Aonyx capensis – Cape Clawless Otter


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Regional Red List status (2016)	**Near Threatened C2a(i)***
National Red List status (2004)	Least Concern
Reasons for change	Genuine change: Declining population
Global Red List status (2015)	Near Threatened A2cde+3cde
TOPS listing (NEMBA) (2007)	Protected
CITES listing (1985)	Appendix II
Endemic	No

*Watch-list Data

The main threat to the Cape Clawless Otter across its range is the deterioration of freshwater ecosystems. In South Africa, 84% of the river ecosystems are threatened, including 54% being Critically Endangered, 18% Endangered, and 12% Vulnerable (Nel et al. 2007; CSIR 2010). This will have increasing impacts on aquatic species.

Taxonomy

Aonyx capensis (Schinz 1821)

ANIMALIA - CHORDATA - MAMMALIA - CARNIVORA - MUSTELIDAE - *Aonyx* - *capensis*

Common names: Cape Clawless Otter (English), Groot-otter (Afrikaans), Qibi, Thene (Sesotho), Ntsini (Swati), leNyibi (Tswana), Nivho, Tshphu (Venda), iNtini (Xhosa), umThini (Zulu)

Taxonomic status: Species

Taxonomic notes: Only one subspecies has been recognised within the assessment region (Meester et al. 1986), reaching as far north as Zambia and Angola (Skinner & Chimimba 2005).

Assessment Rationale

Cape Clawless Otters are widespread, but patchily distributed, within the assessment region. The most likely population estimate ranges from 21,500 to 30,276 individuals, of which 11,825–19,377 can be considered mature (using 55–64% mature structure). However, systematic density estimates are needed to more accurately estimate population size and this species should be reassessed once such data are available. While most subpopulations may currently be stable, future trends in coastal and riverbank development, combined with climate change, may see significant declines for this species. Local declines are beginning to be documented, for example, there is some evidence that a river site in the Drakensberg, KwaZulu-Natal (KZN), has experienced a 75% decrease in Cape Clawless Otter density from 1993 to 2010. Similarly, there are estimated to be three times as many otters in peri-urban than urban areas in Gauteng Province, indicating that disturbed rivers are less suitable for this species. Both examples illustrate reduction in abundance with riparian habitat transformation, pollution, and disturbance. A decline in habitat suitability is also expected. For example, in South Africa's dry interior, increased pumping of water from persistent pools in ephemeral rivers is expected to lead to more river stretches being drier for longer periods, impacting on prey availability, dispersal and social interactions between otter groups/local subpopulations. While the construction of more weirs may create more bodies of permanent or near permanent water, these impact negatively on river ecosystems and are therefore also expected to impact on the Cape Clawless Otter subpopulations. The effect of damming thus needs to be researched. Similarly, canalisation of rivers will negatively impact otter occurrence, possibly due to a reduction in both food (due to a lack of substrate) and shelter (due to a lack of riparian vegetation). Further research such as collaring and tracking, behavioural studies, and habitat disturbance impact studies are necessary to monitor potential local declines from across the species' range. Establishment of long-term monitoring sites to measure subpopulation trends, and implementation of appropriate effective management, are essential to prevent a further decline in the number of individuals. Using a precautionary purview, we uplist this species to Near Threatened C2a(i) as the population is not estimated to be much more than 10,000 mature individuals, no subpopulation is likely to have over 1,000 mature individuals and there is an inferred continuing decline in occupancy. However, contemporary density estimates are required from across the species' range to calculate overall population size more accurately. Similarly, establishing long-term monitoring sites will enable estimation of population trends in different regions. Once these data are available a reassessment should be done.

