# Lower Murray River Action Plan

## REVIEWED AND UPDATED 2014

Original document produced by the Department of Environment 2003
Updated by the Peel-Harvey Catchment Council 2014

The 2014 Lower Murray River Action Plan has been produced by the Peel-Harvey Catchment Council, through funding from the Australian Government

Australian Government

Shire of Murray
Centre of the Peel Region

Government of Western Australia
Department of Water

PEEL-HARVEY CATCHMENT COUNCIL (Inc.)

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# Lower Murray River Action Plan

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# Lower Murray River Action Plan
# Summary

The Peel Inlet, Harvey Estuary and associated rivers are important environmental, cultural, recreational and tourism resources to Western Australia. In 2002 the Department of Environment (now Department of Water), in conjunction with Local and State Government Agencies undertook a study into the development of an 'Economic Development and Recreation Management Plan for the Peel Waterways'. Recommendation 6.2 of that plan was to 'prepare and implement a detailed rehabilitation scheme for the Murray River'(Everall Consulting Biologist, 2002).

In 2003 the 'Lower Murray River Action Plan' was produced by the Department of Environment, through the Ribbons of Blue project. Following the development of the 2003 Plan a number of restoration and rehabilitation works were carried out along the Lower Murray River. Now in 2014, the Plan has been reviewed and updated by the Peel-Harvey Catchment Council, through funding from the Australian Government.

The Plan identifies issues, threats and actions needed to address priority areas along the river. It concentrates on riparian rehabilitation rather than in-stream rehabilitation works. This is not to say that in-stream works are not required, rather they require further investigation, including modelling prior to planning and implementation.

The Plan focuses on the Delta Islands to the Pinjarra Bridge Weir, which has been divided into six reaches. It has been further broken down into sections, which include vegetation condition, bank stability and erosion. Conditions are rated using the Pen-Scott Foreshore Assessment Method (Pen, 1995). The 2014 survey of the reaches has provided an opportunity to revaluate and update conditions using the same methodology as used in the 2003 survey.

This latest survey looks at the present condition and the changes that have occurred over the last decade. Some key findings is the continued degradation of sections through stock access and the absence of fencing, mostly in the upper reaches. The impacts from boats and other human recreational activity is still a major threat to the foreshores, especially in the lower reaches. General observations show that weeds are still a significant problem. The lack of 'dense stands' of overstorey along the river foreshores also continue to be a significant risk to the stability of the river banks.

The 2014 survey of the Lower Murray also provides the opportunity to observe previous restoration and rehabilitation works undertaken over the past decade. The previous methods used can be examined and reviewed to see what has been successful and what has not. This will provide a good understanding and basis for future onground works.

The 2014 survey revealed that the majority of restoration and rehabilitation works that have been carried out (excluding the Delta Islands), has shown some improvement. In the lower reaches, bank stabilising techniques, such as baffle boards haven't always been so effective, especially in the more dynamic reaches of the Delta Islands. Upstream baffle boards have worked in some places and not others, warranting further investigation. The 2003 survey revealed some highly degraded areas, consisting of unstable banks, severe erosion and slumping. On re-evaluation many of these sections have been upgraded to the highest of C Grade (see Pen-Scott Foreshore Assessment Method (Pen, 1995)).

It should be noted that during the time of both surveys there has been no real extreme events. However, if an extreme event was to occur it is recommended that a review of the Lower Murray be undertaken.

# Lower Murray River Action Plan
# Recommendations

1. Implement management strategies in consultation with local Aboriginal Elders and Department of Aboriginal Affairs.

2. Implement a community consultation and communication strategy to inform local landowners on issues relating to river and riparian health, new clearing controls, disturbance of bed and banks etc. - Raise awareness on river health in the local community. Distribute information on new legislation protecting the river environment and what individuals can do to minimise their impact.

3. Identify flood risk zones.

4. Liaise with relevant agencies through the TPS to determine requirements for new developments to provide better management of storm water drainage and road run off to reduce nutrient and sediment pollution eg: treatment drains, detention basins.

5. Liaise with Developers, local councils and the Department of Water, to create management plans for regional open space that manage nutrient and sediment loading from grassed areas abutting waterways.

6. Work with Department of Planning and Infrastructure to police the 5-knot boat limit.

7. Work with vesting agencies to increase signage, and create community awareness of boat impacts.

8. Determine and implement long term drainage maintenance plans.

2003

2014

# Lower Murray River Action Plan
# Introduction

## AIM

**The aim is to protect and enhance the riparian habitat and environmental assets of the Murray River, from the Delta Islands to the Pinjarra Weir.**

## GOALS

Look at current conditions. Review and recommend work programs.

Implement goal and objectives 4 and 5 of the Economic Development and Recreation Management Plan (Everall Consulting Biologist 2002).

Objective 4: protect and enhance the environmental quality of the waterways.

Objective 5: protect and enhance the natural diversity of flora and fauna.

## VALUES

### Environmental

The Murray River provides 63% of surface inflow into the Peel Harvey Estuary (PHCC, 2011), the largest estuarine wetland in Western Australia. The Peel Harvey Estuary forms a significant portion of the RAMSAR listed Peel-Yalgorup Wetland System. Several EPP and Conservation Category wetlands abut the Murray River channel.

### Cultural

This region was a meeting and commodities bartering place for the Aborigines who inhabited the southwest corner of WA. The Murray River is significant to the Aboriginal people from a 'domestic' and 'spiritual' viewpoint (O'Connor *et al.*, 1989). European settlement occurred in the area in 1830 under the program known as the Peel Settlement Scheme. Several sites such as the Old Flour Mill have significant European cultural value.

### Social

The Murray River is a key recreational and tourism resource for the Shire of Murray and the Peel Region. The Lower portion of the River is focussed on urban lifestyle including recreational boating, swimming, fishing and public open space.

### Economic

Thirty-nine economic opportunities were identified by the 'Economic Development and Recreation Management Plan for the Peel Waterways (Everall Consulting Biologist, 2002). Economic values include tourism, infrastructure, fishing, and environmental impacts of Peel-Harvey Estuary.

The lower reaches of the Murray River are environmentally, socially and economically valued, due to the water quality and surrounding natural landscape and vegetation, which makes available fish, waterbirds, other marine life and clear navigable waterways (PHCC, 2011).

