Arafura Swamp

Location and Description

The Arafura Swamp is a large freshwater basin (~700 km²) located on the northern coast of Arnhem Land, about 460 km from Darwin. It occupies the broad floodplain of the Goyder and Gulbuwangay Rivers and abuts the tidally influenced coastal plain of Castlereagh Bay in the north. The swamp is unique in the Top End because of its extensive perennial swamps (fed by springs along the Goyder River), and lack of a continuous river channel to the sea. The permanent swamps support a diverse range of extensive, intact wetland habitats that are relatively rare elsewhere in the Top End. Much of the swamp is covered by open paperbark forest and woodland, making it one of the largest wooded swamps in the Northern Territory.

Tenure and Land Use

The Arafura Swamp is Aboriginal freehold land and is part of the Arnhem Land Aboriginal Land Trust. The Site mainly supports Indigenous use; and Murwangi Station, on the western side of the swamp, is used for pastoral operations. The area is sparsely populated but the community of Ramingining (population 650) is located close to the north-western edge of the Site.

Significance Rating

International Significance

Ecological Values

The large and diverse wetland habitats of the Arafura Swamp support large numbers of waterbirds (over 300 000) at times. Magpie Geese and egrets are most often the dominant species, but at least eight other species, including the Black-necked Stork, Brolga, Radjah Shelduck, and Royal Spoonbill, occur in internationally significant numbers. Numerous rainforest patches occur around the margin of the swamp, and seven threatened species are reported from the Site.

Management Issues

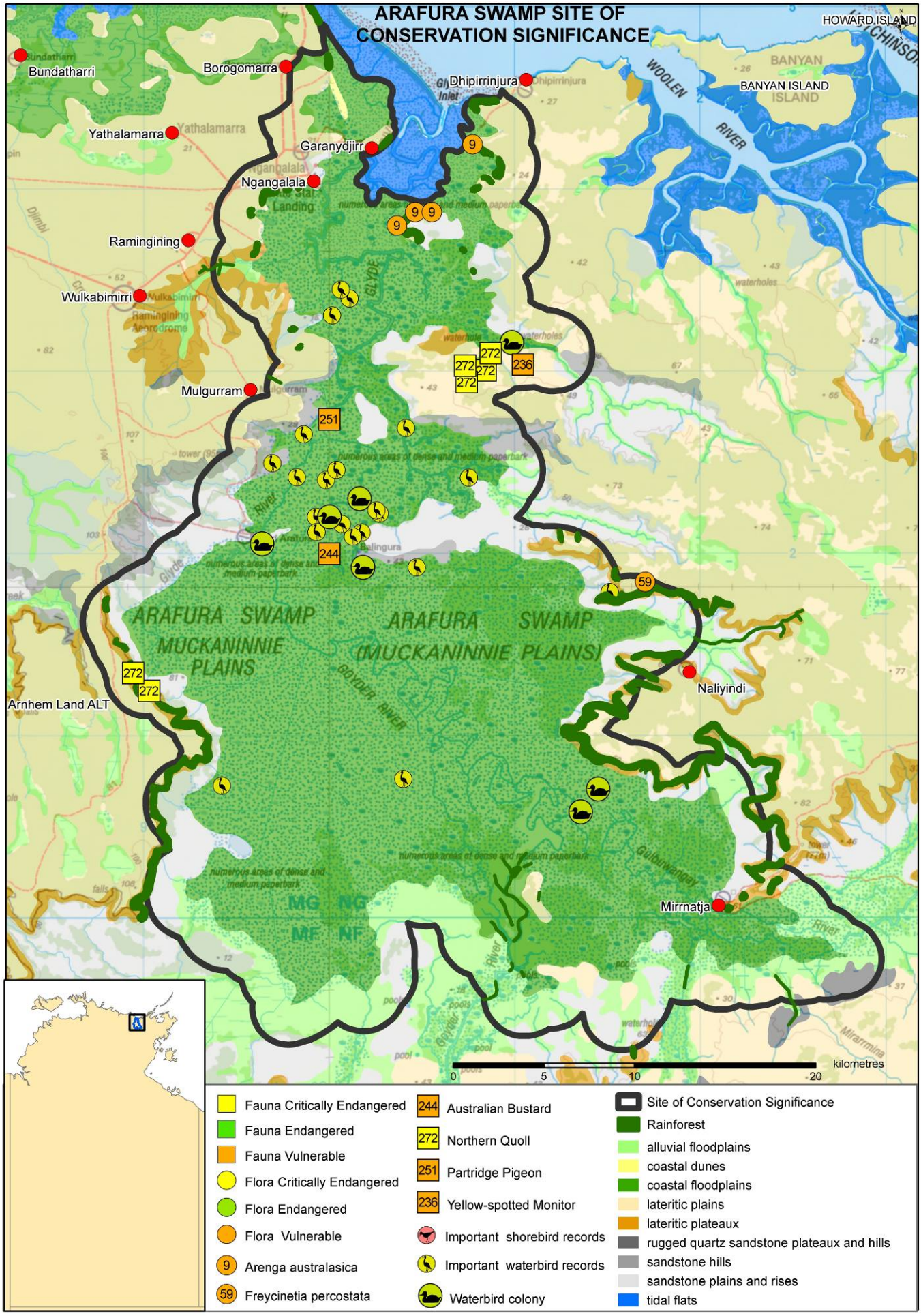
Saltwater intrusion is one of the major threats to the ecological values of the swamp. Populations of weeds and feral animals are currently low and manageable, but there is huge potential for extensive degradation of wetland habitat if they are left unchecked. Unstable management programs, large and frequent fires, and inundation from sea-level rise are also of increasing concern.