Riverside, wetland and coastal habitats must be protected to allow otters sufficient breeding and foraging environments necessary for them to persist and disperse between habitats. Occupancy sign surveys provide a

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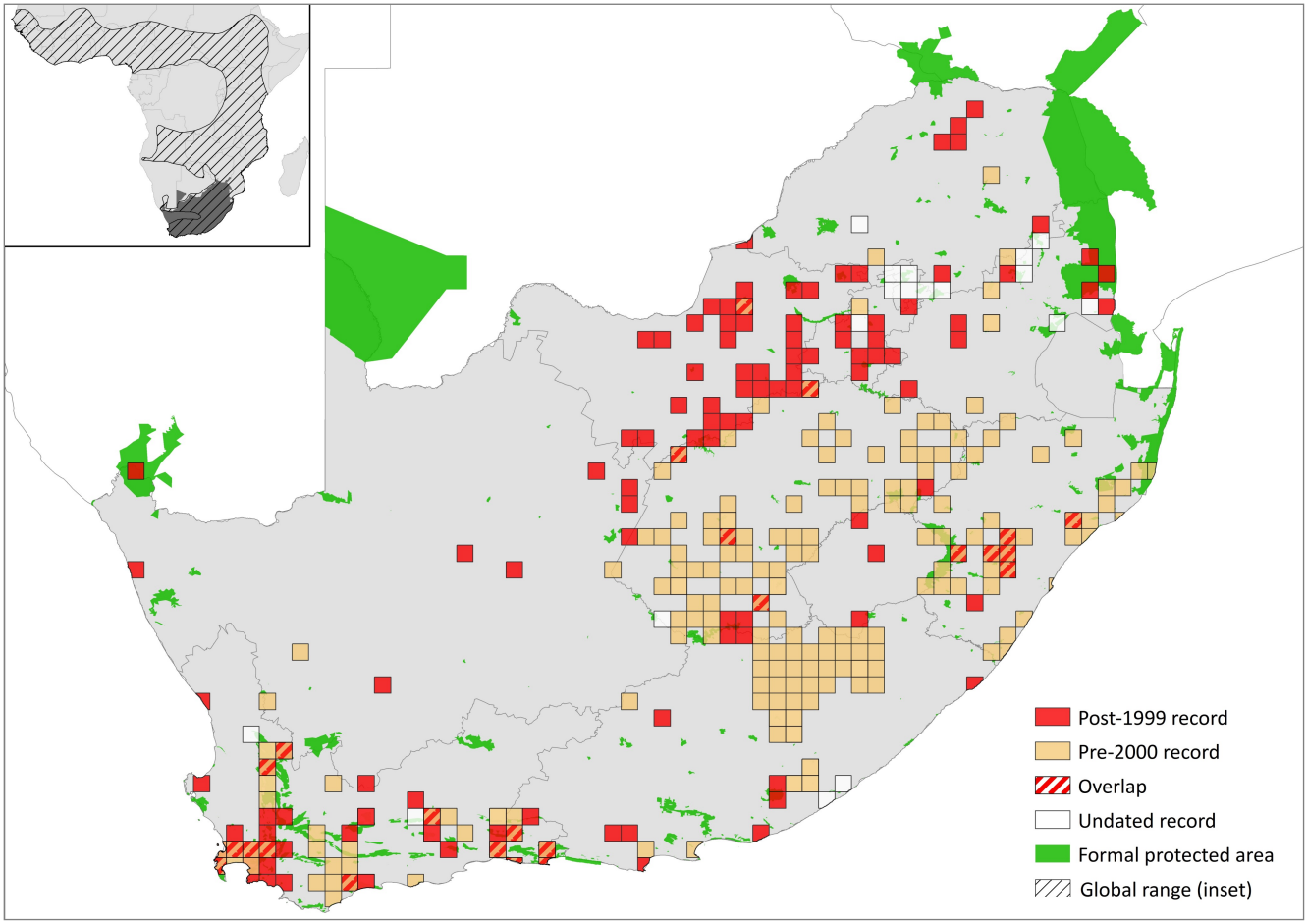

Figure 1. Distribution records for Cape Clawless Otter (*Aonyx capensis*) within the assessment region

Table 1. Countries of occurrence within southern Africa

Country	Presence	Origin
Botswana	Extant	Native
Lesotho	Extant	Native
Mozambique	Extant	Native
Namibia	Extant	Native
South Africa	Extant	Native
Swaziland	Extant	Native
Zimbabwe	Extant	Native

rapid, cost-effective method for monitoring changes in otter occupancy that could be implemented by the relevant management authorities at local or provincial scales.

