Wilson Inlet Foreshore Flora Survey-
Revisit to Vegetation Monitoring Sites established in March 2011

September 2016

WICC
WILSON INLET CATCHMENT COMMITTEE

Green Skills Inc

Acknowledgments

This survey project was carried out by Green Skills under contract to the Wilson Inlet Catchment Committee, and funded through the Denmark Shire Council.

The ground works was undertaken by Mark Parre, who also took the photographs and wrote up the survey. His assistant on the ground survey was Andrew Dickinson. The report was edited and prepared by Tony Peterson and Basil Schur. Shaun Ossinger, WICC Project Officer provided valuable feedback and guidance during the project.

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Contents

1 Introduction

1.1 Aim:

To revisit the 12 existing survey sites established by the Wilson Inlet Foreshore Flora Survey of March 2011. (Figure 1)

To capture site-specific data and thereby report on changes to the foreshore vegetation that have occurred since the 2011 survey.

To establish four new survey sites in areas where future changes are likely to have significant impact, these include development and recreational use.

To make recommendations on the scope, methods, and timing of ongoing Foreshore Flora monitoring.

Figure 1: Location of the March 2011 and June/July 2016 Survey Sites.

1.2 Method:

Sites were revisited and transect pegs located or re-established using GPS coordinates and original photographs.

The 2011 survey report and single photo of each site were used to assist with observing changes in vegetation structure and condition.

Survey forms using the same template as the 2011 Flora Survey were not written up for the original sites for the following reasons:

- Inlet end pegs were missing at all 12 transect locations and both pegs were missing at 5 of the transect locations. A standard 20 by 2m Flora survey would not have been directly comparable to the 2011 results unless the original transect end points had been located to within 1m.
- The time available per site for the 2016 survey was less than that required for full flora surveys of 12 standard 20 by 2m transects.
- A photo survey along with site inspections was considered to be more appropriate for the revisits.

The photographic evidence was easier to interpret than the summary transect and individual plot-data contained in the 2011 report. On the basis of this, many photographs were taken to support future survey work.

New sites were established at four locations using a peg at the inlet end of a transect line and a peg at the land end.

GPS locations were established for all photographs and a direction in which the photo was taken recorded.

Data collected:
A GPS was used to establish latitude and longitude for the survey peg locations and positions from which photographs were taken. Plant species were recorded if they did not appear in the 2011 surveys or if there was a change in the condition of the vegetation. Comments were recorded for all sites. Water depth was not recorded for all sites.

2 Results

2.1 Prawn Rock Channel

Date of inspection 25/6/2016
Both pegs absent, new pegs established.

Land Peg:	S35.02087	E117.32655	Water Depth 30cm
Inlet Peg:	S35.02088	E117.32697	Water Depth 10cm

Comments:

- Planted *Melaleuca cuticularis* (2011) are growing very well
- *Juncus Krausii* looks to have improved
- *Paspalum spp.* (Couch) has declined, as has Kikiyu
- A cycle path has been constructed parallel to the shore and west of the land peg.

Conclusion:
This site seems to have improved.

Comparative Photos

March 2011 Photo of Prawn Rock Channel transect line	June 2016 Photo of Prawn Rock Channel Transect line.
	

2016 Survey Photos

Prawn Rock Channel Land Peg: S35.02087 E117.32655 Water Depth 30cm Photo 1/ 101.6861 taken from the land peg looking toward the inlet peg.	
Prawn Rock Channel Inlet Peg: S35.02088 E117.32697 Water Depth 10cm Photo 2/ 101.6862 taken from the inlet peg looking toward the land peg	

Prawn Rock Channel Inlet Peg: S35.02088 E117.32697 Water Depth 10cm Photo 3/101.6863 taken from the inlet peg looking South	
Prawn Rock Channel Inlet Peg: S35.02088 E117.32697 Water Depth 10cm Photo 4/101.6864 taken from the inlet peg looking North	

2.2 Poddyshot.

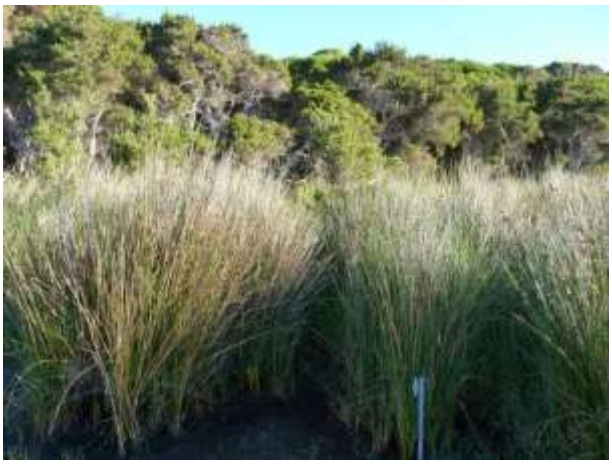
Date of inspection: 25/6/2016
Both pegs absent, new pegs established.

