

Lutrogale perspicillata - (I. Geoffroy Saint-Hilaire, 1826)

ANIMALIA - CHORDATA - MAMMALIA - CARNIVORA - MUSTELIDAE - *Lutrogale perspicillata*

Common Names: Smooth-coated Otter (English), Indian Smooth-coated Otter (English), Loutre d'Asie (French), Nutria Lisa (Spanish; Castilian), Nutria Simung (Spanish; Castilian)

Synonyms: *Lutra perspicillata* I. Geoffroy Saint-Hilaire, 1826

Taxonomic Note:

The species was named as *Lutra perspicillata* by Geoffroy 1826 and as *Lutrogale perspicillata* by Gray 1865. Two subspecies were reported (Pocock 1941) (1) *L. p. perspicillata* - in northeast and southern India, Myanmar and Sumatra; and (2) *L. p. sindica* - in north and northwestern India and Pakistan. Another subspecies *L. p. maxwelli*, whose current status is uncertain, is reported from the marshes of southern Iraq (Mason and Macdonald 1986).

Red List Status

VU - Vulnerable, A2cde+3cde (IUCN version 3.1)

Red List Assessment

Assessment Information

Date of Assessment: 21/01/2020

Reviewed: 26/02/2020

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Assessment Rationale

Smooth-coated Otter is essentially an otter of lowlands and floodplains. The most severe threat to the species is habitat degradation and loss due to increasing anthropogenic pressure on wetlands and waterways. Much of the species' natural habitats have been lost to development activities, including the construction of large-scale hydroelectric projects, reclamation for settlements and agriculture. In addition, aquatic ecosystems are increasingly being polluted by eutrophication and accumulation of persistent pesticides such as chlorinated hydrocarbons and organophosphates through agricultural runoffs. This poses a threat not only to the otter populations living in the habitats, but also negatively impacts the aquatic prey biomass that the otters rely on (Melisch *et al.* 1996). The aquatic prey biomass for otters have been depleted by humans. This is due to the increase in human population over the last century and the lack of effective rural development programmes in policies in order to be able to address the problems of poverty, thereby forcing people to be growingly dependent on natural resources (Badola 1997). In the entire south and southeast Asia there is severe conflict between otters and humans, because of poverty and the recent increases in aquaculture activities leading to indiscriminate killing of otters, either through direct persecution or indirectly through accidental trapping and drowning in fishing gear. In south and southeast Asian countries, prevalent poaching pressure is affecting its survival. Given the extent of habitat loss and degradation that is occurring in south and southeast Asia, coupled with the intensity of poaching, a reduction in otter population size has been observed in many parts of its range (Hussain 1993, Melisch *et al.* 1996, Hussain 2002, Nawab and Hussain 2012). It is believed that the population has been wiped out from most parts of its range in Iraq due to intensive poaching pressure (Al-Sheikhly 2012). During 1991-2003 wide areas of reed beds and lakes of southern Iraq marshes were reclaimed affecting otter population, though recent surveys have confirmed their persistence from southern as well as northern Iraq (Al-Sheikhly and Nader 2013). The increasing illegal wildlife trade of Smooth-coated Otter for their pelts, as pets, or for traditional medicine poses a direct threat to the species. The effect of climate change will also negatively impact the availability of aquatic habitats that Smooth-coated Otter depend on by reducing water levels in long-term droughts and affecting prey densities, and also by the destruction of reproductive sites caused by tumultuous flooding events. In view of these, it is concluded that although the quantitative data on population sizes and trends are lacking, it is suspected that the global population of the Smooth-coated Otter has declined by more than 30% over the past 30 years (or three generations, based on Pacifici *et al.* 2013) (criteria A2) owing to an inferred decline on area of occupancy (AOO), extent of occurrence (EOO), and/or habitat quality (subcriteria c, d, e), which qualifies the species to be categorised as Vulnerable under the criteria A2cde. Further aggravation of these threats, due to lack or failure of adequate conservation measures, may lead to a suspected future decline in population by at least 30% over the next 30 years, further supporting the categorisation as Vulnerable under criteria A2cde+3cde.

Reasons for Change

Reason(s) for Change in Red List Category from the Previous Assessment: No change.

