from four out of ten rivers. Community awareness campaigns has been conducted in 25 districts and are ongoing across Nepal.

4

Conservation Threats, Challenges and Opportunities

4.1 Threats and challenges

Several threats (23) have been listed threatening the survival of otters which can be categorized into; habitat degradation and loss; prey base loss and direct human disturbances.

Habitat degradation and loss

Freshwater ecosystem is highly degraded which threatens the survival of aquatic biodiversity including otters. Causes of habitat degradation and loss to otter species has been identified (Table 2) as follows;

- a. High riverine vegetation loss and degradation
- b. Water pollution from industrial effluents, use of river as a dumping site, agricultural field chemical fertilizers and pesticides discharge
- c. Construction of wildlife unfriendly infrastructures including irrigation intakes, dams and embankments and barrage in large rivers along the Indo-Nepal border and several hydro-projects and irrigation diversion dams
- d. Low water flow in river and stretch and even drying up due to hydropower dams in dry seasons
- e. Unsustainable extraction of river aggregates
- f. Wetlands succession and destruction
- g. Overexploitation of ground water

Poaching and illegal trade

Otters are increasingly threatened by poaching and illegal wildlife trade across their range. While historically exploited for fur, contemporary pressures are dominated by the exotic pet trade, traditional medicine markets, and retaliatory killing linked to fisheries conflict. Thirteen species are listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), yet trafficking persists through both physical markets and online platforms. Southeast and South Asia are major trade hubs and three species ASCO, EO and SCO are most affected species particularly for exotic pet trade, traditional medicines, fur trade and fish depredation (Gomez et al. 2017; Gomez and Bouhuys 2018).

In the past a total of 755 otter pelts were recorded as seized in Nepal in 24 incidents in 29 years period during 1989-2017 (Savage and Shrestha 2018). Traders and nomads were involved in poaching and illegally trading otter skins in the past. They informed local residents that their purpose was to control golden jackals (*Canis aureus*), which were reportedly causing significant losses of chickens and goat kids. In reality, however, they not only killed jackals but also poached various wildlife species, including otters, by setting metal jaw traps and snares along riverbanks. Traders establishing camps on the outskirts of villages, often selecting locations near river confluences with strong currents. Decades ago, hunters under the pretext of targeting jackals but also poached otters, allegedly for sale (Thapa et al. 2026).

Except for a few accidental incidents in remote areas, there has been no record of poaching and illegal trade of otters across Nepal.

Competition with associated species

Several freshwater species—including the gharial, Ganges river dolphin, and mugger crocodile—rely primarily on fish and are listed as Critically Endangered, Endangered, and Vulnerable, respectively. These species coexist with the smooth-coated otter (SCO) within protected areas and major river systems. As they share similar dietary requirements, competition for food is likely. In the context of declining fish availability due to multiple pressures, this potential competition becomes an even greater conservation concern.

Depletion of prey base

A review of the historical timeline of the lower Karnali River region indicates that several major interventions have significantly influenced freshwater biodiversity. The construction of the Girijapur Barrage along the Indo–Nepal border (1972–76), the devastating Karnali flood of 1984, and the Rajapur Irrigation Rehabilitation Project were key events that adversely affected aquatic species, including the Gangetic River Dolphin (WWF Nepal 2006) and associated species such as the smooth-coated otter (SCO). More recently, the Rani Jamara Kulariya Irrigation Project and the Bheri Babai Diversion Multipurpose Project are expected to pose further challenges to the Karnali River’s freshwater ecosystem, particularly during the dry season (Bashyal et al. 2021).

Conversely, the diversion of water from the Geruwa River into the Khauraha River has reportedly enhanced habitat suitability for otters by increasing water volume and fish availability in the Khauraha (Acharya 2017). Similarly, the diversion of water from the Bheri River into the Babai River may potentially create favorable habitat conditions for the smooth-coated otter in the Babai River. However, the broader construction of irrigation intakes, dams, embankments, and barrages along large rivers at the Indo–Nepal border, along with multiple hydropower and irrigation diversion projects, has generally obstructed fish migration routes and reduced overall fish availability (Acharya & Rajbhandari 2011; ADB 2018).

In addition to infrastructural development, overfishing and destructive fishing practices—such as electrocution, poisoning, and blasting—along with the use of small-mesh nets, unsustainable extraction of river aggregates, and motorized boating, are major drivers of fish decline. The excessive extraction of river aggregates alters river flow and channel morphology and destroys critical fish breeding habitats. Local topography further influences prey availability and fishing pressure (Basnet et al. 2020; Mishra et al. 2022; Shrestha et al. 2021a, b; Giri and Shrestha 2024; Giri et al. 2025). The widespread use of fine-mesh nets is particularly detrimental, as it captures large quantities of fish fry and eggs, thereby severely limiting fish overall availability in the future.

4.1.4 Persecution

Recently, local fishers have increasingly reported that otters are removing fish from their nets. On rare occasions, both pups and adults become accidentally entangled in large gill nets. Although retaliatory killings were reported in the past, such incidents are now infrequent and largely confined to remote areas (Thapa et al. 2026).

4.1.5 Human disturbance

Otters are highly sensitive to disturbance and generally prefer quiet, undisturbed habitats. Intensive human activities along river corridors—such as heavy fishing pressure, overgrazing on riverbanks, motorized boating, and large-scale extraction of riverbed aggregates—generate substantial noise and habitat disruption. Such disturbances can compel otters to abandon their dens, thereby increasing stress levels and the risk of mortality. Studies have further shown that otter abundance declines in areas where human settlements are located close to riverbanks (Shrestha et al. 2021; Awasthi et al. 2025).



Photo 1: Overfishing



Photo 2: using large nets (mahajal) for fishing



Photo 3: burgeoning extraction of river aggregates in otter habitat



Photo 4: Pole (locally made up of bamboo) fishing which is a good practice of sustainable fishing



Photo 5: large quantity of fish captured using large number of gill nets to meet overarching demand



Photo 6: A pair of smooth-coated otters at Rani Tal, ShNP (Photo: Friedrich Esser)

Table 2: Existing threats to otter species in Nepal

S.N.	Threats	EO	SCO
1	Habitat degradation by deforestation in river banks		
2	Water pollution		
3	Low water level flow and dry up due to hydropower plants dam		
4	Low water level flow due to irrigation intake and dams		
5	Unsustainable extraction of river aggregates		
6	Habitat degradation by river embankment and barrage		
7	Impeding fish migration by transboundary dams		
8	Wildlife unfriendly infrastructures construction		
9	Overfishing illegal and destructive fishing		
10	Wetland succession and destruction		
11	Site specific poaching and illegal trade		
12	Human disturbance		
13	Unprecedented weather conditions		
14	Site specific natural hazards		

Note: Threats to ASCO currently in Nepal are yet unknown

Vulnerability to climate change

In the prevalence of global warming, level of change in temperature and precipitation is projected across the otter species range possibly resulting decrease in suitable habitat (up to 25%) for SCO in Nepal (Acharya et al. 2023). In a previous study covering the Himalayan range, 6-15% loss of its distribution range for EO and SCO is expected until 2050 (Jamwal et al. 2021). Although habitat exposures seem to be a greater threat, species sensitivity exhibited to be a determining vulnerability. SCO and ASCO could be more vulnerable compared to that of EO (Cianfrani et al. 2018; Jamwal et al. 2021) (Appendix I).

