MERCER PARK

NATIVE VEGETATION RESTORATION

DRAFT PLAN OF MANAGEMENT

Stephanie Lymburner
July 2003

ACKNOWLEDGMENTS

The valuable assistance in site assessment and compilation of this report from Julian Lymburner and James Brideson in gratefully acknowledged.

TABLE OF CONTENTS

1. SUMMARY

A study has been made of Mercer Park for Ballina Shire Council, to create a Draft Plan of Management to be implemented by a community group – East Ballina Landcare Group – and bush regeneration contractors.
An assessment of the site has been carried out, during the study twenty seven (27) native species were identified, predominately Littoral Rainforest Species, dominated by a magnificent specimen of a Small – leafed Fig (*Ficus obliqua*).
Thirty three (33) weed species were identified, in varying densities, but present in all strata of the forest ecosystem, indicating the site to be severely degraded.
Weed control priorities have been determined within the context of an integrated approach to their removal. The study found that no recorded restoration work has been performed since the park was first dedicated and this is reflected in the density of weed infestation and the weed species mix, the area is still vulnerable to further degradation due to its proximity to the urban area.
The Plan proposes on-going weed management control, the establishment of photo monitoring points to evaluate the progress of regeneration, the placing of educational signage and a program aimed at the long term rehabilitation of the site as well as informing the broader community to the value of remnant vegetation. In the future the site will be incorporated in a larger planning concept for the area.

