



4.2 SWAMP FORESTS

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INTRODUCTION



Swamp Forest is a freshwater habitat found in estuaries, freshwater lakes and drainage areas in subtropical and tropical regions of KZN and the Eastern Cape. It occurs as pockets and ribbons at altitudes between 20 m to 60 m and includes common tree species such as *Hibiscus tiliaceus*, *Syzygium cordatum*, *Barringtonia racemosa*, *Voacanga thouarsii* and *Ficus trichopoda* with an understory of ferns (*Microsorium punctatum* and *Nephrolepis biserrata*) and creepers (*Stenoclaena ternifolia*). *F. trichopoda* (swamp fig) and *B. racemosa* (powder-puff tree) are protected under the National Forests Act of 1998, and cannot be cut, disturbed, damaged or destroyed. The endemic *Raphia australis* (raffia, giant palm) is restricted to Maputaland, where it occurs at Kosi Bay and the Siyaya Estuary (Obermeyer and Strey 1969). Trees often overhang the open water, shading out reed and sedge habitat. In the absence of submerged macrophytes, their leaf litter contributes substantially to the detritus food chain in estuarine ecosystems. Swamp Forest soils



uMdloti Estuary, January 2019
Photo: Janine Adams

are generally fine, muddy, waterlogged, and anoxic with organic humus and a peat-like layer, except in St Lucia Estuary where they are sandy, sandy loam or loamy sand with moderate to high organic content. The habitat is classified as Critically Endangered with only 67% occurring in protected areas (Van Deventer *et al.* 2021). It was recently recognised as an integral part of the Estuarine Functional Zone, which has improved its level of protection countrywide.

DRIVERS

Alteration of normal water flow patterns in the estuary and removal, or destruction of habitat are the main threats to Swamp Forests. Species such as *F. trichopoda* are sensitive to fluctuations in hydroperiod and soil moisture, in contrast to *B. racemosa* which tolerates greater hydrological change. Salt-water intrusion has caused mass

mortality of trees in the Richards Bay area because of changes in water dynamics following port development. Swamp Forest is harvested for building materials and traditional medicines and is cleared to make way for subsistence farming. Illegal and unsustainable slash-and-burn practices have destroyed large areas of Swamp Forest in the Kosi Bay Estuary. Habitat removal for residential and industrial developments, roads and bridges has reduced tree cover in many south coast estuaries. Altered soil conditions encourage habitat invasion by terrestrial and alien plants such as *Chromolaena odorata*, *Lantana camara*, and *Pereskia* species, as evident in the iMpenjani Estuary. Fungal disease can affect species, such as *B. racemosa* causing the loss of unripe fruit.

PRESSURES

Swamp Forest is threatened by draining land to cultivate agricultural crops, and by prolonged inundation from fresh or saltwater following closure of an estuary mouth. In rural areas, forest trees are sources of food, construction material, and medicine, and are often harvested excessively. Illegal slash-and-burn agricultural practices in northern KZN, particularly in the iSimangaliso Wetland Park, have removed large Swamp Forest areas and threaten the survival of this sensitive habitat.

STATE

Historic perspective

In 1972, early surveys of KZN estuaries recorded the presence of Swamp Forest but gave little estimate of scale. Van Niekerk *et al.* 2019 measured estuary habitat change over time and recorded loss of Swamp Forest in the iFafa (2,6 ha), uMkhomazi (10 ha), aManzanamtoti (3,3 ha), aManzimtoti (1 ha), uMhlali (19,1 ha), uThukela (1,5 ha), uMgobezeleni (452 ha) and

Kosi (52 ha) estuaries, accounting for about 16% of the total. This loss results from encroachment by sugar cane farming, industrial development, recreational infrastructure and roads. Swamp Forest habitat has been lost to the uMzumbe (described in 1972 as a remnant forest), uMhlabashana (originally noted as an established *Hibiscus* fringe), uMhlungwa (described earlier as bordering the system) and uMahlongwane estuaries. In some cases, the habitat has increased because closed mouth conditions have led to gradual freshening of the system that encourages colonisation by some tree species. The uMgobezeleni Estuary experienced an extensive die-back of mangroves after the construction of a causeway that reduced saltwater intrusion. Swamp Forest has since increased in this estuary as the water body became less saline.

Current state

Total Swamp Forest area in KZN estuaries is estimated to be 3 430,5 ha (Table 4.1; Van Niekerk *et al.*, 2019). Those with more than 100 ha cover are the iMfolozi (1 683,1 ha), Kosi (869 ha), uMgobezeleni (416,6 ha) and uMlalazi (104 ha) estuaries. The largest cover occurs at the iMfolozi/uMsunduze Estuary with extensive cover in the Kosi Bay Estuarine Lake system. These systems need to be protected and monitored because of their high biodiversity importance (Table 4.1).

