MANGROVE CELEBRATION 2024

Second Edition

Lower Rapid Creek

Edited by Lon Wallis

All images of mangrove species by Gary Fox

RAPID CREEK

Rapid Creek Landcare Group

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All images of Lower Rapid Creek mangrove species were taken by Gary Fox. The majority of these images were taken during 2024. They show a view of each mangrove species, its leaves, its flowers and its fruit. When applicable, the pneumatophores are also shown. Unfortunately, several mangrove species seen growing in the area could not be included as they did not flower or fruit in time for this publication.

Front cover: *Sonneratia alba* Mangrove Apple in flower

We have used the definition of a mangrove as used by Glenn Wightman in his *Mangroves of the Northern Territory: Identification and Traditional Use, Northern Territory Botanical Bulletin No. 21*, Department of Natural Resources, Environment & the Arts and Greening Australia NT, Darwin, 2006.

When not otherwise credited, text in the mangrove section is extracted from John Brock, *Native Plants of Northern Australia*, Reed New Holland Publishers, Sydney 2022

Funding for printing this edition provided by:

Airport Development Group

Contents

Rapid Creek Landcare Group

Rapid Creek forms the only significant freshwater system in Darwin. It supports a rich variety of wildlife in its paperbark swamps, woodlands, pandanus communities, riverine monsoon forest and mangroves.

Gurambai is the Larrakia name for Rapid Creek. It means ‘elbow’, referring to the shape of the creek at the saltwater end, towards the mouth of the creek. The Rapid Creek Landcare Group acknowledges the Larrakia people as traditional owners and custodians of Gurambai.

Formed in the 1990’s, the Group has carried out projects throughout the catchment over 30 years. Our revegetation work has revitalilsed the monsoon forest lining Rapid Creek on City of Darwin land, at Yankee Pools where various land tenures collide, and along the Darwin International Airport’s Gurambai Trail. Our core members work tirelessly throughout the year to maintain a range of sites, with weed management being the main focus. Regular tree-planting events and rubbish clean ups also engage the larger community.

Getting hot, sweaty and muddy in the Top End’s build up is all part of the job for the Rapid Creek Landcare Group. We plant local natives in the lead up to the wet season to create wildlife habitat in the Rapid Creek catchment. Our crowning glory is at The Spit, on Parks and Wildlife land near Rapid Creek’s mouth. There we have transformed a wasteland of weeds, litter and dumped items into a rehabilitated area of fruiting native plants that provide homes for a diverse range of birds and other wildlife.

The Group advocates for good management of Rapid Creek by working with stakeholders to implement the Rapid Creek Management Plan. Our achievements include creating 100-150 metre wide conservation zoned buffers along the Creek. We successfully restricted vehicle access to the Creek’s edge. We stopped a sewer main being trenched through the monsoon forest where the rare Rufous Owl lives. We halted a proposal to remove mature trees along the Creek, supposedly in the name of flood mitigation.

Fifty years ago Rapid Creek’s mangroves downstream from Trower Road were bulldozed for the Brinkin Lake Housing Scheme. On Christmas eve 1974 Cyclone Tracy wiped out any remaining vegetation.

In 2024 we celebrate the diversity of the mangrove species that have regenerated naturally. We welcome the return of a healthy ecosystem for our animals, birds and marine life.

Aerial image of a fairly undisturbed lower Rapid Creek in 1945, with later streets superimposed[1]

Based on the classification by Brocklehurst & Edmeades[2], five main mangrove groups can be distinguished in the lower Rapid Creek area:

(1) *Rhizophora stylosa* and *Bruguiera* spp. closed forest, growing on tidal creek banks

(2) *Rhizophora /Bruguiera /Ceriops* closed forests, growing on the transition from creek bank to tidal flat

(3) mono specific *C. tagal* low closed forest, growing on the low tidal flat

(4) *C. tagal /A. marina* low closed forest, growing on the high tidal flat

(5) mixed species low closed to open forest, growing in the hinterland

[1] NT Government historical images

[2] Brocklehurst P., and Edmeades, B., *The mangrove communities of Darwin harbour*, [Darwin]: Dept. of Lands, Planning & Environment, 1996

The NT Place Names Register can be used to date the progress of urbanisation of this area. Although Rapid Creek Road was gazetted on 17 September 1952, the streets in the suburbs of Millner and Rapid Creek were not gazetted until 1963. Trower Road was gazetted on 3 April 1963, and Lakeside Drive on 16 March 1966. The naming of Lakeside Drive suggests that a plan to dam Rapid Creek to create an ornamental lake is at least 5 years earlier than the 1971 call for tenders.

Lower Rapid Creek 7 April 1967, showing the beginning of clearing the mangroves[3]

Preparatory work to establish an ornamental lake quickly followed the gazetting of Lakeside Drive on 16 March 1966. A symposium on the design of Brinkin Lake decided that it was not necessary to preserve mangroves in the lake area because an estuarine reservation - which included mangroves - would be proclaimed elsewhere in the Darwin area.[4] Within a year, mangroves to the west of Lakeside Drive were cleared in preparation for a planned park and oval.