2. AIMS AND OBJECTIVES:

AIM: *To restore, to the extent possible the structure, function, integrity and dynamics of the pre-existing vegetation and the sustaining habitat it provided.*

Regeneration and restoration of native plant communities is a complex, long term process and is more that just weed control. While weed control is of paramount importance, all weeds must be seen as part of a dynamic, interacting eco-system. By exploiting the natural resilience of the native vegetation, weed species can be controlled in such a way that they are replaced by native species rather than by other weeds. (Joseph,1998)

OBJECTIVES:

- To assist natural regeneration by implementing an integrated weed removal program.
- To involve interested members of the community in the restoration project.
- To educate the broader community to the threat that weeds pose to fragile ecosystems.
- To improve the habitat for fauna.
- To implement a planting program with locally indigenous species that will enhance the existing depleted forest structure.

3. SITE HISTORY:

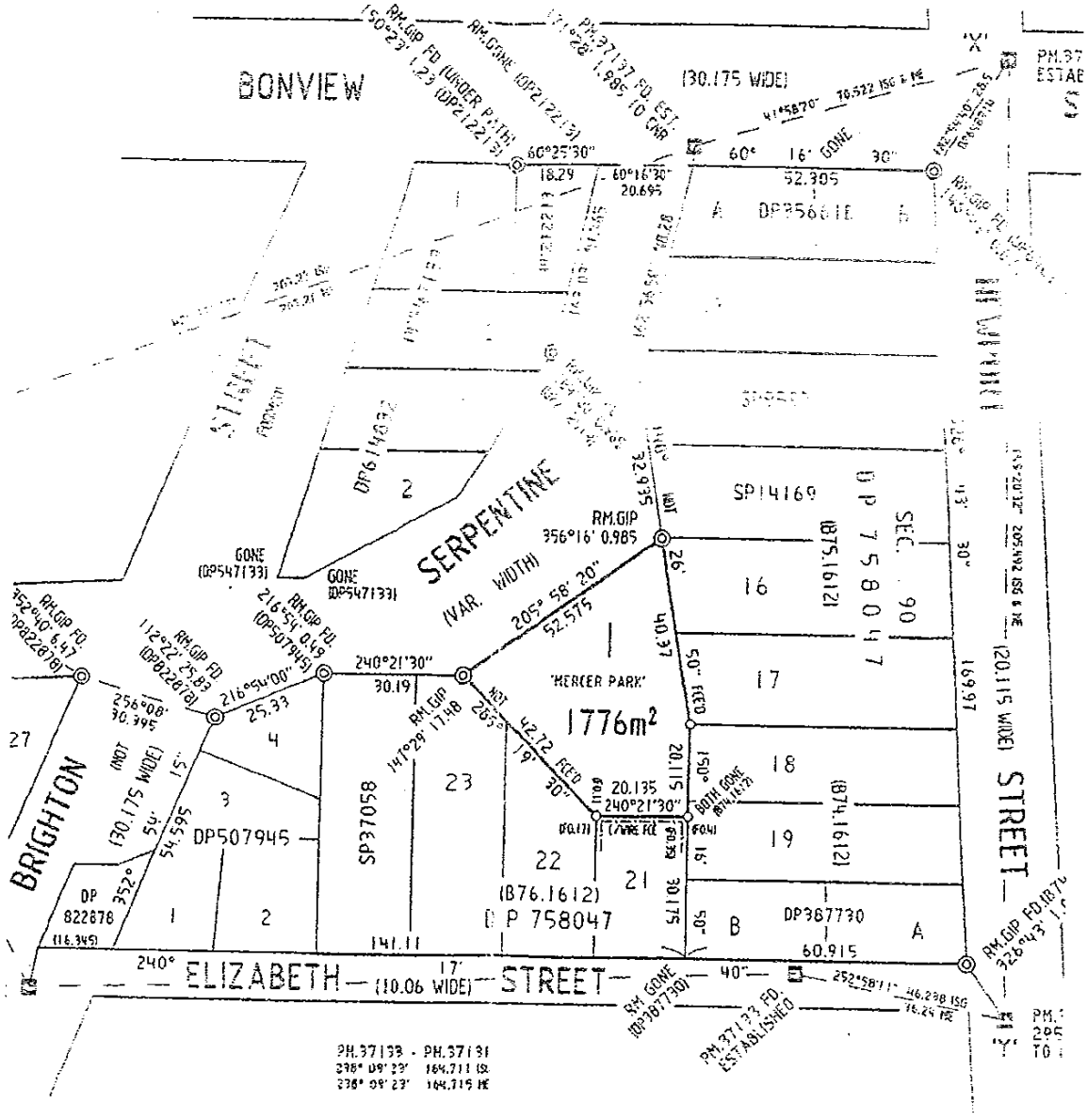
Mercer Park is a small remnant 0.5 hectares of littoral rainforest in the urban area of East Ballina. It was first declared a Park in the early 1960's , the name given to the Park is in recognition of Max and Diana Mercer, who were responsible for starting a newspaper (the Ballina Pilot) in 1955, and being involved with the community in conservation and heritage issues during their lives . The house at number 10 Elizabeth St., East Ballina was built by them in 1954/55, and the large fig that dominates the park now was a feature that they took into account when they were building.