Condition

The catchment is relatively undisturbed and the swamp is mostly in good condition. Degradation is evident in the swamp/estuarine interface.

Current Conservation Initiatives

Northern Territory government agencies and Indigenous rangers operating from Ramingining and Murwangi station are managing and monitoring *Mimosa pigra* and other priority weeds in the region. Indigenous rangers are also actively culling pig populations and have fenced off significant rainforest patches.


ARAFURA SWAMP SITE OF CONSERVATION SIGNIFICANCE
Bundatharri
Borogomarra
Dhipirrinjura
HOWARD ISLAND
BANYAN ISLAND
WOOLEN RIVER
Yathalamarra
Garanydjirr
Ngangalala
Ramingining
Wulkabimirri
Mulgurram
ARAFURA SWAMP MUCKANINNIE PLAINS
ARAFURA SWAMP (MUCKANINNIE PLAINS)
GOYDER RIVER
Naliyindi
Mirrnatja
Arnhem Land ALT
kilometres
0
5
10
20
Fauna Critically Endangered
Fauna Endangered
Fauna Vulnerable
Flora Critically Endangered
Flora Endangered
Flora Vulnerable
Arenga australasica
Freycinetia percostata
Australian Bustard
Northern Quoll
Partridge Pigeon
Yellow-spotted Monitor
Important shorebird records
Important waterbird records
Waterbird colony
Site of Conservation Significance
Rainforest
alluvial floodplains
coastal dunes
coastal floodplains
lateritic plains
lateritic plateaux
rugged quartz sandstone plateaux and hills
sandstone hills
sandstone plains and rises
tidal flats