Regional population effects: The range is continuous with the rest of Africa and as they can travel long distances there is suspected to be dispersal between regions. There is a possibility for dispersal from neighbouring regions along watercourses and coastlines, but it is unknown if this is significant enough to lead to rescue effects.

Distribution

The Cape Clawless Otter is the most widely distributed otter species in Africa (Somers & Nel 2013). Within the assessment region, the species occurs on the east and south coasts of South Africa and sporadically up the west coast to Langebaan, the Berg River Estuary, Cederberg and all major river systems, including the Orange River. They also occur within Swaziland and Lesotho (Lynch 1994; Monadjem 1998; Larivière 2001; Avenant 2004; Avenant & du Plessis 2012; du Plessis et al. 2014). They utilise dams in agricultural areas as well as temporary waterbodies (Nel & Somers 2007). Otters have also been found throughout the Western Cape, in wetlands and rivers surrounding urban areas, and along much of the coast, especially where fresh water is available. They are largely absent from the arid western interior of South Africa.

Cape Clawless Otters occur in all major drainage systems in both summer and winter rainfall regions between the 50 mm and 1,250 mm isohyets (Nel & Somers 2007). Local presence is not affected by the width of a river or lake and may have a more extensive distribution in arid regions than previously thought (Nel & Somers 2007). Although no decline in extent of occurrence is expected, area of occupancy may decline as habitat deterioration proceeds. For example, in the dry interior, increased pumping of water from persistent pools in ephemeral rivers may lead to more river stretches being drier for longer periods (Avenant 2010; Seaman et al. 2010). In the Cape Peninsula, the probability of otter occupancy was not negatively impacted by proximity to urbanised areas at the landscape scale, but declined in canalised sections of river that were heavily impacted by human activity (N. C. Okes unpubl. data). Occupancy increased with proximity to marine protected areas and wetland habitat (N. C. Okes unpubl. data). Despite being heavily transformed, lowland aquatic ecosystems in the Peninsula still provide critical resources in the form of fresh water and breeding sites,

and, together with food within the marine habitat, may be sustaining the Peninsula's otter population (N. C. Okes unpubl. data).

Population

Density estimates from various studies in southern Africa are summarised by Somers and Nel (2013). Within the assessment region, the following density estimates are available: in Tsitsikamma Coastal National Park in the Eastern Cape Province, density has been calculated as 1 otter / 2 km of coast (van der Zee 1982; Arden-Clarke 1986). Verwoerd (1987) similarly estimated 1 otter / 2 km of coast at Betty's Bay in the Western Cape. Using signs such as spoor, estimates of density in freshwater habitats in the Drakensberg, KZN, have been estimated as 1 otter / 1.25–2.5 km (Carugati 1995; Perrin & Carugati 2000), 1 otter / 3–4 km (Rowe-Rowe 1992a), and 1 otter / 2.5 km (Carugati & Perrin 2006). In eastern Zimbabwe the estimate is 1 otter / 8–10 km of river (Butler & du Toit 1994). Based on the recovery of radioactive scats, Somers (2001) gives an estimate of 1.5 individuals / km of river. Although reported widely in Lesotho, especially in the Lesotho Highlands, no density estimates are known. Instead, densities of latrine sites are commonly reported on during environmental impact assessments (for example, du Plessis et al. 2014).

In the previous assessment, a population size of 14,000 individuals was calculated from 26,000 km of river and 2,000 km of coast (density estimated at 1 individual / 2 km river or coast) (Friedmann & Daly 2004). We estimate 53,475 km of river (and 2,140 km of coastline) within its range, of which 24,679 km of river can be considered disturbed and 28,796 km less disturbed using National Freshwater Ecosystem Priority Area land cover data (Nel et al. 2011). For mature population structure, although further empirical data are needed, Van der Zee (1982) estimated the adult to juvenile ratio as 55–64% (22 adults, 18 juveniles; and 16 adults, nine juveniles, respectively) in Tsitsikamma National Park. Using density estimates of 0.25 otter / km of disturbed river (Rowe-Rowe 1992a), 0.8 otter / km of less-disturbed river (Carugati & Perrin 2006) and 0.5 otter / km of coastline (Verwoerd 1987) yields an estimated population size of 30,276 individuals (16,552–19,377 mature). Using the lowest density estimate for disturbed rivers (0.1 otter / km river; Butler & du Toit 1994) yields 26,574 individuals (14,616–17,007 mature). Similarly, using average density estimates for freshwater habitats from the Drakensberg (0.44 otter / km river) for total river length yields a total population of 24,465 individuals (13,456–15,658 mature), which corroborates the estimate produced by Somers and Nel (2013) of around 21,500 individuals (11,825–13,760 mature). However, population size could be as high as 50,433 (27,738–32,277 mature) if the estimate of 1.5 otters / km river (Somers 2001) is used for total river length. Methods used to estimate densities thus far have mostly relied on sign surveys carried out at localised scales and thus current systematic density estimates on a national scale are needed to calculate the mature population size more accurately. For the time being, we assume the most likely total mature population size ranges from 11,825 to 19,377 individuals.