For EO, range loss and habitat fragmentation are expected in the eastern Himalayas, however, suitable area is expected to remain stable in Nepal. Annual mean temperature was found to be the most influencing factor for its distribution. Because of its wide distribution range, opportunistic diet specialization, habitat generalist species and its current conservation status as NT, the species is categorized as the species of “Low concern”. On the other hand, only a slight decrease in suitable habitats is expected for SCO. Annual mean temperature was found to be the most influencing factor for its distribution. Climatic niche and relevant marginality for the species contribute to the higher degree of vulnerability. In addition, medium sized range, current conservation status as VU and prevailing threats for its survival signifies the species of “high concern” globally. In the case of ASCO, widespread suitable habitat loss (up to 40%) has been projected including its western range with Nepal. Mean diurnal temperature range is the most contributing factor for its distribution. Small and isolated population, relative marginality, current conservation status as VU, widespread habitat fragmentation within medium size range, feeding specialization, several pertaining threats, make it susceptible for higher vulnerability and also globally signifies as the species of “high concern” (Duplaix and Savage 2018).

In the local and site-specific context, although climate induced natural hazards such as flood, landslide and erosion are less significant altering the otter habitats, unprecedented weather conditions can result drying up of wetlands and river stretches causing their habitat degradation and loss (Appendix I). An intensive evaluation of climate change impacts on otters has been necessary in several regions globally including South Asia. Conservation efforts should be tailored against the specific regional impacts focusing on mitigating the habitat loss and ensuring connectivity between suitable areas as the climate becomes unprecedented. In the lack of information for several vulnerability characteristics for the Himalayan range including Nepal, Climate Change Vulnerability Assessment (CCVA) for otters should be prioritized and climate refugia for otters should be identified. Wider and deeper sections of rivers tend to experience lower levels of exploitation by local communities, as such conditions are less suitable for traditional fishing methods such as fish traps, temporary damming, and drainage practices (*Duwali* in Nepali) (Houghton, 1987; Tiler et al., 1989). The sustained flow of water and relatively stable fish availability in these broad, deep stretches—along with climate-resilient lakes, reservoirs, and ponds during the dry season—enable them to function as important climate refugia for aquatic species.

4.2 Opportunities

The formulation of the otter conservation action plan brings several opportunities to review and address research and conservation gaps including policy gaps and fostering actions.

Since there are more than 6000 rivers and rivulets in Nepal, otter specific studies have covered some rivers. Monitoring of the otters has been conducted in different intervals or in a long gap in few rivers such as Babai, Karnali and Narayani. Therefore, there are ample research areas remained for the otter species. Furthermore,

ASCO distribution range has yet to be known. Several aspects of research such as diet, ecology including vegetation, water level, water flow, water physical and chemical parameters, fish stock availability, impact of infrastructures, unsustainable river aggregates extraction, change in water level and flow due to hydropower dams and plants, irrigation dams and canals, trans-boundary dams and bridges, flood and landslide, pollution and climate changes should be focused on coming days. Moreover, there are ample opportunities for the research on otters, therefore, promoting the evidence-based conservation.

The threats prevailing to otter's survival and its sustainable conservation in Nepal is multifaceted. On the other hand, there is lack of coordination amongst the government agencies and key stakeholders for the effective implementation, monitoring and enforcement of several laws and policies for the otters and their habitat conservation. Hence, Departments (DNPWC, DFSC, DoR, DoA, DoED, etc. municipalities and rural municipalities, Provincial Government and district Line offices such as Division Forest Offices, protected areas, communication medias, private and public investors, infrastructure contractors, community forest users' groups (CFUGs), river dependent and other local communities etc. will be involved in the implementation of this action plan. Hence, regular coordination and collaboration between all concerned stakeholders should be prioritized and mechanisms should be set accordingly. In the current action plan about 50% of the activities are prioritized based upon local communities' information and suggestion. Another 50% is included based upon the expert's recommendation.

Rivers from Nepal channels through India to reach the Bay of Bengal. Infrastructure development has been burgeoning in the river corridors in both countries. Rivers are heavily exploited for the construction and freshwater ecosystem has largely depleted everywhere. Migratory species including fishes, Dolphins and otters has been affected as their migration has been impeded by the larger dams in the international borders and within the countries. Not only the multi stakeholders' collaboration and coordination is necessary, cooperation between transboundary concerned agencies are also equally important.



Photo 7: A family of smooth-coated otters at Bardia National Park (Photo: Saroj Khadka)



Photo 8: A smooth-coated otter escaping the disturbance due to presence of visitors in Khauraha River, BNP (Photo: Sanjan Thapa)

5

Otter Conservation Action Plan (2026-2035)

5.1 Goal

Sustain otter populations ensuring healthy river systems and perennial water bodies providing safe habitats in Nepal.

5.2 Objectives

1. Safeguard, restore, and manage critical otter habitats to sustain thriving populations
2. Enhance knowledge on otter distribution, ecology, critical habitats and threats
3. Foster strong community awareness through participation and develop stewardship
4. Strengthen stakeholder's collaboration and cooperation

Objective 1. Safeguard, restore, and manage critical otter habitats to sustain thriving populations

Distribution of otter are scattered across Nepal. Mapping the hotspots and critical habitat is important for the effective implementation of this action plan. Freshwater ecosystem is highly threatened ecosystem in Nepal because of several existing threats including intense anthropogenic pressures. Nepal is under development phase and overarching exploitation of river aggregates, wildlife unfriendly infrastructure development and operation, overfishing and destructive or illegal fishing degrade and destruct otter habitats. Otters are the indicator of healthy freshwater ecosystems. On the other hand, otter habitat is associated specifically with the livelihoods of the fisher and river dependent communities. Although, poaching and illegal trade of otters is unknown currently in Nepal except a few site-specific cases, however, it was one of the key threats in the past and given the fact that global otter illegal trade still exists in a larger extent, regular patrolling and monitoring of otters remains necessary. Therefore, protection and restoration of otter's key and degraded habitats becomes an important strategy to sustain thriving populations.