LOCATION	**SOCS Number**	20 (NT Parks and Conservation Masterplan Map Number 13)
	Latitude/Longitude	12º 32´ South, 135º 3´ East (at centre)
	Bioregion	Arnhem Coast (81%), Central Arnhem (19%)
	Description	Arafura Swamp is dominated by a seasonally-inundated coastal floodplain which can reach an area of about 750 km² during peak floods. The site encompasses an area of 1217 km². Large areas of saline flats occur around the mouth of the Glyde River and along Castlereagh Bay and are recognised as a separate site of high conservation significance in the NT.
THREATENED SPECIES	**Significance Rating**	**National Significance**
	Threatened plants and animals (Listings at National/NT level **CR** - Critically Endangered, **EN** - Endangered, **VU** - Vulnerable, **NT** - Near Threatened, **LC** - Least Concern, **DD** - Data Deficient)	Seven threatened species are reported from this site. **Plants** ▪ Australian arenga palm *Arenga australasica* (VU/DD) ▪ *Freycinetia percostata* (-/VU) In the NT, *Freycinetia percostata* is only known from localities on Bathurst Island and the Arafura Swamp (Woinarski et al. 2007). **Vertebrates** ▪ Australian Bustard *Ardeotis australis* (-/VU) ▪ Partridge Pigeon *Geophaps smithii* (VU/VU) ▪ Northern Quoll *Dasyurus hallucatus* (EN/CR) ▪ Merten's Water Monitor *Varanus mertensi* (-/VU) ▪ Yellow-spotted Monitor *Varanus panoptes* (-/VU) (Brennan 2003)
ENDEMIC SPECIES	**Significance Rating**	**Not Significant**
	Notes	**Endemic to the NT:** 58 plant and five vertebrate species recorded in this site are only known from the NT. **Other:** Three plant species recorded from the site are only known from the Arnhem Coast bioregion within the NT, but are also found in other states.
WILDLIFE AGGREGATIONS	**Significance Rating**	**International Significance**
	Marine turtles	Not applicable
	Seabirds	No major aggregations recorded
	Waterbirds	**Total numbers of waterbirds:** Seasonal use of northern wetlands by waterbirds can be highly erratic and populations fluctuate greatly over time. Highest counts for this site vary from estimates of 300 000 individuals in 1998 and 2000 (Brennan *et al.* 2003), to 35 500 in some other years (Chatto 2006). **Counts of individual species:** Maximum counts of species that are internationally significant (> 1% global population; G. Dutson in prep.) include: 123 000 Magpie Geese (1998); 2500 Radjah Shelduck (2000); 15 544 Pied Heron (2000); 1323 Royal Spoonbill (1998) (counts estimated from data in Brennan *et al.* 2003); 7300 Brolga (2000); 25 000 Glossy Ibis (2000); 49 000 Australian White Ibis (2000); 25 000 Straw-necked Ibis (2000); and 585 Black-necked Stork (1998) (Brennan *et al.* 2003). Chatto (2006; R. Chatto, NRETAS, unpubl.) notes 37 important waterbird records for this site, including the significant counts identified above and regionally important counts of other species. **Breeding records:** Seven small (<300 birds) waterbird breeding colonies are reported from the Arafura Swamp (Chatto 2000a). Colonies are mostly located in paperbark trees and dominated by spoonbills, egrets and cormorants. Magpie Geese also nest at this site and a minimum of 1200 nests were counted in June 2000 (Brennan *et al.* 2003).
	Shorebirds	Limited numbers of shorebirds are reported from this site but tidal flats in the nearby Castlereagh Bay support internationally significant numbers (Chatto 2003).
	Other aggregations	Large numbers of flying foxes (Little Red *Pteropus scapulatus* and Black Flying-fox *P. alecto*) roost and feed seasonally in the large Melaleuca forests (DIWA).
WETLANDS	**Significance Rating**	**International Significance**
	Ramsar criteria met	Brennan *et al.* (2003) conducted an assessment of the Arafura Swamp against the criteria for listing it as a wetland of international importance under the Ramsar Convention and found that it satisfies Criteria 1, 2, 3, 4, 5, 6, and 7.
	DIWA criteria met	This site is listed as a wetland of national significance in the Directory of Important Wetlands in Australia (DIWA ID: NT021 Arafura Swamp). The site meets criteria 2, 3, 4, 6 and includes DIWA wetland types B4, B14, B1, B2, B9, and B10.

