

REHABILITATION PLAN

-THE ISLAND- NEIL McDOUGALL PARK

For the City of South Perth



Ecosystem Management Services

August 2002

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Landscape Plan

- The Island - Neil McDougall Park

1.0 Background

The island within Neil McDougall Park is an example of amenity landscaping that is now considered less than desirable from an environmental standpoint. The plants installed onto the island in the late 1970's were chosen for their ability to best meet the requirements for park management, and were selected in a period when the benefits of using native vegetation were not widely understood.

This plan aims to better integrate the aesthetic and environmental needs for the area and the design features measures to strategically remove exotic species and to restore the natural vegetation over time.

2.0 Objectives

The principal objective of this plan is to improve the environmental integrity of the island without significantly disrupting vistas across the lake, or habitat values, during the implementation period.

In order to achieve this objective the plan proposes that:

- Exotic vegetation is systematically removed, and replaced with native species, over a ten year period,
- Weed species are controlled, and finally eradicated, on the island,
- Habitat values are increased through the use of native emergent vegetation and native trees and shrubs,
- Turtle nesting areas are created through the removal of weed species.

As stated, all of this can be achieved, over an extended period, with no significant adverse effect on the aesthetics of the park or island.

3.0 Specific detail of the rehabilitation plan

The revegetation plan encompasses six main activities inclusive of:

- Removal of recognised weed species
- Replacement of exotic species over time
- Provision of habitat
- Preservation of native species
- Maintenance and ongoing weed control
- Provision of a landing area and access ways

3.1 Removal of recognised weed species

3.1.1 Nuisance weeds

The first stage of works on the Island centres around the removal of nuisance weed species such as the Willows (*Salix babylonica*), the pampas grass (*Cortaderia selloana*), the Japanese Peppers (*Schinus teribenthifolius*) and the Chilean Willow (*Salix chilensis*). These species should be removed by hand and the stumps should be treated with a Glyphosate injection.

The cut branches (under 75mm dia) should be mulched and stored on the island for use in the revegetation works. Larger branches should be removed and mulched off site.

3.1.2 Introduced grasses

The second stage of weed removal will be the gradual elimination of grass weeds that are occurring spasmodically in the open section of the island. Grasses occurring away from open water should be controlled using repeated applications of Fusillade, and those grasses growing adjacent to the water should be controlled with Roundup Biactive to reduce any effect on fauna.

3.2 Replacement of exotic species

The third stage of the plan is the removal and replacement of exotic species that fall out of the nuisance weed category. The predominant species listed for replacement are the *Casuarina cunninghamii*, the *Leptospermum laevigatum* and the *Papyrus*. These species are the most dominant on the island and their removal will need to be staged if Island aesthetics and habitat values are to be maintained.

3.2.1 *Casuarina cunninghamiana*

The recommended timeline for the removal of the *Casuarina* is as follows:

- Year 1 - Cut and mulch all *Casuarina cunninghamii* with trunks under 50mm diameter. (around 30% of the total trees)
- Year 2 - Cut and mulch all *Casuarina cunninghamii* with trunks between 50 and 100 mm diameter.
- Year 3 - 9 - Strategic removal of individual trees to make way for revegetation works. The removal of these trees should be aligned to the maintenance of island aesthetics. During this period it is anticipated that the implementation of the revegetation program has resulted in the establishment of many large native *Casuarinas* and *Eucalypts* to replace larger exotic *Casuarina* trees
- Year 10 - Remove remaining *Casuarina cunninghamii* trees if sufficient growth has been attained from replacement species. These trees could either be, cut and removed from the island, or trimmed, poisoned and left if they will not have an adverse effect on the island aesthetics.

3.2.2 *Victorian Tee Tree*

The removal of the Victorian tee tree will also be staged to ensure that the island is not left in a barren state for extended period during revegetation. Much of this species can be cut and mulched in the first year of the project however a fringe of established plants will be left on the north side of the island until such time as native plantings become established in the centre of the island.