# Lower Murray River Action Plan
# Issues

**Land Development**
Opening of the Dawesville Channel has changed the tidal regime escalating existing erosion issues relating to stock and recreational access to the River. The passenger rail service, Kwinana Freeway extension, Peel Harvey deviation and anticipated growth in population will result in increased subdivision and landuse changes along the Murray River and its tributaries placing added pressure on the environment. Much of this project deals with the Murray River floodplain.

**Waterways Development**
Seek information on future proposed landuse or recreational development.

**Recreation**
Increased recreational demand by day-trippers and permanent residents will impact on water quality and bank erosion. Intensified boat activity is resulting in erosion, undercutting and slumping of the bed and upper-river banks through increased wave action.

**Agricultural/Urban Drainage**
Agriculture, road and urban drainage systems contribute high nutrient loads to the Murray River resulting in summer phytoplankton blooms and health warnings placed along sections of the River.

**Fringing Vegetation**
One or two rows of older trees and shrubs protect the river banks in most areas due to little or no natural regeneration. Many have or are falling into the channel leaving banks exposed resulting in increased erosion.

**Landuse**
Urban and rural development, stock access, removal of riparian vegetation and woody debris have contributed to nutrient enrichment of waterways, foreshore erosion, loss of biodiversity, increased water flow and sedimentation along the Murray River.

**Salinity**
This section of the river is influenced by tidal movement and catchment flow. The tidal effect of the Peel Inlet results in stratification particularly in the lower reaches. The Murray River from the Delta Islands to the Pinjarra Weir is stratified for most of the year apart from the winter rainfall season when the river has strong flows of fresh to brackish water throughout its profile.

**Wetland Classification and Protection.**
The Department has a significant role in wetland management with respect to wetland classification and evaluation, ensuring an integrated approach to the management of catchments, and for managing water quantity and quality levels where they have the potential to affect environmental, cultural and other wetland values. There are several EPP and Conservation Category wetlands adjacent to or within the Murray River foreshore.

# Other Studies and Strategies

**Background to other studies/strategies and Peel Region Scheme**

The State NRM Agencies released the report 'Preliminary Agency Statement of Natural Resource Management Priorities in Western Australia' (DoE, 2003).

This statement is intended to provide a guide to investment and activities in NRM. The Murray River has been ranked as having "medium value with a high threat".

**Note**:
- On Reserves or areas existing as Peel Regional Park there is a need to consult with/gain approvals from Department of Planning and Infrastructure (DPI) to fulfil the requirements of the Peel Region Scheme.

Considerable time is required to liaise with the appropriate departments to provide consistency throughout all processes.

Since the original 2003 Lower Murray River Action Plan was produced there have been a number of studies and strategies in relation to the Lower Murray River and surrounds.

Good sources of information can be in the '*Catchment, condition and priorities, Peel-Harvey Catchment 2011*' (Ironbark Environmental, 2011), various publications by the Department of Water including '*Murray drainage and water management plan*' (DoW, 2010) and Shire of Murray's '*Local Biodiversity Strategy*' (Ironbark Environmental, 2013)

# Lower Murray River Action Plan
# Description and Condition
## (Delta Islands to Pinjarra Weir)

**Murray River and its Catchment**

The Murray River is located approximately 72 kilometres south of Perth and is the largest River in the Peel-Harvey Catchment encompassing an area of approx 8300km$^{2.}$ It is a brackish waterway and has an estimated mean annual flow of 360 gigalitres (DoW, 2010). Its headwaters begin 170km inland on the Yilgarn Plateau as the Hotham and Williams Rivers, merging west of Boddington to become the Murray River.

The North and South Dandalup Rivers are dammed in the Darling Range for surface water storage significantly altering their natural flows. These rivers merge on the Coastal Plain and flow into the Murray River. These tributaries are deeply incised on the coastal plain due to the removal of fringing vegetation and are significant sources of nutrients to the Murray River (Pen, 1999).

This action plan concentrates on the 'Coastal Plain' portion of the Murray River, extending from the Delta Islands in the Peel Inlet to the Pinjarra Bridge Weir in the town site of Pinjarra, 25km inland. In 2008 the River Action Plan for the Middle Murray was produced (Hams, A.B., 2008). The upper reaches of the Murray River still require action planning, but should be considered separately to this plan.

Currently an NRM Plan for the Upper Murray is underway, as part of funding deliverables for the Rivers 2 Ramsar – Connecting Corridors for Landscape Resilience, Australian Government project. From this a recommendation will be that a River Action Plan be developed for the Upper reaches of the Murray River, which will mean the entire Murray River will be covered.

All reserves and private land listed in this survey are within the 1 in 100 year floodway or flood fringe as identified in the Water and Rivers commission flood study 1983, and mapped (Figure 1of the Floodplain Management Policy Map) in the '*Peel Region Scheme - Floodplain Management Policy*' (WAPC, 2002).

**Heritage**

The earliest known inhabitants of the Peel Region were Aborigines of the Pindjarup (Binjareb) (O'Connor *et al.*, 1989) dialect group of the Nyoongah people. At the time of the first European settlement in the Peel area in 1830, this group of Aborigines was thought to have numbered around 100. They lived in three main groups near the Murray River and along the coastal plain. This region was a meeting and commodities bartering place for the Aborigines who inhabited the south-west corner of WA. The Murray River is significant to the Aboriginal people from a 'domestic' and 'spiritual' viewpoint (O'Connor *et al.*, 1989).

Initial European settlement commenced shortly after the establishment of the Swan River Colony in 1829 under the Peel Settlement Scheme organised by Thomas Peel.

In acknowledging the significance of the Murray River to the local Aboriginal community, Local Aboriginal Elders have requested that any on ground works only be undertaken in consultation.