The IUCN Red Data List categorised the conservation status of the dominant Forest Swamp species as of least concern largely because of their wide global distribution (*Hibiscus tiliaceus*, *Syzygium cordatum*, *Barringtonia racemosa*, *Voacanga thouarsii* and *Ficus trichopoda*). However, this does not safeguard local stocks of these species which requires a more localised assessment.

Table 4.1: Area cover and presence/absence of two dominant swamp forest species in KZN estuaries where area is > 1 ha (source NBA 2018, Adams et al. 2019).

KZN Estuary No.	Estuary name	Area (ha)	Dominant species		KZN Estuary No.	Estuary name	Area (ha)	Dominant species	
			B. racemosa	H. tilaceus				B. racemosa	H. tilaceus
1	Kosi	869.0	x	x	33	uMahlongwane	4.0		
2	uMgobezeleni	416.7	x	x	37	uMzimayi	2.8		
3	St Lucia	17.4	x	x	38	uMuziwezinto	4.5	x	x
4	iMfolozi / uMsunduze	1683.1	x	x	43	iFafa	6.6	x	x
6	Richards Bay	16.0	x	x	46	uMnamfu	4.0		x
8	uMlalazi	104.0	x	x	47	uMakhosi	7.0		x
9	iSiyaya	3.7	x	x	48	uMfazezala	5.0		x
10	aMatigulu / iNyoni	195.0	x	x	49	uMhlungwa	1.0	x	x
12	iZinkwazi	11.3		x	50	uMhlabashana	11.5		x
13	iNonoti	1.0	x	x	52	iNjambili	6.3	x	x
14	uMdlotane	12.3	x	x	53	iKhoshwana	6.0	x	x
15	uMvoti	2.0	x	x	54	iDombe	9.0	x	
16	uSetheni	4.0		x	56	uMthente	2.0		
18	uMhlali	7.0	x	x	57	uMzimkhulu	4.5		
19	uThongathi	3.4		x	58	uMbango	15.0		x
20	uMdloti	7.8	x		59	iBilanhlonhlo	1.1		
23	Durban Bay	5.0	x		60	iZotsha	5.0	x	
24	iSiphingo	16.0		x	67	iMbizana	3.0		x
26	aManzimtoti	2.5	x		68	iKhaba	1.1		x
27	aManzanamtoti	6.5	x	x	69	uMhlangomkhulu (S)	4.0		x
28	iLovu	5.0		x	70	iMpenjani	6.0		x
29	uMgababa	2.6	x	x	71	iKhandalendlovu	5.2	x	
32	uMkhomazi	10.0		x	72	uMuntongazi	3.0		x
						Overall total	3430.5		

IMPACT

The destruction of Swamp Forest up to the water's edge in Kosi Bay Estuary, for example, has resulted in serious erosion to the estuary banks and considerable loss of trees. The absence of litter fall negatively affects detrital trophic pathways and nutrient flows in the estuarine ecosystem. The loss of trees also represents a loss of carbon storage capacity (Swamp Forest can store 0,046 to 0,06 t C/m³).

The removal of vegetation cover causes oxidation of the peaty soils, reducing organic matter, making the soil infertile and limiting its ability to hold water. The erosion of surface sediment has caused siltation in the Kosi Bay lakes, changing water flow patterns and increasing turbidity that affects the growth of submerged macrophytes and, in turn, fish and invertebrate communities that depend on these beds for shelter and food. Factors impacting the production of these groups ultimately affect the

livelihoods of subsistence fishers and their families who depend on the estuary for food.

RESPONSE



Being critically endangered, swamp forest cover should be tracked through focused monitoring programmes that quantify change in habitat area and species composition. Factors driving change, such as those related to human activities, should be incorporated to identify cause-effect relationships so that

measures can be taken to avoid irreversible habitat loss. Education and awareness can be improved with signboards, and citizen science participation encouraged to ensure ownership and protection.

Data Requirements

Data is needed on changes over time in the extent of swamp forest cover. Traditionally, cover was tracked using digital aerial images. Results were sometimes inaccurate because swamp forest often lies interspersed with mangrove and coastal forest, leading to under- or over-estimations. Multispectral satellite imagery is useful in inaccessible areas and allows mapping to species level. Leaf spectral signatures combined with remote sensing techniques enable change in plant biomass and health to be measured. Multispectral satellite imagery should be used to determine the current baseline and track changes over time.

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