Distribution

Geographic Range

The Smooth-coated Otter is distributed throughout south Asia and southeast Asia. Its distribution is continuous from Indonesia, through southeast Asia, and westwards from southern China to India and Pakistan, with an isolated subpopulation in Iraq (Pocock 1941, Medway 1969, Hussain 1993). Though its current status in the Middle East is not known, its presence has been confirmed from Pakistan, India, Nepal, Bhutan, Bangladesh, southwest China, Myanmar, Thailand, Singapore, Viet Nam, Malaysia (Peninsular Malaysia, Sabah and Sarawak), and Indonesia (Kalimantan, Sumatra, Java) and Brunei (Mason and Macdonald 1986, Corbet and Hill 1992, Wozencraft 1993). Historically, the Smooth-coated Otter occurred in the Pearl River Delta of Guangdong Province and the international borders of the Red River and the Irrawaddy in Yunnan Province. The presence records from Guangdong Province suggest a disjunct distribution in the species' continental range at the easternmost limit. However, due to an upsurge in the pelt trade during the 1900s, otters have faced a massive decline in the country. There are no recent records of the Smooth-coated Otter from China (Li and Chan 2017).

Area of Occupancy (AOO)

Estimated area of occupancy (AOO) - in km²: NA

Continuing decline in area of occupancy (AOO): NA

Extreme fluctuations in area of occupancy (AOO): NA

Extent of Occurrence (EOO)

Estimated extent of occurrence (EOO) - in km²: NA

Continuing decline in extent of occurrence (EOO): NA

Extreme fluctuations in extent of occurrence (EOO): NA

Locations Information

Number of Locations: NA

Continuing decline in number of locations: NA

Extreme fluctuations in the number of locations: NA

Very restricted AOO or number of locations (triggers VU D2)

Very restricted in area of occupancy (AOO) and/or # of locations: NA

Elevation / Depth / Depth Zones

Elevation Lower Limit (in metres above sea level): 0

Elevation Upper Limit (in metres above sea level): 700

Depth Lower Limit (in metres below sea level): 5

Depth Upper Limit (in metres below sea level): 0

Depth Zone: Shallow photic (0-50m)

Map Status

Map Status	How the map was created, including data sources/methods used:	Please state reason for map not available:	Data Sensitive ?	Justification	Geographic range this applies to:	Date restriction imposed:
Done	-	-	-	-	-	-

Biogeographic Realms

Biogeographic Realm: Indomalayan, Palearctic

Occurrence

Countries of Occurrence

Country	Presence	Origin	Formerly Bred	Seasonality
Bangladesh	Extant	Native	-	-
Bhutan	Extant	Native	-	-
Brunei Darussalam	Extant	Native	-	-
Cambodia	Extant	Native	-	-
China	No recent records	Native	-	-
India	Extant	Native	-	-
Indonesia	Extant	Native	-	-
Iraq	Extant	Native	-	-
Lao People's Democratic Republic	Extant	Native	-	-
Malaysia	Extant	Native	-	-
Myanmar	Extant	Native	-	-
Nepal	Extant	Native	-	-
Pakistan	Extant	Native	-	-
Singapore	Extant	Native	-	-
Thailand	Extant	Native	-	-
Viet Nam	No recent records	Native	-	-

Population

Because of the secretive and nocturnal behaviour of Smooth-coated Otter, reliable estimates of its population are not available. In southeast Asia it is found in large groups (Foster-Turley 1992, Hussain 1993, Hussain 1996) 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 and McNeely 1988, Hussain 1996). The group size varies considerably between months and seasons, the group being largest during the monsoon period (Hussain 1996). Along the Chambal River in central India the group size ranges from 1-9 individuals (mean=4.62). During a study conducted in the Corbett Tiger Reserve, in north India an estimate of 41 individuals (35 adults and 6 juveniles) with a mean of 5.1 ± 1.55 was recorded from the 85 km of river stretch within the Reserve (Nawab and Hussain 2007). In Singapore, Khoo & Sivasothi (2018) recorded approximately 79 individuals from 11 groups, with group sizes ranging from 2-14 individuals (mean=7.2).