Land peg	S35.00714	E117.33078	Water Depth 3cm
Inlet peg	S35.00724	E117.33078	Water Depth 30cm

Comments:
Juncus krausii on the shore are inundated and looking stressed as is the samphire
The bund of couch 3m inland is well elevated.
Planted *Melaleuca cuticularis* (2011) are growing well. *Juncus krausii* and *Centella cordifolia* are present but sparse.
The *Juncus krausii* beneath the paperparks at the land end are stressed (very brown)

Conclusion:
Native plants are stressed but recovering. Weeds are persisting.
Overall vegetation condition has declined.

Comparative Photos

March 2011 Photo of Poddyshot transect line	June 2016 Photo of Poddyshot transect line.
	

2016 Survey Photos

Poddyshot Land peg S35.00714 E117.33078 Water Depth 3cm Photo1/101.6857 taken from land peg looking towards the inlet peg.	
Poddyshot Inlet peg S35.00724 E117.33078 Water Depth 30cm Photo2/101/6858 Taken from inlet peg looking South-West	

Poddyshot Inlet peg S35.00724 E117.33078 Water Depth 30cm Photo3/101.6859 Taken from inlet peg looking toward land peg	
Poddyshot Inlet peg S35.00724 E117.33078 Water Depth 30cm Photo4/101.6860 Taken from inlet peg looking North East	

2.3 Yacht Club Reserve

Date of inspection: 25/6/2016
Inlet peg absent. Land peg located. Both had plastic pegs installed.

Land Peg S34.97500 E117.36539 Water level 0.0 (not the same as the 2011 recorded coordinates but this is accurate as the original peg was located)
Inlet Peg S34.97514 E117.36548 Water level 20cm

Comments:
Dead *Melaleuca* seedlings are present below the high-water mark.
Many weed species present including nightshade, couch and *Gladiolus undulatus*
Lepidosperma effusum is growing above the high-water mark.

Conclusion
Native vegetation condition has declined, weeds are persisting.

Comparative Photos

March 2011 Photo of Yacht Club Reserve transect line	June 2016 Photo of Yacht Club Reserve transect line.
	

2016 Survey Photos

Yacht Club Reserve Land Peg S34.97500 E117.36539 Water level 0.0 (not the same as the 2011 recorded coordinates but this is accurate as the original peg was located) Photo 1/101.6853 Taken at Land peg looking towards inlet peg. Note young Yate tree to the Left of Frame.		

Yacht Club Reserve Photo 2/101.6854 Taken at high-water mark showing *Centella cordifolia* above (14m on transect)		

Yacht Club Reserve Photo 3/101.6855 Taken at high water mark, looking towards inlet peg, showing *Selliera radicans*		

Yacht Club Reserve Inlet Peg S34.97514 E117.36548 Water level 20cm Photo 4/ Taken at inlet peg looking towards land peg.		

2.4 Mokare Trail

Date of inspection: 25/6/2016
River peg absent. Land peg located. Both had plastic pegs installed.

Land Peg S34.96822 E117.36584 Water level 3cm
River peg S34.96836 E117.36574

Comments
Many dead saplings along the walk trail.
Rushes have declined and are stressed
Many weeds present including plantain, bridal creeper, couch

Conclusion
While many of the tree deaths may have occurred prior to the 2011 survey it is clear from comparing the photo in the 2011 report to the same area at present that the vegetation condition has declined.

Comparative Photos

March 2011 Photo of Mokare Trail transect line	June 2016 Photo of Mokare Trail transect line.
	

2016 Survey Photos

Mokare Trail Land Peg S34.96822 E117.36584 Water level 3cm Photo 1/ 101.6849 Taken from land peg looking toward the river.		

Mokare Trail River peg S34.96836 E117.36574 Photo 2 /101.6850 Taken from river peg looking towards land peg (compare to 2011 survey report photo)	

Mokare Trail Photo 3/ 101.6851 Taken where transect intersects Mokare trail looking North West. (note river peg in lower left of frame)	

Mokare Trail Photo 4/ 101.6852 On Mokare trail looking towards land peg.		

2.5 Lake View Place

Date of inspection: 25/6/2016
Inlet peg absent. Land peg located. Both positions had a plastic peg installed.

Land Peg	S34.97539	E117.40795
Inlet Peg	S34.97553	E117.40787

Comments
What was good native vegetation at the inland end of the transect in 2011 is still in good condition.
No Taxandria juniperina was located and I think it was incorrectly identified in 2011, what is present is Agonis flexuosa and Callistachys lanceolata.
There are lots of weeds present including Dock and Kangaroo Apple.
Melaleuca densa varies from only the branch tips being green to some very healthy specimens.
There is a distinct transition line from the very degraded shore to good bushinland.

Conclusion:
Vegetation has declined since 2011 in terms of quantity and condition

Comparative Photos

March 2011 Photo of Lake View Place transect line	June 2016 Photo of Lake View Place transect line.
	