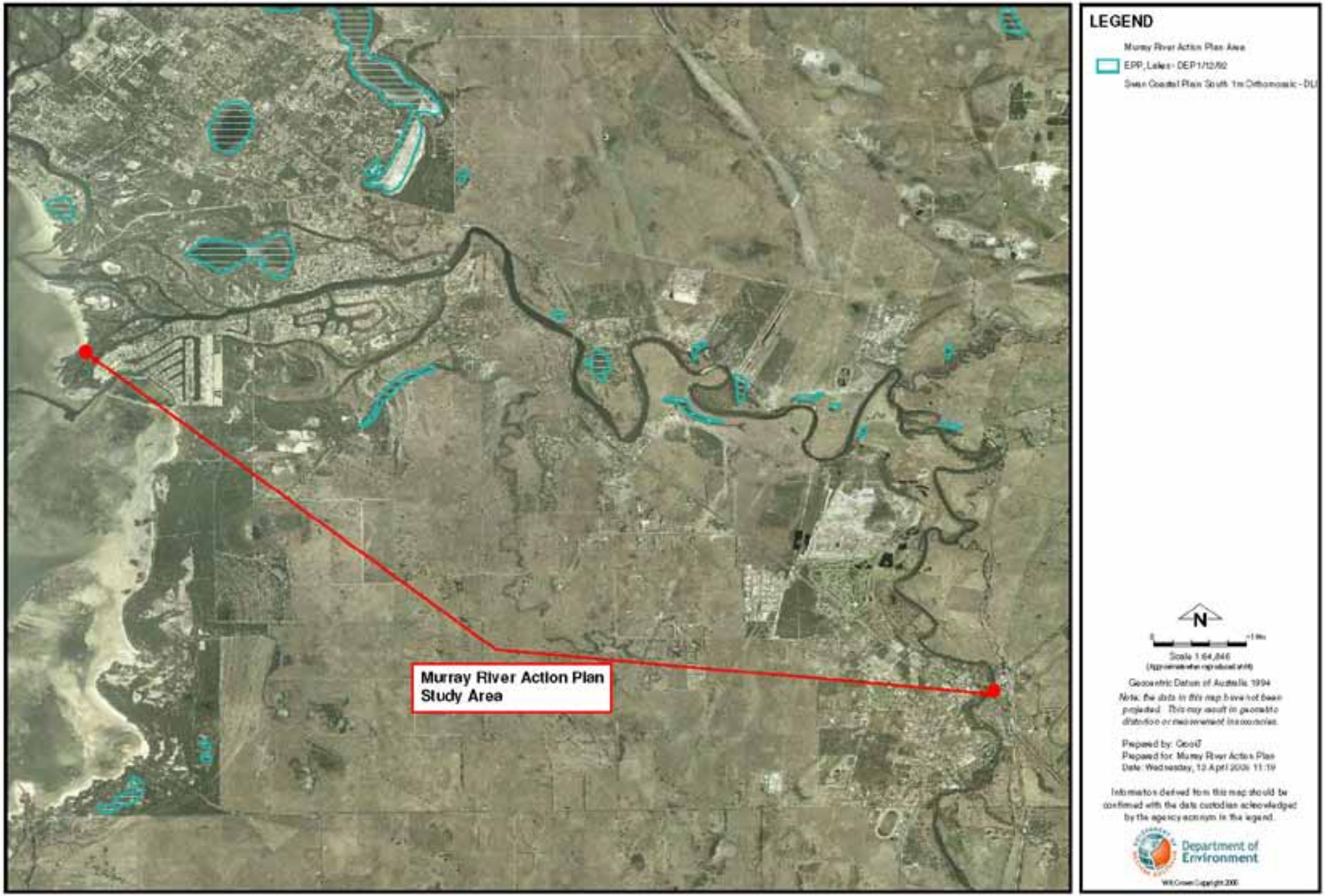
**Climate**

The Peel Region climate, encompassing the Murray River, is best described as 'Mediterranean'. This region is subject to distinct seasons with hot dry summers and mild wet winters. Approximately 90% of annual precipitation falls between April and October, with an annual rainfall on the coastal plain averaging 900mm and increasing to 1,300mm over the Darling Scarp. Around half the annual inflow to the estuary is received in July and August with two thirds is received from June to October (PHCC, 2014). The majority of streams receive minimal flow between December and April with the majority of this being derived from groundwater (WRC, 2000 and Bussemaker, 2003).

**Description and Condition of Management Reaches**

The Murray River has been divided into six reaches from the Delta Islands to the Pinjarra Bridge Weir. The division was determined by biophysical characteristics and landuse and is a useful way of managing local issues and actions.

## Study Site - Lower Murray River Study Site



## GPS Coordinates for Reach Sections

| Reach No | Reach Description | GPS Coordinates |
|---|---|---|
| **1** | Delta Islands to Wilgie Creek | e383737, n6394815 to e388451, n6395145 |
| **2** | Wilgie Creek to Rodoreda Crescent | e388451, n6395145 toe390644, n6393402 |
| **3** | Rodoreda Crescent | e390644, n6393402 to e390877, n6394021 |
| **4** | Rodoreda Crescent to Dandalup River Delta | e390877, n6394021 toe393594, n6393516 |
| **5** | Dandalup River Inlet to 5 km bend | e393594, n6393516 toe394514, n6391617 |
| **6** | 5 km bend to Pinjarra Bridge Weir | e394514, n6391617 toe394709, n6389477 |

## Murray River Condition Description

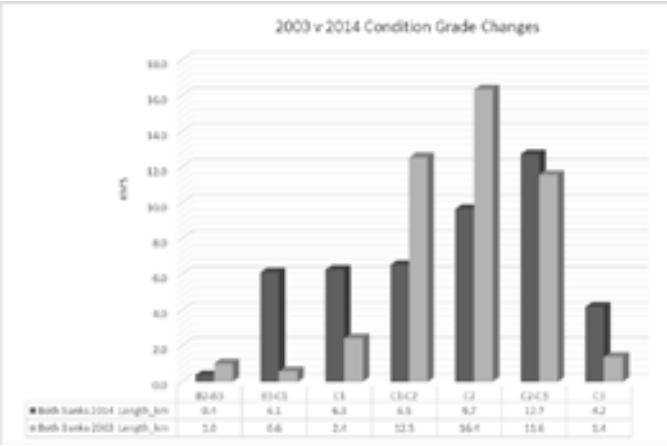
During the 2003 instream survey the following points of interest were mapped:

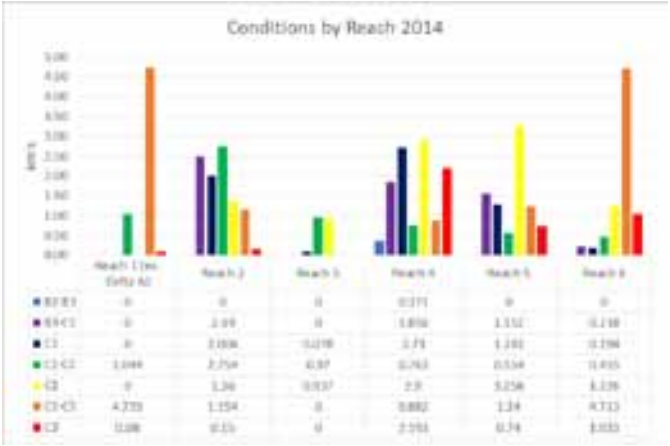
- Weed infestations
- Bank stability and erosion points
- Tributaries
- Drains
- Infrastructure – fencing, jetties
- Revegetation

Conditions were rated using the Pen-Scott Foreshore Assessment Method (Pen, 1995).
The 2014 survey reviewed the 2003 Foreshore Assessment Grading of reaches and updated them, mapping the new findings and identifying high priority areas.

Below illustrates the approximate overall changes to conditions for 2003 compared to 2014.

### 1.1. Foreshore Condition Comparison 2003 v 2014



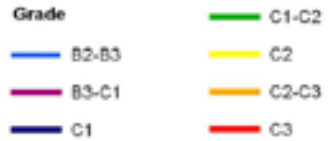




## 1.2. Foreshore Assessment Grading

Aerial, ground and instream studies of the river were undertaken as part of this survey. Foreshores were graded using the Pen-Scott Foreshore Assessment Method (Pen, 1995).

The following maps indicate the condition of the foreshore, using colour-coded lines. Most of the foreshore rates as C grade foreshore with some B grade reaches where banks are stable and vegetation is in better condition.

The following colours and grades have been used in this survey.




**A Grade Foreshore**

**A1: Pristine**

The river embankments and floodway are entirely vegetated with native species and there is no evidence of human presence or livestock damage.

**A2: Near Pristine**

Native vegetation dominates but introduced weeds are occasionally present in the understorey, though not to the extent that they displace native species. Otherwise there is no human impact. A river valley in this condition is as good as can be found today.

**A3: Slightly Disturbed**

Here there are areas of localised human disturbance where soil may be exposed and weed density is relatively heavy, such as along walking or vehicle tracks. Otherwise native plants dominate and would quickly recolonise disturbed areas should human activity decline.

**B Grade Foreshore**

**B1: Degraded – weed infested**

In this stage weeds have become a significant component of the understorey vegetation. Although native species remain dominant, a few have been replaced or are being replaced by weeds.

**B2: Degraded – heavily weed infested**

In the understorey weeds are about as abundant as native species. The regeneration of some tree and large shrub species may have declined.

**B3: Degraded – weed dominated**

Weeds dominate the understorey but many native species remain. Some trees and large shrub species may have declined or disappeared altogether.

**C Grade Foreshore**

**C1: Erosion prone**

While trees remain, possibly with some large shrubs or grass trees, the understorey consists entirely of weeds, mainly annual grasses. Most of the trees will be a few resilient or long lived species and their regeneration will be at most below replacement level or at worst negligible. In this state, where soil is supported by short lived weeds, a small increase in physical disturbance will expose the soil and render the river embankment and floodway vulnerable to serious erosion.

**C2: Soil exposed**

Annual grasses and weeds have been removed through heavy livestock damage and grazing, or as a result of recreational activities. Low level soil erosion has begun by the action of either wind or water.

**C3: Eroded**

Soil is washed away from between the tree roots. Trees are being undermined and unsupported embankments are subsiding into the river valley.

**D Grade Foreshore**

**D1: Ditch – eroding**

Fringing vegetation no longer acts to control erosion. Some trees and shrubs remain and act to retard erosion in certain spots but are will eventually be undermined.

**D2: Ditch – freely eroding (Optional)**

No significant vegetation remains and erosion is completely out of control. Undermined and subsided embankments are common, as are large sediment plumes along the river channel. (This category is optional and can be combined with D1, in which case D3 becomes D2)

**D3: Drain – weed dominated**

The highly eroded river valley has been fenced off, enabling the colonisation of perennial weeds. The river has become a simple drain similar, if not identical, to the typical major urban drain. (In areas with artificial drainage systems, which may incorporate natural streamlines, the D3 category is replaced by E that has three sub-categories).

## Reach 1- Murray River Delta Islands to Wilgie Creek

### Description and Condition

This reach is approximately 5.2 km long and begins at the Delta Islands. It comprises a number of braided channels entering the Peel Inlet and ends at Wilgie Creek where rural grazing land commences. Vesting of much of this area is with the Shire of Murray. Urban development dominates both foreshores.