Nepal is ranked one of the most vulnerable countries to the global climate change. The glaciers are rapidly melting which alters the river flow specifically during the dry seasons and more importantly glacial lake outburst floods (GLOFs) destructing the otter habitat and fish breeding sites. On the other hand, unprecedented weather conditions such as erratic rainfall causes erosion, landslides and floods destructing and degrading the aquatic ecosystems including otter habitat and fish breeding sites (Jamwal et al. 2022). Wetlands succession and drying up further due to prolonged dry seasons is also one of the major challenges in otter habitat protection. Therefore, identifying climate refugia and implementing pre-emptive measures such as climate resilient wetlands restoration and infrastructure development have become more necessary than ever.

Output and actions:

Output	Action
Otter habitat mapped, protected, restored and improved	Identify and map otter hotspots and critical habitats across Nepal
	Implement integrated watershed management in upstream to reduce the alteration in otter habitat in low lands
	Promote to construct wildlife friendly river bank embankments and dams in the key habitat of otter
	Retrofitting of existing of embankments and dams in important areas to make such infrastructure otter and other aquatic wildlife friendly
	Restore the riparian habitat through placing of logs, large rocks and boulders along the river banks, embankments and dams and plantation of native vegetation
	Develop sustainable river aggregates mining protocol and regulate unsustainable practices of extraction
	Conduct routine water quality monitoring and control point and non-point
	Reduce the inflow of pollutants from agricultural fields, industries, pollution disposal sites in key otter habitats
	Regulate unsustainable and illegal fishing in river and wetland, promote sustainable fishing practice by developing and regulating sustainable fishing guideline to enhance prey availability
	Declare and manage river stretches or wetlands critical for otter as fish sanctuary to enhance prey availability
	Integrate otter conservation in infrastructure development projects
	Regulate and monitor the state of compliances of Environmental Impacts Assessment and other environmental guidelines by development projects
	Maintain environmental flow, enforce mandatory offset measures and fish ladders in the river-based infrastructures
	Develop and implement site-specific conservation and management plans
	Facilitate and capacitate government bodies and conservation partners to secure external funds for improved habitat protection and management opportunities.
	Explore new community-led conservation in critical site outside PAs as OECMs engaging local governments and communities and indigenous people.
	Strategically institutionalize, capacitate and engage diverse stakeholders including river dependent communities, local youth, women and students in habitat management activities.

Climate refugia for the otters identified and restored	Identify, classify and map wetlands and RAMSAR sites for otter friendly management.
	Identify climate refugia for otters such as confluences, deep water pools and fish breeding sites
	Conduct long term study on climate induced impact on otter, their prey and habitat
	Prepare climate resilient river and wetland management strategy and action plan
	Initiate dialogues for climate-resilient infrastructure development in Otter habitats for well-being of nature and communities
	Restore and construct climate resilient and wildlife friendly ponds, lakes and wetlands
	Promote climate resilient fish, prawn, freshwater snails and mussels farming
Poaching and illegal trade of otters controlled	Organize capacity building workshop annually for law enforcement agencies including Nepal Police, CIB, park staffs, DFO staff and other stakeholders in facilitating effective law enforcement to reduce illegal activities in known otter habitat
	Strengthen, build capacity and mobilize community based anti-poaching units in all PAs and priority districts
	Conduct capacity building program for mobilization of BZUCs (Buffer Zone User Committees), CFUGs (Community Forest User Group) and Conservation Area Management Committees (CAMC) and other local stakeholders to control poaching and illegal trade at local level
	Strengthen the wildlife crime investigation process and enhance the evidence collection mechanism through capacity building and training
	Conduct regular patrolling and effective monitoring for otter and its habitat and illegal fishing involving Nepal Army, park staffs and CBAPUs

Objective 2. Enhance knowledge on otter distribution, critical habitats and threats

Enhancing knowledge on species support evidence-based conservation and also systematic planning and conservation implications. Thus far the studies have targeted occupancy and abundance deploying methods including indirect evidences, direct observation and camera traps. Also, habitat surveys, threats and local people's perception assessments and habitat suitability mapping has been achieved. One of the major conservation outcomes is sustaining the population, however, populations of otters are yet to be estimated. This action plan emphasizes periodic monitoring of otters in its hotspots. Specifically, it targets piloting genetic studies across large river systems. Since, otters are widely distributed across Nepal and the funding are limited, comprehensive information on ecology, population status, distribution, threats and habitat selection

and suitability should be gathered to prioritize the conservation needs and areas for the strategic implication of the action plan.

Output	Action
Comprehensive information on biology, population status, distribution, threats and habitat suitability of Otter assessed	Develop and publish the standard protocol for otter population, habitat monitoring and genetic study
	Develop baseline information on biology, population size and distribution of otters in Nepal
	Compile existing field survey data on otter to identify otter hotspots and map perennial rivers, lakes, and reservoirs that serve as critical habitats for otters
	Design and conduct scientific studies on population status, distribution, home range and habitat selection and behaviors of otters in potential and priority areas in all physio-geographic ranges
	Study on habitat dynamics of otter in response to natural and anthropogenic factors
	Conduct the periodic monitoring of smooth-coated otter and update the population in every 5 years
	Study on diversity, distribution and density of fish in otter hotspots
	Conduct nationwide and site-specific trend of poaching and illegal trade
	Conduct the study to assess the impact of infrastructure, mining and pollution on otter populations, prey base and habitats
	Model potential climate change impact on otter habitat and conduct climate change vulnerability assessment (CCVA) for otter species
	Conduct population and habitat viability assessment (PHVA) of otter species
	Assess local knowledge, traditions, attitude and perceptions on otter conservation
	Conduct capacity building to field staffs and citizen scientists on otter research and monitoring
	Pilot genetic study of otter species across its habitat to understand genetic diversity of the population

Objective 3. Foster strong community awareness through participation and develop stewardship

A large part of known otter habitats lies outside the protected areas. These habitats support several resources such as construction materials, drinking water, irrigation and electricity supplies etc. to the human population. More specifically, it is of utmost importance to fisher and river dependent communities as food (fish, insects, frogs etc.), minerals ore extraction (for eg. gold digging by Sohana communities). Effective community engagements are necessary for the result oriented and impactful interventions of the action plan.

Awareness on otter conservation needs, threats and local communities' role has been ongoing from early 2000s. Recently, an initiative for community stewardship has been initiated in lower Karnali river region. Conservation awareness and capacity building has to be continued, upscaled and replicated targeting different levels of government, agencies, policy makers and all stakeholders including local communities to change the perception and negative attitude. Livelihood enhancement and alternative and diversification of income generation such as fish farming, promoting indigenous hill stream fishes farming, incorporating otters into ecotourism package are targeted to motivate community stewardship for long term conservation of otters.