Furthermore, current densities could be lower on farmland, especially in modified habitats. For example, there is some evidence that along a river site in the Drakensberg, KZN, otters have decreased by 75% between 1993–2010 (Kubheka et al. 2013). Additionally, a recent comparison between urban and peri-urban areas in Gauteng has shown that there are three times as many signs of otter in peri-urban than urban areas (D. W. Ponsonby unpubl. data), indicating that they may be avoiding heavily disturbed urban areas. Similarly, it is currently difficult to do similar assessments of the rate of decrease in other areas as historical data are only available for specific regions of the country. Long-term monitoring sites should be established to allow comparative studies to be produced and evidence amassed for a possible net decline in population size over three generations, estimated to be a 13-year period (Pacifici et al. 2013), especially as future trends in coastal and riverbank development, combined with climate change, may see significant declines for this species. Many areas may be suffering local declines or extinctions already due to unfettered development or ecosystem modification.

Current population trend: Declining

Continuing decline in mature individuals: No

Number of mature individuals in population: 11,825–19,377

Number of mature individuals in largest subpopulation: < 1,000

Number of subpopulations: Unknown

Severely fragmented: No. They can move long distances (> 30 km) through sandy, waterless habitat (an individual tracked by spoor) and cross saddles in mountains between watersheds (a collared individual) (Nel & Somers 2007).

Habitats and Ecology

Cape Clawless Otters are predominantly aquatic and seldom found far from permanent water. Fresh water is an essential habitat requirement, not only for drinking but also for rinsing their fur. As otters do not have a subcutaneous layer of fat like most other aquatic mammals, they rely on their dense fur for thermoregulation. Thus, rinsing their fur in freshwater followed by rolling in sand, grass or reeds helps them cleanse their fur and restore the thermoregulatory properties. Generally, they will only occur in marine habitats provided there is access to fresh water (coastal rivers or estuaries) and rocky shores are preferred for foraging (van Niekerk et al. 1998), and otter activity is often found near thick vegetation, abundant food supply and fresh water (van der Zee 1982; Arden-Clarke 1986; van Niekerk et al. 1998). Elsewhere, they are found in diverse habitats, from impoundments, estuaries, and mangroves to desert conditions of the upper Doring River in the Western Cape and the Fish River in southern Namibia (Nel & Somers 2007; Somers & Nel 2013); they are also found in many seasonal or episodic rivers in the Karoo, such as the Sak, Vis, Riet, Seekoei and Gamka Rivers, provided suitable-sized pools persist (Nel & Somers 2007; Somers & Nel 2013; Prinsloo 2014). They have been recorded up to 2,900 m asl in the Lesotho Highlands (Lynch 1994; Avenant & du Plessis 2012). Cape Clawless Otters have been found in towns and cities, and can occupy rivers with high pollution and eutrophication levels (Somers & Nel 2013).

Somers and Nel (2004) found that in a river ecosystem, otters selected habitat characterised by reed beds,

boulders and overhanging vegetation. It has also been found by other authors including Rowe-Rowe (1992a, 1992b) and Perrin and Carugati (2000), that Cape Clawless Otter activity is usually associated with natural riverine habitat, particularly with rocks covered with dense vegetation and large areas of undisturbed long grasses and dense bushes. Kubheka et al. (2013) found less otter sign in areas without stream-bank cover. Deforestation, overgrazing and the deterioration of riparian vegetation is therefore a threat to the key habitat requirements for the species in a river environment.

