Annexure 18 – Examples of biodiversity information sheets

Information sheet for the grey crowned crane (*Balearica regulorum regulorum*)

Balearica regulorum regulorum

GREY CROWNED CRANE

Description

A very large grey bodied bird characterised by long black legs, obvious white patches on the wings, a spiky straw coloured crest, white cheeks and red gular wattles.

Conservation status

Endemism: Sub-species is a southern African endemic

International conservation status

IUCN Red List Category: Currently listed as Vulnerable (1)

National conservation status

IUCN Red List Category: Currently listed as Vulnerable (1)

IUCN Red List criteria: A1a,c; A2b,c; C1 (2)

Legal protection status: Listed in Appendix 1II of Cites (2)

Distribution

The Grey Crowned Crane is globally restricted to Africa, with its distribution not having changed much over the last century. The South African population, along with the population in Zimbabwe, Botswana, Mozambique, Namibia and Zambia make up the smaller of the two subspecies, the South African subspecies (*Balearica regulorum regulorum*). Within South Africa, the Grey Crowned Crane is restricted to the moist eastern, higher rainfall areas of the country, from the Eastern Cape Province, throughout the western parts of KwaZulu-Natal and north-eastern Free State, into the south-eastern regions of Mpumalanga. This species is particularly abundant in higher altitudes such as in the north Eastern Cape and east Griqualand (southern KwaZulu-Natal), KwaZulu-Natal midlands and Wakkerstroom to north-east Free State regions. In the Free State, its breeding range has contracted to the north-east, while it no longer breeds in the North West Province(3).

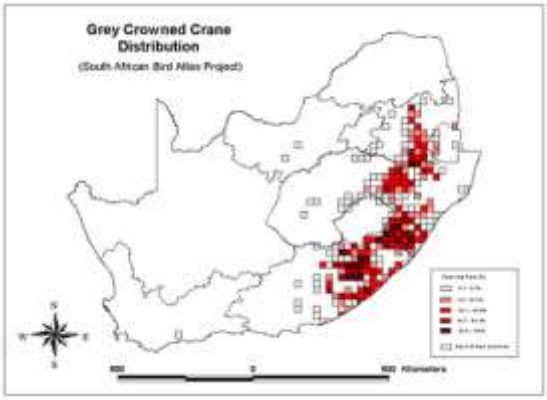

Figure 1. Grey crowned crane distribution (3)

Current level of protection within protected areas

Although known to occur in a number of protected areas, the Grey Crowned Crane nests and forages outside of protected areas, with the overriding conservation challenge being the development of sustainable management alternatives for their co-existence within existing land-uses(3).

Key threats to the species

- Drainage and transformation of wetland breeding areas by draining and damming,

for intensive farming and overgrazing from livestock.
- Loss of surrounding grassland habitat to agriculture and forestry practices
- Irresponsible application of pesticides and agro-chemicals in croplands.
- Intentional poisoning
- Power lines pose a collision hazard to young inexperienced cranes, and to adult birds in misty conditions
- Capture of chicks
- Uncontrolled hunting by domestic dogs

Priority actions required to protect the species

- Protection of remaining nest sites and associated foraging habitat
- Community-based habitat conservation programmes.
- Implementing management recommendations that allow cranes to coexist in agricultural and human utilization zones.

Guidelines for species surveys

Given that identification and protection of breeding sites is the primary concern, surveys should be undertaken during the breeding season. The nest is a circular platform of uprooted grasses and sedges concealed in tall emergent vegetation (greater than 1 m in height) in or along the margins of wetlands such as marshes with water c.1 m deep (1).

In South Africa, the Grey Crowned Crane is a summer breeder, with a peak in egg laying around November / December (3). Useful datasets of historic records are also available from the Endangered Wildlife Trust - Crane Conservation and Provincial conservation bodies. Local residents should also be questioned to obtain further information about potential occurrence and breeding activity.

Description of core habitat characteristics

Protection of nesting sites and associated foraging habitat is regarded as essential for the persistence of this species. Detail of specific habitat characteristics are provided below:

Breeding/recruitment: This bird nests on a raised bed of reeds, typically located in areas of seasonal to permanent wetland habitat, especially in marshes with water 1 m deep and with emergent vegetation 1 m above the water(1). They may also nest in well-vegetated farm dams, where they make their nests among tall, often reedy, wetland vegetation, often of a height so that the nest is sufficiently concealed from terrestrial predators(3).

Foraging habitat: Their preferred foraging habitat consists of expanses of short to medium height open grasslands adjacent to wetlands where they feed on grass seeds, insects and other invertebrates. Grey Crowned Cranes also use agricultural lands extensively in which to forage, including pastures, irrigated areas, fallow fields, newly planted cereal crops and harvested fields where they feed on harvest leftovers. The Grey Crowned Crane's generalist feeding strategy has allowed this species to adapt to human settlement and can be found most often in man-modified environments(3).

Guidelines for identifying and mapping core areas

For at least the first week, adults remain within ca 100m of the nest and return to roost where young are brooded. Family unit remains on breeding territory for at least 4 months after which young join non-breeding flocks (4). Preliminary studies by EWT suggest that availability of suitable foraging habitat within 200m is important in breeding site selection (5). This translates to an area requirement of c.a. 12.5Ha per nest site. Core areas requiring protection are therefore the habitat in which net sites have been located (e.g. wetland area), together with at least 12.5Ha of preferred natural foraging habitat (short to medium height open grasslands) around the nest site. If this core area cannot be achieved due to existing pressures, agricultural land may be included at a ratio of 2:1 provided at least 5Ha of grassland remains.

Sensitivity to potential site-based impacts

Disturbance of core habitat: Given the importance of core habitat for breeding

success, any direct disturbance in this area should be avoided.

Pollution: Application of pesticides and agro-chemicals in croplands pose a potential threat to birds that forage in these areas. Such application should therefore be minimized to prevent poisoning.

Alteration of hydrological regimes: Alteration of the hydrological functioning of wetland systems on which breeding takes place could affect the suitability of sites for nest breeding. Careful assessment of potential impacts would therefore be required to ensure that potential hydrological impacts are adequately mitigated.

Disturbance: Breeding birds are susceptible to disturbance and may abandon the nest if disturbed on a regular basis. Loud noises close to nest sites may also have a negative effect and should be avoided.

Key management considerations

Fire management: Wetlands and grassland areas should also be burnt on a periodic basis to maintain vegetation condition. This should ideally be done in sections (block burning) to provide a mosaic of different habitats. Where breeding sites occur, burning should take place outside of the burning season to prevent mortality of chicks.

Livestock management: Livestock movement should be restricted in proximity to nest sites during the breeding season. Overgrazing of core habitat areas should also be prevented.