2016 Survey Photos

Lake View Place Land Peg S34.97539 E117.40795 Photo 1/ 101.6846 Taken from land peg looking along transect towards inlet.		

Lake View Place Inlet Peg S34.97553 E117.40787 Photo 2 / 101.6847 Taken from inlet peg looking towards land peg.	
Lake View Place Photo 3/ 101.6848 Taken looking west to inlet peg and dead Melaleuca densa	

2.6 Crusoe Beach

Date of inspection: 25/6/2016
Both pegs absent. New plastic pegs installed.

Land peg	S34.98401	E117.42690
Inlet peg	S34.98417	E117.42682

Comments
There are few plants below the high water mark, many above. Some dead paperbark seedlings are present in the zone of inundation.
Weeds are mostly absent but there is some *Gladiolus undulatus* at the High Water mark.
Conclusion
There are some *Melaleuca* seedlings above the High water mark. The native vegetation appears to be in good condition. Comparing the 2011 photo to the present one of the same area it indicates the *Juncus krausii* has declined.

Comparative Photos

March 2011 Photo of Crusoe Beach transect line	June 2016 Photo of Crusoe Beach transect line.
	

2016 Survey Photos

Crusoe Beach Photo1 / 101.6841 Taken looking West across land peg (GPS S34.98407 E117.42702)	
Crusoe Beach Land peg S34.98401 E117.42690 Photo 2 / 101.6842 Taken at land peg looking toward inlet peg.	

Crusoe Beach Photo3 / 101.6843 Taken looking East towards land peg (GPS location S34.98383 E117.42670)	
Crusoe Beach Photo4 / 101.6845 At high water mark looking towards land peg showing Desmocladus sp. Dead and alive.	

Crusoe Beach Inlet peg S34.98417 E117.42682 Photo5 / 101.6890 Taken from Inlet peg looking to Land peg (same as 2011 report photo)	
Crusoe Beach Inlet peg S34.98417 E117.42682 Photo6 / 101.6891 Taken from inlet peg looking East	

Crusoe Beach Inlet peg S34.98417 E117.42682 Photo7 / 101.6892 Taken from inlet peg looking West	
Crusoe Beach Photo8 / 101.6893 Selliera radicans at base of Melaleuca cuticularis on transect looking stressed but alive	

Crusoe Beach Photo9/ 101.6894 Taken to the East of transect to show the difference in canopy density between *Melaleuca densa* and *Melaleuca cuticularis*		

2.7 Hay River

Date of inspection: 24/6/2016
Inlet Peg absent. Land peg located. Plastic pegs installed for both.

Land peg	S34.96961	E117.46075
Inlet Peg	S34.96964	E117.46061

Comments
Melaleuca cuticularis look healthy, however photo 101.6895 shows change.
Dramatic decline of *Juncus krausii*
No paperbark seedlings

Conclusion
Vegetation stressed but recovering
Rushes in decline

Comparative Photos

March 2011 Photo of Hay River transect line	June 2016 Photo of Hay River transect line.
	

2016 Survey Photos

Hay River Land peg S34.96961 E117.46075 Photo1 /101.6835 Taken from land peg looking towards inlet.		

Hay River Inlet peg S34.96964 E117.46061 Water depth 24cm Photo2 / 101.6836 Taken from inlet peg looking towards land peg but focussing on *Juncus krausii* at peg base and *Rupia megacarpa* hanging at last years inundation level.		

Hay River Inlet peg S34.96964 E117.46061 Water depth 24cm Photo3 / 101.6837 Looking North West from inlet peg	
Hay River Inlet peg S34.96964 E117.46061 Water depth 24cm Photo4 / 101.6838 Looking South East from inlet peg	

Hay River Photo5/ 101.6895 Taken from inlet at the same location as 2011 report photo. It clearly shows decline of rushes and tree canopy thinning.	

2.8 Morley Beach

Date of inspection: 24/6/2016
Both pegs absent. Plastic pegs installed.

Land peg	S34.99550	E117.48132
Inlet peg	S34.99545	E117.48112

Comments
Difficult to say where the original survey line was positioned. GPS coordinates and 2011 report photo inconclusive.
Melaleuca cuticularis healthy
Dead *Agonis flexuosa* just inland of land peg
Dead banksias amongst paperbarks, most look long dead
Juncus krausii at the shore end stressed but recovering
Conclusion
Vegetation community stressed but recovering. Rushes are in decline.

Comparative Photos

March 2011 Photo of Morley Beach transect line	June 2016 Photo of Morley Beach transect line.
	

2016 Survey Photos

Morley Beach Inlet peg S34.99545 E117.48112 Photo1 / 101.6831 Looking East across inlet peg across transect	

Morley Beach Land peg S34.99550 E117.48132 Photo2 / 101.6832 At land peg looking towards inlet peg	
Morley Beach Inlet peg S34.99545 E117.48112 Photo3 / 101.6833 Inlet peg looking South	

Morley Beach Inlet peg S34.99545 E117.48112 Photo4 / 101-6834 Inlet peg looking North	

2.9 Youngs Lake

Date of inspection: 24/6/2016
Inlet peg absent. Land peg located but badly corroded.
Plastic peg installed.