Output	Action
Knowledge and capacity of communities and stakeholders enhanced	Raise awareness on otter ecology, conservation status among stakeholders at the 3-tier of government including political and bureaucracy (local, provincial & federal levels), different managerial authorities (DFOs/Park staff), community (UGs, CFUGs, BZCF, CSs), Indigenous People and Local Communities (IPLC) depended on forests, forest product collectors, local fishers, transhumance practitioners, INGOs, NGOs, universities and other academic institutions, researchers, conservationists, media personnel, school students and eco clubs members
	Prepare documentary film to reach the wide audience emphasizing on the critical situation of species as an indicator of healthy freshwater ecosystem
	Develop awareness packages for policy makers, developers, local government and local communities on otter and its prey base conservation
	Design and conduct intensive outreach programs to school children, eco-clubs and river dependent communities
	Organize events to disseminate conservation messages and aware people via different means of audio visuals radios and televisions, documentaries through social media platforms

Objective 4. Strengthen national, regional, transboundary and international collaboration and cooperation

Nepal a signatory of CBD, CITES, Ramsar Convention and several other international treaties and is committed for the convention for the conservation of its biodiversity and environment. Several conservation plans,

policies, acts and management plans does not include specifically otters, but mention broadly aquatic species and their habitats. However, local policies for otter, prey and habitat has been initiated by some local governments and this needs to be expanded to other concerned areas. For the effective implementation of the action plan synergies and collaboration between federal, provincial and local governments, concerned agencies, conservation partners and key stakeholders including local communities is of utmost priority. For the aquatic biodiversity conservation, transboundary efforts are warranted because of embankments and dams in the large river systems in the downstream.

Conservation partners are vital in securing the funding to support in capacity building of different levels of government and key stakeholders as well as government initiatives in implementing the action plan. Academic institution and conservation partners can support in research and evidence-based conservation.

Transboundary cooperation strengthened	Organize regular transboundary conservation cooperation meetings with neighboring countries at local and national level
	Conduct joint monitoring of otter in Trans-border river system of Nepal on the issues of fish ladder use in dams during fish migration and breeding seasons
	Facilitate collaborative research and monitoring across international borders
	Organize national, transboundary and international learning-sharing exchange seminars and visits of national/local stakeholders including PAs, DFOs staff, local community leaders and citizen scientists
	Participate and contribute in international convention meetings, workshops, and training

Collective engagement of stakeholder established	Coordinate joint monitoring to regulate environmental safeguards and EIA compliances in irrigation canals, hydropower plants and road construction projects
	Coordination with concerned authority to construct fish ladder and operate regularly for fish migration and breeding as well as maintaining optimum volume of water level flow
	Encourage the concerned authorities for retrofitting of existing dams and embankment in critical areas for enhancing the migration of aquatic species
	Collaborate with local government for the sustainable sewage and solid wastes management, reducing chemical discharge and water pollutants inflow; and strict enforcement to implementation of such measures
	Coordinate with provincial and local government, district level line agencies to regulate the riverbed material collection from otter habitats
	Promote to incorporate the otter conservation in policy and program of provincial and local government
	Lobby with authorities of the local, provincial and federal governments to give adequate priority for conservation of otter and its prey species incorporating the policy, program, annual plan and ensure for budgetary provisions
	Enhance engagement with infrastructure planners and development agencies to promote wildlife-friendly infrastructures and integrate effective mitigation measures in the infrastructural planning process

The logical framework is presented in Appendix II, and the action plan with associated budget is provided in Appendix III.



Photo 9: A family of smooth-coated otters in BNP (Photo: Sagar Giri/WWF Nepal)

6

Implementation and Monitoring

6.1 Implementing Agency

This action plan will be implemented from June, 2026 to December, 2035. DNPWC will lead the overall implementation of the action plan in collaboration with key stakeholders in PAs. Provincial governments, Division Forest Offices (DFOs), local governments (Municipalities and RMs) and DFSC will take the lead in the overall implementation of the action plan outside the PAs in collaboration with district level line agencies, conservation partners and key stakeholders. Research and conservation actions will be conducted and supported by NTNC, Academic institutions (Tribhuvan University, Kathmandu University, Far-Western University, Mid-Western University etc.), WWF Nepal, ZSL Nepal, SMCRF and other I/NGOs in coordination with DNPWC and DFSC. BZMCs, BZUCs, CFUGs, CBAPUs and other CBOs and CSOs, security forces, government line agencies through integrated conservation approaches and also freelancers and individuals can contribute to the implementation of this action plan.

6.2 Financial Plan

Estimated budget for the implementation of this conservation action plan for the next 10 years is NPR 237,800,000 (USD 1,592,653) (Table 3). The funds will be managed through the Government's regular budget and in addition support from conservation partners such as NTNC, WWF Nepal, ZSL Nepal and other I/NGOs. International agencies such as Rufford Small Grants, IUCN SSC OSG, several zoos across the world etc. can financially support the project activities in implementing the action plan. Academic institutions (Tribhuvan University, Kathmandu University, Far-Western University, Mid-Western University etc.) can provide fellowships and students grants to support the studies and research as well as mentoring students.

Table 3: Summary of estimated budget

S.N.	Objective	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	Total (NPR in 000)
1	Safeguard, restore, and manage critical otter habitats to sustain thriving populations	10,300	8,300	10,100	6,500	8,300	8,800	5,800	7,800	5,800	8,800	80,500
2	Enhance knowledge on otter distribution, critical habitats and threats	6,000	2,600	2,600	2,400	2,900	3,600	2,400	2,400	2,600	3,900	31,400
3	Foster strong community awareness through participation and develop stewardship	8,800	8,800	11,900	11,200	11,200	11,200	11,200	11,200	11,200	11,200	107,900
4	Strengthen national, regional, transboundary and international collaboration and cooperation	1,700	2,200	2,200	1,700	1,700	2,200	2,200	1,700	2,200	2,200	20,000
Grand Total (NPR)												239,800

6.3 Monitoring and Evaluation

Monitoring will be conducted during the implementation phase by the respective implementing partners. Overall coordination and mid-term and final evaluation of the action plan will be conducted by DNPWC by involving key stakeholders in 2030 and 2035. The learnings from the mid-term evaluation will be incorporated into the plan and the plan will be updated accordingly.