Photo 1. Max and Diana Mercer on the verandah that overlooks Mercer Park.

AERIAL PHOTOGRAPH

SCALE 1 : 5000

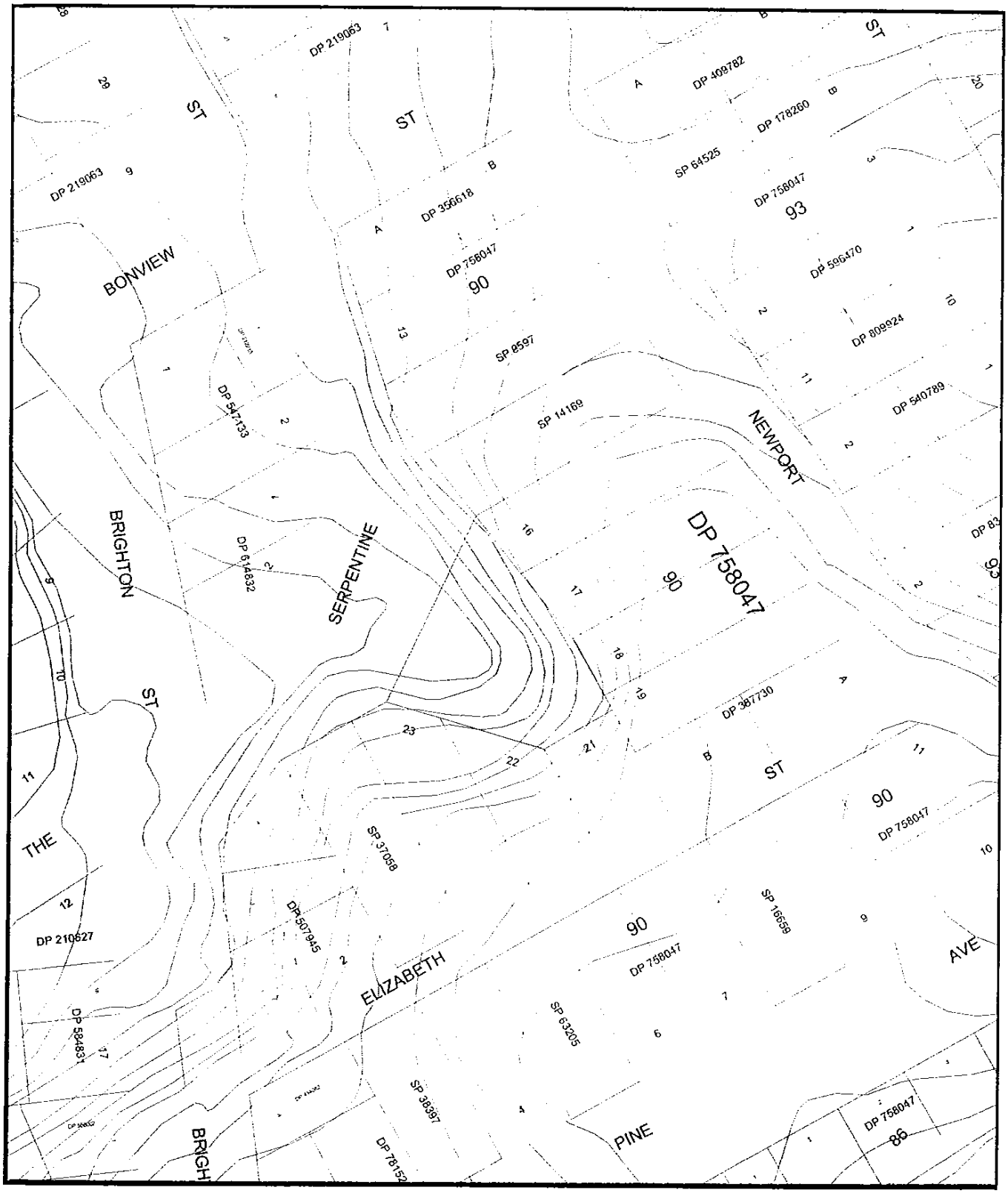
SURVEYORS MAP



SURVEYORS (PRACTICE) REGULATION 1996 CL.32(2)PT.4

MARK	ISG CO-ORDINATES - ZONE 56/2 COMBINED SCALE FACTOR = 0.999978			ACC. CAT.	
	EASTING	NORTHING	HEIGHT	H	V
PM 37131	356428.423	1805572.322	N.A	2	NA
PM 37133	356568.944	1805659.224	N.A	2	NA
PM 37134	356612.554	1805672.766	N.A	2	NA
PM 37136	356507.772	1805849.536	N.A	2	NA
PM 37137	356460.609	1805797.105	19.527	2	1
PM 70784	356326.784	1805698.849	2.698	2	2
SOURCE	ISG CO-ORDINATES ADOPTED FROM THE LAND INFORMATION CENTRE OF NSW. (LICENSE)				

CONTOUR MAP


BONVIEW
ST
BRIGHTON
ST
THE
ST
SERPENTINE
NEWPORT
ST
ELIZABETH
AVE
PINE
DP 758047
90
93
86
DP 219063
DP 408782
DP 178260
SP 64525
DP 356618
DP 758047
DP 596470
SP 8597
DP 809824
SP 14169
DP 540789
DP 547133
DP 614832
DP 387730
SP 37058
DP 507945
DP 210627
DP 584831
SP 16559
SP 63205
SP 38397
DP 781521

5. THREATS AND IMPACTS

5.1 Weeds: pose the biggest threat to the current health and the long term viability of the park, with invasive weed species being present at all levels of the forest structure.(see 6.2 and the weed species list in Appendices). Most of the weeds present in the park are the result of vegetative dumping or are 'garden escapes'.

5.2 Drainage: it appears that there are several illegal drainage lines emptying into the park from the surrounding houses, these are causing erosion and have the potential to spread more weed seed propagules and disturb the natural ecological balance.

5.3 Erosion,: is a significant threat to the park as the underlying soil is nutrient enriched sand with very little holding capacity, both drainage and excessive traffic – human and vehicular - create erosion in this soil type especially on the steep and unstable slopes

5.4 Urban area the park is bounded on three sides by houses, and a portion of road reserve bounds the fourth side. All of the houses represent a real threat by way of rubbish dumping of both household items and vegetative dumping, impacting on the fragile ecosystem.
The neighbouring properties are all heavily weed infested and represent a seed bank of propagules capable of re-infesting the park after work has commenced.