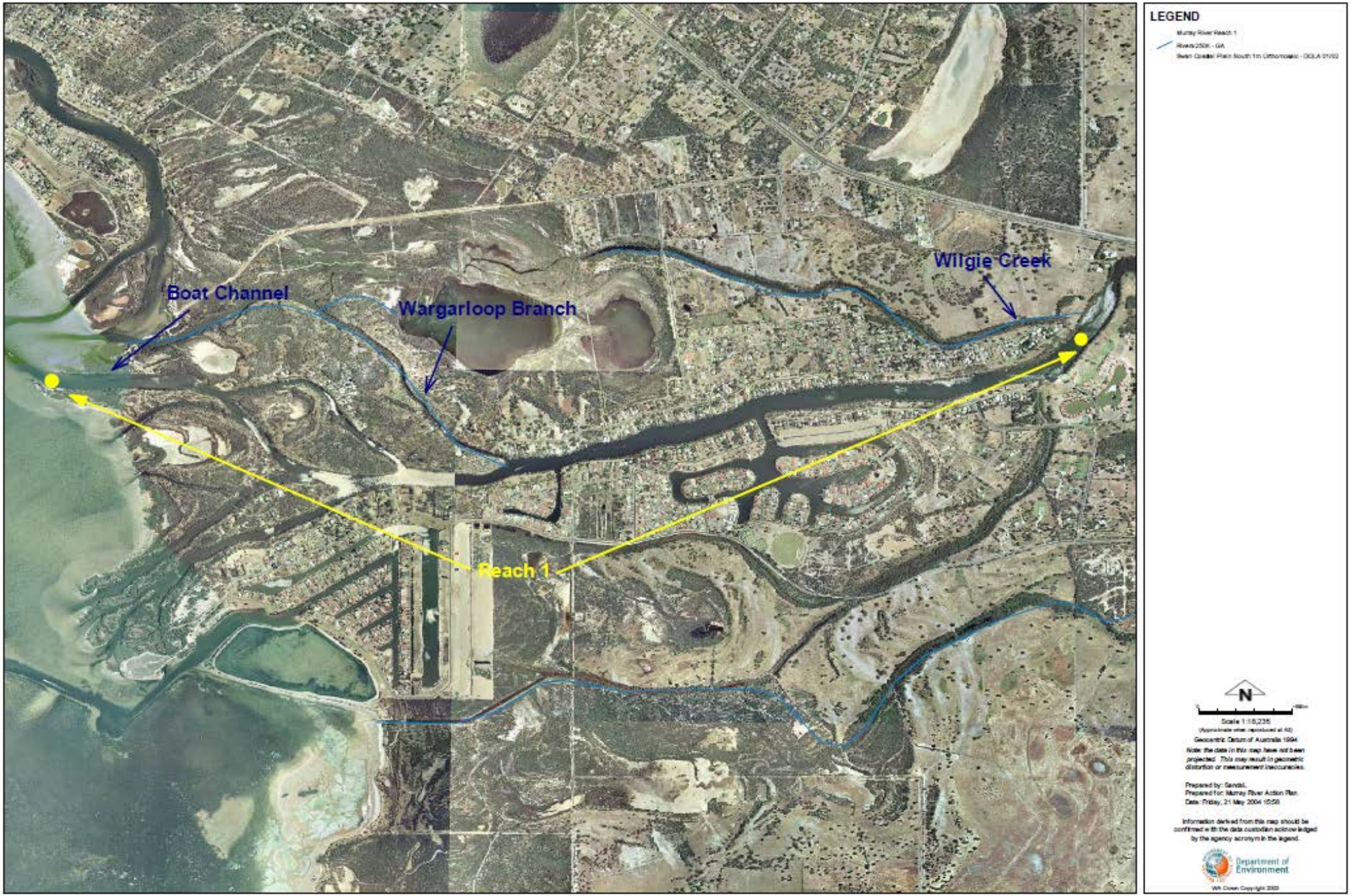
Most of the actions for the Delta Islands section this reach are included in the Delta Islands Management Plan being developed by the Shire of Murray, and therefore not graded as part of the 2014 survey. However, some observational evidence was recorded, such as reviewing previous rehabilitation programs, which included revegetation and bank stabilisation.

| **DESCRIPTION** | |
|---|---|
| **Landuse** | Some urban development exists on the Islands. Land uses include canal developments, caravan parks, shop and a fuelling station. Privately owned blocks with riparian rights abut the river. Artificial walling, rock and logs protect large areas of the bank adjoining these blocks. There is increasing urban development on the left bank, around the Delta Islands. Most of the Delta Islands are Crown Reserves. Some reserves exist between urban blocks and the river on the left bank. Most reserves abutting the foreshore are vested with the Shire of Murray. Risk of Acid Sulfate Soils is high. |
| **Fencing** | No fencing |
| **Landforms and Soils** | Delta Islands consist of V1 saline tidal flats; V2 in marginally higher areas; V3 and V6a are predominant on left bank. Toward the end of the reach soils change to B2 on right bank and P10 on the southern. All soils along this reach have a high to moderate phosphorous export risk. |
| **CONDITION** | |
| **Feature** | **Comments** |
| **Vegetation** | Delta Islands support shallow rooted, salt tolerant vegetation such as Samphire, Paperbark and Casuarina. Some sedges and rushes line the river foreshore. There is evidence of Samphire regeneration in lower areas under tidal influence. Demise of Melaleuca, Eucalypts and Casuarina along delta tidal flats has been influenced by increased tides.<br>East of the Delta Islands the overstorey is predominantly Paperbark (Melaleuca spp) and Casuarina. The understorey is very sparse with isolated clumps of sedges and rushes where rock or log walls are absent. The local community has undertaken some revegetation of the reserves. There has been a loss of fringing vegetation along all urban areas and foreshore reserves. |
| **Weeds** | Watsonia and love grass dominate large areas of the understorey. Exotic garden weeds are also present (mostly situated near/on housing). Typha patch located at Clansman |
| **Bank Stability & Erosion** | Banks are generally stable due to extensive rock and log walling. However, increased tidal activity from the Dawesville Channel has caused clay banks to slump and some older areas of walling are degrading. Increasing human activity has resulted in the loss of sedges, rushes and upperstorey vegetation and an increase in foreshore erosion. Baffle boards have been placed at points along this section. Most have failed to stop erosion and add to the stability of the reach. Deposition is evident between Cooleenup and Jeengarnyeejip Islands. |
| **Habitat** | The Delta Islands provide a variety of foreshore habitats for terrestrial animals including roosting sites. Instream habitat is varied as the braided channel provides a variety of widths and depths, as does the tidal influence. There is a significant amount of instream woody debris. East of the Delta Islands the reach is straight. Some instream woody debris exists along the water-edge providing roosting sites but rock and log walls have replaced much of the natural embankment. Foreshore habitat is sparse due to the removal of vegetation. |
| **Other Comments** | Unauthorised access by small boats is resulting in the destruction of fringing vegetation and erosion. Increased tidal activity since the construction of the Dawesville Channel, impacts of storm surges and flooding has led to a loss of vegetation along this reach. Illegal activity was evident at certain points along the reach, such as illegal clearing of vegetation and new jetty construction.<br>Where baffle boards have been installed along this reach in the past appeared to have failed to improve bank stabilisation. |