Other: Dogs and cats should be restricted where breeding pairs occur as they could kill chicks or cause severe disturbance of nesting birds, leading to abandonment of nest sites.

Relevance of corridors for persistence of the species

Crowned cranes are highly mobile species, and are able to make use of transformed areas (croplands, pastures) for foraging. Given their mobility and ability to fly between areas of suitable habitat, corridors are not regarded as essential for the persistence of this species.

Corridor design requirements

N/A

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Information sheet for the Pickersgill's Reed Frog (*Hyperolius pickersgilli*)

Description

A small, slender frog (max 29mm). Colour variable. Male is brown (occasionally green) on the upperside, with or without darker stippling, and with a white stripe extending dorsolaterally from snout tip to groin. Female is brilliant yellow-green with no dorsolateral stripe. Flanks and limbs are off-white. The tadpole is long and slender with a muscular tail, and is similar to other *Hyperolius* spp tadpoles.

Male

Female

Conservation status

Endemism: A South African and KwaZulu-Natal endemic

International conservation status

- **IUCN Red List Category:** Not listed

National conservation status

- **IUCN Red List Category**: Currently listed as Endangered [1] (Note: This status is likely to be upgraded to Critically Endangered following a recent reassessment, which is awaiting verification by the IUCN).
- **IUCN Red List criteria**: B1ab(ii,iii,iv)+2ab(ii,iii,iv) [1, 3]
- **Legal protection status**: Listed as Specially Protected under Schedule Four of the KwaZulu-Natal Conservation Management Amendment Act, 1999. [4]

Distribution

Pickersgill's Reed Frog is globally endemic to a narrow strip along the coast of KwaZulu-Natal. It is known from near Kingsburgh in the south to St Lucia estuary in the north[1]. Predictive niche modeling does not significantly expand its potential distribution[2]. All known sites occur with 20km of the coast. Within this range, it is known from few (ca. 15), isolated, small populations. A number of the known sites have not been visited in recent years and some populations have probably been lost.

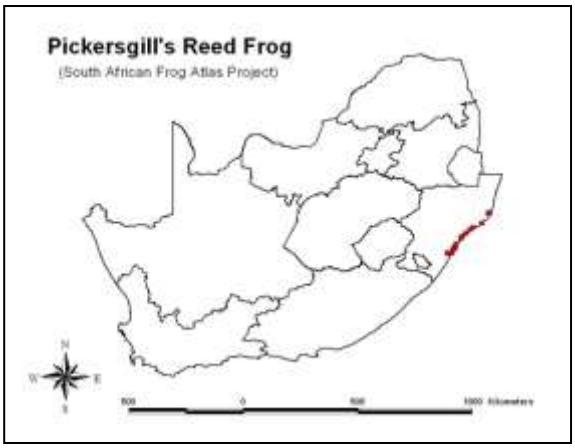

Figure 1. Pickersgill's Reed Frog distribution [2]

Current level of protection within protected areas

Pickersgill's Reed Frog is poorly represented in protected areas[2]. It has been recorded from Umlalazi Nature Reserve, Mtunzini. It also occurs marginally in the south of iSimangaliso Wetland Park, however, it has not been recorded there recently, nor has it been found elsewhere in the park, despite survey efforts[5].

Key threats to the species

- Drainage, degradation and transformation of wetland breeding sites, as a result of urbanisation, industrialisation, agriculture and afforestation
- Isolation of breeding sites and loss of surrounding terrestrial habitat through activities listed above
- Loss of breeding sites as a result of lowered water tables due to surrounding afforestation
- Chemical and other pollution of breeding sites

Priority actions required to protect the species

- Resurveying to confirm the frog's continued presence and site-specific threat evaluations for all known sites
- Surveys for additional sites supporting the species
- Design and implementation of management plans to protect, and maintain or improve the quality of sites supporting extant populations
- Monitoring of known populations
- Priority should be given to obtaining legal protection for at least a proportion of the sites
- Rehabilitation of natural terrestrial vegetation at some sites
- Municipal managers, planners and environmental assessment practitioners along the KwaZulu-Natal coast should be aware of the potential importance of small, seemingly insignificant wetlands for this species

Guidelines for species surveys

Pickersgill's Reed Frog is highly cryptic, as it is small and occurs in densely vegetated habitats. The primary method for surveying for this species is through the detection of the male's call at breeding sites. Even so, the call is soft and often inconspicuous against other ambient wetland noises. Surveys need be undertaken at night during the breeding season (August-March, but primarily November-March). Ideally, repeat surveys should be done at individual sites over the breeding season to improve the chance of detecting the species. All wetlands within 25km of the coast along the KwaZulu-Natal coastline should be assessed for this species.

Description of core habitat characteristics

Protection of breeding sites and associated terrestrial habitat is regarded as essential for the persistence of this species. Detail of specific habitat characteristics are provided below:

Breeding/recruitment: This frog breeds in densely vegetated wetlands. These sites are often small (<1ha) and the water is stagnant or very slow flowing and typically <50cm deep[(6)]. Such sites often don't have the appearance of 'pristine wetlands'. The dominant vegetation in these wetlands is often the sedge *Cyperus dives* but can also be *Phragmites* and *Typha*. Interestingly, Pickersgill's Reed Frog appears to seldom use the same breeding sites as the widespread Painted Reed Frog *Hyperolius marmoratus*. Males call from elevated positions, concealed within dense stands of vegetation. A gelatinous mass of approximately 50 eggs is attached to the vegetation, several centimetres above the water, and the tadpoles drop from the eggmass in to the water about a week after egglaying[(7)]. Time to metamorphosis is unknown, but may be in the region of six-eight weeks.

Foraging/overwintering/dispersal habitat: Virtually nothing is known about this species' use of habitats away from breeding sites[(6)]. However, there are records of non-breeding individuals 0.2km and 1.5km from breeding sites (unpubl. data), indicating that they do move widely away from breeding sites. Additionally, it is known that many closely related species regularly move some distance from water[(1)], and terrestrial habitats are increasingly recognized as important habitats for frogs for foraging, overwintering and dispersal between subpopulations[(8)]. It seems likely that Pickersgill's Reed Frogs regularly utilize densely vegetated habitats ≤100m surrounding breeding sites, and may regularly move well beyond this.

Guidelines for identifying and mapping core areas

Although there is no detailed information available specifically relating to this species, the following guidelines are based on research on other species, together with what is known about this and closely related species.

Breeding/larval habitat: The breeding site is absolutely essential for individual populations.

The wetland itself and a 30-60m envelope should be considered the 'core aquatic habitat'[9, 10]. This area is crucial and should be protected from any disturbance.