6. SITE ASSESSMENT:

6.1: Native Vegetation

The native vegetation of the plan is regarded as being Littoral Rainforest with the alliance of Cupaniopsis anacardiodies – Acmena spp. and subalIiance 17 occurring in the Richmond Valley.
Scattered individual trees, representing Suballiance 17 occur throughout the residential area of East Ballina. (Floyd,1990).
The Park is dominated by a large Small-leafed Fig and whilst several other native species occur in the park there is a higher density of weed species than native species
It is interesting to note that one of the native species, Brown Pearwood (*Amorphospermum antilogum*) occurring in the park, but the recorded Southern limit of this species is in the Tweed Valley (Williams, Harden & McDonald 1984) making this plant somewhat unusual as it is unlikely that it has been planted.
The canopy is intact, by way of the Small-leafed Fig, it has the potential to provide excellent migratory resilience – with bird species and Flying Foxes bringing in seed propagules.
The middle stratum of the forest has examples of Tuckeroo(*Cupaniopsis anacardiodes*), Maiden's Blush(*Sloanea australe*), Brown Bollygum(*Litsea australe*),Grey Ebony (*Diospyros fasciculosa*) with other species also present. (see species list in Appendices)
The lower stratum or forest floor, throughout the whole park and surrounding properties, is completely covered with weed species, it was difficult to find any native species, from this strata present.

The 'in situ' resilience of the park is regarded to be low due to the high number of weed species present in the lower strata, therefore planting of locally indigenous species maybe necessary to enhance the existing depleted forest structure and for erosion control on the steep slopes

6.2 Weed Species:

The park is heavily infested with weed species affecting all layers of the forest structure, including the canopy of the Small-leafed Fig which has Madeira Vine and Cape Ivy present in the canopy.

The middle stratum is significantly degraded, due to several weed species smothering most of the strata particularly Madeira Vine, Cape Ivy and Climbing Asparagus (*Protaspargus plumosus*), all of these species have the ability to smother and kill the host trees or shrubs.

The forest floor is of most concern being completely overrun by weed species, notably Singapore daisy, germinating tubers of Madeira Vine, Tropical Chickweed (*Drymaria cordata*) Wandering Jew (*Commelina fluminensis*) and Ground Asparagus (*Protasparagus aethiopicus*). These species are successfully out competing the native species and preventing seedling germination.

The presence of these weeds , at the density that currently occurs, inhibits the germination of any native species. The long term effect of this means that the park could simply become a weed reservoir with few native species surviving.

Photo 2. Weeds smothering the mid-strata and covering the forest floor.

Two fern species Fishbone Fern (*Nephrolepis cordifolia*) and (*Nephrolepis hirsutula*) occur, though native to Australia, they are not from this region, and are growing in large dense colonies throughout the park,
Similarly the Umbrella Tree (*Schefflera actinophylla*)is growing out of range and has the potential to spread.
Some species of trees have been planted that are not native notably Jacaranda (*Jacaranda mimosifolia*), or are incorrect species for this vegetation type.
ie Red Cedar (*Toona ciliata*).
Jacaranda's are seen to be an environmental weed in some rainforest remnants and will require monitoring. Both of these trees were most probably planted by Diana Mercer and could be seen as having some heritage value.
Whilst it appears that only the significant weeds have been focussed upon, all the weed species will be controlled in an integrated and systematic program so that one area will be treated before commencing on the next zone, or work area.
There are many weed species that are limited in distribution or degree of infestation and are not causing major damage at this stage but they have the potential to become serious pests unless their spread is monitored and appropriate control methods instituted.

6.3: WORK ZONES:

The adjoining road reserve appears to be part of the park , which is also heavily weed infested requires rehabilitation works and will incorporated into the restoration plan.
For these purposes the park has been divided into two (2) work zones and a number of work areas.