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Appendix II: Logical Framework

Objective 1. Safeguard, restore, and manage critical otter habitats to sustain thriving populations

Output	Action	OVI	Verification	Assumption
Otter habitat mapped, protected, restored and improved	Identify and map otter hotspots and critical habitats across Nepal	# of priority conservation sites	project report	
	Implement integrated watershed management in upstream to reduce the alteration in otter habitat in low lands	Area of IWM, level of sedimentation	project report	vast area, limited funding, limited time
	Promote to construct wildlife friendly river bank embankments and dams in the key habitat of otter	# and length of infrastructure	project report	limited funding
	Retrofitting of existing of embankments and dams in important areas to make such infrastructure otter and other aquatic wildlife friendly	# and length of infrastructure	project report	limited funding
	Restore the riparian habitat through placing of logs, large rocks and boulders along the river banks, embankments and dams and plantation of native vegetation	length or area of restored habitats	DNPWC and PAs report, project report	unprioritized outside PAs
	Develop sustainable river aggregates mining protocol and regulate unsustainable practices of extraction	# of protocol and incidents and cases reported	local government report, monitoring report, project report	less interest amongst contractors and local government
	Conduct routine water quality monitoring and control point and non-point	# of monitoring and routine tests	monitoring report	
	Reduce the inflow of pollutants from agricultural fields, industries, pollution disposal sites in key otter habitats	quantity and characteristics of agricultural fields	monitoring report	vast area, limited funding, limited time

Otter habitat mapped, protected, restored and improved	Regulate unsustainable and illegal fishing in river and wetland, promote sustainable fishing practice by developing and regulating sustainable fishing guideline to enhance prey availability	# guidelines executed and incidents and cases reported	monitoring report	vast area, limited funding, limited time
	Declare and manage river stretches or wetlands critical for otter as fish sanctuary to enhance prey availability	# and area of fish sanctuary	local government report, project report	limited funding
	Integrate otter conservation in infrastructure development projects	# of project integrated otter conservation	reports from departments, project report, EIA report	vast area, limited funding, limited time
	Regulate and monitor the state of compliances of Environmental Impacts Assessments and other environmental guidelines by development projects	# monitoring events	EIA report	vast area, limited funding, limited time
	Maintain environmental flow, enforce mandatory offset measures and fish ladders in the river-based infrastructures	# monitoring events	Monitoring report	vast area, limited funding, limited time
	Develop and implement site-specific conservation and management plans	# plans	DNPWC, PA and DFO reports	
	Facilitate and capacitate government bodies and conservation partners to secure external funds for improved habitat protection and management opportunities	# workshops, meetings	DNPWC, PA and DFO and project reports	limited opportunities
	Explore new community-led conservation in critical site outside PAs as OECMs engaging local governments and communities and indigenous people	# OECMs	DFO and project reports	
	Strategically institutionalize, capacitate and engage diverse stakeholders including river dependent communities, local youth, women and students in habitat management activities	# participation	participation records, project report	large extent, limited funding

Climate refugia for the otters identified and restored	Identify, classify and map wetlands and RAMSAR sites for otter friendly management.	# sites and area of management	DNPWC, DFO and project report	
	Identify climate refugia for otters such as confluences, deep water pools and fish breeding sites	# of climate refugia	DNPWC, DFO and project report	
	Conduct long term study on climate induced impact on otter, their prey and habitat	# study, impacts	project report	
	Prepare climate resilient river and wetland management strategy and action plan	# strategy or action plan prepared	Departmental reports	expensive
	Initiate dialogues for climate-resilient infrastructure development in Otter habitats for well-being of nature and communities	# meetings, workshops	activity or project report	
	Restore and construct climate resilient and wildlife friendly ponds, lakes and wetlands	# restored sites	DNPWC, PAs, DFO, Project reports	
	Promote climate resilient fish, prawn, freshwater snails and mussels farming	# of farming supported	Departmental reports, project reports	vast area, limited funding
Poaching and illegal trade of otters reduced	Organize capacity building workshop annually for law enforcement agencies including Nepal Police, CIB, park staffs, DFO staff and other stakeholders in facilitating effective law enforcement to reduce illegal activities in known otter habitat	# workshops, # of incidences	Departmental reports, security agencies report, DNPWC, PAs and project reports	
	Strengthen, build capacity and mobilize community based anti-poaching units in all PAs and priority districts	# workshops, # monitoring events	PAs and DFOs reports	

Poaching and illegal trade of otters reduced	Conduct capacity building program for mobilization of BZUCs (Buffer Zone User Committees), CFUGs (Community Forest User Group) and Conservation Area Management Committees (CAMC) and other local stakeholders to control poaching and illegal trade at local level	# workshop	DNPWC and PAs, DFOs, security agency reports	
	Improve the wildlife crime investigation process and enhance the evidence collection mechanism through capacity building and training	# workshop, # incidence	DNPWC and PAs, DFOs, security agency reports	
	Conduct regular patrolling and effective monitoring for otter and its habitat and illegal fishing involving Nepal Army, park staffs and CBAPUs	# monitoring, # incidence	DNPWC and PAs report	regular patrolling including otters, prey and their habitat

Objective 2. Enhance knowledge on otter distribution, critical habitats and threats

Output	Action	OVI	Verification	Assumption
Comprehensive information on biology, population status, distribution, threats and habitat suitability of Otter assessed	Develop and publish the standard protocol for otter population, habitat monitoring and genetic study	# protocol	protocol, DNPWC, DFSC, project report	
	Develop baseline information on biology, population size and distribution of otters in Nepal	# study, status, population estimate, occupancy, abundance, distribution data	project report, university thesis	
	Compile existing field survey data on otter to identify otter hotspots and map perennial rivers, lakes, and reservoirs that serve as critical habitats for otters	# and area of otter hotspots and habitats	project report, university thesis	

Comprehensive information on biology, population status, distribution, threats and habitat suitability of Otter assessed	Design and conduct scientific studies on population status, distribution, home range and habitat selection and behaviors of otters in potential and priority areas in all physio-geographic ranges	# studies	project report, university thesis	
	Study on habitat dynamics of otter in response to natural and anthropogenic factors	habitat characteristics	project report, university thesis	
	Conduct the periodic monitoring of smooth-coated otter and update the population in every 5 years	population estimate, # monitoring event	DNPWC and PAs report	
	Study on diversity, distribution and density of fish in otter hotspots	# study	project report, university thesis	
	Conduct nationwide and site-specific study on trend of poaching and illegal trade	# trend of poaching and illegal trade, # study	Departmental reports, security agencies report, project report, university thesis	
	Conduct the study to assess the impact of infrastructure, mining and pollution on otter populations, prey base and habitats	# impacts	project report, university thesis	
	Model potential climate change impact on otter habitat and conduct climate change vulnerability assessment (CCVA) for otter species	# potential impact	CCVA assessment report	
	Conduct population and habitat viability assessment (PHVA) of otter species	viable and population estimate	PHVA assessment report	