Foraging/overwintering/dispersal habitat: Terrestrial habitats away from the breeding site are likely to be as important for a population's persistence as the breeding site[8]. It is difficult to prescribe a single size value for this habitat, however, an area of ≥100m surrounding the breeding site should be maintained with very little disturbance[9]. Where possible, extending parts of the core habitat up to >1km from the site or at least maintaining areas of appropriate habitat with some connection to the breeding site within this area would be beneficial[11, 12]. In addition, it is important to attempt to maintain connectivity of the breeding site with other important landscape features, such as nearby wetlands (particularly if these also are known to or may support breeding *H. pickersgilli*), drainage lines and substantial areas of indigenous vegetation in good condition. This will need to be determined on a site-by-site basis, depending to a degree on the distribution of specific landscape features and existing land use surrounding individual breeding sites.

Sensitivity to potential site-based impacts

Disturbance of core habitat: Given the importance of core habitat for breeding success, any direct disturbance to the 'core aquatic habitat' as defined above should be avoided. Disturbance within the surrounding terrestrial habitats (particularly within 100m) should be minimised or preferably excluded; any development within this area should be of low intensity and allow for a large proportion of vegetation (preferably indigenous) to be maintained.

Alteration of hydrological regimes: Alteration of the hydrological functioning of wetland systems in which breeding takes place could affect the suitability of the breeding site. This could be through reduction (e.g. alien plants in or near the wetland, stormflow diversion) or increase (e.g. hardened surfaces nearby) in water volumes received. Careful assessment of potential impacts would therefore be required to ensure that potential hydrological impacts are adequately mitigated.

Pollution: Use of pesticides, agro-chemicals and industrial chemicals in surrounding areas and upstream of breeding sites may potentially contaminate breeding sites. Potential sources of contaminants need to be identified and managed appropriately to prevent or minimise the amounts of contaminants entering the system.

Noise: Frogs rely strongly on acoustic communication, particularly for reproductive success. The effect of noise as a result of anthropogenic activities such as traffic and industrial activity causes changes in calling behaviour of male frogs and response of females ([13, 14]). This could potentially negatively impact on breeding success. Pickersgill's Reed Frog has a particularly quiet call that does not carry far, and seems a more likely candidate that many other species to be negatively affected by excessive noise. It would therefore be important to minimise noise production in the vicinity of breeding sites.

Light: Most frogs, including Pickersgill's Reed Frog are primarily nocturnal. Excess light pollution may affect such species, however this issue is currently poorly understood[15]. In the absence of additional information, light pollution should be avoided as far as possible near core aquatic habitats.

Key management considerations

Alien plant management: Infestation of breeding sites and adjacent habitats by alien plants should be controlled. Removal needs to be done with minimal impact – habitat damage during clearing operations must be minimised and the use of herbicides should be strictly controlled and confined to those products that have been proven to have no negative effects on aquatic fauna.

Fire management: Wetlands and grassland areas may be burnt on a periodic basis to maintain vegetation condition. This should ideally be done in sections (block burning) to provide a mosaic of different habitats. Any burning should take place outside of the active season (approx. August-May) to prevent mortality of active frogs.

Encouragement of indigenous terrestrial vegetation re-establishment: Many breeding sites are surrounded by terrestrial habitat that

has been degraded and where a significant proportion of the natural vegetation has been lost. Where concerted management efforts are made, it may be beneficial to replant appropriate plant species in order speed up the rehabilitation process.

Introduction of Fish: Fish can be voracious predators of tadpoles and metamorph frogs, and introduced fish are a major threat to amphibians elsewhere in the world. The introduction of fish at known sites should therefore be avoided.

Relevance of corridors for persistence of the species

Compared with many other faunal groups, frogs are relatively poor dispersers, given their small size, generally low vagility and requirement of moist microhabitats. As a result, the availability of sufficient non-breeding habitat in order to disperse and forage is vital to ensure the longterm viability of populations. Connectivity should be maintained between breeding sites and other wetlands, drainage lines and areas of untransformed habitat.

Corridor design requirements

Corridors need to have a fair proportion of vegetation (preferably indigenous) present. It is beneficial if they are managed for biodiversity e.g. minimum disturbance, with alien plant control programmes, appropriate fire regimes (where needed) and programmes for maintaining or improving the quality of indigenous vegetation.

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Information sheet for the Nile crocodile (*Crocodylus niloticus*)

Description

A large crocodilian, which is instantly recognizable, and the only crocodile species that occurs in southern Africa. Juveniles are dark olive to brown with darker, crossbands on the tail and body. Adults are generally uniformly dark and the crossbanding on the tail becomes fainter with increasing age. The abdomen is light in color and the interior of the mouth is pale yellow. Adults average 3 – 3.5 m and may exceptionally exceed 5m in length.

Conservation status

Endemism: Although seven subspecies have been proposed, this has not been universally accepted. *Crocodylus niloticus* is an African endemic.

International Conservation Status

IUCN Red List Category: International: Lower risk/least concern (to be updated) [3].

National Conservation Status

- **IUCN Red List Category**: Vulnerable (1988) [4].
- **IUCN Red List criteria**: Not specified in the 1988 revision [4].
- **Legal protection status**: Listed in Appendix II of Cites [5].

Distribution

The natural distribution expands over 40 countries in Africa and overall Nile crocodiles are not threatened, having a relatively secure status in southern and eastern Africa especially [1]. Although South Africa was once host to large crocodile populations occurring in the estuaries, rivers and lakes of the eastern half of the country, today the species range is confined to a few waterbodies and eastward flowing rivers south of the Limpopo River extending to the Amatigulu – Nyoni estuary in KwaZulu Natal. Secure and viable populations in South Africa are restricted to Kruger National Park, Ndumo Game Reserve, Jozini Dam and Lake St Lucia. Preliminary findings of a current research project at Pongola River/Jozini Dam suggest that this population is larger than previously assumed [2].

Current level of protection within protected areas

Adequate protection of key habitat (e.g. nesting and basking grounds) seems to be restricted to areas of strict human exclusion. Crocodiles are likely to become locally extinct from protected areas where local communities share water and other resources with them (e.g. Kosi Bay, Lake Sibaya & Muzi Pan) [6]. There have been a number of recent observations of snared crocodiles in Ndumo Game Reserve [7]. Illegal killings for Muthi vary in severity among areas.

Key threats to the species

- Habitat destruction and degradation of lakes, wetlands, dams, rivers & estuaries, e.g. formal & subsistence farming and other means.
- Construction of dams in rivers.
- Pollution of rivers and dams (e.g. recent pansteatitis outbreak in KNP and Loskop Dam).
- Uncontrolled water removal for agricultural and other uses.
- Industrial development.
- Illegal killings for Muthi purposes.
- Destruction of nests and killings of crocodiles by people competing for the same water resource.
- Killings of crocodiles by farmers in rivers or dams.
- Destruction of nesting sites by trampling and disturbance of livestock.