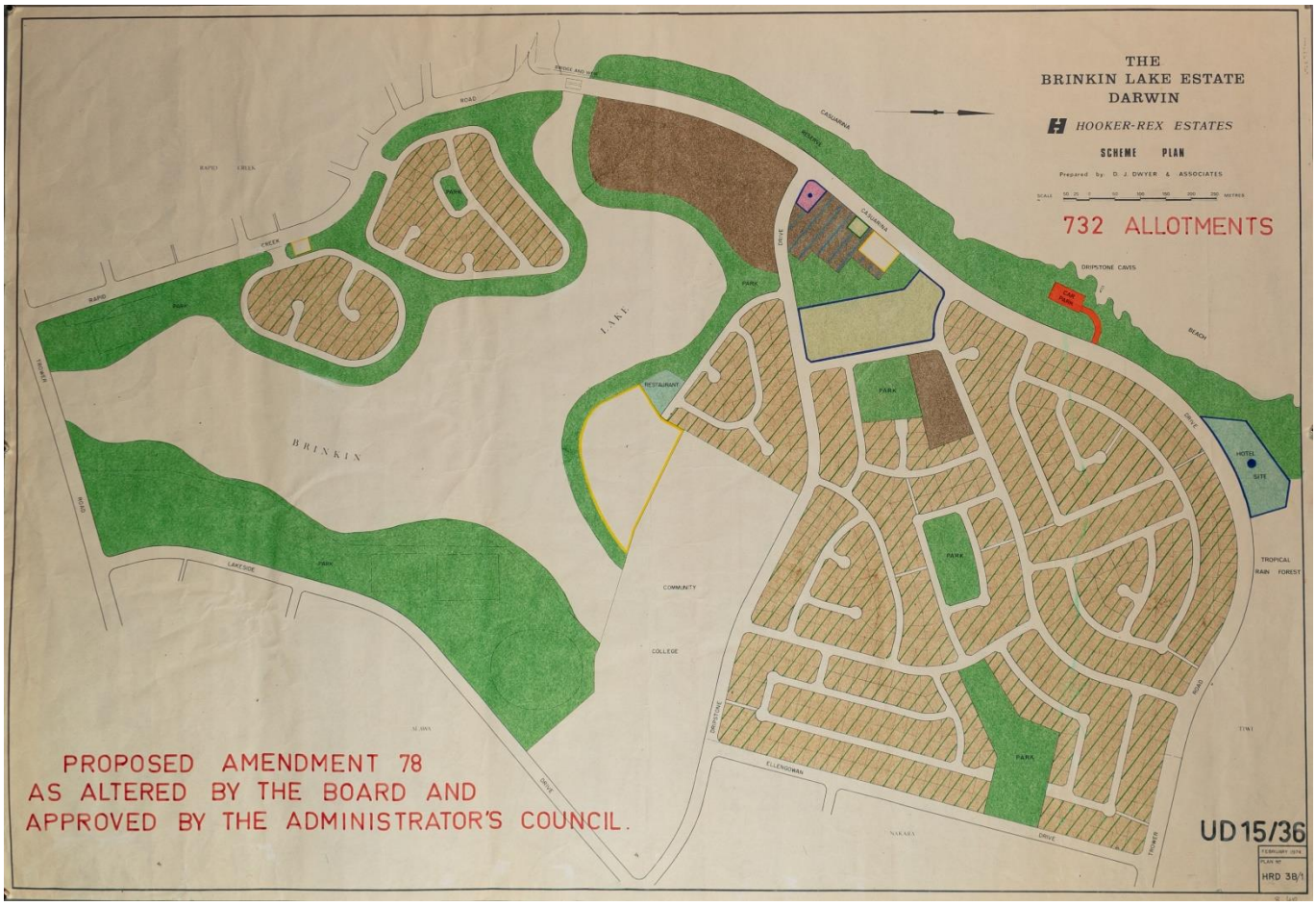
[3] Library & Archives NT PHO139-1842
[4] CSIRO - Fisheries and Oceanography - Conferences and Meetings - General - Hooker Regional Developments - *Symposium on Development of Brinkin Lakes Estate,* Darwin - Cronulla - 29th May 1973, NAA: P2556, OZ 44 p. 8

Aerial view of Millner, Rapid Creek, Alawa, Northern suburbs, 10th April 1968[5]

This 1968 image shows clearing of Rapid Creek above and below Trower Road under the process of gardenization. One ecologist recommended removing all mangroves in order to discourage birds from roosting in the mangroves and spreading viruses.[6] The area south of Trower Road has been cleared and the creek canalized. An area to the west of Lakeside Drive has been clear-felled, while windrows of bulldozed mangroves await removal. However, a strip of mangroves along Rapid Creek Road has been left as a green zone.

The sewage revetment from the Rapid Creek pumping station to Lakeside Drive stands above the surrounding ground level. The remaining mangroves still show clear zonation, with tree species along the creek itself taller than those on the mud flats.

[5] Aerial view of Millner, Rapid Creek, Alawa, Northern suburbs, 10th April 1968, PH0139/1561, Northern Territory Dept. of Lands Collection, https://hdl.handle.net/10070/970616
[6] CSIRO - Fisheries and Oceanography - Conferences and Meetings - General - Hooker Regional Developments - *Symposium on Development of Brinkin Lakes Estate*, Darwin - Cronulla - 29th May 1973, NAA: P2556, OZ 44 p. 12



The Brinkin Lake Estate Scheme February 1974[7]

Bulldozing the area of Rapid Creek bordered by Rapid Creek Road, Lakeside Drive, Trower Road and the coast was well under way by 1969.[8] Developing Brinkin Lake Estate north of Trower Road dates from 1971 when the Northern Territory Administration advertised for proposals to establish an 80 hectare lake on Rapid Creek.[9] It was to be known as Brinkin Lake. The proposed lake would be created by the construction of a weir 64 metres long at the mouth of Rapid Creek, with a crest level near high tide level.

Financing would be provided from the sale of housing lots. However, it was considered that the initial proposal of only 600 lots could not support the establishment of a lake of 80 hectares. Therefore the area of the proposed lake was reduced to 33 hectares in order to make room for more lots.[10] The number of lots deemed necessary to make the scheme financial was increased to 774, although the Administrator's Council finally approved 732.[11]

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[7] D. J. Dwyer & Associates, *The Brinkin Lake Estate Darwin*: scheme plan, Plan no. HRD 3B/1, February 1974, Library & Archives NT, Northern Territory Library Maps, Map 8-41 / Drawer 36
[8] Ferwerda J. G., Ketner P., McGuinness K. A., *Differences in regeneration between hurricane damaged and clear-cut mangrove stands 25 years after clearing*, Hydrobiologia, October 2007, p. 36
[9] D. J. Dwyer & Associates, *Rapid Creek Recreational Project, Darwin, N.T.* : a report to Dept. of Lands and Housing, N.T. of Australia, 1980, Northern Territory Library
[10] Dwyer 1980 p. 2
[11] Map Proposed Amendment 78 as altered by the Board and approved by the Administrator's Council Plan No. HRD 3B/1

The basic concept of the development was to create a lake behind a weir which would be overtopped only by high tides. At the end of the wet season the lake would possibly be entirely fresh, and approximately two months would be needed for this to be exchanged for salt water. A skimmer wall would be needed upstream of the weir in order to keep the salinity of the lake within reasonable limits by preferentially removing the high salinity water from the lower levels.[12]

Mangrove clearing for Brinkin Lake before May 1973[13]

The process of bulldozing the mangroves into windrows was well under way by the middle of 1973.