Cape Clawless Otters are predominantly crepuscular, meaning they are mostly active at dawn and dusk (Somers & Nel 2004). However, this behaviour may differ between disturbed and non-disturbed habitats. In the protected areas of Drakensberg in KZN they are often seen foraging from mid-afternoon. In the Cape Peninsula and Gauteng, for example, otters are more nocturnal in the urban areas possibly so as to avoid dogs, people and disturbance.

With a wide variety of prey items (for example, Rowe-Rowe 1977; Somers & Purves 1996; Jordaan et al. 2015), this species shows functional responses to temporal or geographical patterns, and can switch between prey items (for example, between fish, crabs, frogs, insects or combinations thereof), thus facilitating a wide distribution (Nel & Somers 2007).

Arden-Clarke (1986) estimated the home range of otters in Tsitsikamma National Park, Eastern Cape of South Africa, and found the minimum home range for a female otter to be 14.3 km (7.5 km core range), and for a male otter to be 19.5 km (12 km core range). In the Western Cape, the home range of otters in rivers was estimated by Somers and Nel (2004). They found that total range length varied from 4.9–54.1 km (linear home range core length from 0.2–9.8 km). The pattern of home range use by females was suggestive of territoriality. Male Cape Clawless Otters had overlapping home ranges in both studies (Arden-Clarke 1986; Somers & Nel 2004), with other males and with females.

Ecosystem and cultural services: Globally, other otter species are considered to be indicators of water quality—for example, in both North American rivers (North American River Otter *Lontra canadensis*) (Mayack 2012) and coastlines (Sea Otter *Enhydra lutris*) (Jessup et al. 2004)—or sentinels of environmental health; for example, in Europe (European Otter *Lutra lutra*) (Chadwick 2007; Lemarchand et al. 2011). Mayack (2012) suggested that the otter's wide distribution, opportunistic and predatory nature, plus their flexibility in habitat and diet, allow them to serve as a useful upper level consumer component in ecosystem monitoring. Similarly, the Cape Clawless Otter may be a useful flagship species to highlight the importance of river health, and potentially provide information on the contaminant levels in African urban rivers as European Otters do in Europe. However, it is not yet known whether Cape Clawless Otters have an important role in the freshwater ecosystems. Currently, research is underway investigating the health of otters relative to the pollution levels in urban rivers (N. C. Okes unpubl. data). Preliminary results show that certain persistent organic pollutants are present in the tissues of otters found killed on the roads in the Cape Peninsula (N. C. Okes unpubl. data). Further research is needed in order to establish whether they may be a useful indicator species for river health (see, for example, Seaman et al. 2010; Prinsloo 2014).

In the Lesotho Highlands, inhabitants report that Cape Clawless Otters are commonly used for traditional medicine, clothes, hats, and as food (Avenant 2004).

Use and Trade

Individuals are taken from the wild for use in zoos and aquariums. However, this is not suspected to have a negative effect on the population. Some farmers persecute this species as a perceived competitor for fish stocks, especially subsistence rural dwellers (for example, Power 2014). Additionally, some farmers that (for example) farm with geese (for down) regard them as a threat to poultry, thus consider them pests. For example, fisheries managers of the Kairezi River Protected Area in Zimbabwe blamed trout declines on otter predation and competition with trout for food, even though scat analysis revealed that only 1% of otter faeces contained the remains of trout and their diets overlapped by only 17% (Butler 1994; Butler & Marshall 1996). In parts of their range, they may be killed for skins and other body parts (De Luca & Mpunga 2005), including as traditional medicine (Cunningham & Zondi 1991). They are listed on Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) due to their similarity to sister species *Aonyx congicus*, the Congo Clawless Otter, which is hunted for fur and

Table 2. Use and trade summary for the Cape Clawless Otter (*Aonyx capensis*)