	Notes	This site has been nominated as a national High Conservation Value Aquatic Ecosystem (the finalised list of HCVAE will replace the DIWA list), and is a priority HCVAE in the Caring for our Country Business Plan 2009-2010 (Commonwealth of Australia 2008). It is one of the largest wooded swamps in the NT and possibly one of the largest in tropical Australia (DIWA). This wetland system is unique in the Top End due to perennial inflow from springs along the Goyder River, as well as its lack of a continuous river channel to the sea. This means that at least part of the swamp remains permanently flooded throughout the year (Brennan *et al.* 2003). The structure of the main basin of the swamp is unusual compared to other large freshwater swamps in coastal regions of the NT because it is constricted by bedrock at its downstream limit. Other large coastal swamps in the NT are less constrained and tend to flare out towards the coast (Brennan *et al.* 2003).
	Rivers	Surface inflow to the swamp is from the Goyder and Gulbuwangay Rivers which terminate at the southern end of the swamp where water disperses across the floodplain. The Glyde River is the tidal channel from the swamp to the sea at Castlereagh Bay, but is largely outside the site. Most Top End rivers have continuous channels to the sea, lack significant perennial springs, and/or only flow seasonally. Only the Mary River is similar to the Goyder in terms of its channel diffusing into floodplain swamps before reaching the sea, but the Mary River is not spring-fed. The Goyder River is the ninth largest river system in the NT and has the second highest end-of-dry season flow rate in the NT (Brennan *et al.* 2003).
FLORA	**Significance Rating**	**Regional Significance**
	Notes	**Rainforest:** Almost 3000 ha of rainforest (or 1% of the NT rainforest estate) occur as scattered patches around the margin of the Swamp. Most patches are small <100 ha but four patches are >100 ha (Russell-Smith 1991). Both threatened plant species found in this site are from rainforest environments. **Restricted vegetation communities:** *Hanguana malayana* swamp is a restricted freshwater wetland community in the southern part of the Arafura Swamp and is associated with permanently flooded areas where the Goyder River diffuses into the Swamp. This site encompasses the largest area of this community in the NT and vast areas of other freshwater wetland species when compared to the rest of the NT (K. Brennan, NRETAS, pers. comm.). **Restricted range species:** The Arafura wetlands contain almost the entire NT population of the large distinctive wetland palm *Corypha utan*, though other small outlier populations are known from the Liverpool River and southern Gulf of Carpentaria (Brennan et al 2003).
OTHER ENVIRONMENTAL VALUES		The Glyde River supports high densities of Saltwater Crocodiles which are amongst the highest of all rivers surveyed in the Top End (Fukuda *et al.* 2007). The swamp encompasses a vast area of open floodplains and forested areas which is relatively inaccessible (K. Brennan, NRETAS, pers. comm.). Seventeen species recorded from the Arafura Swamp are listed under international conventions or bilateral agreements protecting migratory animals. The Arafura Swamp and adjacent tidal flats of Castlereagh Bay is proposed to be nominated by Birds Australia as an internationally-recognised *Important Bird Area* (G. Dutson in prep.) due to the occurrence of globally significant numbers of a range of waterbird and shorebird species. The Arafura Swamp and Arafura Jungles sites are listed on the Register of the National Estate for their natural values (Australian Heritage Council).
MANAGEMENT ISSUES		**Fire:** In the period 1993-2004, 25% of the site was burnt in fewer than three years, and 7% was burnt in more than six years. Brennan *et al.* (2003) report that small and controlled fires are still used by locals while they are hunting in the Swamp, but that the area is vulnerable to extensive wildfires lit by unauthorised people during dry periods. Unfavorable fire regimes have killed large areas of paperbarks and degraded some local environments. **Feral animals:** Although current populations of Water Buffalo, pig and cattle in the swamp are not high, they cause considerable physical damage to the wetland environments (Brennan *et al.* 2003). Cane Toad and feral cat are also present in the Arafura catchment (Brennan *et al.* 2003). **Weeds:** Two Weeds of National Significance *(Mimosa pigra* and Olive Hymenachne *Hymenachne amplexicaulis)* (Brennan *et al.* 2003), seven category A and B weeds, and 4 other undeclared but problematic environmental weeds (high priority weeds: Smith 2001) are recorded from this site. Weed establishment in the swamp is currently quite low but some serious weeds are present that need to be managed. **Other:** Saltwater intrusion as one of the major threats to the ecological and cultural values of the Arafura Swamp (Williams *et al.* 2003). Short term and unstable management programs, which are often typical of Indigenous ranger units, are unhelpful to maintaining the conservation values of the swamp (Brennan *et al.* 2003). Grazing cattle are damaging fragile banks and waterways in the northern part of the swamp where freshwater and tidal areas meet (Brennan *et al.* 2003). Sea-level rise resulting from climate change could directly affect the freshwater wetlands of the Arafura Swamp (Brennan *et al.* 2003).