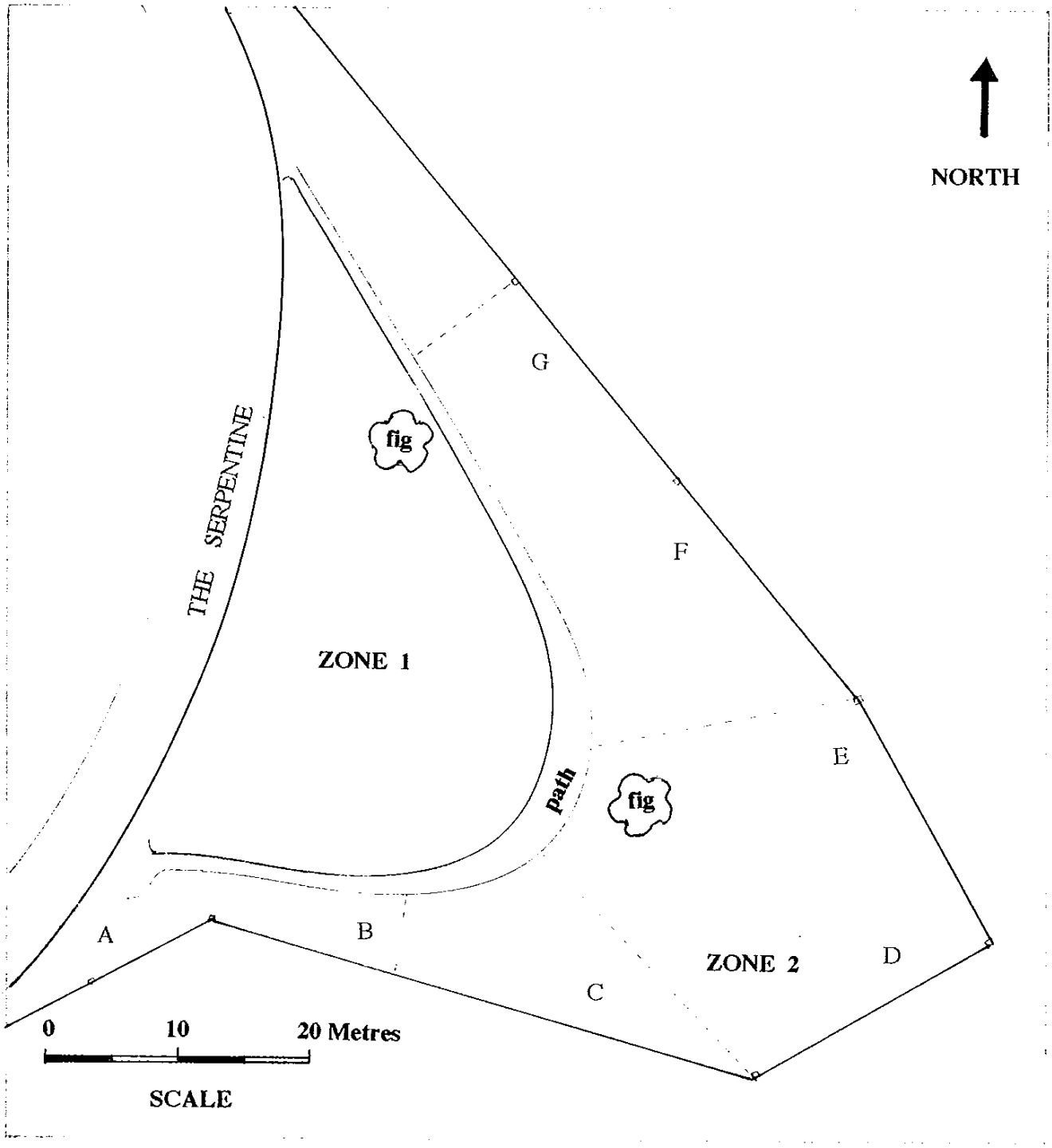
Zone 1 is formed by the road reserve and the natural gully at the base of the slope, it is dominated by the Small-leafed Fig.

Zone 2 is the steep slope, from the old road up to the adjacent properties boundaries. This area will be divided into work areas that will relate to boundary marker pegs.

A map showing work zones and work direction is on the following page.
This map will be used in conjunction with work sheets to record work progress, chemicals used and daily personnel attendance.

WORK ZONES MAP.

MERCER PARK



7.MONITORING:

The main application of monitoring programs should be the prediction of key factors in the regeneration project, such as:

- follow-up programs for weed species and weed species germination
- the native species regrowth
- the changes in species density, cover and biomass
- ecosystem response to different regeneration techniques

Photo monitoring points will be established throughout the park. A regular photo program and daily work sheet observations will be the main form of monitoring.

8. RECOMMENDATIONS:

- Systematic, integrated removal of weed species.
- Establishment of photo monitoring points – to assess project
- Exclusion of vehicular traffic from the major area of the park.
- Signage, based on educating the community to the threats of weeds and vegetative dumping.
- Planting of locally indigenous native species to assist in erosion control and enhance the existing flora
- Creation of a graded walking track.
- Placing of a seat to encourage the community to appreciate the beauty of the Small-leafed Fig and surrounding environment.
- Investigate illegal drainage and implement control methods.

Photo 3. Path, heading north west, showing infestation of ferns.

9. PRIORITIES:

- Establish photo monitoring points, taking photo's before any regeneration work commences.

- Treat the small outbreak of Glory Lily (*Gloriosa superba*) in Zone 2 – this is a particularly invasive weed in sandy soils and is difficult to control.