Category	Applicable?	Rationale	Proportion of total harvest	Trend
Subsistence use	Yes	Skins are used by traditional healers, commonly used for traditional medicine, clothes, hats and bushmeat.	Unknown	Unknown
Commercial use	Yes	Individuals are taken from the wild for use in zoos and aquariums. However, this is not suspected to have a negative effect on the population.	Unknown	Not suspected to have a negative effect on the population.
Harvest from wild population	Yes	Bushmeat and skins for clothes, hats and for traditional medicine.	Unknown	Unknown
Harvest from ranched population	No	No ranched or captive-bred individuals.	-	-
Harvest from captive population	Unknown	-	-	-

Table 3. Threats to the Cape Clawless Otter (*Aonyx capensis*) ranked in order of severity with corresponding evidence (based on IUCN threat categories, with regional context)

Rank	Threat description	Evidence in the scientific literature	Data quality	Scale of study	Current trend
1	*1.1 Housing & Urban Areas*: habitat loss from settlement sprawl along coastlines and rivers. Current stresses *1.1 Ecosystem Conversion*, *1.2 Ecosystem Degradation* and *2.1 Species Mortality*: wetland conversion, increased pollution and increased hunting.	Kubheka et al. 2013 GeoTerraImage 2015	Empirical Indirect	Local National	Threats increasing along with human settlement expansion.
2	*2.3 Livestock Farming & Ranching*. Current stress *1.2 Ecosystem Degradation*: shelter removal from overgrazing.	-	Anecdotal	-	Possibly increasing with human settlement expansion.
3	*7.1.1 Increase in Fire Frequency/Intensity*: burning of riverbanks and wetlands for agricultural practices.	-	Anecdotal	-	Possibly increasing with human settlement expansion.
4	*2.2.2 Agro-Industry Plantations*: habitat loss from afforestation along rivers.	Jewitt et al. 2015	Indirect	Regional	Increasing
5	*9.3 Agricultural & Forestry Effluents*: soil erosion, sedimentation, pesticides and fertiliser pollution in rivers and wetlands.	Nel et al. 2007	Indirect	National	Increasing
6	*9.2 Industrial & Military Effluents*: pollution from industrial expansion along rivers and seepage from mining.	Nel et al. 2007	Indirect	Indirect	Increasing
7	*9.1 Domestic and Urban Waste Water*: sewage and pollutants from human settlements decreasing water quality.	Nel et al. 2007 Kubheka et al. 2013	Indirect Empirical	National Local	Increasing with human settlement expansion.
8	*7.2 Dams & Water Management/Use*: increased abstraction of surface water for industrial, agricultural and domestic use.	Nel et al. 2007	Indirect	National	Increasing
9	*5.1.3. Persecution/Control*: direct persecution for perceived competition for fish stocks.	-	Anecdotal	-	Possibly increasing with human settlement expansion.
10	*11.2 Droughts*: increased aridity and drought conditions caused by global climate change.	Erasmus et al. 2002	Simulation	National	Increasing

bushmeat in Cameroon and Congo. In the Lesotho Highlands, inhabitants report that Cape Clawless Otters are commonly used for traditional medicine, clothes, hats, and as food (Avenant 2004). In Swaziland, otters are used for loin skins, and by traditional healers (N. L. Avenant unpubl. data).

Threats

There are no major threats to the species within the assessment region. However, in some parts of their range, their habitat has been either drastically changed or lost, following bush clearing, deforestation, overgrazing, siltation, expansion of human settlements, draining of wetlands, water extraction or denudation of riparian vegetation (Rowe-Rowe 1995; Nel et al. 2007; CSIR 2010).