The plan to develop Brinkin Lake Estate submitted by Hookert-Rex Estates was accepted by the NT Administration, and a letter of intent was issued in 1972 advising Hooker-Rex that it was the successful applicant, and that a lease of the area would be issued to the Company. At the time of Cyclone Tracy in December 1974, all the environmental issues had been resolved and approved by the authorities. The tenders for the first stage of the Brinkin Lake Estate Project closed on Christmas Eve.[14]

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[12] J. Tuck, J., Foster, D. N., and Askew, A. J., *Lake Brinkin Study*, The University of New South Wales Water Research Laboratory, Technical Report No. 73/2 March 1973 pp. 2, 3, 4

[13] CSIRO - Fisheries and Oceanography - Conferences and Meetings - General - Hooker Regional Developments - Symposium on Development of Brinkin Lakes Estate, Darwin - Cronulla - 29th May 1973, NAA: P2556, OZ 44 p. 83

[14] Dwyer 1980 p. 2

Lower Rapid Creek cleared of mangroves 1974[15]

In this 1974 image the area north of Trower Road has been clear-felled, with some windrows of bulldozed mangroves remaining on the ground. The cleared area is almost completely denuded, with virtually every seedling, sapling and tree removed.[16] The sewage revetment between the Rapid Creek and Alawa pumping stations cuts across the creek, altering the relative salinity upstream of the revetment. An open drain in line with Stasinowsky street debouches fresh water towards the mangroves.

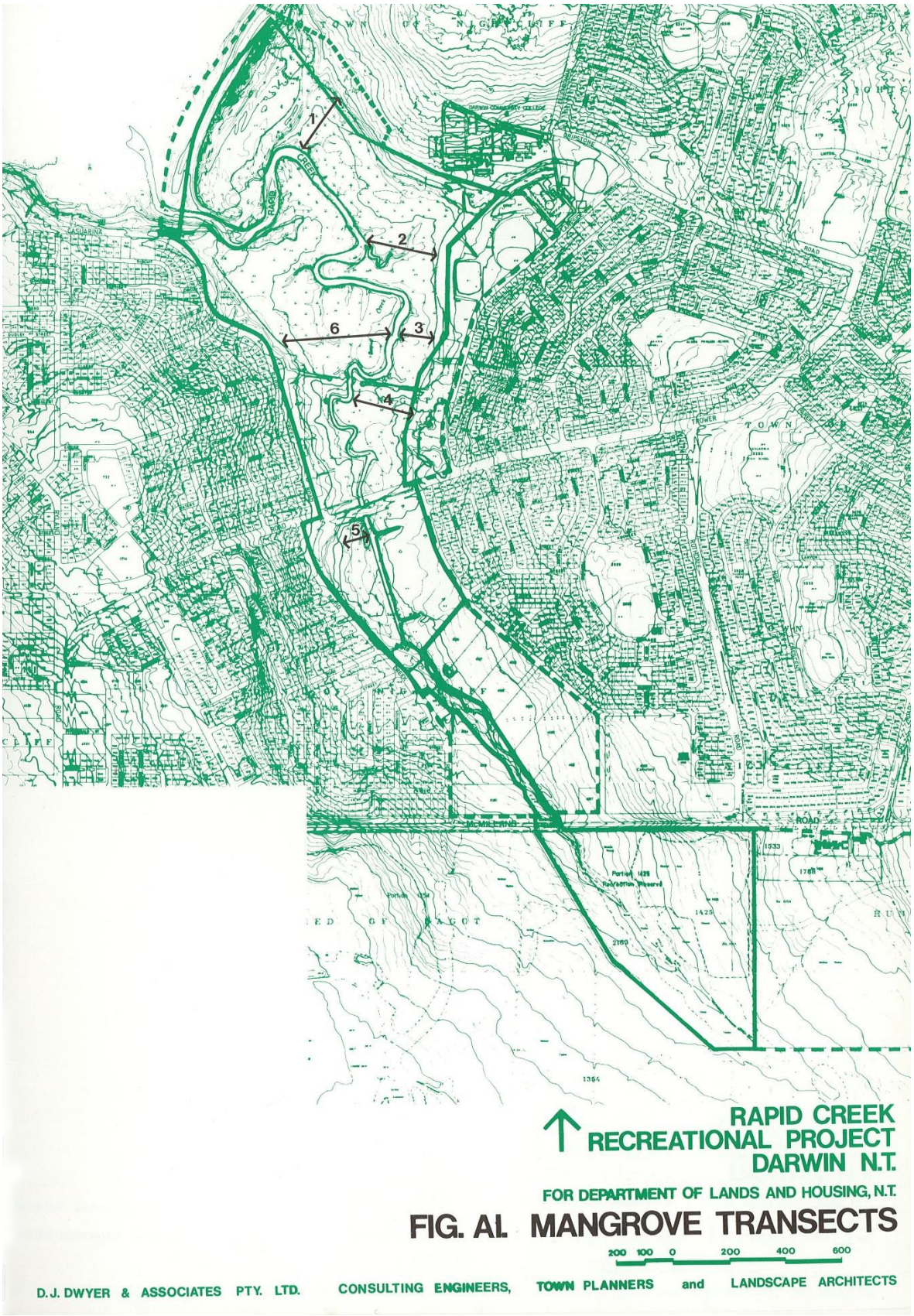
[15] LANT_NTRS 3862_P1_NTC300_Frame 5032_[rotated]
[16] Ferwerda J. G., Ketner P., McGuinness K. A., *Differences in regeneration between hurricane damaged and clear-cut mangrove stands 25 years after clearing*, Hydrobiologia, October 2007

Rapid Creek 1975 following Cyclone Tracy[17]

This 1975 aerial image of Rapid Creek shows lower Rapid Creek after Cyclone Tracy. The zone north of the sewage revetment shows an area almost totally cleared of mangroves. Some windrows of bulldozed mangroves remain on the ground. A small region of uncleared mangroves remains south of the sewage revetment. The storm water drain from the Darwin Institute of Technology and the drain from Stasinowsky Street can be seen.

The Brinkin Lake Estate development project was terminated after Cyclone Tracy, with the area being left to regenerate naturally.

[17] Austral Aerial Surveys (Fugro) 1975



Transects used by Dwyer in 1980 and Guinea in 1987 to identify regeneration of mangrove species[18]

[18] Dwyer 1980, Figure A1

Three different phases of mangrove regeneration in the lower Rapid Creek area were studied by Dwyer in 1980[19], Guinea in 1987[20], and Ferwerda *et al* in 2007[21]. Nine species were noted by Dwyer in 1980, while Guinea identified an additional 8 in 1987.