Population Information

Current Population Trend: Decreasing

Number of mature individuals (=population size): NA

Extreme fluctuations? (in # of mature individuals): NA

Severely fragmented? NA

Continuing decline in mature individuals? NA

Continuing decline % in mature individuals within 1 generation or 3 years, whichever is longer (up to max. of 100 years in the future): NA

Continuing decline % in mature individuals within 2 generations or 5 years, whichever is longer (up to max. of 100 years in the future): NA

Continuing decline % in mature individuals within 3 generations or 10 years, whichever is longer (up to max. of 100 years in the future): NA

Extreme fluctuations in the number of subpopulations: NA

Continuing decline in number of subpopulations: NA

All individuals in one subpopulation: False

Number of mature individuals in largest subpopulation: NA

Number of Subpopulations: NA

Population Reduction - Past

Percent Change in past	Reduction or Increase	Qualifier	Justification
30%	Reduction	Inferred	-

Basis?

c) a decline in area of occupancy, extent of occurrence and/or quality of habitat, d) actual or potential levels of exploitation, e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites)

Reversible?

No

Understood?

Yes

Ceased?

No

Population Reduction - Future

Percent Change in future: NA

Future Population Reduction Basis: NA

Population Reduction - Ongoing

Both: Percent Change over any 10 year or 3 generation period, whichever is longer, and must include both past and future, future can't go beyond 100 years: NA

Both Population Reduction Basis: NA

Causes of both (past and future) reduction reversible? No

Causes of both (past and future) reduction understood? Yes

Causes of both (past and future) reduction ceased? No

Quantitative Analysis

Probability of extinction in the wild within 3 generations or 10 years, whichever is longer, maximum 100 years: NA

Probability of extinction in the wild within 5 generations or 20 years, whichever is longer, maximum 100 years: NA

Habitats and Ecology

The Smooth-coated Otter is essentially a plains' otter. In the Indian subcontinent they are adapted to live even in the semiarid region of northwestern India and Deccan plateau (Prater 1971). Generally, the species uses large rivers and lakes, peat swamp forests, mangroves and estuaries, and also rice fields for foraging (Foster-Turley 1992). In southeast Asia, rice fields appear to be one of the most suitable habitats in supporting its viable populations (Melisch *et al.* 1996). However, they were more abundant in the mangroves of Kuala Gula, Malaysia as compared to the rain forest rivers (Shariff 1984). In certain areas, such as Singapore, the species uses highly disturbed urban sites, with some populations showing a remarkable resilience in the presence of human activity (Theng and Sivasothi 2016, Khoo and Sivasothi 2018).

Along the large rivers in India, the Smooth-coated Otters prefer rocky stretches since these stretches provide sites for den and resting. River stretches with bank side vegetation and marshes are used in proportion to their availability especially in summer as they provide ample cover while travelling or foraging. Open clayey and sandy banks are largely avoided as they lack escape covers (Hussain 1993; Hussain and Choudhury 1995, 1997). In the Tarai areas of the upper Gangetic plains the Smooth-coated Otters use seasonally flooded swamps during monsoon (July-September) and in early winter (October-February). Winter being the breeding season, the swamps are extensively used as natal den sites and nursery. By February-March the swamps begin to dry and the fish biomass appears to be depleted, consequently the otters move to the perennial rivers (Hussain and Choudhury 1997). In west Java, the Smooth-coated Otters prefer mangroves and tidal stretches of the rivers and rice fields. Freshwater swamps and coastal stretches lacking vegetation are avoided (Melisch *et al.* 1996). In rice fields and pond areas they prefer sites having moderate diversity of vegetation. Rivers with moderate to slow or stagnant water and water bodies having a width of 10-40 m are preferred. In Huai Kha Khaeng, Thailand, the Smooth-coated Otters extensively use the slowly meandering river near the dam and the dam itself (Kruuk *et al.* 1994). In urban Singapore, in addition to natural sites, otters use human-made, concretized structures such as reservoirs and canals, and have adapted to use concrete and grass for grooming. Latrines, resting sites, and dens are present in areas with high human accessibility such as small gaps and crevices under bridges, and under metal beams and roads. They have been observed using stairs and ladders to access dry land in concrete canals with steep sloping walls (Khoo and Sivasothi 2018).