- Commence a spray program in Zone 1 – to suppress the Singapore Daisy and Nephrolepis sp.. Hand treat Cape Ivy and Madeira Vines and bag tubers and tuberlings, remove from site. Removal of woody weeds such as Golden Bells (*Tecoma stans*) from road reserve

- Hand treat exotic vines and hand removal of Madeira Vine tuberlings from work area 1 in Zone 2 progressing from the road edge east.
  This will be time consuming work -- suitable for volunteers.

- An assessment of the work will be made at the completion of the initial work area to ascertain the need for planting.
  This method will be continued for the remainder of Zone 2.

- Bollards (or equivalent) and educative signage should be placed at the park entrance as soon as possible, to prevent vehicular access and to inform the community of the importance of the park and the restoration project.

Other recommendations to be implemented as funding allows.

10. CONCLUSION:

The future of this small remnant is under threat from numerous invasive plant pest species and the likelihood of further invasion by 'garden escapes'.
The senescing of existing native plant species and the failure of germination on the forest floor will see the demise of this park.
It is essential that the weed species be controlled in order to allow for successive generations of rainforest plants to enhance the present canopy and mid stratum species and allow germination of native species on the forest floor..
The importance of this remnant for community education and on-going bio-diversity in the mosaic of small coastal remnants will only be fully achieved by the commitment to an ongoing regeneration and continuing maintenance program.

REFERENCES:

Floyd A.1990 Australian Rainforest in N.S.W. Vol 2, Surrey Beatty and Son Pty.Ltd. N.S.W. Australia.

Joseph R.1998 An Integrated, Systematic Approach to Rainforest Restoration, in Rainforest Remnants – A Decade of Growth, Horton S.(ed) NSW NPWS, 1999

Nicholson H.& N. 1985 -1994 Rainforest Plants vols 1 –5 Terania Rainforest Publishing.

The Big Scrub Rainforest Landcare Group 1998 Common Weeds of Northern NSW Rainforest., The Richmond Catchment Committee.

Williams J.B., Harden G.J., McDonaldW.J.F 1984 Trees and Shrubs in Rainforests of New South Wales and Southern Queensland. University of New England Printery Armidale.

APPENDICES

NATIVE PLANT SPECIES LIST:

At 30:06:03 with ongoing work more species will be added to this list.

Family	Botanical Name	Common Name
Agavaceae	Cordyline sp.	Palm Lily
Araceae	Alocasia brisbanensis	Cunjevoi
Arecaceae	Archontophoenix cunninghamiana	Bangalow Palm
Aspleniaceae	Asplenium australasicum	Bird's Nest Fern
Cupressaceae	Callitris columellaris	Sand Cypress Pine
Ebenaceae	Diospyros fasciculosa	Grey Ebony
Elaeocarpaceae	Sloanea australis	Maiden's Blush
Euphorbiaceae	Bridelia exaltata	Brush Ironbark
	Baloghia inophylla syn.lucida	Brush Bloodwood
Flagellariaceae	Flagellaria indica	Whip Vine
Lauraceae	Cryptocarya triplinervis	Three-veined Laurel
	Litsea australis syn.leefeana	Brown Bolly gum
	Neolitsea australiensis	Green Bolly gum
Meliaceae	Toona ciliata syn.australis	Red Cedar
Moraceae	Ficus obliqua	Small-leaved Fig
Myrtaceae	Syzygium oleosum	Blue Lilly Pilly
Peperomiaceae	Peperomia blanda var.floribunda	Peperomia (groundcover)
Philesiaceae	Geitonoplesium cymosum	Scambling Lily (vine)
Proteaceae	Banksia integrifolia	Coastal Banksia
Rutaceae	Flindersia schottiana	Cudgerie
Sapotaceae	Amorphospermum antilogum	Brown Pearwood
Sapindaceae	Cupaniopsis anacardioides	Tuckeroo
	Harpullia hillii	Blunt-leaved Tulip
Smilacaceae	Smilax australis	Smilax (vine)
Urticaceae	Dendrocnide photinophylla	Shiny-leaved Stinging Tree
Verbenaceae	Clerodendrum floridbundum	Smooth Clerodendron
	Gmelina leichhardtii	White Beech

WEED SPECIES LIST:

At 30:06:03 with ongoing work more species will probably be added to this list.