- Negative effects of exotic invasive vegetation (especially when forming dense stands at breeding sites), e.g. *Chromolaena odorata* [8].

Priority actions required to protect the species

- Identify and protect historical and current nesting areas from human and livestock disturbance. Preferably, there must be no activities of humans or livestock in such areas between September and April.
- In areas where crocodile and local communities co-exist, sustainable use (where the local community benefit from the presence of crocodiles, e.g. ranching of wild eggs) is most likely the only way to prevent extirpation.
- Maintain critical habitats within protected areas by removing invasive vegetation from nesting areas, excluding livestock from nesting areas, etc.
- Prevent disturbance from ecotourism activities (e.g. boat tours) in protected areas.
- Prevent illegal killings and expose syndicates through regular patrols and counter intelligence.
- Monitor the status of sub-populations through regular aerial, boat and foot surveys.
- Restock protected areas where crocodiles have been eradicated as soon as the cause of decline have been modified or are under control. If the local community shares the water resource, restocking will need to follow consultation with and approval from the local people.

Guidelines for species surveys

A combination of survey methods is recommended.

- Conduct aerial surveys from a slow flying airplane with an experienced pilot in the absence of cloud cover or wind during mid morning (after 10:00) in winter, as more crocodiles would be visible. Environmental conditions (wind, cloud cover, air and water temperature) should be noted and crocodiles encountered should be plotted on a map or recorded with a GPS. The use of the same observers is preferable [6].
- Spotlight counts should be conducted (if the water is deep enough) from a boat at night to quantify visibility bias during aerial counts. These counts also provide a better representation of the smaller size classes of the population. Environmental conditions (wind, moon phase, air and water temperature) should be noted and crocodiles encountered should be plotted on a map or recorded with a GPS. The use of the same observers is preferable [6].
- Nesting surveys should be conducted in the middle of the breeding season (e.g. January in Zululand) by experienced staff. All possible nesting habitats should be surveyed with an emphasis on historical and recent nesting areas. Nesting sites should be recorded with a GPS [6].

Description of core habitat characteristics

Protection of nesting sites is regarded as essential for the persistence of this species. Details of specific habitat characteristics are as follows:

Breeding/recruitment: Although some variation exists between the nesting sites of different sub-populations (at St Lucia most nest sites are excavated in fine sand, while along the Pongola River and at Ndumo nesting sites are often selected in areas with higher loam or clay content), most nesting sites require sandy substrate that receives sufficient sunlight for egg incubation, adequate elevation (above the floodline) if close to a stream or river and sufficient vegetation to proved a shaded area close to the nest. The female will shelter in shade or nearby water during the hot hours of the day. Nest sites are always relatively close to fresh water, which provides an area for the female to drink as well as nursery habitat for the hatchlings.

Foraging habitat: Hatchling and juvenile crocodiles feed on small fish, invertebrates (e.g. insects and spiders), frogs etc. that are found in shallow, still or slow flowing water with sufficient aquatic vegetation. As crocodiles progress in size their diet changes to incorporate larger fish, small mammals, birds and other reptiles. Large adults can seize and drown prey as heavy as themselves, but crocodiles are extreme opportunists and large adults can often be seen feeding on small prey. Crocodiles require relative shallow water to hunt, and are essentially predators of the water's edge.

Thermoregulation: Although crocodiles don't hibernate in the strict sense of the word, the winters in Zululand are cool compared to tropical Africa and hatchlings and juveniles shelter in burrows for the first few years of their life [(4)]. Adults also frequent burrows in the banks of rivers and streams, most probably to thermoregulate, as these tunnel are cool in summer and warm in winter, compared to the ambient temperature.

Shelter: Hatchling and juvenile crocodiles rely heavily on vegetation for shelter, and only once they reach approximately 1.2m (total length) will they spend more time basking in open areas with exposed sandbanks. Adults require a combination of shoreline vegetation and excess to deep enough water to find shelter in, especially in areas of human disturbance.

Guidelines for identifying and mapping core areas

Females select nesting sites at the end of the dry season, (late October to early November) which is followed by oviposition and an incubation period of approximately 90 days [(9)]. The hatchlings remain around the nursery area for a few weeks before they disperse [(9)].

Sensitivity to potential site-based impacts

Disturbance of nesting habitat: Given the importance of the nesting site for breeding success, any direct disturbance in this area should be avoided.

Pollution: Recent mass mortalities in the Olifants Gorge of KNP and at a smaller scale in Loskop Dam from pansteatitis (yellow fat disease) have demonstrated the vulnerability of the species [(10)]. Although it is not yet clear what exactly triggered the pansteatitis outbreak in the Olifants Gorge, it is most likely related directly or indirectly to pollution. Research on the presence and effects of environmental contaminants on crocodiles in KZN is currently underway.

Direct Disturbance: Prolonged disturbance to crocodiles (e.g. boat operators or local fisherman that venture too close) may eventually cause crocodiles to leave an area.

Key management considerations

Protection of nesting sites: Identify and protect historical and current nesting areas from human and livestock disturbance. Remove dense stands of exotic invasive vegetation at breeding sites (e.g. *Chromolaena odorata*).

Manage disturbance to crocodiles: Prevent disturbance from ecotourism activities (e.g. boat tours) in protected areas.

Patrols: Prevent illegal killings and expose syndicates through regular patrols and counter intelligence.

Restocking of extirpated areas: Restock protected areas where crocodiles have been eradicated as soon as the cause of decline have been modified or are under control. If the local community shares the water resource, restocking will need to follow consultation with and approval from the local people [(11)].

Other: Crocodiles that are continuously fed by the public in areas might loose their innate fear for humans and become extremely dangerous.

Relevance of corridors for persistence of the species

Connectivity between sub-populations in protected areas through rivers such as the Pongola, iMfolozi and Mkhuze are very important to maintain genetic diversity. Although there is evidence of limited movement between Lake St Lucia and Hluhluwe-iMfolozi, the extent of such movements are not known. Increased development and disturbance along rivers linking the protected areas will most probably lead to isolation between sub-populations.

Corridor design requirements

Habitat characteristics: Water extraction from and inflow of toxic pollutants in connecting rivers will negatively impact

crocodile movement. Destruction or transformation of natural bank vegetation with subsequent erosion will reduce shelter to crocodiles. Sedimentation of rivers will alter flow regime (e.g. not flowing or too shallow for prolonged periods during the year).