3.2.3 *Papyrus*

The dominant species on the island fringes is the *Papyrus*. Although introduced, the *Papyrus* performs a valuable role in providing Fauna habitat and It is critical that extensive native emergent plantings are established before any attempt is made to remove the *Papyrus*. With this in mind, the following timeline is recommended for the removal of this species:

- Year 1-3 - Establish extensive plantings of native rush and sedge species around the island banks, and into the water. The preferred species for this zone are :

- Seasonally inundated regions on the island banks -
Bolboschoenus caldwellii, *Juncus pallidus*, *Baumea juncea*.
- Shallow but permanently wet regions - *Baumea preissii*,
Schoenoplectus validus
- Deep water zones to 1m deep - *Baumea articulata*, *Eleocharis sphacelata*

- Year 4– Remove approximately 30% of the introduced Papyrus and implement a strategy to control re-growth over the coming year.
- Year 5 – Replant into the cleared zones using a combination of the recommended species.
- Year 6 - Remove another 30% of the introduced Papyrus and implement a strategy to control re-growth over the coming year
- Year 7 – Replant into the cleared zones using a combination of the recommended species.
- Year 9 – Allow plantings to become established during this period
- Year 9 - Remove the balance of the introduced Papyrus and implement a strategy to control re-growth over the coming year
- Year 10 - Replant into the cleared zones using a combination of the recommended species.

3.2.4 Other species

The three species discussed above are by far the most dominant and represent around 90% of the islands cover. Other plants are identified for removal however they represent a very small percentage of the islands cover and are not considered to be a threat to the integrity of the island. Such species include:

- Eucalyptus lansdowneana
- Eucalyptus citriodora
- Acacia longifolia
- Agonis flexuosa
- Other broadleaf weeds

These plants should be removed at the discretion of the City of South Perth Environmental Officer.

3.3 Provision of habitat

As stated, the key objective of the plan is the replacement of exotic species with native species that both, retain the basic form of the island, and provide increased habitat for fauna. The plan details proposed areas of revegetation that include:

- Turtle nesting beaches
- Areas of emergent native vegetation
- Areas of riparian vegetation, and
- Dryland plantings with overstorey and understorey species

3.3.1 Provision of native riparian vegetation

Native emergent vegetation will be installed around the island during the ten years of the project and in accordance with the timelines detailed above. In addition to the emergent species detailed, it is important that other native vegetation is installed onto the banks of the island to improve habitat values and increase amenity. Species recommended for this zone include:

Shrubs

Jacksonia furcellata
Hypocalymma angustifolium
Regelia ciliata

Groundcovers / herbs

Isolepis nodosa
Baumea juncea
Juncus kraussii
Lepidosperma effusum

3.3.2 Provision of turtle nesting beaches

Two locations on the perimeter of the island have been identified as being suited to turtle nesting. For turtles to nest it is desirable to have areas of beach that slope slightly upwards to a significant bank. The beach should have limited canopy cover to allow the sand to heat to a temperature suitable for incubation, and is best planted with native shrub and rush species such as Isolepis nodosa, Acacia pulchella, Lepidosperma effusum and Juncus kraussii nearer the waters edge. The numbers of these species should be determined when the final nesting areas have been identified. This can not occur until such time as the area is cleared of weeds.

3.3.3 Provision of overstorey and understorey plantings across the island

It is proposed that much of the island be revegetated with a combination of overstorey and understorey species. Initial works should focus on reinstating the overstorey species with understorey being incorporated into the works program as tree species become established.

The overstorey species recommended for this work include:

Trees

Eucalyptus rudis
Melaleuca raphiophylla
Casuarina obesa

Understorey plantings will be installed when these plantings become established and the species will include shrubs and groundcovers that occur naturally within the region and environment. The following species are readily available and suited to the region:

Shrubs

Acacia pulchella
Jacksonia furcellata
Hypocalymma angustifolium
Regelia ciliata
Melaleuca acerosa
Spyridium globulosum
Hibbertia hypericoides
Astartea fascicularis
Actinostrobilus pyramidalis

Groundcovers / herbs

Isolepis nodosa
Juncus kraussii

3.3.4 Installation of emergent rushes and sedges

The removal and replacement of exotic weeds is integral to the success of the revegetation program. Much of the island perimeter has been overtaken by introduced Papyrus, the removal of which is detailed in subsequent sections of this document. Following the removal of the exotic weed species the cleared areas can be replanted with the following species:

Seasonally inundated species

Bolboschoenus caldwellii
Juncus pallidus
Baumea juncea

Shallow water species

Baumea preissii
Schoenoplectus validus

Deep water zones

Baumea articulata
Eleocharis sphacelata

3.4 Preservation of native species

Whilst much of the island vegetation is introduced, there are some native species present and it is important that every effort is made to preserve these plants. Native species identified on the island include:

- Eucalyptus rudis (flooded gum)
- Actinostrobilus pyramidalis
- Restio Sp.
- Jacksonia Sp.