Land peg	S35.01482	E117.46534	
Inlet Peg	S35.01488	E117.46521	water depth 20cm

Comments
Few weeds in zone of inundation, many above it
There is a small *Melaleuca densa* between 2 small *Melaleuca cuticularis* to the north of the large *Melaleuca cuticularis* in the 2011 report photo that is now dead.
May be a good site for a quadrat
Conclusion
Melaleuca densa is showing stress,
Melaleuca cuticularis is in good condition
Juncus krausii is in decline

Comparative Photos

March 2011 Photo of Youngs Lake transect line	June 2016 Photo of Youngs Lake transect line.
	

2016 Survey Photos

Youngs Lake Land peg S35.01482 E117.46534 Photo1 /101.6822 Land peg looking towards inlet.	
Youngs Lake Inlet Peg S35.01488 E117.46521 water depth 20cm Photo2 /101.6899 From inlet peg looking towards land peg.	

Youngs Lake Photo3 /101.6823 Looking North across transect along shore from GPS location S35.01498 E117.46532		

Youngs Lake Photo4 / 101.6824 Taken South East of land peg looking South from GPS location S35.01484 E117.46542 showing recovering *Aganis flexuosa* on high water mark with *Gladiolus undulatus* and *Watsonia* amongst it		

2.10 Nenamup Inlet

Date of inspection: 24/6/2016
Inlet peg absent. Land peg located. Replaced with Plastic peg.

Land Peg	S35.01967	E117.47768
Inlet Peg	S35.01985	E117.47766

Comments
Melaleuca densa has green tip-growth but loss of lower foliage density since last photo survey
High water mark delineated by *Melaleuca spathulata, Brachysoma sericia*, and *Melaleuca densa*
Conclusion
Vegetation condition is little changed from the 2011 survey.

Comparative Photos

March 2011 Photo of Nenamup Inlet transect line	June 2016 Photo of Nenamup Inlet transect line.
	

2016 Survey Photos

Nenamup Inlet Land Peg S35.01967 E117.47768 Photo1 / 101.6817 From land peg looking towards inlet peg	
Nenamup Inlet Inlet Peg S35.01985 E117.47766 Photo2 / 101.6819 From inlet looking across inlet peg to land peg	

Nenamup Inlet Photo3 / 101.6820 Looking West across inlet peg from GPS location S35.01984 E117.47775	
Nenamup Inlet Photo4 / 101.6821 Juncus krausii seedlings as many as 40 per 10^2cm. S35.01981 E117.47768 . A good point to monitor survival.	

2.11 Nullaki Gate

Date of inspection: 24/6/2016
Inlet peg absent Land peg located
Land peg S35.01992 E117.42388
Inlet Peg S35.01981 E117.42396 Water Depth 22cm

Comments
Weed species include Arum Lily, *Watsonia*, *Gladiolus undulatus*, and *Vicia sativa* (vetch)
The native sedge and rush community is in slightly better condition
Agonis flexuosa are showing signs of re-sprouting but are very stressed.

Conclusion
Site conditions are much as they were for the 2011 survey.

Comparative Photos

March 2011 Photo of Nullaki Gate transect line	June 2016 Photo of Nullaki Gate transect line.
	

2016 Survey Photos

Nullaki Gate Photo1 /101.6825 Looking North to inlet peg	
Nullaki Gate Photo2 / 101.6826 Looking South to land peg	

Nullaki Gate Photo3 / 101.6827 Looking West along Bibbulman Track across transect to show dead Peppermint on transect line, live Peppermints behind	

2.12 Nullaki Jetty

Date of inspection: 29/6/2016
Both pegs absent. New plastic pegs installed
Land Peg S34.99982 E117.38644
Inlet Peg S34.99977 E117.38638

Comments
Melaleuca cuticularis and *Melaleuca densa* are looking stressed
Sedges and rushes are slightly improved
Lots of weed growth along the shore

Conclusion
Melaleucas are recovering

Comparative Photos

March 2011 Photo of Nullaki Jetty transect line	June 2016 Photo of Nullaki Jetty transect line.
	