*denotes invasive native species growing out of range

Family	Botanical Name	Common Name
Acanthaceae	Hypoestes phyllostachya	Freckle Face
Araliaceae	*Schefflera actinophylla	Umbrella Tree
Areaceae	Syagrus romanzoffianum	Cocos Palm
Aristolochiaceae	Aristolochia elegans	Dutchman's Pipe (vine)
Asparagaceae	Protasparagus plumosus	Climbing Asparagus(vine)
	Protasparagus aethiopicus	Ground Asparagus
Asteraceae	Delairia odorata	Cape Ivy (vine)
	Tithonia diversifolia	Japanese Sunflower
	Widelia trilobata	Singapore Daisy
Balsaminaceae	Impatiens walleriana	Balsams, Busy Lizzy
Basellaceae	Anredera cordifolia	Madeira Vine
Bignonaceae	Tecoma stans	Golden Bells
Caryophyllaceae	Drymaria cordata	Tropical Chickweed
Colchicaceae	Gloriosa superba	Glory Lily
Commelinaceae	Callisia fragrans	Callisia
	Tradescantia fluminensis	Wandering Jew
	Trandescantia zebrina	Striped Wandering Jew
Convolvulaceae	Ipomoea cairica	Coastal Morning Glory(vine)
Crassulaceae	Bryophyllum sp.	Mother of Millions
Davallaceae	* Nephrolepis cordifolia	Fishbone Fern
	* Nephrolepis hirsutula	
Euphorbiaceae	Euphorbia cyathaphora	Painted Spurge
Fabaceae	Senna pendula var.glabrata	Winter Cassia
	Desmodium intortum	Green-leaf Desmodium
Malaceae	Eryobotria japonica	Loquat
Myrtaceae	Eugenia uniflora	Brazilian Cherry
Ochnaceae	Ochna serrulata	Ochna, Mickey Mouse Plant
Passifloraceae	Passiflora suberosa	Corky Passionfruit (vine)
	Passiflora subpeltata	White Passionflower (vine)
Phytolaceae	Rivina humilis	Coral Berry
Poaceae	Setaria palmifolia	Palm Grass
Rutaceae	Murraya paniculata	Orange Jessamine
Solanaceae	Solanum seaforthianum	Climbing or Brazilian Nightshade
Verbenaceae	Lantana camara	Lantana

WEED REMOVAL and CONTROL TECHNIQUES for individual species

VINES

Common Name	Botanical Name
Madeira Vine	(*Anredera cordifolia*)* Hand weed tubers and small vines: bag and compost or place in bin.
Cape Ivy	(*Delairia odorata*) * runners roll up and hang up to dry.

The method described below is to be used to treat these highly invasive vines.

Scrape-ditch-paint method: This method applies to many species of vines where it is desirable to treat vines intact, particularly those with aerial tubers such as Madeira Vine, or those which will propagate from segments eg. Cape Ivy.

(a) Scrape the stem tissue on one side of the stem only for 20 – 30 centimetres if possible. (Note: on Madeira Vine it is necessary to scrape heavily). Scrape as many section of the stem as possible.

(b) Apply glyphosate at the rate of 100%with a paint brush

(c) On stems which are thicker or horizontal, make a ditch into the stem with a knife and apply herbicide – taking care not to sever the stem.

(d) *It is desirable to collect ALL the aerial tubers on Madeira Vine that can be reached before using this method.*

Green –leaf Desmodium	(*Desmodium intortum*) Hand removal or crown, collect and bag seeds.
Dutchman's Pipe	(*Aristolochia elegans*) Hand removal, collect and bag seeds.
Climbing Asparagus	(*Protasparagus plumosus*) Cut above head height and close to ground spray regrowth with glyphosate 1:50 + Li700.
Corky Passionfruit	(*Passiflora suberosa*) Hand removal and cut scrape and paint stems close to ground.
White Passionflower	(*Passiflora subpeltata*) as for Corky Passionfruit.
Coastal Morning Glory	(*Ipomoea cairica*) Vines and runners: hand pull, roll up and hang up to dry.
Climbing or Brazilian Nightshade	(*Solanum seaforthianum*) Hand removal, collect and bag ripe seeds remove from site.

Regrowth of these vines may be sprayed with a back pack using glyphosate at 1:50 with Li 700(a surfactant) or removed by hand.

TREES AND SHRUBS:

The following shrub and tree species are to be treated using the 'cut scrape paint' method:
(1) Cut- scrape-paint method: This method applies to all woody shrubs, trees.
(a) Cut plant low to the ground
(b) Apply glyphosate immediately at the rate of 1:1.5 with a paint brush
(c) Scrape sides lightly to reveal green tissue and apply the herbicide to the scraped area
(d) Take care that the brush is not contaminated with soil.