1980	**1987**
Acanthus ilicifolius	*Acanthus ilicifolius*
Aegialitis annulata	*Aegialitis annulata*
Avicennia marina	*Avicennia marina*
Bruguiera exaristata	*Bruguiera exaristata*
Ceriops tagal	*Ceriops tagal*
Lumnitzera racemosa	*Lumnitzera racemosa*
Rhizophora stylosa	*Rhizophora stylosa*
Scyphiphora hydrophylacea	*Scyphiphora hydrophylacea*
Xylocarpus australasicus	*Xylocarpus australasicus*
	Aegiceras corniculatum
	Bruguiera parviflora
	Camptostemon schultzii
	Excoecaria agallocha
	Hibiscus tiliaceus
	Osbornia octodonta
	Pemphis acidula
	Sonneratia alba

In their 2007 study, Ferwerda *et al* found that, although there were quite a number of adult *Avicennia marina,* there was a virtual absence of *A. marina* juveniles and saplings. They found that the composition of mangrove species was unbalanced even 25 years after being clear-felled. The authors concluded that *A. marina* might eventually be replaced by other species in the canopy.

Today - despite this gloomy prediction - the different species of lower Rapid Creek mangroves appear to have made a remarkable recovery fifty years after being clear-felled. However, there is some evidence that the zonation to be expected among different species has not returned to its original state.

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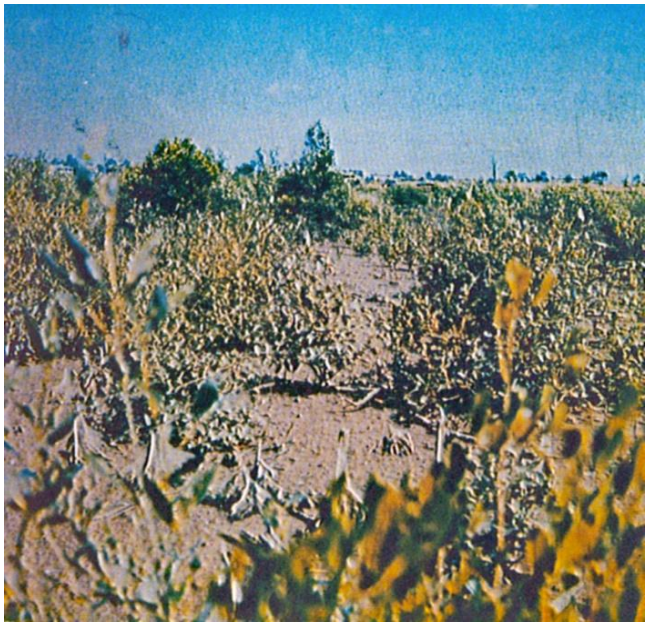
[19] Dwyer, D. J. & Associates *Rapid Creek Recreational Project, Darwin, N.T.* : a report to Dept. of Lands and Housing, N.T. of Australia, 1980

[20] Guinea, Michael L., *Rapid Creek Mangrove Regeneration, Thirteen Years Onwards*, Department of Natural Science Darwin Institute of Technology, 1987

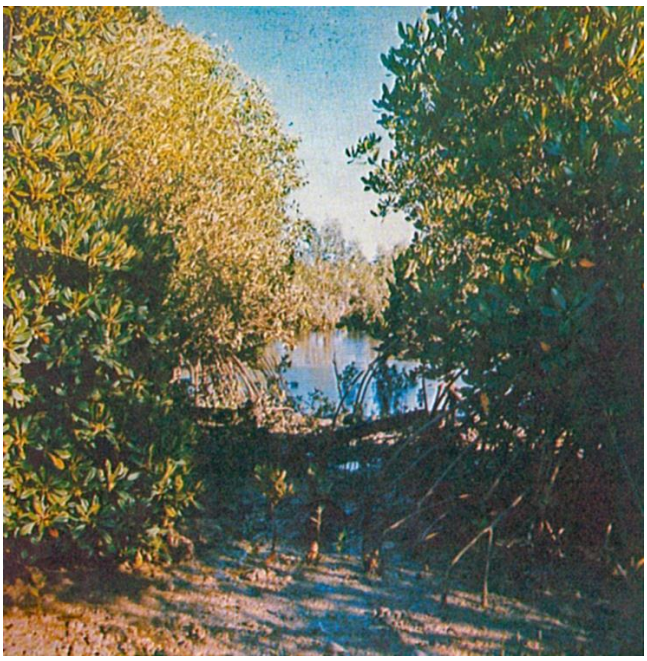
[21] Ferwerda J. G., Ketner P., McGuinness K. A., *Differences in regeneration between hurricane damaged and clear-cut mangrove stands 25 years after clearing*, Hydrobiologia, October 2007

D. J. Dwyer's images taken in 1980, of regenerating mangroves 6 years after being bulldozed[22]

Bulldozed mangrove trunks on the estuarine flats



Regenerating mangroves on the estuarine flats



Rhizophora mangroves bordering Rapid Creek

Regenerating mangroves along a drainage channel

[22] D. J. Dwyer & Associates, *Rapid Creek Recreational Project, Darwin, N.T.* : a report to Dept. of Lands and Housing, N.T. of Australia, 1980, Northern Territory Library pp. A15, A17

Selected Mangroves of Lower Rapid Creek




bulldozed for housing development in 1974




destroyed by Cyclone Tracy on 24th December




allowed to regenerate naturally for 50 years




celebrate our diversity of species in 2024

all images of mangrove species by Gary Fox

Acanthus ilicifolius Holly-leaved Mangrove

Small, sprawling shrub to 1.5m high, commonly forming thickets.

Habitat: tidal waterways on the landward margins.

Flowers: pale lilac-blue and cream to nearly white with prominent curled lower lip, 1.5-1.13cm long, several on terminal spikes to 20cm long.

Flowering: May-Nov

Leaves: opposite, smooth, holly-like, tapered to base, blade 5-1.5cm x 2-6cm, margins generally prickly-toothed or may be untoothed; stalk 0.8-1.3cm long.

Leaf shape may vary considerably, some plants having entirely untoothed leaves.