2016 Survey Photos

Nullaki Jetty Photo1 / 101.6828 Looking from shore to land peg	
Nullaki Jetty Land Peg S34.99982 E117.38644 Photo2 / 101.6829 Looking from land end peg to inlet	

Nullaki Jetty Land Peg S34.99982 E117.38644 Photo3 / 101.6830 Looking from land peg to the East	
Nullaki Jetty Inlet Peg S34.99977 E117.38638 Photo4 /101.6896 Looking from inlet peg to land peg	

Nullaki Jetty Inlet Peg S34.99977 E117.38638 Photo5 /101.6897 Looking East from inlet peg	
Nullaki Jetty Inlet Peg S34.99977 E117.38638 Photo6 /101,6898 Looking West from inlet peg	

2.13 Prawn Rock Island

Date of inspection: 21/7/2016
New Survey Site
Land peg S35.02494 E117.32808
Inlet Peg S35.02486 E117.32808

Comments
Junkus krausii looking stressed
Melaleuca cuticularis planted in 2011 healthy
Apart from annual inundation there are many impacts on this site including: wave action induced erosion; wind-blown salt-spray; and, recreational use
While a Transect Survey Form was filled in for this site the main emphasis is on the photos which show the condition of this area of the island at this point in time
Just to the North of the transect is one large *Melaleuca cuticularis* which has clustered around it a range of coastal species including; *Rhagodia baccata, leucopogon parviflorus, and Olearia axillaris.* This was not included in the transect as it is not representative of the area being a slightly elevated position.
The plants all looked stressed but as it is an exposed position, wind-blown salt is most likely the cause.

Prawn Rock Island Inlet Peg S35.02486 E117.32808 Photo1 /101.6866 Looking along transect from inlet peg to land peg	

Prawn Rock Island Inlet Peg S35.02486 E117.32808 Photo2 / 101.6867 Looking North across inlet peg	
Prawn Rock Island Inlet Peg S35.02486 E117.32808 Photo3 / 101.6868 Looking South across inlet peg	

Prawn Rock Island Land peg S35.02494 E117.32808 Photo4 / 101.6869 At land peg looking towards inlet peg	
Prawn Rock Island Land peg S35.02494 E117.32808 Photo5 / 101.6870 Looking Southwest from land peg	

Prawn Rock Island Land peg S35.02494 E117.32808 Photo6 / 101.6871 Looking Northwest from land peg	
Prawn Rock Island Land peg S35.02494 E117.32808 Photo7 / 101.6872 Looking South East from land peg	

2.14 265 Ocean Beach road.

Date of inspection: 21/7/2016
Wilson Inlet foreshore adjacent location 265 Ocean Beach road.
No Transect Survey Form was filled in for the site
Pegs were put in 14m apart
Notes were made where vegetation changes occurred along the transect line.

Land peg	S34.99068	E117.34083
Inlet peg	S34.99080	E117.34080

Comments
There was a layer of matted weedy growth on the shoreline, 1-3 m wide which could not be identified as it was dead, this should be investigated when it regrows.
A *Melaleuca densa* in the zone of inundation at 6m is looking good, it was probably planted in 2012
Ficinia nodosa occurs at 8m and *Lepidosperma effusum* at 9m. The land rises from here to where a Karri occurs at 14m. Asparagus scandens occurs here as does *Gladiolus unulatus*
There is major disturbance South West of the survey site with total loss of foreshore vegetation which goes back to when this was a holiday park.
This would be a good site to restore the native vegetation within the zone of inundation.
Access to this site is not possible by road without crossing private land. Access is via the Bibbulmun walk trail along the base of Weedon Hill from Campbell Road or by boat.

Ocean Beach Road Land peg S34.99068 E117.34083 Photo1 / 101.6873 Taken at land peg looking toward inlet peg.	

Ocean Beach Road Inlet peg S34.99080 E117.34080 Photo2 / 101.6874 Taken at inlet peg looking to land peg	
Ocean Beach Road Inlet peg S34.99080 E117.34080 Photo3 / 101.6875 Taken at inlet peg looking South West	

Ocean Beach Road Inlet peg S34.99080 E117.34080 Photo4 / 101.6876 Taken at inlet peg looking North East	

2.15 Poison Point

Date of inspection: 23/7/2016
Land peg S34.99133 E117.35429
Inlet peg S34.99139 E117.35405

No vegetation Survey Form was filled for this site, however the following observations were made along the 20m transect line:
0-4m *Juncus krausii* mostly brown but alive, samphire brown
At 4m *Melaleuca cuticularis* in good condition
4m-12m *Juncus krausii* absent, *Samolus repens* only understory
12m *Melaleuca densa* stressed but green shoot-tips. Many adjacent Melaleuca densa are dead. *Juncus krausii* starts again here.
17m Young *Melaleuca cuticularis*
18m *Melaleuca cuticularis*
20m Young Melaleuca cuticularis, young melaleuca densa, Ficinia nodosa, juncus pallidus
Comments
Vegetation that was inundated until 6 days ago is brown with a few green shoots on the *Juncus krausii*.
At the high water mark is a line of *Melaleuca densa* seedlings 0.5 to 1m tall.
This is a good location for monitoring seedling germination and inundation deaths.