Smaller plants, such as the Restio and Jacksonia should be tagged prior to the commencement of works to ensure they are not damaged during clearing.

3.5 Maintenance and ongoing weed control

As for all rehabilitation works it will be necessary to implement a long term maintenance strategy for the island works. The weeds that will need to be targeted over the period of the plan include:

- Re-growth of nuisance weed species such as Japanese pepper, willow and pampas grass.
- Introduced grass species including Kikuyu, couch and buffalo grass
- Re-growth of Papyrus in cleared or revegetate areas, and
- New weed species resulting from seed making its way onto the island.

The preferred method of weed control is hand removal coupled with spot applications of Roundup Biactive, and where appropriate, Fusillade.

Over an extended period it is anticipated that the island will generate its own natural mulch, and that, in addition to mulch created from the clearing of exotic species, will help with long term weed management on the island.

3.6 Provision of landing beach and access ways

There will be a significant amount of work occurring on the island over the ten year period. This, coupled with a need to provide for access to monitor fauna and flora, will mean that a designated landing area and internal pathways will need to be left to allow for movements around the island. The plan proposes that a limited number of "goat tracks" be left to allow Council to access most regions on the island without damaging established vegetation. The landing beach should be kept clear of vegetation following the implementation of the plan to ensure personnel are able to access the island without injury.

4.0 Timelines

As stated, the underlying principal of the plan is that exotic species are replaced with native species, over time, with a minimal impact on island aesthetics throughout the entire process. With this in mind the revegetation works are scheduled to occur over a 10 year period to ensure that the mature vegetation already occurring on the island is able to be replaced in a manner that will have a minimal impact on the vistas across the lake.

4.1 Summary of rehabilitation activities by year

Year 1

- Remove nuisance weed species
- Start to eradicate grass weeds from the island
- Remove all exotic Casuarinas under 50mm diameter
- Remove 3/4 of the Victorian Tee Tree from the centre of the island
- Plant native riparian vegetation on the South West side of the island
- Plant native trees and shrubs where sufficient cleared land occurs
- Plant dryland rush and shrub species around turtle beaches where sufficient cleared land occurs

Year 2

- Continue with ongoing weed control – start to target grasses in proposed beach zones
- Remove all Casuarinas with trunk diameters less than 100mm
- Monitor and infill emergent vegetation on the South West side of the island
- Continue with the planting of native trees and shrubs where sufficient cleared land occurs

Year 3

- Tag and remove Casuarina trees to allow for increased plantings
- Continue with ongoing weed control – target grasses in proposed beach zones
- Remove the remainder of the Victorian Tee Tree if aesthetics allow

Year 4

- Tag and remove Casuarina trees to allow for increased plantings
- Continue with planting as areas become available through clearing
- Cut and mulch 30% of the Papyrus and monitor and control re-growth for one year

Year 5

- Tag and remove Casuarina trees to allow for increased plantings
- Continue with planting as areas become available through clearing
- Install emergent species into the area cleared of Papyrus (yr4)

Year 6

- Tag and remove Casuarina trees to allow for increased plantings
- Continue with planting as areas become available through clearing
- Cut and mulch a further 30% of the Papyrus and monitor and control re-growth for one year

Year 7

- Tag and remove Casuarina trees to allow for increased plantings
- Continue with planting as areas become available through clearing
- Install emergent species into the area cleared of Papyrus (yr6)

Year 8

- Tag and remove Casuarina trees to allow for increased plantings
- Monitor plant growth and infill as required
- Monitor the growth of emergent species and infill as required

Year 9

- Tag and remove Casuarina trees to allow for increased plantings
- Monitor plant growth and infill as required
- Cut and mulch the balance of the Papyrus and monitor and control re-growth for one year

Year 10

- Remove or poison the remaining Casuarina cunninghamii
- Monitor plant growth and infill as required
- Install emergent species into the area cleared of Papyrus (yr9)

All years

- Implement a maintenance program to control weed growth and monitor plant health
- Selectively remove undesirable plants (non-native species that pose little threat to the integrity of the ecosystem) throughout the period of works, as aesthetics dictate.

5.0 Plant numbers by zone

The following tables detail recommended plant numbers by planting zones and correlate to the recommendations contained within the text of this document. For specific information on the location of each zone refer to the attached sketch plan.