Aspects which would encourage use:

Movement between protected areas will increase if adequate shelter (e.g. vegetation along river bank) and disturbance free (from humans) basking habitat (e.g. sandbanks) exists.

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Information sheet for the Spotted-necked otter (*Lutra maculicollis*)

Description

L. maculicollis is the smaller of the two otter species found in South Africa, with a combine head and body length of about 600mm and it weighs only 4-5kg. Spotted-necked otter has a slim, elongated body with dorso-ventrally flattened tail. The head is broad at the back, narrows at the muzzle with small ears that are pressed close to the head. The feet are fully webbed, with short claws. The colour of the fur is generally brown, slightly lighter on the underside. The throat has irregular patches and spots of cream or white [(1)].

Conservation status

Endemism: Not endemic to South Africa

International Conservation Status

- **IUCN Red List Category**: Least concern

National Conservation Status

- **IUCN Red List criteria:** Least concern

- **Legal protection status**: Spotted-necked otter is protected in National Parks. Unprotected outside of reserve in Natal, listed as near threatened in the SA Red Data Book (8),and listed on Appendix II of cites (4). A permit is required for protected species.

Distribution

The spotted-necked otter is widely distributed in Africa south of the Sahara, but it is absent from the eastern half of Tanzania, Zimbabwe, the southern portion of Botswana and Namibia [(2)]. In South Africa, the spotted-necked otter is rare and occurs in the eastern half of the country. Lakes, swamps, rivers, streams and impoundments of the mountain and upland-region are the habitats more suitable for the species. In the Natal-KwaZulu it is less common in the basin plainlands and intermediate regions; it is apparently absent from plateau, low-lying and coastal [(3)].

Current level of protection within protected areas

Spotted-necked otter is protected in National Parks. In the Natal Drakensberg Park spotted-necked otters have been recorded in the contiguous protected areas from Garden Castle to Cathedral Peak (except Highmoor), and in Royal Natal National Park. Other protected areas from which they have been reported are Albert Falls, Coleford, Craigie Burn, Himeville, The Swamp, Umvoti Vlei, Vryheid and Wagendrift.

Key threats to the species

- Deterioration in water quality (toxics, nutrients and turbidity)
- Habitat transformation associated with development pressure and overgrazing
- Opportunistic hunting.
- Over hunting and over fishing of all indigenous fauna.

Priority actions required to protect the species

- Maintaining water quality (including sediment loads) through sound catchments and land management
- Protection of areas of suitable habitat
- Monitoring of population change

Guidelines for species surveys

- To study otters one needs to apply combined methods, amongst those one need to walk the river bank for kilometres

on both sides looking for the signs e.g. holts, faecal matter, tracks etc.
- Need to know how the faecal matter looks like and tracks.
- One must be able to identify the spotted-necked otter on sight.
- Traps can be used for capturing spotted-necked otter.
- For sightings, otters are more active in the late afternoon and early morning.

Description of core habitat characteristics

Spotted-Necked Otters are very aquatic and require permanent water sources with high fish densities. They prefer larger rivers, lakes and swamps with open areas of water. They appear to only make use of fresh water habitats. Because they mainly hunt by sight, they need clear, unpolluted water where there are numerous small fish, or fish, crabs and frogs. Long reeds, grass and bushes are essential to provide cover, and holes or other shelters are also needed. The most suitable habitat is the large fish-rich African lakes and the deep, clear areas of the Botswana Okavango.

Breeding/recruitment: These otters are believed to breed seasonally between September and December. There is not much known about their breeding behaviours. The female's holt or den is found in the bank of the river. The gestation period of most otters is 60-65 days and they produce one to three offspring. Spotted-necked otters are most commonly seen with two. The cubs will begin swimming at 8 weeks and they will stay with their mother for around a year.

Foraging habitat: The spotted-necked otter's diet consists mainly of fish, crustaceans, and amphibians but they also eat insects, water bird chicks, and molluscs when they can be found. They hunt their prey using sight and carry it in their mouths to the surface of the water where they eat. They will make several short hunting trips throughout the day, resting in vegetation in between. In some areas they are found to be nocturnal.

Shelter: Riparian vegetation (long grass, reeds, and bushes) is essential component of the spotted-necked otter habitat as it provides cover during periods of inactivity, so are holes or other shelter. They dig holes (den) on the bank of the river for shelter.

Guidelines for identifying and mapping core areas

Permanent sources of unpolluted freshwater with high densities of fish are necessary to support spotted-necked otters. Areas of open water such as large lakes, rivers and swamps are preferred and dense marginal vegetation such as reeds, grass and bushes is important for cover [(6)]. Breeding takes place at different times of the year across the spotted-necked otters' range, with between one and three cubs born after a gestation period of around three months. The young are born blind and remain with their mother, who provides all the parental care, for up to a year [(7)].

Sensitivity to potential site-based impacts

The main threats to spotted-necked otters are considered to be siltation due to erosion near the source of rivers (e.g. overgrazing and poor agricultural practice), cultivation of bank side habitats, indiscriminate bushfires, competition for fish and hunting.

Pollution: Pollution is a major factor in spotted-necked otter decline. They are generally declining in many areas, primarily due to the loss of the clean, clear water habitats they require to function effectively. Because they mainly hunt by sight, they need clear, unpolluted water where there are numerous small fish, or fish, crabs and frogs.

Direct Disturbance: Increasing human population, poor agricultural practices are some of the anthropogenic disturbances that negatively affect spotted-necked otters. Furthermore, in large water bodies such as Lake Victoria, introduced alien fish may be out-competing the spotted-necked otter for the smaller indigenous fish on which it depends. In parts of its range the spot-necked otter is also persecuted for food and fur or even just

because it is considered a competitor for fish (5) (6).

Key management considerations

The main conservation efforts are in making local populations aware of the need to preserve wetland habitats and the creatures which live in them. Here, as everywhere, otters are a key species – bio indicators of healthy ecosystems. Studies on otter populations have recommended patrols to catch fish poachers and a closed fishing season.

Fire management: Spotted-necked otters make use of riparian vegetation for shelter so an early burning regime must be practice to prevent later uncontrollable bushfires.

Livestock management: Pollution and general degradation of freshwater habitats is caused by overgrazing and poor agricultural practice. Dogs should not be allowed in spotted-necked otters habitat as they will prey on them.

Relevance of corridors for persistence of the species

Corridors are very important for the spotted-necked otters as they move around in search of food and mating. This is demonstrated at Kamberg Nature Reserve where spotted-necked otters move between two protected sections of the reserve that is separated by the village and farm land.