The Smooth-coated Otter is predominantly a fish eater, but supplements its diet with shrimp/crayfish, crab and insects, and other vertebrates such as frog, mudskippers, birds and rats (Prater 1971, Foster-Turley 1992, Hussain and Choudhury 1998). In general, its diet is similar to that of Eurasian Otter. The range of fish in the diet varies from 75% to 100% (Tiler *et al.* 1989, Foster-Turley 1992, Hussain 1993, Melisch *et al.* 1996, Hussain and Choudhury 1998). The Smooth-coated Otters exhibit the typical opportunistic feeding behaviour similar to the Eurasian Otter. Along the major rivers in India they eat more fish, often making up to 94% of the total diet (Hussain and Choudhury 1998), while along the coast in mangrove habitats and in rice fields it ranges between 75-100% (Foster-Turley 1992, Melisch *et al.* 1996). In west Java otters inhabiting mangrove areas eat more of crustaceans, around 22% of the diets contain remains of crab and shrimp whereas in the paddy fields in Malaysia, along with fish they tend to eat more rice field rats *Rattus argentiventer*, represented in 23% of the spraints (Foster-Turley 1992). In Singapore, along the mangrove habitats, prawn consisted 35% of their diets (Theng *et al.* 2016).

Hussain (1993) identified 12 fish species from the spraint of Smooth-coated Otter from the Chambal River, of which seven species were eaten throughout the year. *Rhinomugil corsula* (Mugilidae) and *Rita rita* (Bagaridae) were the preferred species. At least eight species of fish were identified from the spraints from Malaysia (Foster-Turley 1992). Some of these include Gourami (*Trichogaster* spp.), Climbing Perch (*Anabis testudineus*), catfish (*Clarius* spp.), snakehead (*Channa* spp.) and mudskipper (*Gobioidei*). In the rice fields they ate large amount of most common fish (*Trichogaster* and *Anabis* spp.). The size of the fish consumed varied from 5-46 cm, often ranging between 15-30 cm (Wayre 1978). No significant relationship was found between the calorific values of the fish and the quantities consumed. Thus, the prey selection by Smooth-coated Otter is mainly influenced by its availability (Hussain 1993). In Singapore, at least 12 fish species from 11 families were identified from spraints, with the highest occurrence of fish from the Cichlidae family (Theng & Sivasothi, 2016).

The Smooth-coated Otter attains sexual maturity at twenty-two months in captivity (Desai 1974). Yadav (1967) observed first litter at four years of age. In captivity they mate during August to October in water followed by prolonged playful bouts between partners (Desai, 1974, Naidu and Malhotra 1989). Copulation takes place several times daily. Males are polygamous mating with up to four females (Desai 1974). In the wild in northern India mating occurs in August-September and littering in November-December (Hussain 1993). Desai (1974) observed litter size of 2-5 (mean = 3.25). Similarly, Naidu and Malhotra (1989) observed litter size 1-5. The breeding schedule of Smooth-coated Otters in the wild in India corresponds with the captive records (Hussain 1993, 1996). Evidences of littering have been recorded in October and the cubs were seen out of the den in February. The mean litter size along the Chambal River was three (Hussain 1996). In Singapore, litter size observed from two family groups over seven litters was 3-7 (mean = 4.86), with breeding being non-seasonal (Khoo & Sivasothi, 2018).

Based on the percentage of active telemetry recordings, Hussain (1993) observed that the overall activity pattern

of Smooth-coated Otters along the Chambal River in India was in the form of a bimodal curve in which two period of high activity were separated by a period of relative inactivity. This pattern of activity varied considerably among seasons. In summer, the relative period of inactivity was greater than in winter or monsoons. A significant difference was also found between day and night time activities in different seasons. Otters were more diurnal during winter than in summer or monsoon.