Comprehensive information on biology, population status, distribution, threats and habitat suitability of Otter assessed	Assess local knowledge, traditions, attitude and perceptions on otter conservation	# study	project report, university thesis	
	Conduct capacity building to field staffs and citizen scientists on otter research and monitoring	# workshop, participant	project report	
	Pilot genetic study of otter species across its habitat to understand genetic diversity of the population	# study	project report, university thesis	
Long term research and knowledge shared	Collaborate and coordinate with experts within and outside country for learning and sharing otter conservation	# meetings, workshops, # publications	published journal articles	
	Capacity building to field staff and citizen scientists on otter research and monitoring	# workshop, participant	project report	
	Collaborate with national, international academic institutions/NGOs, donors and local communities in research and monitoring	# meetings, workshops, # publications	published journal articles	
	Encourage collaboration among academic institutions, independent researchers (both national and international) and conservation partners to advance otter research and conservation efforts	# meetings, workshops, # publications	project report, university thesis, published articles	
	Facilitate consultation among otter researchers, conservation partners, and academic institutions to prioritize key research areas across different physiographic ranges.	# consultation	consultation report	
	Form national level otter network under the leadership of DNPWC-DFSC to prioritize and identify key areas for otter research and conservation initiatives and conduct periodic workshops and seminars	# network, members	DNPWC and DFSC report	

Objective 3. Foster strong community awareness through participation and develop stewardship

Output	Action	OVI	Verification	Assumption
Knowledge and capacity of communities and stakeholders enhanced	Raise awareness on otter ecology, conservation status among stakeholders at the 3-tier of government including political and bureaucracy (local, provincial & federal levels), different managerial authorities (DFOs/Park staff), community (UGs, CFUGs, BZCF, CSs), indigenous People and local Communities (IPLC) depended on forests, forest product collectors, local fishermen, transhumance practitioners, INGOs, NGOs, universities and other academic institutions, researchers, conservationists, media personnel, school students and eco clubs members	# awareness campaign, # participants	DFO, local government, DNPWC, DFSC, PAs, project report, university thesis, published articles, media report	
	Prepare documentary film to reach the wide audience emphasizing on the critical situation of species as an indicator of healthy freshwater ecosystem	# documentary, # audience	project report, media report	
	Develop awareness packages for policy makers, developers, local government and local communities on otter and its prey base conservation	# awareness package, # audience	Departmental reports, project report, PAs report	
	Design and conduct intensive outreach programs to school children, eco-clubs and river dependent communities	# schools, schoolchildren, events	project report	
	Organize events to disseminate conservation messages and aware people via different means of audio visuals radios and televisions, documentaries through social media platforms	# events, # audience reached	project report	

Livelihood of local fishing/river dependent communities enhanced and overfishing reduced	Identify and manage the alternative livelihood options of fishing to river dependent communities and initiate to amend the provision of fishing on legal and policy instruments.	# households supported, #provisions amended	local government, departmental, DFOs, PAs, project and media reports	
	Provide skill development training and financial support as seed money to local river dependent community for their alternative livelihood	# training, amount of seed money, # HHs, income level	DFO, local government, DNPWC, DFSC, PAs, project report, university thesis, published articles, media report	
	Construct and manage fish ponds involving river dependent communities as well as pilot indigenous fish (snow trout) farming in hill streams	# fish ponds supported, indigenous hill stream fish farming	DFO, local government, DNPWC, DFSC, PAs, project report, university thesis, published articles, media report	
	Establish incentive mechanism and livelihood alternatives and diversification of income generating activities (IGAs) to fishing and river dependent communities	# and type of IGAs	DFO, local government, DNPWC, DFSC, PAs, project report, university thesis, published articles, media reports	

Ecotourism activities linked with Otter Species initiated	Survey potential site for ecotourism promotion and study on "willingness to pay" with national and international tourists	# ecotourism site, # study, amount of revenue	PAs, project and media reports	
	Construct and maintain the ecotourism infrastructure to promote otter species-based ecotourism	# infrastructures	PAs, project and media reports	
	Design and develop community-based ecotourism plans for key otter conservation sites and train river dependent communities and concerned stakeholders to implement the ecotourism plans	# plans, # training, # participant	PAs, project and media reports	
	Enhance the capacity building of local authority, local communities and stakeholders for otter ecotourism	# workshop, # participants	local government, departmental, DFOs, PAs, project and media reports	
	Coordinate with provincial and local government otter species-based ecotourism promotion in their respective areas	# coordination meetings	provincial and local governments, DFOs, PAs, project and media reports	

Objective 4. Strengthen National, Regional, Transboundary and International collaboration and cooperation

Output	Action	OVI	Verification	Assumption
Transboundary cooperation strengthened	Organize regular transboundary conservation cooperation meetings with neighboring countries at local and national level	# transboundary cooperation meeting	DNPWC, DFSC, DFO and project report	
	Conduct joint monitoring of otter in trans-border river system of Nepal on the issues of fish ladder use in dams during fish migration and breeding seasons	# joint monitoring, incidences of fish ladder use	DNPWC, DFSC, DFO and project report	

Transboundary cooperation strengthened	Facilitate collaborative research and monitoring across international borders	# collaborative study and monitoring	DNPWC, DFSC, DFO and project report	
	Organize national, transboundary and international learning-sharing exchange seminars and visits of national/local stakeholders including PAs, DFOs staff, local community leaders and citizen scientists	# seminar, conference, # participants	conservation partners report, event report	
	Participate and contribute in international convention meetings, workshops, and training	# events, # participants	event report and proceedings	
Collective engagement of stakeholder established	Coordinate joint monitoring to regulate environmental safeguards and EIA compliances in irrigation canals, hydropower plants and road construction projects	# joint monitoring, incidences of EIA compliances	local government, departmental and project report	less interest by construction contractors and project operators
	Coordination with concerned authority to construct fish ladder and operate regularly for fish migration and breeding as well as maintaining optimum volume of water level flow	# meeting, incidence of fish ladder use, #volume of water flow	local government, departmental and project report	less interest by construction contractors and project operators
	Encourage the concerned authorities for retrofitting of existing dams and embankment in critical areas for enhancing the migration of aquatic species	# collaborative planning workshop, level of chemical discharge	local government, departmental and project report	large extent, limited funding
	Collaborate with local government for the sustainable sewage and solid wastes management, reducing chemical discharge and water pollutants inflow; and strict enforcement to implementation of such measures	# collaborative planning workshop, level of chemical discharge	local government, departmental and project report	large extent, limited funding