## Reach 1- Murray River Delta Islands to Wilgie Creek

| ISSUES AND ACTIONS |
|---|
| **Issues & Threats** |
| 1. Increased tidal activity due to the Dawesville Channel has resulted in bank slumping, increased erosion and a loss of vegetation, especially species intolerant to salt.<br>2. Urban pressures and proximity has resulted in a loss of vegetation and its nutrient stripping capacity.<br>3. Increased tidal activity and wave action from heightened boat usage is exasperating erosion along the river bank.<br>4. Urban drainage and septics are contributing nutrient loads to the river.<br>5. Unauthorised access by small boats is resulting in the destruction of fringing vegetation and erosion.<br>6. Uncontrolled vehicle access is resulting in the destruction of fringing vegetation and erosion.<br>7. Watsonia and Lovegrass dominate large areas of the understorey.<br>8. Illegal clearing of vegetation.<br>9. Unauthorised installation of Jetty/Landings. |
| **Action required** |
| 1. Identify areas of cultural significance through Department of Aboriginal Affairs and liaise with local aboriginal groups.<br>2. Revegetate foreshore reserves and Delta Islands in consultation and partnership with vesting authority, the community and other interested stakeholders to stabilise banks and reduce nutrient export.<br>3. Determine classification of all wetlands.<br>4. Restrict vehicle access to foreshore reserves.<br>5. Work with Department of Planning and Infrastructure to enforce 5 knot limit.<br>6. Investigate implementation of speed limiting devices to reduce boat wash.<br>7. Work with key stakeholders including Water Corporation, Shire of Murray, PHCC and local community groups, such as Friends of Rivers-Peel to encourage connection to main sewers.<br>8. Continue bank stabilisation programs such as sedge/rush planting (of salt tolerant species) and rock walling to stabilise banks, reduce erosion and sedimentation. |
| **Future actions** |
| 9. Provide walk and cycle paths to minimise human impact along foreshore reserves.<br>10. Produce and implement a weed management plan for all reserves and Delta Islands, focusing on areas that can be effectively managed.<br>11. Introduce poo bags and erect signage to ensure all dogs are restrained on a leash in foreshore reserves to protect riparian vegetation and reduce excrement fouling public reserves and entering the river.<br>12. Monitor and review recreational facilities and impacts along reserves.<br>13. Include drainage mapping to identify point source pollution and possible streamlining, retrofitting, etc activities.<br>14. Identify and sign historical landmarks.<br>15. Form working groups to assist in maintaining foreshore areas<br>16. Engage community to assist with local councils to implement management plans |

## Reach 1- Murray River Delta Islands to Wilgie Creek - Study Area Map



## Reach 1- Murray River Delta Islands - **Foreshore Condition Assessment Map 2003**

**LEGEND**

**Note:**
**Condition ratings 2003**

Most of the actions for the Delta Islands are included in the Management Plan being developed by the Shire of Murray.

As part of the 2014 survey this reach was observed and notes taken (see map below).

Restoration works carried out throughout the Delta Islands post 2003 survey included bank stabilisation, revegetation and weed control.

Results were varied, with some places showing improvement. Many of the baffle boards that were installed around 2008 are in disrepair and require some form of attention.

N

Scale 1:8,469

Geocentric Datum of Australia 1994

Note: the data in this map have not been projected. This may result in geometric distortion or measurement inaccuracies.

Prepared by: Sandst.
Prepared for: Murray River Action Plan
Date: Friday, 25 June 2004 11:21

Information derived from this map should be confirmed with the data custodian acknowledged by the agency acronym in the legend.

Department of Environment

## Reach 1- Murray River Delta Islands - Foreshore Condition Assessment Map 2014


**Lower Murray River Action Plan**
**Review 2014**
**Foreshore Condition Assessment**

PEEL-HARVEY CATCHMENT COUNCIL (Inc.)

**Legend**

- Murray River Reaches
- B2-B3
- B3-C1
- C1
- C1-C2
- C2
- C2-C3
- C3

N
W E
S

0 250 m

GDA 94 UTM 50
Aerial Photo: Metro South Sep.2013
Prepared by J Garvey
Date: 29/07/2014

Peel-Harvey Catchment Council
Rivers 2 Ramsar
Connecting River Corridors
for Landscape Resilience

Australian Government

This project is supported by the Peel-Harvey Catchment Council, through funding from the Australian Government

## Reach 1 - Murray River Delta Islands East to Wilgie Creek - Foreshore Condition assessment Map


Lower Murray River Action Plan
Review 2014
Foreshore Condition Assessment

Legend
- Murray River Reaches
- B2-B3
- B3-C1
- C1
- C1-C2
- C2
- C2-C3
- C3

N
W E
S

0 250 m

GDA 94 UTM 50
Aerial Photo: Metro South Sep 2013
Prepared by J Garvey
Date: 29/07/2014