Hussain (1993) observed daily movements of four radio-implanted Smooth-coated Otters of different age and sex within their home range. Two types of movements were identified; small-scale movements associated with foraging in a restricted area close to dens, and more extensive travels between dens and foraging sites. Most of the movement was restricted between 250 to 1,500 m. A typical group of Smooth-coated Otter consisting of male, female, and up to four young ones require 7 to 12 km of river for their territory and an even longer stretch of shoreline if living along the coast (Wayre 1974). During a radio-tracking study along the Chambal River, India, the home range of all the otters tracked overlapped intensively. Among the radio-implanted otters, the maximum home range was observed in sub-adult male and the minimum in juvenile female and male. Among the non-tagged otters, the home range of female with cubs was estimated as 5.5 km. In case of the adult male it was estimated to be approximately 17 km (Hussain 1993). Along the Chambal River, the home range length and area of smooth-coated otter was less than that of Eurasian Otter, in Perthshire, Scotland and North American River Otter *Lontra canadensis* in Idaho (Melquist and Hornocker 1983), but larger than that of Eurasian Otter (Erlinge 1967) in Sweden.

IUCN Habitats Classification Scheme

Habitat	Season	Suitability	Major Importance?
1.6. Forest -> Forest - Subtropical/Tropical Moist Lowland	Resident	Suitable	Yes
1.7. Forest -> Forest - Subtropical/Tropical Mangrove Vegetation Above High Tide Level	Resident	Suitable	Yes
1.8. Forest -> Forest - Subtropical/Tropical Swamp	Resident	Suitable	Yes
1.9. Forest -> Forest - Subtropical/Tropical Moist Montane	-	Marginal	-
3.6. Shrubland -> Shrubland - Subtropical/Tropical Moist	-	Unknown	-
4.6. Grassland -> Grassland - Subtropical/Tropical Seasonally Wet/Flooded	-	Unknown	-
5.1. Wetlands (inland) -> Wetlands (inland) - Permanent Rivers/Streams/Creeks (includes waterfalls)	Resident	Suitable	Yes
5.2. Wetlands (inland) -> Wetlands (inland) - Seasonal/Intermittent/Irregular Rivers/Streams/Creeks	-	Suitable	No
5.3. Wetlands (inland) -> Wetlands (inland) - Shrub Dominated Wetlands	Resident	Suitable	Yes
5.4. Wetlands (inland) -> Wetlands (inland) - Bogs, Marshes, Swamps, Fens, Peatlands	Resident	Suitable	Yes
5.5. Wetlands (inland) -> Wetlands (inland) - Permanent Freshwater Lakes (over 8ha)	Resident	Suitable	Yes
5.6. Wetlands (inland) -> Wetlands (inland) - Seasonal/Intermittent Freshwater Lakes (over 8ha)	Resident	Suitable	Yes
5.7. Wetlands (inland) -> Wetlands (inland) - Permanent Freshwater Marshes/Pools (under 8ha)	-	Marginal	-
5.8. Wetlands (inland) -> Wetlands (inland) - Seasonal/Intermittent Freshwater Marshes/Pools (under 8ha)	-	Marginal	-
5.9. Wetlands (inland) -> Wetlands (inland) - Freshwater Springs and Oases	-	Marginal	-
5.13. Wetlands (inland) -> Wetlands (inland) - Permanent Inland Deltas	Resident	Suitable	Yes

5.14. Wetlands (inland) -> Wetlands (inland) - Permanent Saline, Brackish or Alkaline Lakes	-	Unknown	-
5.15. Wetlands (inland) -> Wetlands (inland) - Seasonal/ Intermittent Saline, Brackish or Alkaline Lakes and Flats	-	Unknown	-
5.16. Wetlands (inland) -> Wetlands (inland) - Permanent Saline, Brackish or Alkaline Marshes/Pools	-	Unknown	-
5.17. Wetlands (inland) -> Wetlands (inland) - Seasonal/Intermittent Saline, Brackish or Alkaline Marshes/Pools	-	Unknown	-
9.10. Marine Neritic -> Marine Neritic - Estuaries	Resident	Suitable	Yes
12.5. Marine Intertidal -> Marine Intertidal - Salt Marshes (Emergent Grasses)	-	Marginal	-
13.4. Marine Coastal/Supratidal -> Marine Coastal/Supratidal - Coastal Brackish/Saline Lagoons/Marine Lakes	Resident	Suitable	Yes
13.5. Marine Coastal/Supratidal -> Marine Coastal/Supratidal - Coastal Freshwater Lakes	Resident	Suitable	Yes
15.1. Artificial/Aquatic & Marine -> Artificial/Aquatic - Water Storage Areas (over 8ha)	Resident	Suitable	Yes
15.2. Artificial/Aquatic & Marine -> Artificial/Aquatic - Ponds (below 8ha)	-	Marginal	-
15.3. Artificial/Aquatic & Marine -> Artificial/Aquatic - Aquaculture Ponds	-	Marginal	-
15.6. Artificial/Aquatic & Marine -> Artificial/Aquatic - Wastewater Treatment Areas	-	Unknown	-
15.7. Artificial/Aquatic & Marine -> Artificial/Aquatic - Irrigated Land (includes irrigation channels)	-	Unknown	-
15.8. Artificial/Aquatic & Marine -> Artificial/Aquatic - Seasonally Flooded Agricultural Land	-	Marginal	-
15.9. Artificial/Aquatic & Marine -> Artificial/Aquatic - Canals and Drainage Channels, Ditches	-	Marginal	-