Fruit: oblong to ovoid capsules 1.8-2.5cm x 1.2cm, shiny dark brown, actively discharging 2-4 hairy flat roundish seeds 1cm diameter when mature.

Fruiting: Jun-Dec

Acrostichum speciosum Mangrove Fern, Leather Fern

Coarse clumping fern to 1.5m high with creeping rhizomes, often forming large dense clumps.

The only fern found in association with mangroves.

Spores: produced on upper fertile leaflets which are smaller than sterile ones, covering the entire undersurface as a dark-brown mass.

Leaves: erect pinnate-like fronds to 1.5m long, divided into numerous large alternate leaflets to 20cm x 35cm, somewhat thick and leathery, dull dark green, tapering to narrow tip.

Habitat: coastal flats and tidal areas usually associated with mangroves, with frequent saltwater inundation.

Aegialitis annulata Club Mangrove

Small shrub mostly to 1.5m high (may reach 3m), clublike base of stem swollen.

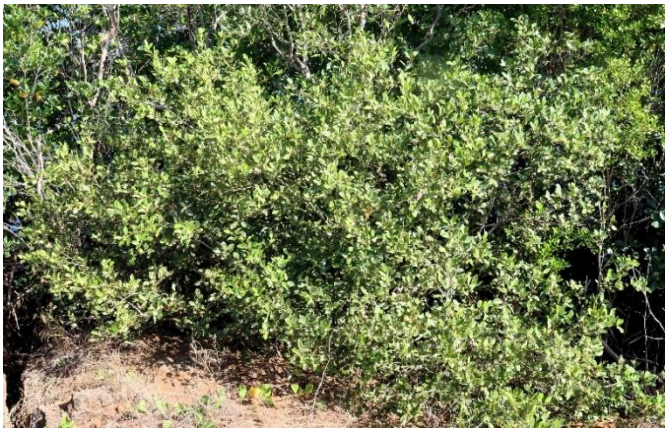
Fruit: smooth, narrow, curved banana-shaped 5-angled capsules, 3-5cm x 0.2cm, persistent calyx at base, reddish when ripe, containing single seed which germinates within fruit, Jan-Mar.

Leaves: alternate, smooth, leathery, broadly ovate to nearly round, blade 6-8cm x 4.5-6cm, dull green, marked by fine longitudinal depressions and salt glands, rounded tip; stalk sheathed, winged, to 5.5cm long.

Flowers: white, narrow tubular, 5-petaled, about 1.2cm long, produced on axillary branching panicles. Sep-Dec (Jan).

Habitat: mangrove forests, commonly on seaward edge, in tidal mud with salinity up to that of seawater.

Aegiceras corniculatum River Mangrove



Shrub or small tree 3-5m high, in mangrove forests, commonly on landward margins; banks of tidal estuarine waterways, seasonally brackish.

Fruit: curved, horn-like, cylindrical, about 3-4cm x 0.5-0.6cm, pointed tip; seed germination takes place within fruit. Fruiting: Dec-Mar.

Beginning of the inflorescence, buds sharply pointed.

Leaves: alternate, smooth, somewhat leathery, oval-elliptic tapering to base, glossy green above, paler underneath, glands present, rounded tip.

Flowers: white, scented about 0.8cm long, several in axillary or terminal umbels 3-4cm across.

Flowering: May-Oct.

Avicennia marina White Mangrove

Small, multi-stemmed tree 4-10m high. Habitat: forms dense stands at the seaward margins of mangrove communities, may also occur in estuaries and tidal river regions.

Flowering: Oct-Jan.

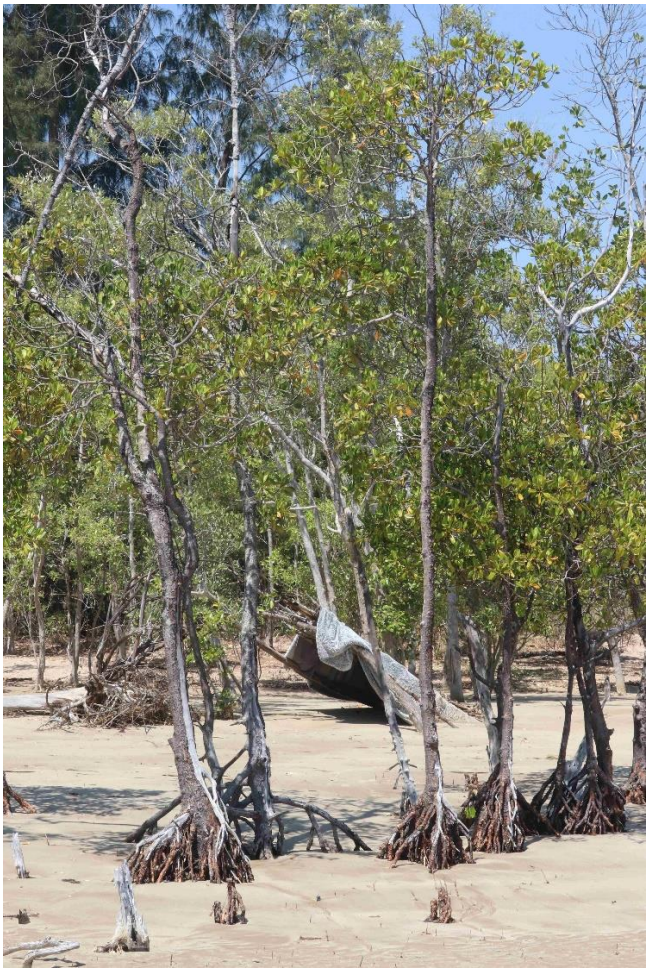
Fruit: compressed, roundish capsules 2-2.5cm x 1.5-2.2cm, velvety-hairy to nearly smooth, pale green when ripe, enclosing single dark green seed. The seed germinates on the plant before it drops. Fruiting Jan-Feb.

Leaves: opposite, elongated-oval, blade 6-l1.5cm x 1.7-3.5cm, smooth and shiny green above, grey-white and densely felty-hairy underneath, generally long-pointed tip; short stalk.

Flowers: small, pale orange, strong-smelling, 0.5-0.7cm across, stalkless in small dense clusters in inflorescences produced terminally or in upper leaf axils.

Numerous thin pencil-like pneumatophores arising from shallow, radially spreading roots.