In KZN, Rowe-Rowe (1992b) identified the primary threat as the increasing human population, leading to adverse alteration of freshwater habitats and riparian vegetation. Negative effects usually arise from increased agricultural activity, such as overgrazing with increased soil run-off, and commercial afforestation (for example, Jewitt et al. 2015). Acid pollution from coal mining, pesticides from farmlands and waste from urban landfill sites are also observed as a threat (Mason & Rowe-Rowe 1992; N. C. Okes pers. obs. 2015). Urban expansion and industrialisation are responsible for the pollution of streams and rivers and for the loss of habitat. However, the impacts of habitat loss, increased riparian activity and disturbance on otter populations are largely unknown. A recent study compared otter sign surveys at a location in the Drakensberg in 1972–1974, 1993–1994 and in 2012 (Kubheka et al. 2013). They found that the signs of otters along this site had largely been reduced since earlier surveys (by 75% for the Cape Clawless Otter), and speculate that human population growth and increased riparian activity was having a negative impact on otter presence in this location in the Drakensberg (Kubheka et al. 2013). Internationally, increases in pollution have led to a dramatic decrease in local otter populations (Kruuk 2006). Current research on otters in the Cape Peninsula has found that certain persistent organic pollutants are present in the tissue of otters in urban areas (N. C. Okes unpubl. data). More research however is required on the effects of pollution on otters and their associated sources of food in South Africa as there is a gap in knowledge relating to the threat faced by otters from degradation of riparian areas. Occupancy modelling in the Cape Peninsula across a transformed landscape suggests that otters can tolerate certain levels of human impact and can inhabit areas in close proximity to roads (although road collisions are a threat in these areas) and in areas of high human population density (N. C. Okes unpubl. data).

Analysis of habitat use within rivers, however, suggests a higher probability that otters prefer non-canalised sections of river that are not heavily polluted (N. C. Okes unpubl. data). More data regarding the level of degradation of riparian areas the otters can successfully tolerate is needed. Research in South America has shown that the Southern River Otter (*Lontra provocax*) is able to tolerate moderate levels of change to riverbank vegetation so long as there is very little human activity along the floodplain (Medina-Vogel et al. 2003).

In the Lesotho Highlands, the impacts of dogs and cattle herders are expected to be less on otters than on most other mammals along rivers, due to the otter's ability to escape in and through the water, and their nocturnal activity patterns (Avenant 2004; Avenant & du Plessis 2012). Higher up in the mountains, where streams are smaller/easier to cross, dogs may be a threat (N.L. Avenant pers. obs.). Other predicted threats in the Highlands are overgrazing of riverbanks, and the burning of riverbanks and wetland areas (for grazing). Occasionally, they are accidentally caught and drowned in gill nets and fish traps (Rowe-Rowe 1990).

Another problem arising from human activity along rivers is pollutants entering rivers causing some species in the rivers to die-off, leading to a decrease in the biotic diversity of the rivers (Grimm et al. 2008), ultimately resulting in a shift in predator-prey dynamics. More research is required on the potential impacts pollution and climate change may have on the otter's prey base. No research has yet been conducted on the threshold for Cape Clawless Otter survival along disturbed rivers.

Current habitat trend: The main threat to the species is the declining state of freshwater ecosystems in Africa (Nel et al. 2007; Jacques et al. 2015). Within the assessment region, there is deteriorating habitat quality in all major rivers and inland water sources, especially decreases in flow and increases in pollution. In KZN, for example, Rowe-Rowe (1992b) identified the rapidly increasing human population as the primary threat, resulting in adverse alteration of catchments, riverine vegetation and freshwater habitats. Recent remote sensing data reveal a continuing expansion in both urban and rural settlements, having increased from 0.8% to 38% across all provinces between 2000 and 2013 (GeoTerraImage 2015). Similarly, 84% of main river ecosystems in South Africa were identified as threatened: 54% Critically Endangered, 18% Endangered, and 12% Vulnerable (Nel et al. 2007). Habitat removal is the greatest problem as they rely heavily on vegetation cover for shelter and protection. Overgrazing of riverbanks will thus have a negative impact. Climate change also has the potential to alter otter habitat, especially as wet areas continue to contract eastwards in South Africa (Erasmus et al. 2002), and to increase human/otter conflict for scarce resources such as water, land, and fish (Hendrix & Glaser 2007).

Conservation

Cape Clawless Otters are present in a number of protected areas across their range, both in the interior (Rowe-Rowe 1992b; Avenant 1997; Avenant & Watson 2002; Watson 2006) and along the coast (Arden-Clarke 1986). The main interventions revolve around riparian and coastline protection and enforcement of existing legislation.