Continuing Decline in Habitat

Continuing decline in area, extent and/or quality of habitat?	Qualifier	Justification
Yes	Inferred	-

Life History

Generation Length	Justification	Data Quality
10	Based on Pacifici et al. 2013	good

Movement Patterns

Movement Patterns: Not a Migrant

Congregatory: No

Systems

System: Terrestrial, Freshwater (=Inland waters), Marine

Use and Trade

General Use and Trade Information

Species not utilized: False

No use/trade information for this species: False

Species is illegally utilized in wildlife trade.

Subsistence:	Rational:	Local Commercial:	Further detail including information on economic value if available:
Yes	-	-	-

National Commercial Value: Yes

International Commercial Value: No

End Use	Subsistence	National	International	Other (please specify)
1. Food - human	true	-	-	-
3. Medicine - human & veterinary	true	-	-	-
10. Wearing apparel, accessories	true	true	-	-

Is there harvest from captive/cultivated sources of this species? No

Trend in level of total offtake from wild sources: Increasing

Trend in level of total offtake from domesticated sources: Not domesticated

Harvest Trend Comments: NA

Non-Consumptive Use

Non-consumptive use of the species? True

Explanation of non-consumptive use: The species may serve as a subject for research and/or for tourism.

Threats

The major threat to Smooth-coated otter populations is habitat loss and degradation due to increasing anthropogenic pressure on wetlands and waterways. Much of the natural habitats have been lost to development activities, including the construction of large-scale hydroelectric projects, reclamation for settlements and agriculture. In addition, wetlands and waterways are increasingly polluted by eutrophication and accumulation of persistent pesticides such as chlorinated hydrocarbons and organophosphates through agricultural runoffs. This poses a danger not only to the otter populations living in the habitats, but also negatively impacts the aquatic prey biomass that the otters rely on (Melisch *et al.* 1996). The aquatic prey biomass for otters have also been depleted by humans. This is due to the increase in human population over the last century without effective rural development programmes that have been able to address the problems of poverty, forcing people to be more and more dependent on natural resources (Badola 1997). Although urban populations of smooth-coated otters occur in the Singapore, not every country or city may be able to replicate the myriad of factors (suitable riparian habitats, clean waters, free of poaching, etc) that is required for the establishment of these otters.

Severe conflict human-otter conflicts in the entire south and southeast Asia have threatened the otter populations in the region. Indiscriminate killings of otters driven by resource competition between humans, especially aquaculturists and the species occur, as otters frequent fish farms for foraging. This is exacerbated by poverty and a recent increase in aquaculture activities. In southeast Asian countries, there does not seem to be any intentional otter trapping (Melisch *et al.* 1996) though it is prevalent in India, Nepal and Bangladesh fuelled by illegal wildlife trade.

The illegal wildlife trade poses a direct threat to the Smooth-coated otter. From 1980 to 2015, 5,881 otter pelts were seized across 15 countries in Asia, with about half of the pelts coming from India and most cases involving the Smooth-coated and Eurasian otters (Gomez *et al.* 2016). Otters are also coveted by the online pet trade, particularly in Southeast Asia (Gomez and Bouhuys 2018) and for use in traditional medicine in some countries of Southeast Asia and China (Poole 2003).

Linear infrastructure such as road networks, have led to the fragmentation of wildlife habitats, thereby posing another threat to the species. There have been frequent records of road kills of otters in India and Southeast Asian countries, however, there is inadequate data available on the trends of mortality due to roads and other

linear infrastructure,. An insufficient reporting system for road kills also hampers an understanding of the level of otter mortality from vehicles.