Bruguiera exaristata Rib-fruited Orange Mangrove



Small spreading tree 3-10m high with buttressed trunk and numerous knee-like pneumatophores.
Habitat: mangrove communities on the landward fringe, in estuaries, tidal inlets and rivers.
Bark: dark grey, tessellated to fissured on larger trees.

Leaves: opposite, crowded towards ends of branches, smooth, thick, leathery, glossy above, oval-elliptic, blade 4-10cm x 2-5cm, sharp pointed; stalk 1.5-2.5cm long. leaf scars leave three small U-shaped traces on the stem.

Fruit: cone-shaped, 1. 5cm long; seed germinates on plant, producing pendulous, narrow cylindrical hypocotyl 4-9cm x 0.6-0.13cm, longitudinally ribbed, brown-orange, crowned by persistent calyx lobes, Jun-Dec.

Flowers: large, orange, 2-3.5cm, x 1.5-3cm, enclosed in green calyx, pendulous, solitary in upper leaf axils, May-Nov.

Camptostemon schultzii Kapok Mangrove [text: Wightman, G., *Mangrove Plant Identikit for North Australia's Top End*]

A shrub to 5 m, occasionally a tree to 22 m; pneumatophores sometimes forming knotted lenticelled lumps to 3m from the stem base.

Fruit: obovoid capsule, 1 cm long.

Leaves: alternate, elliptic-lanceolate, 3-9cm long x 2-4 cm wide, tiny brown scales below, scales and glands above; small, dark-brown scales on new growth.

Flowers: small with 5 white petals

Seeds: 2, deltoid-obovoid, 9 mm long, densely woolly.

Habitat: *Camptostemon schultzii* prefers soft, muddy soils that are regularly inundated, and is commonly found fringing tidal waterways.

Ceriops australis (previously *Ceriops tagal var. australis*) Yellow Mangrove

Shrub or small tree 2-6m high, knee-shaped pneumatophores occasionally present.

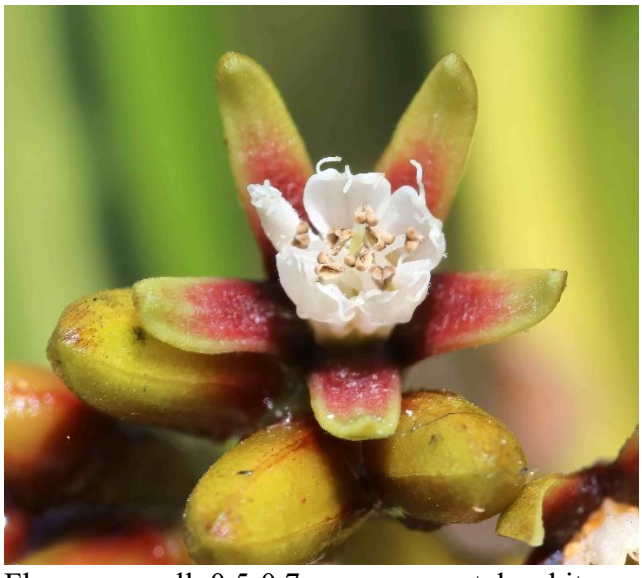
Habitat: mangrove communities, on the landward margins, commonly forming dense stands.

Leaves: opposite, crowded towards ends of branchlets, smooth, leathery, spatulate tapering to base, blade 3-9cm x 1.5-6cm, shiny bright green to yellow-green, rounded tip; stalk to 2.5cm long.

Flowers in dense 4-10 flowered clusters in upper leaf axils; buds red. Flowering: Jun-Nov (Dec).

Buttressed trunk or small stilt roots.

Fruit: smooth, cone-shaped, 1-1.3cm x 0.5-0.7cm, pointed calyx lobes at base, green to brown; seed germinates on plant producing sharp cylindrical hypocotyl 5-15cm x 0.4-0.6cm. Jun-Dec.



Flowers: small, 0.5-0.7cm across, petals white turning orange (with age), reddish calyx.

Dalbergia candenatensis [text: Wightman, G., *Mangroves of the Northern Territory*]

perennial twining vine to 8 m long

Flowers: mostly January, small, white peaflowers on branching inflorescences

Leaves: pinnate, 5-8 alternate obovate leaflets with blades to 50 mm long and 35 mm wide.

Fruiting: February and March, sickle-shaped pod, to 35 mm long and 15mm wide, brown when mature, single seeded; buoyant fruit is adapted to both water and wind dispersal.

Habitat: landward edge of mangrove communities.

Dalbergia candenatensis appears intolerant of frequent saltwater inundation, preferring either areas with perennial high fresh water input or areas at the upper limits of normal tidal influence.

***Excoecaria agallocha* – Milky Mangrove** [Text: FloraNT, accessed 30/11/2024]

small semi-deciduous tree with one or several stems to mostly 8 m high but sometimes to 15 m.

male flowers tiny, yellowish, arranged in many-flowered clusters on spikes to 12 cm long.
Male and female flowers on separate plants.
Flowering: October to February begins when the plant is leafless. Fruiting: December to March.

Twigs and petioles produce white caustic sap.

Habitat: mangrove communities on sand in areas receiving some freshwater input.

Leaves: alternate, discolorous, ovate, obovate or elliptic to 115 mm long and 60 mm wide,
2 glands at base near junction with petiole.

detail of male flowers

small 3-lobed female ovules with tiny flowers

Hibiscus tiliaceus Beach Hibiscus

Tree 5-8m high with spreading crown; evergreen. Bark smooth, grey-brown.

Flowers: large, yellow wide dark maroon-purple centre, 6-7cm x 7-9cm in upper leaf axils.

Flowering: periodic.

Habitat: coastal region; on sand dunes, in vine thickets on stabilised dunes or cliff, above the beach, or in association with mangroves; monsoon forest associated with freshwater streams in lowland country, occasionally on fringes of black-soil plains.

Leaves: alternate, broad, heart-shaped, nearly circular, blade 8-14cm x 7.5-12.5cm, dark green and sparsely hairy to smooth above, whitish and densely hairy underneath, venation prominent and raised underneath, short-pointed tip.

Fruit: hairy, semi-woods capsules, 2-2.5cm x 1.8-2cm, brown and splitting when ripe, containing several small kidney-shaped seeds.

Fruiting: Jan-Apr.

Lumnitzera racemosa White-flowered Black Mangrove

Mangrove shrub or small bushy tree 5-13m high.

Flowers: white, stalkless, somewhat tubular.