Work on the effects of vegetation removal along rivers in South America have shown that the local species, *Lontra provocax*, will still frequent areas with moderate vegetation removal but only if human activity is not present as there is not enough cover to remain concealed from human detection (Medina-Vogel et al. 2003). The development of game reserves/national parks along rivers inhabited by Cape Clawless Otters would be beneficial as these areas

Table 4. Conservation interventions for the Cape Clawless Otter (*Aonyx capensis*) ranked in order of effectiveness with corresponding evidence (based on IUCN action categories, with regional context)

Rank	Intervention description	Evidence in the scientific literature	Data quality	Scale of evidence	Demonstrated impact	Current conservation projects
1	*1.2 Resource & Habitat Protection*: reduce development along rivers and coastlines through conservancy formation and stewardship schemes.	-	Anecdotal	-	-	-
2	*2.1 Site/Area Management*: reduce overgrazing by stocking livestock/wildlife at ecological capacity.	-	Anecdotal	-	-	-
3	*5.4 Compliance & Enforcement*: enforcement of zoning regulations and penalties for pollution.	-	Anecdotal	-	-	-
4	*5.2 Policies & Regulations*: development of stricter regulations on water abstraction, riverside and coastal development and pollution.	-	Anecdotal	-	-	-
5	*6.1 Linked Enterprises & Livelihood Alternatives*: the use of community projects to restore habitats.	-	Anecdotal	-	-	Working for Water Programme, Department of Environmental Affairs
6	*4.3 Awareness & Communication*: making the public aware of the importance of protecting water resources.	-	Anecdotal	-	-	-

would protect habitat along rivers and prevent the removal of necessary vegetation types. However, as is seen in the work by Kubheka et al. (2013), pollution entering rivers upstream from reserves still makes its way into the reserves, which will impact the otters.

Biodiversity stewardship opportunities of key sites should be sought. For example, stricter regulations and enforcement on development along riverbanks and coastlines needs to be implemented. Monitoring and mitigation of pollution (chemical and physical) of rivers needs to be implemented or increased. Education and awareness campaigns that position this species as an indicator of river health, and thus prestige for the landowner, should be promoted and tested as a conservation intervention. In the Lesotho Highlands, a limit to the number of dogs and stricter enforcement of no grazing in conservation areas may help. The use of extension services to restore riparian habitats, such as the Working for Water Programme, should continue to be used in key watersheds within the species' range.

Recommendations for land managers and practitioners:

- Nature conservation officers should cooperate with agricultural extension officers to give coordinated advice in veld management, agricultural practices and river care.
- Landowners should be encouraged to reduce stocking rates and take down fences, as, due to the large home range of the species, it can cover large distances when searching for freshwater and fences will only fragment their habitat (Arden-Clarke 1986).

Research priorities:

- Determine what limits otter populations.
- Determining the role of Cape Clawless Otters on river ecosystem functioning.
- Develop effective long-term monitoring programmes for this species in different habitat types.
- Determine, using genetics, accurate long-term population density and structure estimates across various habitats.

Encouraged citizen actions:

- Avoid building properties on riverbanks.
- Citizens can assist the conservation of the species by reporting sightings on virtual museum platforms (for example, iSpot and MammalMAP), and therefore contribute to an understanding of the species distribution. Citizens can conduct simple otter surveys using a useful guide: "Otter surveys: a simple and quick method". This can be obtained from paula.vanberkel@gmail.com or from the Otter Specialist Group (Lesley.wright@stfc.ac.uk).
- In some urban areas near rivers and wetlands, citizens can become involved in the local WESSA affiliated Friends of the River groups which help to ensure the conservation of these systems.
- Citizens can partake in beach and coastal clean ups.
- Supervise hunting dogs in farmlands to prevent unnecessary otter deaths. Similarly dog walkers should be mindful of their dogs when walking on beaches in the early morning and late evening, when this species is often active.

Data Sources and Quality

Table 5. Information and interpretation qualifiers for the Cape Clawless Otter (*Aonyx capensis*) assessment

Data sources	Field study (literature), indirect information (literature, expert knowledge)
Data quality (max)	Estimated
Data quality (min)	Suspected
Uncertainty resolution	Maximum/minimum values
Risk tolerance	Precautionary

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Details of the methods used to make this assessment can be found in *Mammal Red List 2016: Introduction and Methodology.*