Populations of otters are also susceptible to diseases such as rabies, canine distemper, canine hepatitis, and parvovirus, which may be contracted by smooth-coated otters from feral dogs or other species of otters.

Climate change will take a serious toll on otter populations worldwide. Smooth-coated otters depend on rivers, lakes and streams, which face dramatic alteration under a warming scenario, reducing water levels in long-term droughts and affecting prey densities, and also tumultuous flooding periods will lead to disruption in reproductive activities due to inundation and destruction of reproductive sites (Cianfrani et al. 2018)

Threats Classification Scheme

No past, ongoing, or future threats exist to this species. False

The threats to this species are unknown. False

Threat	Timing	Timing score	Scope	Severity	Impact Score	Impact category
1.1. Residential & commercial development -> Housing & urban areas	Ongoing	3	2	3	8	High
Stresses:	1. Ecosystem stresses-> 1.1. Ecosystem conversion 1. Ecosystem stresses-> 1.2. Ecosystem degradation 1. Ecosystem stresses-> 1.3. Indirect ecosystem effects					
2.1.1. Agriculture & aquaculture -> Annual & perennial non-timber crops -> Shifting agriculture	Ongoing	3	2	3	8	High
Stresses:	1. Ecosystem stresses-> 1.1. Ecosystem conversion 1. Ecosystem stresses-> 1.2. Ecosystem degradation 1. Ecosystem stresses-> 1.3. Indirect ecosystem effects					
2.4.3. Agriculture & aquaculture -> Marine & freshwater aquaculture -> Scale Unknown/Unrecorded	Ongoing	3	1	2	6	Medium
Stresses:	1. Ecosystem stresses-> 1.3. Indirect ecosystem effects					
4.1. Transportation & service corridors -> Roads & railroads	Ongoing	3	3	3	9	High
Stresses:	1. Ecosystem stresses-> 1.1. Ecosystem conversion 1. Ecosystem stresses-> 1.3. Indirect ecosystem effects 2. Species stresses-> 2.1. Species mortality					
5.1.1. Biological resource use -> Hunting & trapping terrestrial animals -> Intentional use (species is the target)	Ongoing	3	3	3	9	High
Stresses:	2. Species stresses-> 2.1. Species mortality					
5.1.2. Biological resource use -> Hunting & trapping terrestrial animals -> Unintentional effects (species is not the target)	Ongoing	3	2	2	7	Medium
Stresses:	2. Species stresses-> 2.1 Species mortality					
5.3.5. Biological resource use -> Logging & wood harvesting -> Motivation Unknown/Unrecorded	Ongoing	3	2	2	7	Medium
Stresses:	1. Ecosystem stresses-> 1.1. Ecosystem conversion 1. Ecosystem stresses-> 1.2. Ecosystem degradation					

5.4.4. Biological resource use -> Fishing & harvesting aquatic resources -> Unintentional effects: (large scale) [harvest]	Ongoing	3	3	3	9	High
Stresses:	1. Ecosystem stresses-> 1.2. Ecosystem degradation 2. Species stresses-> 2.1. Species mortality 2. Species stresses -> 2.3. Indirect species effects -> 2.3.2. Competition					
5.4.5. Biological resource use -> Fishing & harvesting aquatic resources -> Persecution/control	Ongoing	3	2	2	7	Medium
Stresses:	1. Ecosystem stresses-> 1.2. Ecosystem degradation 2. Species stresses-> 2.1. Species mortality 2. Species stresses -> 2.3. Indirect species effects -> 2.3.2. Competition					
7.2.11. Natural system modifications -> Dams & water management/use -> Dams (size unknown)	Ongoing	3	1	2	6	Medium
Stresses:	1. Ecosystem stresses-> 1.1. Ecosystem conversion 1. Ecosystem stresses-> 1.2. Ecosystem degradation 1. Ecosystem stresses-> 1.3. Indirect ecosystem effects					
9.1.1. Pollution -> Domestic & urban waste water -> Sewage	Ongoing	3	2	3	8	High
Stresses:	1. Ecosystem stresses-> 1.2. Ecosystem degradation 1. Ecosystem stresses-> 1.3. Indirect ecosystem effects					
9.3.4. Pollution -> Agricultural & forestry effluents -> Type Unknown/Unrecorded	Ongoing	3	2	2	7	Medium
Stresses:	1. Ecosystem stresses-> 1.2. Ecosystem degradation 1. Ecosystem stresses-> 1.3. Indirect ecosystem effects					
11.2. Climate change and severe weather-> Droughts	Future	1	2	3	6	Medium
Stresses:	1. Ecosystem stresses-> 1.1. Ecosystem conversion 1. Ecosystem stresses-> 1.2. Ecosystem degradation					
11.4. Climate change and severe weather-> Storms and flooding	Future	1	2	3		Medium
Stresses:	1. Ecosystem stresses-> 1.1. Ecosystem conversion 1. Ecosystem stresses-> 1.2. Ecosystem degradation					