Fruit: hard, smooth, compressed, 1-1.5cm x 0.3-0.4cm, persistent calyx lobes at apex, fibrous woody interior, single-seeded. Fruiting: Jan-Jun.

Leaves: spirally arranged, crowded towards ends of branchlets, smooth, slightly fleshy, leathery, spatulate tapering to base, blade 2-9cm x 1-2.5cm, light green, tip mostly rounded and indented with small gland underneath; stalk 0-lcm long.

Flowering: Oct-May
nectar-rich, 0.8-1cm x 0.7-0.8cm, few-flowered in short spikes about 3cm long in upper leaf axils.

Habitat: landward margins of mangrove community; fringes of tidal waterways with fresh-water influence.

Aboriginal uses: valued for firewood; slow-burning and difficult to put out; wood sometimes used to make fire sticks or fighting spears.

Osbornia octodonta Myrtle Mangrove

Multi-stemmed mangrove shrub or small tree generally 2-4m high.

Bark: grey, fibrous, flaky on older stems; smooth and whitish-grey on young branches.

Habitat: mangrove forest towards the landward margins, in tidal estuaries, salt pans or along tidal watercourses.

Flowers: small stalkless, pale green-cream, slightly tubular, 0.7-1cm x 0.4-0.5cm, enclosed in prominent densely hairy calyx, 1-3 in upper leaf axils.

Flowering: Nov-Feb (also recorded in Jun).

Leaves: opposite, smooth, somewhat spatulate tapering to base, blade 2-5cm x 1-2.1cm, numerous small translucent oil dots, rounded tip; nearly stalkless or very short reddish stalks.

Fruit small, cone-shaped, 0.7-lcm x 0.4-0.7cm, enclosed in velvety-hairy calyx tube with lobes at apex, pale grey, non-splitting, containing 1-2 seeds. Fruiting: Dec-Feb (Mar).

Pemphis acidula Bantigue, Mentigi

Much-branched spreading shrub or small tree 2-4m high, sometimes forming thickets.

Bark: dark brown, somewhat fissured or flaky.

Leaves: opposite, small, sometimes succulent, finely hairy both sides, narrow-oval, blade 1-2.5cm x 0.4-l.lcm, dull grey-green, rounded tip; very short hairy stalk.

Flowers: white, somewhat star-shaped, 1-1.5cm across, solitary in upper leaf axis.

Flowering. Apr-Nov.

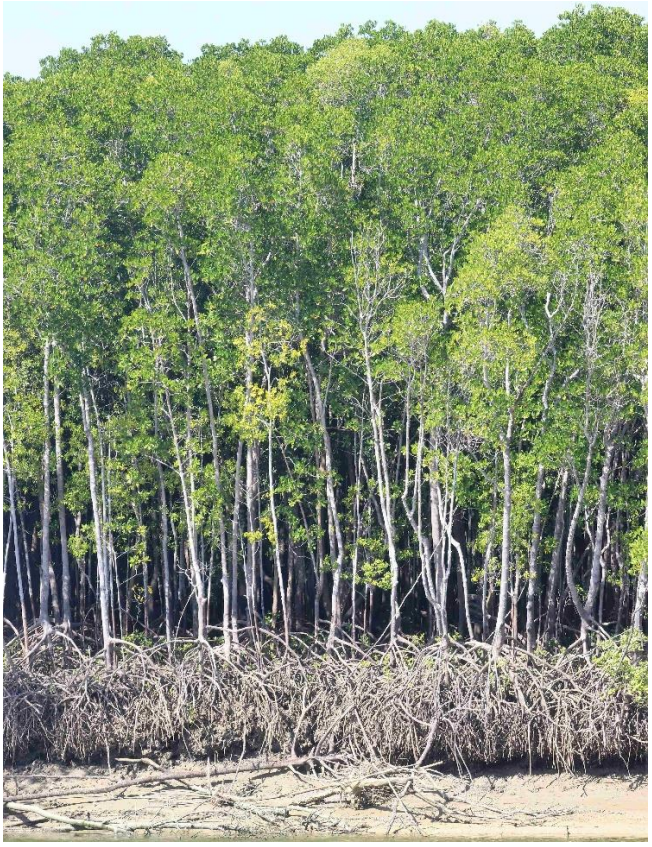
Habitat: coastal foreshore, generally at high tide level, on sandy beach or lateritic ledges or cliffs, commonly at rear fringe of mangrove forests.

Fruit: small roundish woody capsules 0.5-0.6cm diameter, enclosed within persistent hairy calyx., containing many angular seeds.

Fruiting: Apr-Nov.

Aboriginal uses: wood used to make digging sticks and woomera pegs; twigs and roots used to treat toothache.

Rhizophora stylosa Stilt-rooted Mangrove



Small to moderate-sized mangrove tree, arching stilt roots from trunk generally 5-12m high.

Fruit: smooth, brown, pear-shaped, 2.5-5cm x 2-3cm, 4 prominent calyx lobes at base;
Fruiting: Apr-Nov.

Slender aerial roots from branches.

Seed germinates on tree, producing narrow, cylindrical hypocotyl 25-65cm x 0.9-1.4cm.

Flowers: 1-1.3cm long, white feathery-hairy petals surrounded by stiff cream-yellow calyx lobes, 4-16 flowers in upper leaf axils. Flowers: Apr-Nov.

Scyphiphora hydrophylacea Yam-Stick Mangrove

Shrub or small tree up to 6 m tall, occasionally with small stilt roots and brownish-grey bark.

Flowers: in 1.5–3cm by 2–2.5 cm clusters.

Leaves: opposite, stalked leaves have leathery blades usually drop-shaped to broadly elliptic with a rounded tip, light green, hairless on both sides, 4–7cm by 2–4 cm, with 4–6 pairs of indistinct veins.

Flowers: pale pink to whitish-pink, 3–5 mm long, hairless outside.

Habitat: intertidal zones of mangrove forests, near the edges of brackish water.

Fruit: elliptic and deeply ridged, becoming light brown and buoyant when ripe.

Sonneratia alba Mangrove Apple

Spreading mangrove tree generally 4-5m high, may reach 8m.

Stout cone-shaped pneumatophores to 25cm high arising from radiating cable roots.

Leaves: opposite, smooth, thick, fleshy, oval to elliptic, blade 4.8-10.7cm x 2.7-7.5cm, bright green, rounded tip; stalk 0.6-1.5cm long.