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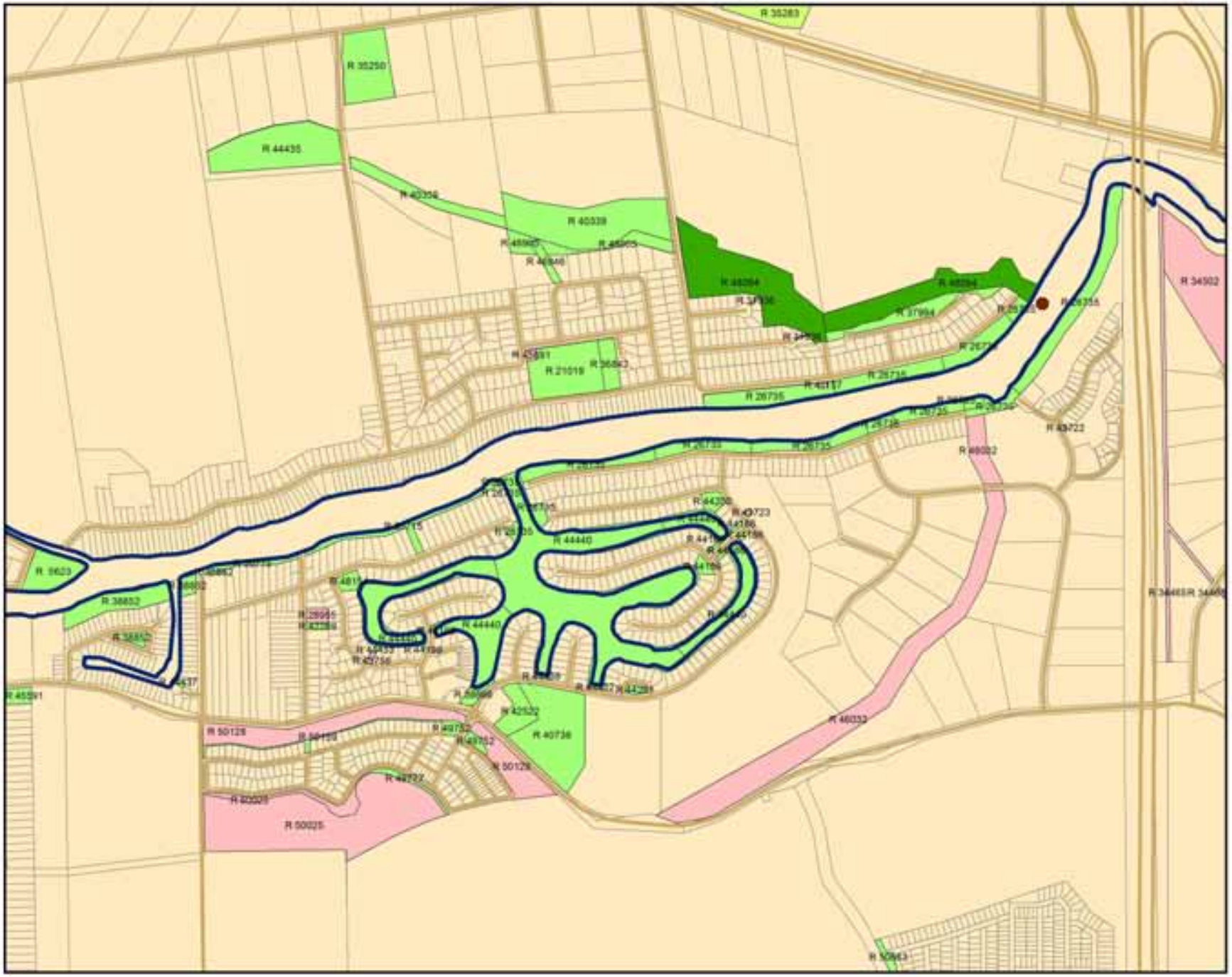
## Reach 1 - Murray River Delta Islands to Wilgie Creek - **Reserves and Landowners Map**



Lower Murray River Action Plan
Review 2014
Foreshore Condition Assessment

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**Legend**

- Murray River Reaches
- Roads
- Murray River

**Reserves**

- Unvested Reserves
- Conservation Commission
- Waters & Rivers
- Shire of Murray Vesting
- Freehold Land

N W E S

0 125 250 500

Metres

Scale: 1:10,000
(When printed on A3)

GDA 94 UTM 50
Aerial Photo: Metro South Sep. 2013
Prepared by C Archibald
Date: 15/10/2014

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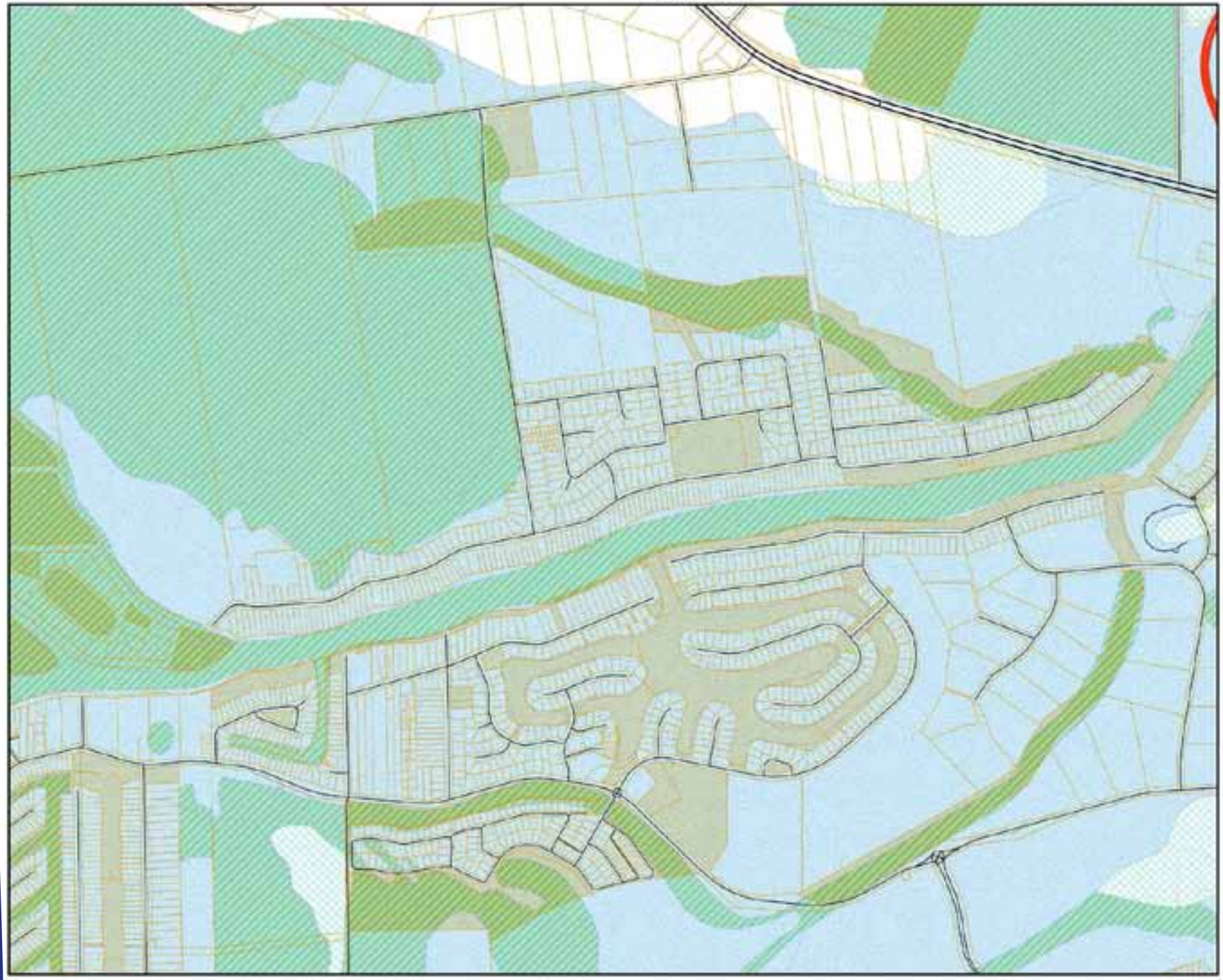
## Reach 1 - Murray River Delta Islands to Wilgie Creek - **Wetlands Classification Map**