Collective engagement of stakeholder established	Coordinate with provincial and local government, district level line agencies to regulate the riverbed material collection from otter habitats	# coordination meetings, area and # sites of river bed materials collection	provincial and local governments, departmental, DFOs, PAs, project and media reports	time consuming, no interest by local and provincial government
	Promote to incorporate the otter conservation in policy and program of provincial and local government	# policy and programs	provincial and local governments, departmental, DFOs, PAs, project and media reports	large extent, limited funding
	Lobby with authorities of the local, provincial and federal governments to give adequate priority for conservation of otter and its prey species incorporating the policy, program, annual plan and ensure for budgetary provisions	# policy, programs, annual plan and budget amount	federal, provincial and local governments report and budget, departmental, DFOs, PAs, reports and budget	large extent, limited funding
	Enhance engagement with infrastructure planners and development agencies to promote wildlife-friendly infrastructures and integrate effective mitigation measures in the infrastructural planning process	# workshop, joint monitoring, # wildlife-friendly infrastructure and incidences	federal, provincial and local governments report and budget, departmental, DFOs, PAs, reports and budget	large extent, limited funding

Appendix III: Budget

Objective 1. Safeguard, restore, and manage critical otter habitats to sustain thriving populations

Action	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	Total (NPR in 000)
Identify and map otter hotspots and critical habitats across Nepal	100										100
Implement integrated watershed management in upstream to reduce the alteration in otter habitat in low lands	100	100	100	100	100	100	100	100	100	100	1,000
Promote to construct wildlife friendly river bank embankments and dams in the key habitat of otter	100	100	100	100	100	100	100	100	100	100	1,000
Retrofitting of existing of embankments and dams in important areas to make such infrastructure otter and other aquatic wildlife friendly	100	100	100	100	100	100	100	100	100	100	1,000
Restore the riparian habitat through placing of logs, large rocks and boulders along the river banks, embankments and dams and plantation of native vegetation	100	100	100	100	100	100	100	100	100	100	1,000
Develop sustainable river aggregates mining protocol and regulate unsustainable practices of extraction	400										400
Conduct routine water quality monitoring and control point and non-point	100	100	100	100	100	100	100	100	100	100	1,000
Reduce the inflow of pollutants from agricultural fields, industries, pollution disposal sites in key otter habitats	100	100	100	100	100	100	100	100	100	100	1,000
Regulate unsustainable and illegal fishing in river and wetland, promote sustainable fishing practice by developing and regulating sustainable fishing guideline to enhance prey availability	300										300

Declare and manage river stretches or wetlands critical for otter as fish sanctuary to enhance prey availability	100	100	100	100	100	100	100	100	100	100	1,000
Integrate otter conservation in infrastructure development projects	500	500	500	500	500						2,500
Regulate and monitor the state of compliances of Environmental Impacts Assessments and other environmental guidelines by development projects	100	100	100	100	100	100	100	100	100	100	1,000
Maintain environmental flow, enforce mandatory offset measures and fish ladders in the river-based infrastructures	100	100	100	100	100	100	100	100	100	100	1,000
Develop and implement site-specific conservation and management plans			500								500
Facilitate and capacitate government bodies and conservation partners to secure external funds for improved habitat protection and management opportunities		100	100	100	100	100	100	100	100	100	900
Explore new community-led conservation in critical site outside PAs as OECMs engaging local governments and communities and indigenous people		2,000			2,000			2,000			6,000
Strategically institutionalize, capacitate and engage diverse stakeholders including river dependent communities, local youth, women and students in habitat management activities	100	100	100	100	100	100	100	100	100	100	1,000
Identify, classify and map wetlands and RAMSAR sites for otter friendly management				200							200

Identify climate refugia for otters such as confluences, deep water pools and fish breeding sites	300										300
Conduct long term study on climate induced impact on otter, their prey and habitat	100	100	100	100	100	100	100	100	100	100	1,000
Prepare climate resilient river and wetland management strategy and action plan			300								300
Initiate dialogues for climate-resilient infrastructure development in Otter habitats for well-being of nature and communities	100	100	100	100	100	100	100	100	100	100	1,000
Restore and construct climate resilient and wildlife friendly ponds, lakes and wetlands	3,000		3,000			3,000				3,000	12,000
Promote climate resilient fish, prawn, freshwater snails and mussels farming	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	20,000
Organize capacity building workshop annually for law enforcement agencies including Nepal Police, CIB, park staff, DFO staff and other stakeholders in facilitating effective law enforcement to reduce illegal activities in known otter habitat	500	500	500	500	500	500	500	500	500	500	5,000
Strengthen, build capacity and mobilize community based anti-poaching units in all PAs and priority districts	500	500	500	500	500	500	500	500	500	500	5,000

Conduct capacity building program for mobilization of BZUCs (Buffer Zone User Committees), CFUGs (Community Forest User Group) and Conservation Area Management Committees (CAMC) and other local stakeholders to control poaching and illegal trade at local level	500	500	500	500	500	500	500	500	500	500	5,000
Improve the wildlife crime investigation process and enhance the evidence collection mechanism through capacity building and training	500	500	500	500	500	500	500	500	500	500	5,000
Conduct regular patrolling and effective monitoring for otter and its habitat and illegal fishing involving Nepal Army, park staffs and CBAPUs	500	500	500	500	500	500	500	500	500	500	5,000
Sub-Total (NPR)	10,300	8,300	10,100	6,500	8,300	8,800	5,800	7,800	5,800	8,800	80,500

Objective 2. Enhance knowledge on otter distribution, critical habitats and threats

Action	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	Total (NPR)
Develop and publish the standard protocol for otter population, habitat monitoring and genetic study		200									200
Develop robust and baseline information on biology, population size and distribution of otters in Nepal	500										500
Compile existing field survey data on otter to identify otter hotspots and map perennial rivers, lakes, and reservoirs that serve as critical habitats for otters	100										100
Design and conduct scientific studies on population status, distribution, home range and habitat selection and behaviors of otters in potential and priority areas in all physiogeographic ranges	100	100	100	100	100	100	100	100	100	100	1,000