Corridor design requirements

Areas of open water such as large lakes, rivers and swamps are preferred and dense marginal vegetation such as reeds, grass and bushes is important for cover. Water must be unpolluted and must be clear as spotted-necked otters rely on sight when hunting.

Habitat characteristics: Spotted-necked otters are very aquatic and require permanent water sources with high fish densities. They prefer larger rivers, lakes and swamps with open areas of water. Long reeds, grass and bushes are essential to provide cover, and holes or other shelters are also needed.

Aspects which would encourage use: Movement between subpopulation will increase if permanent sources of unpolluted freshwater with high densities of food (fish, crabs, frogs and aquatic insects) and dense marginal vegetation such as reeds, grass and bushes are protected.

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Information sheet for the Black-headed dwarf chameleon (*Bradypodion melanocephalum*)

Identification

Branch (1998)[1], Tolley & Burger (2007)[2]. Differs from other *Bradypodion* dwarf chameleons by the low casque and unpigmented or red throat grooves (Figure 1)[3].

Figure 1. Adult female (top left), adult male (top right), juvenile (below).
Photos: James Wakelin (female & juvenile) and Adrian Armstrong (male)

Conservation status

Endemism: Endemic to a small region of eastern South Africa, occurring south of the Thukela River in several discrete populations in the KwaZulu-Natal midlands and coastal areas and extending marginally into the Eastern Cape Province[2]. Near-endemic to KwaZulu-Natal (Figure 2).

International Conservation Status

- **IUCN Red List Category**: Not yet listed

National Conservation Status

- **IUCN Red List Category**: Not yet listed
- **IUCN Red List criteria:** N/A
- **Legal protection status:** Not yet protected
  Note: Used to be common where they were found, but now are generally scarce except in good remaining habitat or when squeezed by land transformation into small habitat patches(5, 6).

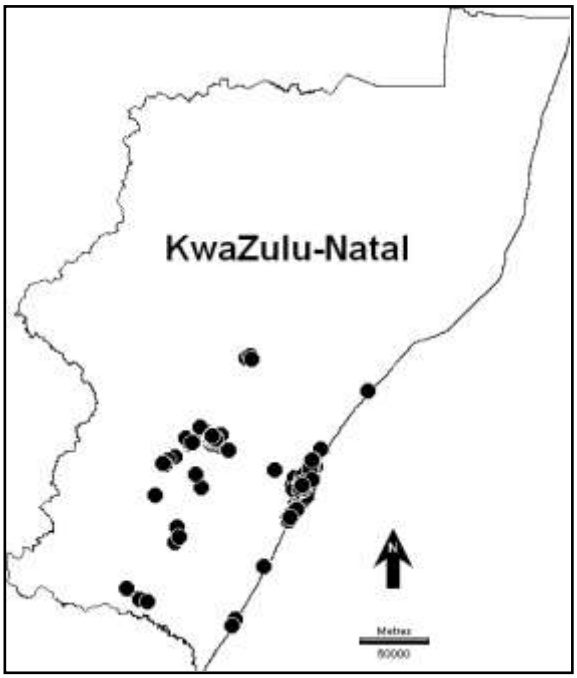

Figure 2. Distribution of the black-headed dwarf chameleon in KwaZulu-Natal.

Current level of protection within protected areas

Inadequately protected in statutory protected areas[4].

Key threats to the species

- Loss of grassland habitat through sugarcane farming, sylviculture and urban (including industrial) expansion are the main reasons for the decline in populations[5, 7].
- Degradation and eventual loss of grassland habitat through alien plant invasion, overgrazing and too frequent fires further diminish the size of their populations[7, 8].
- Fires kill dwarf chameleons, and because female bear live young their offspring maybe killed at the same time[8, 9].

- Introduced predators (e.g. cats, dogs, common mynah birds), motor vehicles and electric fences increase the mortality rate of the species[5, 7].
- Pollution of their drinking water by air pollutants and pesticides are also threats to the species' existence[5].

Priority actions required to protect the species

- More protected areas for this species are required[4].
- Existing habitat for the species must be maintained in good condition through appropriate burning regimes, alien plant removal, and control of livestock grazing pressure where applicable[7, 8].

Guidelines for species surveys

Surveys must be undertaken after dark by several observers using torchlight when the animals are roosting. Observers should have appropriate experience in surveys of this nature to ensure that this inconspicuous species is located if present. Black-headed dwarf chameleons are most detectable then since they roost in exposed positions towards the ends of stems and branches. Surveys should be carried out during summer or early winter as numbers are lowest during late winter and early summer ("spring"), winter being the season of lower food availability[8].

Description of core habitat

Grassland, wooded grassland, reed beds and forest edges[4, 7, 10].

Guidelines for identifying and mapping core areas

Potential habitat for the black-headed dwarf chameleon has been mapped[4, 7]**.**. An area of approximately 583 ha of suitable habitat should contain a viable population of about 7 000 adults[11, 12]**.** This area may be a single area or else a series of suitable habitat patches connected by appropriate corridors.

Sensitivity to potential site-based impacts

Disturbance of core habitat: Direct disturbance in this area should be avoided, or at least minimized in the case of alien plant removal.

Pollution: Application of pesticides should be avoided; in particular, no aerial spraying within 3 km of black-headed dwarf chameleon habitat should be permitted and land-based application of pesticides and herbicides near the habitat should ensure that no spray drift onto the habitat occurs (e.g. by directing spray nozzles downwards, avoidance of pesticide application on windy days). The application of herbicides for alien plant control in the habitat must be in accordance with the label instructions and herbicide drift onto indigenous plants must be avoided.

Alteration of hydrological regimes: Alteration of the hydrological functioning of wetland systems could affect the suitability of the habitat. Careful assessment of potential impacts would therefore be required to ensure that potential hydrological impacts are adequately mitigated.

Domestic predators: Dogs and cats should not be allowed to stray into black-headed dwarf chameleon habitat, and dogs should be kept on leashes when being walked though the habitat, to prevent predation on the dwarf chameleons.

Key management considerations

Fire management: Burning of its grassland habitat should not occur more than once every two years and only one part of the grassland habitat should be burnt in any single year.

Alien plant control: Alien plant removal should be ongoing and be carried out on a patch rotational basis (i.e. not intensely over the whole site and not using heavy machinery such as tractor-pulled implements). Alien plant control methods should avoid damage to the indigenous plants and other habitat elements at the site.

Livestock management: Livestock generally should not be allowed into black-headed dwarf chameleon habitat.

Electric fences: Electric fences erected at the edge of black-headed dwarf chameleon habitat should be of the pressure-activated type, with the force required for activation of the current set at much more than the weight of a black-headed dwarf chameleon to prevent electrocution of the chameleons (and other small animals).