5.1 Riparian Zones

A total of 225 square metres have been identified as requiring revegetation with riparian species including tree, shrub and groundcover species.

Table 1: Species selection and densities

Form	Species	Planting density	Square metres of planting	Plants required
Tree	Casuarina obesa	3m centres	Entire area	25
Shrubs	Jacksonia furcellata	Random	Upper bank	20
	Hypocalymma angustifolium	Groups of 3 – 5 at 1m centres	40	40
	Regelia ciliata	Groups of 3 – 5 at 1m centres	40	40
Groundcovers / herbs	Isolepis nodosa	Swathes of plantstock at 0.5m centres	40	160
	Baumea juncea	Swathes of plantstock at 0.5m centres	35	140
	Juncus kraussii	Swathes of plantstock at 0.5m centres	35	140
	Lepidosperma effusum	Swathes of plantstock at 0.5m centres	35	140
TOTALS			225	705

5.2 Turtle nesting beaches

A total of 220 metres of beach have been provided for turtle nesting. These areas should be sparsely planted with a random mixture of *Acacia pulchella* and native rushes and sedges. The planting should consist of clumps of plantstock with open sand between groupings. It is recommended that around 50% of the total beach area be planted at an average final density (within the groupings) of one plant per square metre.

Table 2: Species selection and densities

Form	Species	Planting density	Square metres of planting	Plants required
Shrub	<i>Acacia pulchella</i>	randomised		25
Groundcover/herb	<i>Isolepis nodosa</i>	randomised		35
	<i>Juncus kraussii</i>	randomised		25
	<i>Lepidosperma effusum</i>	randomised		25
TOTALS			110	110

5.3 Overstorey and understorey plantings

A total of 1270 square metres have been identified as requiring revegetation with a mixture of trees, shrub and groundcover species.

Table 3: Species selection and densities

Form	Species	Planting density	Square metres of planting	Plants required
Tree	Casuarina obesa	Across entire area with emphasis on lower sections		150
	Eucalyptus rudis	Random across entire area		20
	Melaleuca raphiophylla	Across entire area with emphasis on lower sections		60
Shrub	Hypocallyma angustifolium	Groups of 3 – 5 at 1m centres	350	350
	Acacia pulchella	Groups of 3 – 5 at 1m centres	150	150
	Regelia ciliata	Groups of 3 – 5 at 1m centres	200	200
	Jacksonia furcellata	Random	Random across entire area	50
	Spyridium globulosum	Groups of 3 – 5 at 1m centres	100	100
	Hibbertia hypericoides	Groups of 3 – 5 at 1m centres	100	100
	Astartea fascicularis	Groups of 3 – 5 at 1m centres	100	100
Groundcover/herb	Actinostrobos pyramidalis	Random		20
	Isolepis nodosa	Swathes of plantstock at 0.5m centres	150	600
	Juncus kraussii	Swathes of plantstock at 0.5m centres	120	480
	TOTALS		1270	2380

5.4 Emergent rushes and sedges

A total of 700 square metres of shallow marsh would become available for the planting of emergent vegetation following extensive weed control around the island. As stated, staged weed removal and native replanting will be required to preserve habitat throughout the revegetation program.

Table 4: Species selection and densities

Zone	Species	Planting density	Plants required
Seasonally inundated	<i>Bolboschoenus caldwellii</i>	Swathes at 0.5m spacing	As required following successful weed control
	<i>Juncus pallidus</i>	Swathes at 0.5m spacing	
	<i>Baumea juncea</i>	Swathes at 0.5m spacing	
Shallow permanent water	<i>Baumea preissii</i>	Groups at 1.0m spacing	
	<i>Schoenoplectus validus</i>	Groups at 1.0m spacing	
Water to 1.2m deep	<i>Baumea articulata</i>	Groups at 1.0m spacing	
	<i>Eleocharis sphacelata</i>	Groups at 1.0m spacing	

6.0 Conclusion

The relative isolation of the island within Neil McDougall park presents an ideal opportunity to provide habitat for native fauna that will remain largely undisturbed. This type of habitat is difficult to create within the metropolitan area and is unique within the City of South Perth.

With planning and effort the island can be transformed from a largely exotic ecosystem with many weed species, to a native habitat that will support many types of native fauna. Further, this work is achievable within the given timeframes, and need not impact on the island aesthetics over the longer term.

As for all revegetation works, follow-up weed control and ongoing maintenance will be the key to the success of this project in the long term.