Umbrella Tree	(*Schefflera actinophylla*) when treating this species make sure the cut trunk is not in contact with the ground as it 'strikes' readily.
Golden Bells	(*Tecoma stans*)
Winter Cassia	(*Senna pendula var.glabrata*)
Loquat	(*Eryobotria japonica*)
Brazilian Cherry	(*Eugenia uniflora*)
Ochna, Mickey Mouse Plant	(*Ochna serrulata*) do not hand pull seedlings, even with small plants it is advised to cut scrape and paint them.
Orange Jessamine	(*Murraya paniculata*)
Japanese Sunflower	(*Tithonia diversifolia*) take care to keep the stem away from the ground as it 'strikes' readily.
Lantana	(*Lantana camara*)
Cocos Palm	(*Syagrus romanzoffianum*) Knife out seedling and small plants.

GROUNDCOVERS

The ground covers are to be treated with the following methods.

Singapore Daisy	(*Widelia trilobata*) Spray with glyphosate1:50 + metsulfuron methyl 1.5 g per 10 ltrs + Li700.
Glory Lily	(*Gloriosa superba*) Hand removal with follow up essential.
Freckle Face	(*Hypoestes phyllostachya*) Hand pull or crown out or spray with glyphosate 1:50 + Li700.
Ground Asparagus	(*Protasparagus aethiopicus*) Hand crown or spray with glyphosate1:100+ metsulfuron methyl 1.5g per 10 litres.
Balsams, Busy Lizzy	(*Impatiens walleriana*) Hand pull and compost.
Tropical Chickweed	(*Drymaria cordata*) Spray with glyphosate 1:100+ Li700
Callisia	(*Callisia fragrans*) as for Wandering Jew.
Wandering Jew	(*Tradescantia fluminensis*) Hand removal in small areas and compost or spray with glyphosate 1:50 + Li700.
Striped Wandering Jew	(*Trandescantia zebrina*) as for Wandering Jew.

Mother of Millions	(*Bryophyllum sp.*) Hand removal, bag and remove from site.
Fishbone Fern	(*Nephrolepis cordifolia*) Hand pull and hang out to dry. Spray large outbreaks with glyphosate 1:100 + metsulfuron methyl 1.5gs per10lts + Li700.
	(*Nephrolepis hirsutula*) as for Fishbone Fern.
Coral Berry	(*Rivina humilis*) Hand pull, hang plants up to dry out, remove ripe berries from site.
Palm Grass	(*Setaria palmifolia*) Knife out, compost root section.
Painted Spurge	(*Euphorbia cyathaphora*) Hand pull and compost.

RECOMMENDED SPECIES FOR EROSION CONTROL:

Based on species lists from Broken Head Nature Reserve, Boulders Beach and observations at Iluka Nature Reserve and Brunswick Heads Nature Reserve.

Family	Botanical Name	Common Name
Adiantaceae	Adiantum aethiopicum	Maiden hair Fern
	Pellea falcata	Sickle Fern
Agavaceae	Cordyline rubra	Red-fruited Palm Lily
	Cordyline stricta	Narrow-leafed Palm Lily
Aristolochaceae	Pararistolochia pravenosa	Richmond Birdwing Butterfly Vine
Arecaceae	Archontophoenix cunninghamiana	Bangalow Palm
Asclepidaceae	Hoya australis	Hoya Vine
Blechnaceae	Blechnum cartilagineum	Gristle Fern
	Doodia aspera	Rasp Fern
Commelinaceae	Commelina cyanea	Native Wandering Jew
Cyatheaceae	Cyathea cooperi	Straw Tree Fern
Dioscoreaceae	Dioscorea transversa	Native Yam
Dryopteridaceae	Lastreopsis sp.	Sheild Fern
Euphorbiaceae	Glochidion sumatranum	Umbrella Cheese Tree
Liliaceae	Crinum pendunculatum	Crinum Lily
	Dianella caerula	Blue Flax Lily
	Tripladenia cunninghamii	Kreysigia
Moraceae	Ficus fraseri	Sandpaper Fig
Myrtaceae	Acmena smithii	Lilly Pilly
Poaceae	Oplismenus sp.	Basket Grass
	Panic pygmaeum	Dwarf Panic Grass
Rubiaceae	Canthium comprosmoides	Coast Canthium
Rutaceae	Acronychia imperforata	Coast Acronychia
Xanthorrhaceae	Lomandra longifolia	Spiny Mat Rush