Conservation

Smooth-coated Otter is a protected species in almost all the range countries which prohibits its killing. It has been up listed to Appendix I from Appendix II of CITES in 2019. However, most range countries are not able to control the clandestine trade leading to extensive poaching.

The Smooth-coated Otter, once common in the wetlands and low lying areas of south Asia, is now restricted to a few protected areas. Creation of networks of Protected Areas, identification of sites as wetlands of national and international importance under Ramsar Convention, has, to some extent, halted the degradation of its habitat.

Over the years the IUCN SSC Otter Specialist Group has developed a cadre of biologist across Asia to conduct field surveys and has popularize otter conservation by promoting otters as ambassadors of the wetlands. A global strategy for otter conservation was also published by the IUCN SSC Otter Specialist Group as a consolidated effort to identify and discuss the significant factors that influence habitat quality and the presence of otter in each region where they occur. However, concerted efforts to conserve this species are needed. For the long term survival of the species, policy based action, research on factors affecting its survival, habitat based action on

creation and wherever required expansion of protected areas, and communication and awareness building actions are needed. The Global Otter Conservation Strategy for the species (Hussain *et al.* 2018) recommends priority actions that include:

- Monitor population status of Smooth-coated Otters in protected as well as non-protected area in all range countries.
- Determine the status of *L. p. maxwelli* in the Iraqi marshes.
- Support existing laboratories, and creation of new research facilities dedicated to research on conservation genetics of the species.
- Support full-time research for otter conservation.
- Organise workshops for capacity building, conservation education, and awareness in all range countries.

Conservation Actions In- Place

Action Recovery Plan	Not e
No	-

Systematic monitoring scheme	Not e
No	-

Conservation sites identified	Not e
Yes, over part of range	-

Occur in at least one PA	Not e
Yes	-

Percentage of population protected by PAs (0-100): (Not specified)

Area based regional management plan	Not e
Yes	-

Invasive species control or prevention: No

Harvest management plan	Not e
No	-

Successfully reintroduced or introduced benignly	Not e
No	-

Subject to ex-situ conservation	Not e
No	-

Subject to recent education and awareness programmes	Not e
Yes	-

Included in international legislation	Note

Yes	CITES Appendix I
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Subject to any international management/trade controls	Note
Yes	CITES Appendix I

Important Conservation Actions Needed

Conservation Actions	Note
1.1. Land/water protection -> Site/area protection	-
1.2. Land/water protection -> Resource & habitat protection	-
2.1. Land/water management -> Site/area management	-
2.3. Land/water management -> Habitat & natural process restoration	-
4.1. Education & awareness -> Formal education	-
4.2. Education & awareness -> Training	-
4.3. Education & awareness -> Awareness & communications	-
5.1.3. Law & policy -> Legislation -> Sub-national level	-
5.4.4. Law & policy -> Compliance and enforcement -> Scale unspecified	-
6.1. Livelihood, economic & other incentives -> Linked enterprises & livelihood alternatives	-

Research Needed

Research	Note
1.2. Research -> Population size, distribution & trends	-
1.3. Research -> Life history & ecology	-
1.4. Research -> Harvest, use & livelihoods	-
1.5. Research -> Threats	-
2.1. Conservation Planning -> Species Action/Recovery Plan	-
3.1. Monitoring -> Population trends	-
3.4. Monitoring -> Habitat trends	-

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