MANAGEMENT INFORMATION	**NRM groups**	South-East Arafura Catchment Rangers (Mirrngadja), Gurrwurling Rangers (Murwangi), Wanga Djakamirr Rangers (Ramingining) (Northern Land Council 2006).
	Protected areas	None of the site falls within the NT formal protected area network.
	Current management plans	**Site-specific plans:** There is a template for a catchment management plan in Williams *et al.* (2003). **Recovery plans for threatened species:** Northern Quoll (Hill and Ward in prep.); Partridge Pigeon (Woinarski 2004a). **Other management plans:** Australian Weeds Strategy (NRMMC 2007); Threat Abatement Plan for Predation by Feral Cats (Environment Australia, 1999); Threat Abatement Plan for Predation, habitat degradation, competition and disease transmission by feral pigs (DEH 2005); FIREPLAN: Fire management for the savanna community (Russell-Smith *et al.* in press.).
	Monitoring programs and research projects	Regular surveys of Saltwater Crocodiles are conducted in the Glyde River every second year (PWSNT 2005), last surveyed in mid 2010. A comprehensive biodiversity survey of the Swamp was conducted between 1998 and 2001 (Brennan et al. 2003). Fire in the tropical savannas is mapped continuously under the North Australia Fire Information Project http://www.firenorth.org.au/nafi/app/init.jsp
	Management recommendations	Implement measures to mitigate the impacts of saltwater intrusion (I. Fox, NRETAS, pers. comm.). In conjunction with the Northern Land Council and Commonwealth Department of Environment, Water, Heritage & the Arts, assist traditional owners and Wanga Djakamirr Rangers to establish an Indigenous Protected Area and associated conservation agreement and management plan for the Arafura Swamp catchment (NRETA 2005). Support capacity development of community-based rangers engaged in conservation management in the Arafura Swamp Catchment (NRETA 2005).
KEY REFERENCES	**Papers and reports**	Brennan, K., Woinarski, J., Hempel, C., Cowie, I. and Dunlop, C. (2003). *Biological inventory of the Arafura swamp and catchment*. A report to Indigenous community rangers and the Natural Heritage Trust, Northern Territory Department of Infrastructure, Planning and Environment, Darwin. Chatto, R. (2006). *The distribution and status of waterbirds around the coast and coastal wetlands of the Northern Territory*. Technical Report 76, Parks and Wildlife Commission of the Northern Territory, Palmerston. 254pp. DIWA (A Directory of Important Wetlands in Australia). *Australian Wetlands Database*. Department of Environment, Water, Heritage & the Arts, Canberra ACT (accessed December 2007). Williams D., Chudleigh I. and Jolly P. (2003), *Arafura Swamp Water Resources Study*, Technical Report, Department of Infrastructure, Planning and Environment, Darwin NT.
	Contributors	Kym Brennan, Biodiversity Conservation, NRETAS, Darwin

***Melaleuca viridiflora* swamp is widespread throughout the Arafura Swamp (Photo: Kym Brennan)**