Chemical pollutants: Pollutant air emissions and pesticide spray that may drift into the habitat must be avoided through thorough scrubbing of air emissions at source and avoidance of pesticide use or correct application of pesticides when required (e.g. no aerial spraying within 3 km of black-headed dwarf chameleon habitat, directing spray nozzles downwards, avoidance of pesticide application on windy days).

Relevance of corridors for persistence of the species

Corridors are vital for the persistence of black-headed dwarf chameleon populations as these populations mainly occur in areas where the habitat has been transformed or degraded by urban expansion, afforestation, agricultural cultivation, rural settlement and alien plant invasion. As a result, remaining habitat tends to be small in size and somewhat degraded. Therefore, to maintain viable populations, these small habitat areas need to be connected to form a larger overall habitat area and to allow demographic processes, e.g. dispersal, to operate. In this way, the effective population size and genetic heterozygoscity will be higher and therefore the probability of the persistence of the population in the medium term will be increased. The immigration of new black-headed dwarf chameleons to a habitat patch is required for the maintenance of genetic diversity.

Corridor design requirements

Corridors should consist of suitable habitat (grassland, wooded grassland, reedbeds and forest edges) of at least 250 m width, and should be managed for the survival and persistence of the chameleons. Suitable corridors may be along rivers, where buffers of indigenous vegetation of about 125 m width or greater are maintained on either side of the rivers. However, corridors should not only be situated along rivers when connecting habitat patches. The greater the number of corridors connecting suitable habitat patches the greater the likelihood of successful movement of individuals between habitat patches.

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Information sheet for the plant *Kniphofia leucocephala*

Description

Kniphofia leucocephala has 4-7 aerial groups of leaves per plant, 3-6 at each growing point. The leaves are green to glaucous-green, channelled above and keeled below. They are V-shaped in cross-section, soft, and 470-630mm long and 4-7mm wide. They gradually taper to a point at the apex. The leaf margins have fine bead-like outgrowths in the upper third but are smooth on the lower part and on the keel. The stolons are short and form tufts about 50 mm in diameter. The roots are yellow. The inflorescence is ovoid to rhomboid at mid flowering stage and 45-50 by 38-46 mm (Baijnath, 1992). Mature flowers are white and occur from August to January.

Distribution

Historically found near Lake Msingazi in the vicinity of Richards Bay. Currently only found at Langepan vlei near Kwambonambi.

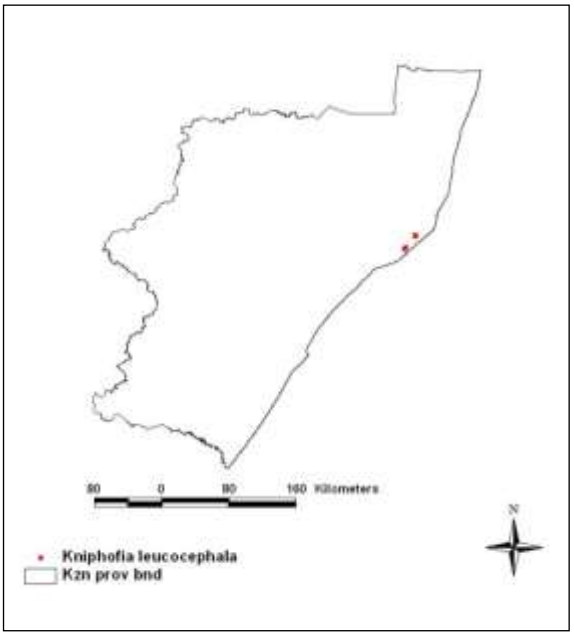

Figure 1. *Kniphofia leucocephala* distribution [3]

Conservation status

Endemism: KwaZulu-Natal endemic

International Conservation Status

- **IUCN Red List Category:** Not listed

National Conservation Status

- **IUCN Red List Category**: Currently listed as Critically Endangered [1]
- **IUCN Red List criteria**: B1ab(iii)+2ab(iii)[2]

Legal protection status: *K. leucocephala* is protected in KwaZulu-Natal under section 61 of the KwaZulu-Natal Conservation Management Amendment Act 5 of 1999. A permit, issued by the Conservation Service, is required to gather a protected plant from the wild or to transport, export and sell protected plants. Protected plants may only be purchased from a person who is legally entitled to sell the plant.

Current level of protection within protected areas

Kniphofia leucocephala does not occur in any protected area. [3].

Key threats to the species

- Loss of grassland habitat to agriculture and forestry practices and to urban development.
- Potential change in the hydrology of the wetland due to the replacement of pine trees with Eucalyptus species
- Overgrazing and trampling by cattle

Priority actions required to protect the species

- Protection of the remaining site
- Establishment of populations in suitable habitat that have independent disturbance factors but allow for the genetic linking of populations to attain the population target of a minimum of 6 wetlands of 16ha each.
- Land owner/manager involvement in the conservation programme.
- Implementation of management recommendations

Guidelines for species surveys

Surveys should be undertaken during the flowering season in September after a winter burn (Church, 2006).

Description of core habitat characteristics

Kniphofia leucocephala occurs in a wetland in Maputaland Wooded grassland. Soils in the drainage line are hydromorphic, with a deep sticky humus layer overlying sands. Clay has settled along the depression and is overlain by peat. Aggregates of organic detritus and ferric hydroxide form a loose layer on the bottom; Phosphorous is deficient as indicated by low concentrations of algae (Reavell, 1996).

Guidelines for identifying and mapping core areas

N/A

Sensitivity to potential site-based impacts

Alteration of hydrological regimes: Alteration of the hydrological functioning of the wetland system could affect the suitability of the site for *K. leucocephala*. Careful assessment of potential impacts would therefore be required to ensure that potential hydrological impacts are adequately mitigated.

Disturbance: The effect of trampling by cattle around water points is unknown.

Key management considerations

Fire management: Langepan should be burnt biennially in winter to allow for flower and seed production during spring.

Livestock management: Livestock movement should be restricted during the flowering season to prevent trampling and grazing of flower heads. Overgrazing of core habitat areas should also be prevented.

Other: Alien plants should be removed from the grassland.

Relevance of corridors for persistence of the species

This is dependent on the establishment of new populations and the movement of primary pollinators.