Poison Point Land peg S34.99133 E117.35429 Photo1 / 101.6877 From land peg looking south to inlet peg	

Poison Point Land peg S34.99133 E117.35429 Photo2 / 101.6878 From land peg looking West	
Poison Point Land peg S34.99133 E117.35429 Photo3 / 101.6879 From land peg looking East	

Poison Point Inlet peg S34.99139 E117.35405 Photo4 / 101.6880 From inlet peg looking to land peg	
Poison Point Inlet peg S34.99139 E117.35405 Photo5 / 101.6881 From inlet peg looking West	

Poison Point Inlet peg S34.99139 E117.35405 Photo6 /101.6882 From inlet peg looking East	

2.16 Springdale Beach

Date of inspection: 23/7/2016
No Vegetation Survey Form was filled in.
Land peg S34.96993 E117.38860
Inlet peg S34.97001 E117.38853

Comments
Very rocky (laterite) at the shore
Melaleuca densa at 3m on transect looking very healthy.
Melaleuca cuticularis is in good condition
Juncu krausii is stressed but alive
Lepidosperma effusum at high water mark, also *Callistachys lanceolata* and *Agonis flexuosa*
Vegetation is in good condition however there are no Melaleuca seedlings in the zone of inundation.

Springdale Beach Inlet peg S34.97001 E117.38853 Photo1 / 101.6883 At inlet peg looking to land peg	
Springdale Beach Inlet peg S34.97001 E117.38853 Photo2 / 101.6884 At inlet peg looking East	

Springdale Beach Inlet peg S34.97001 E117.38853 Photo3 / 101.6885 At inlet peg looking West	
Springdale Beach Photo4 / 101.6886 At 4m on transect looking South to inlet peg	

Springdale Beach Land peg S34.96993 E117.38860 Photo5 / 101.6890 At land peg looking to inlet peg	
Springdale Beach Land peg S34.96993 E117.38860 Photo6 / 101.6891 At land peg looking East	

Springdale Beach Land peg S34.96993 E117.38860 Photo7 / 101.6892 At land peg looking West	

3 General comments

In order to build up a database that shows major changes and trends, photographic survey work needs to be undertaken at least annually and at the same time every year. February is considered a good time due to low water levels and weeds being present. One of the impacts of the survey not being performed annually, as recommended by the original survey, has been the loss over time of the survey pegs and the inability to relate specific water-level and weather events with changes in the vegetation.

The 2011 survey data was of little value in assessing changes to the vegetation due to survey pegs no longer existing. Relocating sites using GPS coordinates was accurate to +/- 3m, meaning that the 2m wide transect may have been missed completely.

If additional photographs had been taken as part of the 2011 survey then the 2016 assessment could have been more quantitative.

The use of plastic pegs which will not rust away as the previous metal pegs did, and the taking of many more photos for each site, mean that it should be easier to relocate and evaluate sites in the future.

The photographs of each site need to be preserved in a high quality format so that field comparisons are not being made based upon a low resolution photocopy. Photographs need to be labelled with site-location and date and archived in a retrievable format so that photographic images are available in the field for future survey teams. A reference sheet for each photo should be created and added to each year to show vegetation change over time.

The number of survey sites used is more than needed to determine the impact of extended periods of inundation on fringing vegetation (as with non-sand bar opening years). It may be that reducing the number to 8 sites would be sufficient. If the aim of assessing the vegetation quality on the inlet is required to gauging impacts of a non-opening the sand bar then the current number of sites (16) is considered appropriate.

4 Conclusions

One principal conclusion based on this revisit to all sites is that it appears that the vegetation within the zone of inundation has declined in health since the 2011 survey.

Based on the observations made in this comparison it appears that prolonged inundation is likely to be the major cause of this decline. The presence of *Melaleuca* seedlings above the high water mark and the absence below indicates that even those species that tolerate prolonged inundation as adults are killed when young.

The most concerning change has been the reduction of healthy *Juncus krausii* as this is a niche readily invaded by weed species.

There may have been some reduction in some weed species since the 2011 survey on some sites but this is difficult to prove.

It is recommended that agencies and groups responsible for natural resource management decisions that can potentially impact the riparian vegetation of Wilson inlet will be able to utilise this report to make better-informed decisions regarding: ongoing monitoring work; bar-openings; coastal access; weed control; and revegetation.

Appendix 1: Table of Survey Sites

Transect Name	Date of creation	Land Peg Latitude	Land Peg Longitude	Inlet Peg Latitude	Inlet Peg Longitude
Prawn Rock Channel	Mar 2011	S35.02087	E117.32655	S35.02088	E117.32697
Poddyshot	Mar 2011	S35.00714	E117.33078	S35.00724	E117.33078
Yacht Club Reserve	Mar 2011	S34.97500	E117.36539	S34.97514	E117.36548
Mokare Trail	Mar 2011	S34.96822	E117.36584	S34.96836	E117.36574
Lake View Place	Mar 2011	S34.97539	E117.40795	S34.97553	E117.40787
Crusoe Beach	Mar 2011	S34.98401	E117.42690	S34.98417	E117.42682
Hay River	Mar 2011	S34.96961	E117.46075	S34.96964	E117.46061
Morley Beach	Mar 2011	S34.99550	E117.48132	S34.99545	E117.48112
Youngs Lake	Mar 2011	S35.01482	E117.46534	S35.01488	E117.46521
Nenamup Inlet	Mar 2011	S35.01967	E117.47768	S35.01985	E117.47766
Nullaki Gate	Mar 2011	S35.01992	E117.42388	S35.01981	E117.42396
Nullaki Jetty	Mar 2011	S34.99982	E117.38644	S34.99977	E117.38638
Prawn Rock Island	June 2016	S35.02494	E117.32808	S35.02486	E117.32808
265 Ocean Beach Road	June 2016	S34.99068	E117.34083	S34.99080	E117.34080
Poison Point	June 2016	S34.99133	E117.35429	S34.99139	E117.35405
Springdale Beach	June 2016	S34.96993	E117.38860	S34.97001	E117.38853