Study on habitat dynamics of otter in response to natural and anthropogenic factors	100	100	100	100	100	100	100	100	100	100	1,000
Conduct the periodic monitoring of smooth-coated otter and update the population in every 5 years	1,000					1,000					2,000
Study on diversity, distribution and density of fish in otter hotspots	100	100	100	100	100	100	100	100	100	100	1,000
Conduct nationwide and site-specific study on trend of poaching and illegal trade	500	500	500	500	500	500	500	500	500	500	5,000
Conduct the study to assess the impact of infrastructure, mining and pollution on otter populations, prey base and habitats	500	500	500	500	500	500	500	500	500	500	5,000
Model potential climate change impact on otter habitat and conduct climate change vulnerability assessment (CCVA) for otter species	1,000									1,000	2,000
Conduct population and habitat viability assessment (PHVA) of otter species	1,000										1,000
Assess local knowledge, traditions, attitude and perceptions on otter conservation	100	100	100	100	100	100	100	100	100	100	1,000
Conduct capacity building to field staffs and citizen scientists on otter research and monitoring	500	500	500	500	500	500	500	500	500	500	5,000
Pilot genetic study of otter species across its habitat to understand genetic diversity of the population					500					500	1,000
Collaborate and coordinate with experts within and outside country for learning and sharing otter conservation	100	100	100	100	100	100	100	100	100	100	1,000
Capacity building to field staff and citizen scientists on otter research and monitoring	100	100	100	100	100	100	100	100	100	100	1,000

Collaborate with national, international academic institutions/NGOs, donors and local communities in research and monitoring	100	100	100	100	100	100	100	100	100	100	1,000
Encourage collaboration among academic institutions, independent researchers (both national and international) and conservation partners to advance otter research and conservation efforts	100	100	100	100	100	100	100	100	100	100	1,000
Facilitate consultation among otter researchers, conservation partners, and academic institutions to prioritize key research areas across different physiographic ranges.	100	100	100	100	100	100	100	100	100	100	1,000
Form national level otter network under the leadership of DNPWC-DFSC to prioritize and identify key areas for otter research and conservation initiatives and conduct periodic workshops and seminars			200			200			200		600
Sub-Total (NPR)	6,000	2,600	2,600	2,400	2,900	3,600	2,400	2,400	2,600	3,900	31,400

Objective 3. Foster strong community awareness through participation and develop stewardship

Action	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	Total (NPR)
Raise awareness on otter ecology, conservation status among stakeholders at the 3-tier of government including political and bureaucracy (local, provincial & federal levels), different managerial authorities (DFOs/ Park staff), community (UGs, CFUGs, BZCF, CSs), indigenous People and local Communities (IPLC) depended on forests, forest product collectors, local fishermen, transhumance practitioners, INGOs, NGOs, universities and other academic institutions, researchers, conservationists, media personnel, school students and eco clubs members	500	500	500	500	500	500	500	500	500	500	5,000
Prepare documentary film to reach the wide audience emphasizing on the critical situation of species as an indicator of healthy freshwater ecosystem			300								300
Develop awareness packages for policy makers, developers, local government and local communities on otter and its prey base conservation	100	100	100	100	100	100	100	100	100	100	1,000
Design and conduct intensive outreach programs to school children, eco-clubs and river dependent communities	100	100	100	100	100	100	100	100	100	100	1,000
Organize events to disseminate conservation messages and aware people via different means of audio visuals radios and televisions, documentaries through social media platforms	100	100	100	100	100	100	100	100	100	100	1,000

Identify and manage the alternative livelihood options of fishing to river dependent communities and initiate to amend the provision of fishing on legal and policy instruments.	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	20,000
Provide skill development training and financial support as seed money to local river dependent community for their alternative livelihood	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	20,000
Construct and manage fish ponds involving river dependent communities as well as pilot indigenous fish (snow trout) farming in hill streams	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	20,000
Establish incentive mechanism and livelihood alternatives and diversification of income generating activities (IGAs) to fishing and river dependent communities	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	20,000
Survey potential site for ecotourism promotion and study on "willingness to pay" with national and international tourists			2,000								2,000
Construct and maintain the ecotourism infrastructure to promote otter species-based ecotourism			2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	16,000
Design and develop community-based ecotourism plans for key otter conservation sites and train river dependent communities and concerned stakeholders to implement the ecotourism plans			200								200
Enhance the capacity building of local authority, local communities and stakeholders for otter ecotourism			200	200	200	200	200	200	200	200	1,600
Coordinate with provincial and local government otter species-based ecotourism promotion in their respective areas			200	200	200	200	200	200	200	200	1,600
Sub-Total (NPR)	8,800	8,800	11,900	11,200	11,200	11,200	11,200	11,200	11,200	11,200	107,900

Objective 4. Strengthen national, regional, transboundary and international collaboration and cooperation

Action	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	Total (NPR)
Organize regular transboundary conservation cooperation meetings with neighboring countries at local and national level	200	200	200	200	200	200	200	200	200	200	2,000
Conduct joint monitoring of otter in trans-border river system of Nepal on the issues of fish ladder use in dams during fish migration and breeding seasons	200	200	200	200	200	200	200	200	200	200	2,000
Facilitate collaborative research and monitoring across international borders	200	200	200	200	200	200	200	200	200	200	2,000
Organize national, transboundary and international learning-sharing exchange seminars and visits of national/local stakeholders including PAs, DFOs staff, local community leaders and citizen scientists	100	100	100	100	100	100	100	100	100	100	1,000
Participate and contribute in international convention meetings, workshops, and training	100	100	100	100	100	100	100	100	100	100	1,000
Coordinate joint monitoring to regulate environmental safeguards and EIA compliances in irrigation canals, hydropower plants and road construction projects	200	200	200	200	200	200	200	200	200	200	2,000
Coordination with concerned authority to construct fish ladder and operate regularly for fish migration and breeding as well as maintaining optimum volume of water level flow	100	100	100	100	100	100	100	100	100	100	1,000
Encourage the concerned authorities for retrofitting of existing dams and embankment in critical areas for enhancing the migration of aquatic species	100	100	100	100	100	100	100	100	100	100	1,000

Collaborate with local government for the sustainable sewage and solid wastes management, reducing chemical discharge and water pollutants inflow; and strict enforcement to implementation of such measures	100	100	100	100	100	100	100	100	100	100	1,000
Coordinate with provincial and local government, district level line agencies to regulate the riverbed material collection from otter habitats	200	200	200	200	200	200	200	200	200	200	2,000
Promote to incorporate the otter conservation in policy and program of provincial and local government	100	100	100	100	100	100	100	100	100	100	1,000
Lobby with authorities of the local, provincial and federal governments to give adequate priority for conservation of otter and its prey species incorporating the policy, program, annual plan and ensure for budgetary provisions	100	100	100	100	100	100	100	100	100	100	1,000
Enhance engagement with infrastructure planners and development agencies to promote wildlife-friendly infrastructures and integrate effective mitigation measures in the infrastructural planning process		500	500			500	500		500	500	3,000
Sub-Total (NPR)	1,700	2,200	2,200	1,700	1,700	2,200	2,200	1,700	2,200	2,200	20,000

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