Corridor design requirements

N/A

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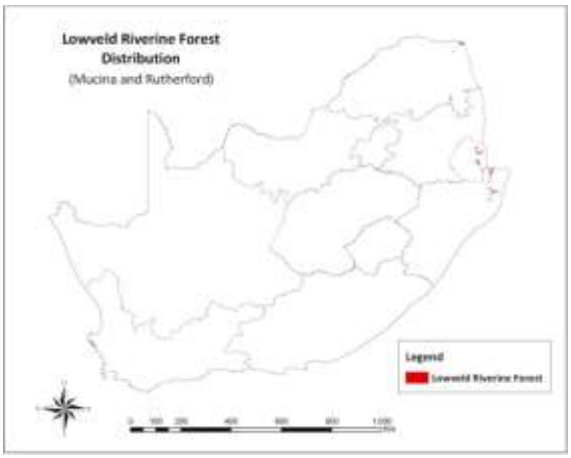
Information sheet for the lowland riverine forest

Description

This rare vegetation type comprises tall multi-layered gallery forests fringing larger rivers and water pans in the savanna biome of South Africa and neighbouring countries. It is controlled by a specific hydrological regime and is often subjected to flooding, sometimes to very heavy flooding. Important taxa included in this vegetation type are:
(i) Tall trees - *Acacia robusta* subsp. *Clavigera*, *Breonadia salicina*, *Diospyros mespiliformis*, *Faidherbia albida*, *Ficus sycomorus*, *Kigelia africana*, *Berchemia discolour*, *Combretum erythrophyllum*, *C. imberbe* and *Ekebergia capensis*.
(ii) Small trees - *Combretum hereroense*, *Croton megalobotrys*, *Hyphaene coriacea*, *Nuxia oppositifolia*, *Phoenix reclinata* and *Veronia colorata*.
(iii) Tall shrubs - *Abutilon angulatum*, *Acacia schweinfurtii* and *Ficus capreifolia*.
(iv) Soft shrubs - *Hypoestes aristata*.
(v) Herbs - *Achyranthes aspera*
(vi) Graminoides - *Digitaria eriantha*, *Panicum maximum*, *Echinochloa pyramidalis*, *Eriochloa meyeriana*, *Panicum coloratum*, *Phragmites mauritianus*, *Setaria incrassate*, *S. sphacelata* and *Sporobolus consimilis*[1].

Distribution

Lowveld Riverine Forest is restricted to the fringes of large rivers and pans in the low lying subtropical regions of South Africa and neighbouring countries. This area is defined as the Northern parts of KwaZulu-Natal (Zululand) and the Eastern parts of Mpumalanga and Limpopo provinces and Swaziland. It is limited to low altitudes of between 20m and 320m with recent alluvial deposits and fine textured soils such as the Dundee soil form[1].



Conservation status

Endemism: This vegetation type is restricted to the low lying subtropical areas of eastern Southern Africa (see distribution) [1].

IUCN Red List Category: Though not categorised on the IUCN Red List, this vegetation type is reported to be critically endangered[1].

Legal protection status: All natural forests are afforded protection under the National Forests Act (no 84 of 1998), which prohibits their felling without a permit, while certain individual forest tree species are also protected under this act.

Current level of protection within protected areas

The recommended conservation target for this rare vegetation type is 100% of its existing area1. Approximately half of the known area is currently conserved in existing federal and private protected areas such as the Kruger and Mapungubwe National Parks, the Greater St Lucia wetland park, Ndumo and Mkhuze game reserves in South Africa and the Royal Hlane Game Sanctuary in Swaziland1. An unknown proportion of the remainder has been irreversibly transformed through clearance for cultivation.

Key threats to this vegetation type

- Invasion by alien plant species such as *Melia azedarach*, *Chromolaena odorata*, *Lantana camara*, *Psidium guajava* and *Caesalpinia decapetala*, is considered a serious threat to this vegetation type.
- The building of dams[2], excessive extraction of water from rivers for mining and agriculture and upstream agricultural malpractices threaten the hydrological regime which controls this vegetation type.
- A further significant threat is the clearing of forest for cultivation, especially given that this vegetation type is always located close to water resources.
- Local exploitation for timber and non-timber forest products. Fuel wood represents the highest volume of forest products used by rural people.

Priority actions required to protect the vegetation type

Only 50% of the recommended 100% of this vegetation type is currently under formal protection1. Despite statutory protection of forests and indigenous tree species, areas of this vegetation type outside of formally conserved areas are often disturbed and subject to transformation. Any areas where this vegetation type occurs should be protected and rehabilitated where possible to ensure that the functions and biodiversity associated with this vegetation type are protected. Due consideration must also be given to water allocations and catchment management to ensure that flows and sediment inputs are not altered to such a degree that they affect the structure and composition of this vegetation type.

Guidelines for surveys

Where activities are planned within the distribution range of this vegetation type, an assessment of structure and composition of vegetation should be undertaken to confirm whether or not the riparian area under consideration is Lowland Riverine Forest.

Description of core habitat characteristics

See description of this vegetation type for details of topographic setting, structural and species composition.

Guidelines for identifying and mapping core areas

Any areas consistent with the description of this vegetation type should be identified and mapped.

Sensitivity to potential site-based impacts

Pollution: Inputs of pollutants should be avoided as this may affect plant species.

Water inputs: The vegetation type is well adapted to high flows, and is therefore unlikely to be negatively affected by any increase in lateral inputs or flood peaks, provided this is through diffuse or sub-surface flows. Concentrated flows should be avoided, since this could cause erosion.

Sedimentation: This vegetation type occurs on alluvial soils, so is well adapted to deposition of sediments.

Direct Disturbance: Although quite robust, direct disturbances of the forest edge or interior should be avoided as this is likely to stimulate encroachment by alien invasive plants.

Key management considerations

Fire management: Fire should be avoided as far as possible, to prevent degradation of this vegetation type.

Livestock management: Livestock should be carefully controlled or excluded from these areas as grazing reduces vegetation cover, leading to reduced water retention and infiltration and increased surface flow and erosion[3]. Heavy utilization may also reduce recruitment and therefore the long-term viability of the habitat.

Catchment management: The composition and structure of riparian vegetation is dependent on the extent, duration, timing and frequency of flooding that determines the disturbance regime, geomorphological activity, groundwater level and its chemistry[2]. Activities in the upstream catchment that reduce flows, particularly during dry years are a key concern as this may cause dieback of forest species[2]. Reduced flooding frequency may also affect seedling regeneration and therefore initiate population declines of riparian trees.

Other: The leading cause of deforestation in many areas is the clearing of land for agriculture, and the felling of trees for fuel and construction materials. Joint resource management strategies which take local use of forest products into account are thus important in establishing the sustainable utilisation of forest areas and forest products.

Relevance of corridors for persistence of the species

This is essentially a 'linear' vegetation type by nature, due to its link to the edges of water bodies. Rehabilitation of degraded riparian areas should be considered where possible to link remnant patches and so increase the viability of the habitat and associated species.

Corridor design requirements

Habitat characteristics: Naturally occurring species should be re-introduced where rehabilitation of degraded areas is planned.

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