Appendix 2: Data for 2 of the New Sites established in July 2016

Wilson Inlet Foreshore Fringing Vegetation Survey Template

Date: 21/7/2016 **Transect ID:** PRI1 **Size:** 20m x 2m

Location: Prawn Rock Island

Shore end Lat/Long: S35.02486 E117.32822 **Inland end Lat/Long:** S35.02494 E117.32808

Soil Type:
Colour: Cream
Texture (s/l/c): Sand
(sand/loam/clay)

Survey Project Officers:
Mark Parre

Cover Abundance Scale (A)	
Cover Abundance Value	**Description**
1	one-a few individuals
2	uncommon and < 5 % cover
3	common and < 5 % cover
4	very abundant and 5 % or 5-20 % cover
5	20 - 50 %
6	D50 - 75 %
7	75 - 100 %

Bushland Condition Scale (B)	
Bushland Condition Value	**Description**
Very Good - Excellent (VG)	80-100% Native Flora Composition. Vegetation structure intact or nearly so. Cover/abundance of weeds less than 5%. No or minimal signs of disturbance
Fair - Good (G)	50-80% Native Flora Compostion. Vegetation structure modified or nearly so. Cover/abundance of weeds 5-20% any number of individuals. Minor signs of disturbance.
Poor (P)	20-50% Native Flora Composition. Vegetation structure completely modified. Cover/abundance of weeds 20-60% any number of individuals. Disturbance incidence high.
Degraded (D)	0-20% Native Flora Composition. Vegetation structure disappeared. Cover/abundance of weeds 60-100% any number of individuals. Disturbance incidence very high.

Common vegetation species and their acronyms

Md	*Melaleuca densa*		Cl	*Callystachys lanceolatum*		WS	*Samolus repens*	
Mc	*Melaleuca cuticularis*		Tr	*Templetonia retusa*		Ma	*Muehlenbeckia adpressa*	
Df	*Daisy Flower Lylac*		Fn	*Ficinia nodosa*		Le	*Lepidosperma effusum*	
La	*Lobelia alata*		Jk	*Juncus krausii*		Pw	*Pink White Star Flower*	
Sg	*Spyridium globulosum*		Sp	*Sandphire*		R b	*Rhagodia baccata*	

General Comments/observations:

Begins on Sandy beach, but at 4m natives and couch-grass begin and continue inland. Melaleuca cuticularis in transect have been planted, but one adjacent is original.

Wilson Inlet Foreshore Fringing Vegetation Survey Transect Hay River

Transect ID: **PRI1** **Date :** **21/7/2016** **Survey Project Officers:** Mark Parre

SPECIES	ABUNDANCE & Bushland		SPECIES	WATER LEVEL
	1			
	A= 0	0		
	B= D	D		0
JK2	**2**		JK2	
	A=1	1		
	B=D	D		0
JK1	**3**		JK1	
	A=1	1		
	B=D	D		0
	4			
	A=0	0		
	B=D	D		0
JK Fn	**5**		JK Fn	
	A=7	7		
couch	B=G	G	couch	0
JK Fn	**6**		JK Fn	
	A=7	7		
Centella cordifolia	B=VG	VG	Centella cordifolia	0
	7			
JK Fn	A=7	7	JK Fn	
	B=VG	VG		0
JK Fn	**8**		JK Fn	
	A=7	7		
	B=VG	VG		0
JK Fn	**9**		JK Fn	
CC	A=7	7	CC	
	B=VG	VG		0
JK Fn	**10**		JK Fn Ws	
Mc	A=7	7		
Couch Ws	B=VG	VG		0
	11			
JK Fn Ws	A=7	7	JK Fn Ws	
	B=VG	VG		0
Mc	**12**			
JK Fn Ws	A=7	7	JK Fn Ws	
couch	B=VG	VG		0
	13			
JK Fn Ws	A=7	7	JK Fn Ws	
	B=VG	VG		0
Mc	**14**			
JK Fn Ws	A=7	7	JK Fn Ws	
	B=VG	VG		0
	15			
JK Fn Ws	A=7	7	JK Fn Ws	
	B=VG	VG		0
	16			