Fruit: smooth, flattened-globular berries, 3-4cm x 3-3.5cm, pointed tip, base enclosed by persistent lobed calyx, green when ripe, numerous small seeds in thick pulp; edible fruit.

Fruiting: Mar-Oct.

Flowers: large, white or red with numerous fine white stamens, scented, 4.5-5.5cm long, prominent (fleshy lobed) green calyx at base, solitary, terminal on branchlets.

Flowering: Mar-Oct.

Habitat: a pioneering species in mangrove communities, commonly found on the seaward margins, in coastal and downstream estuarine regions.

Suaeda arbusculoides Jellybean plant [text extracted from Wightman, G., *Mangrove Plant Identikit*]

Erect woody subshrub to 50 cm high, glabrous.

Habitat: usually found as a single plant, although it is sometimes found penetrating several metres into a dense mangrove stand.

Leaves: alternate, succulent, oblanceolate, 10-20 mm long, 2-3 mm wide. Fresh leaves are almost circular in cross-section, or semicircular with one flat side.

The plant stores salt in its leaves, which wither and fall off when the concentration of salt becomes too high.

Flowers: pale green, bisexual, in axillary clusters usually of up to 5, subtended by 2 or 3 small, scale-like bracteoles. The perianth is succulent, with 5 lobes, sub-orbicular, green, fleshy, up to 2 mm wide. There are 5 tiny stamens and a superior ovary.

The flowers are insect-pollinated.

Fruit: semi-globose to 4 mm wide and contains a single circular seed.

The plant flowers and fruits throughout the year, but mainly in March and June.

Xylocarpus moluccensis (Previously *X. australasicus*) Cedar Mangrove

Medium to large much-branched mangrove tree 10-15m high (may reach 25m), deciduous.

Stout pencil-like pneumatophores.

Leaves: alternate, smooth, dark green, pinnate, whole leaf 10-15cm long, divided into 1-3 pairs of somewhat leathery, oval-elliptic leaflets of variable size, blade 4.2-13.5cm x 2-7cm.

Fruit: large, globular, leathery brownish capsules 5-l0cm diameter, enclosing angular brown seeds about 4-7cm long. Fruiting Nov-Feb.

Flowers: on slender axillary inflorescences 3-8cm. male and female flowers; small, cream, scented, 0.3-0.7cm across, Flowering: Jun-Oct.

Suggested Reading

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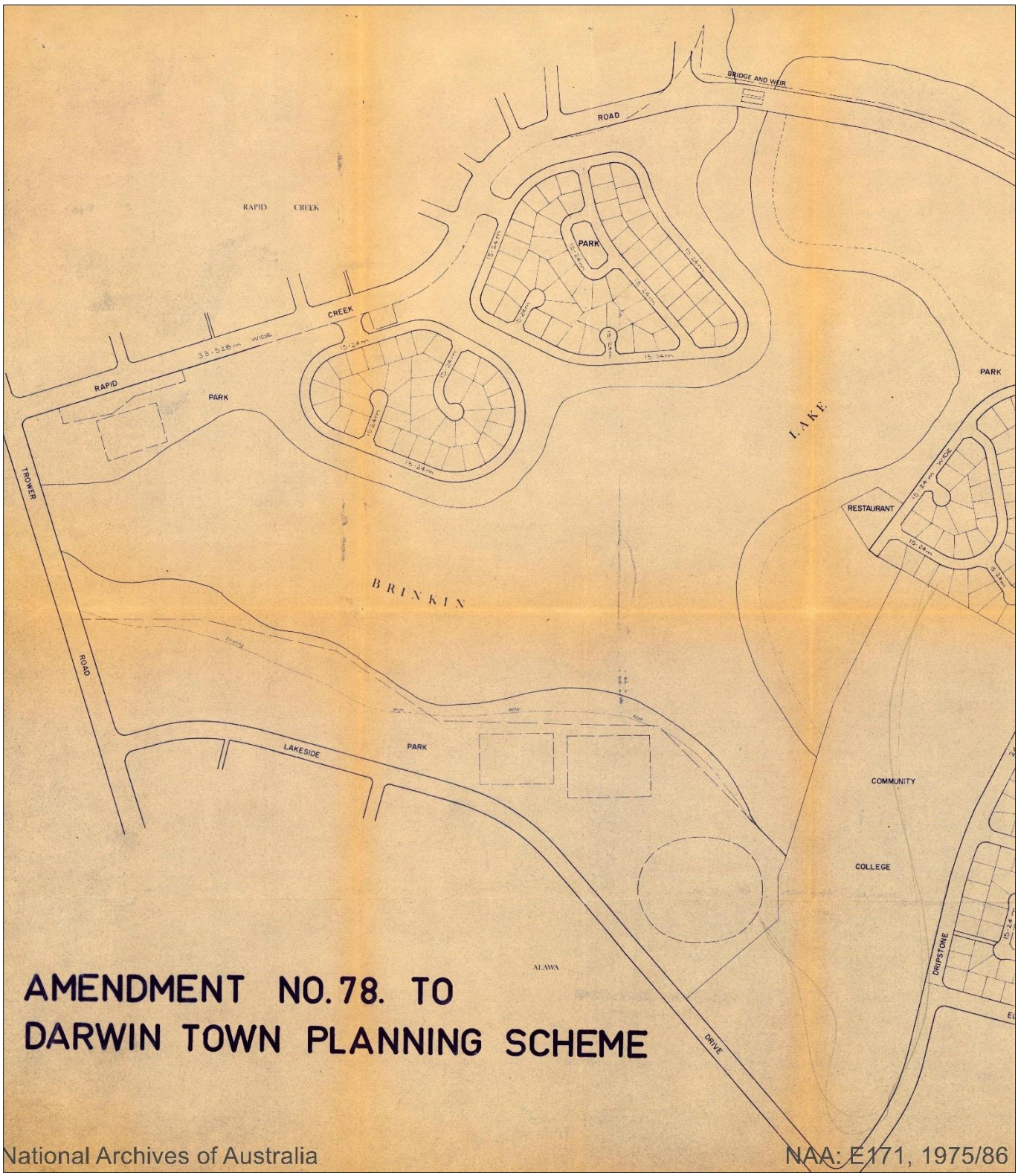
Brinkin Lake - February 1974



The Brinkin Lake Scheme to build a weir across the mouth of Rapid Creek to make an ornamental lake