JK Fn Ws	A=7	7	JK Fn Ws	
	B=VG	VG		0cm
	17			
JK Fn Ws	A=7	7	JK Fn Ws	
	B=VG	VG		0
	18		Mc Jk Fn	
JK Fn Ws	A=7	7		
	B=VG	VG	Couch Ws	0
	19			
JK Fn Ws	A=7	7	JK Fn Ws	
	B=VG	VG		0
Mc	**20**			
JK Fn Ws	A=7	7	JK Fn Ws	
	B=VG	VG		0

Wilson Inlet Foreshore Fringing Vegetation Survey Template

Date:	**24/6/2016**	**Transect ID:**	**MB2**	**Size:**	20m x 2m
Location:	**Morley Beach**	**(Cuppup**	**Creek end)**		

Shore end Lat/Long:	**S34.99545**	**Inland end Lat/Long:**	
	E117.48112		

Soil Type:
Colour: Black
Texture (s/l/c): Loam
(sand/loam/clay)

Survey Project Officers:
Andrew Dickinson
Mark Parre

Cover Abundance Scale (A)	
Cover Abundance Value	**Description**
1	one-a few individuals
2	uncommon and < 5 % cover
3	common and < 5 % cover
4	very abundant and 5 % or 5-20 % cover
5	20 - 50 %
6	D50 - 75 %
7	75 - 100 %

Bushland Condition Scale (B)	
Bushland Condition Value	**Description**
Very Good - Excellent (VG)	80-100% Native Flora Composition. Vegetation structure intact or nearly so. Cover/abundance of weeds less than 5%. No or minimal signs of disturbance
Fair - Good (G)	50-80% Native Flora Compostion. Vegetation structure modified or nearly so. Cover/abundance of weeds 5-20% any number of individuals. Minor signs of disturbance.
Poor (P)	20-50% Native Flora Composition. Vegetation structure completely modified. Cover/abundance of weeds 20-60% any number of individuals. Disturbance incidence high.
Degraded (D)	0-20% Native Flora Composition. Vegetation structure disappeared. Cover/abundance of weeds 60-100% any number of individuals. Disturbance incidence very high.

Common vegetation species and their acronyms

Md	*Melaleuca densa*		Cl	*Callystachys lanceolatum*		G.f	*Goose Foot*	
Mc	*Melaleuca cuticularis*		Tr	*Templetonia retusa*		Ma	*Muehlenbeckia adpressa*	
Df	*Daisy Flower Lylac*		Fn	*Ficinia nodosa*		Le	*Lepidosperma effusum*	
La	*Lobelia alata*		Jk	*Juncus krausii*		Pw	*Pink White Star Flower*	
Sg	*Spyridium globulosum*		Sp	*Sandphire*		R b	*Rhagodia baccata*	

General Comments/observations:

Melaleuca cuticularis nearest inlet are very healthy.
From 14 and 20 in the transect the cover abundance at ground level was down to a few individuals however these were Melaleuca cuticularis and the canopy cover above was 100%

Wilson Inlet Foreshore Fringing Vegetation Survey Transect Hay River

Transect ID: **Date :** **Survey Project Officers:**

SPECIES	ABUNDANCE & Bushland		SPECIES	WATER LEVEL
	1			
Mc	A= 1		Na - INUNDATED	
	B= VG			25cm
Mc	**2**			
	A=1		Na - INUNDATED	
	B=VG			25cm
Mc	**3**			
	A=1		Na - INUNDATED	
	B=VG			29cm
Mc	**4**			
	A=1		Na - INUNDATED	
	B=VG			23cm
Mc	**5**			
	A=1		Na - INUNDATED	
	B=VG			18cm
Na - INUNDATED	**6**			
	A=		Na - INUNDATED	
	B=			18cm
Samphire	**7**			
	A=6	6	Samphire	
	B=VG	VG		17cm
Samphire	**8**			
	A=6	6	Samphire	
	B=VG	VG		12cm
Samphire	**9**			
	A=6	6	Samphire	
	B=VG	VG		11cm
Samphire	**10**			
	A=7	7	Samphire	
	B=VG	VG		0
Samphire	**11**			
	A=5	5	Samphire	
	B=VG	VG		4cm
Samphire	**12**			
	A=5	5	Samphire	
	B=VG	VG		8cm
Dicot	**13**		Dicot	
	A=7	7		
Samphire	B=VG	VG	Samphire	7cm
Dicot	**14**		Dicot	
	A= 1	1		
Samphire	B= VG	VG	Samphire	3cm

Mc	**15**		Mc	
	A= 1	1		
	B= VG	VG		1cm
Mc	**16**		Mc	
	A= 1	1		
	B= VG	VG		0cm
Mc	**17**		Mc	
	A= 1	1		
	B= VG	VG		0
Mc	**18**		Mc	
	A= 1	1		
	B= VG	VG		0
Mc	**19**		Mc	
	A= 1	1		
	B= VG	VG		0
Mc	**20**		Mc	
	A= 1	1	Warrigul greens	
	B= VG	VG		0