Lower Murray River Action Plan
Review 2014
Wetland Classification

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**Legend**

Murray River Reaches

**Roads**

Highway
Main Road
Local Road
Cadastre
Reserves

**Wetland Evaluation**

Conservation
Multiple Use
Resource Enhancement

N
W E
S

0 125 250 500
Metres

Scale: 1:10,000
(When printed on A3)

GDA 94 UTM 50
Prepared by C Archibald

Date: 15/10/2014

Peel-Harvey Catchment Council
Rivers 2 Ramsar
Connecting River Corridors
for Landscape Resilience

Australian Government

This project is supported by the
Peel-Harvey Catchment Council,
through funding from
the Australian Government

## Reach 1 - Murray River Delta Islands to Wilgie Creek - **Peel Regional scheme Map**

## Reach 2- Wilgie Creek to Rodoreda Crescent

### Description and Condition

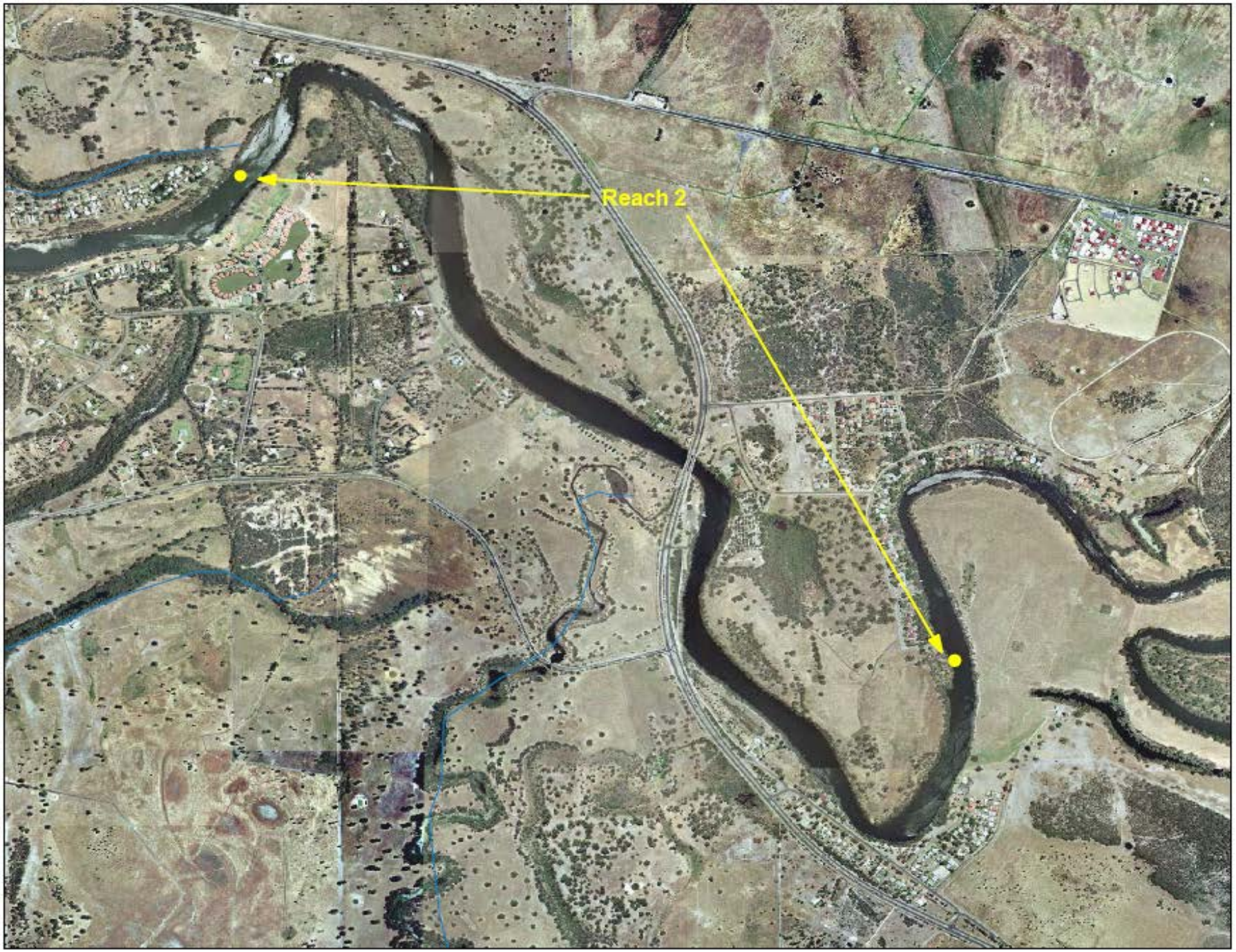
This reach is approximately 4.8 km long and includes private rural land. Private land abuts the river for a large portion of this reach. C Class Reserve adjoins the Ravenswood Caravan Park on the right bank (Reserve 26526) and along the initial section of the left bank (Reserve 34502). Both reserves are zoned public recreation but remain unvested.

| **DESCRIPTION** | |
|---|---|
| **Landuse** | Grazing land commences on the right bank. Lot 12 to end of reach on left bank is predominantly privately owned. Crown Reserve 34502 is zoned public recreation and remains unvested. Ravenswood Hotel and Caravan Park are located on lot 65 north east of Ravenswood Bridge. Several reserves abut the urban blocks. |
| **Fencing** | Minimal foreshore fencing exists in both urban and rural areas. Stock has access to large sections of the river. There is a short section of fence along the left bank adjoining the reserve and right bank near Ravenswood Bridge. |
| **Landforms and Soils** | The right bank is predominantly B2 with some P10. South of the river soils are predominantly P10 with some P2. |
| **CONDITION** | |
| **Feature** | **Comments** |
| **Vegetation** | Lot 1996 supports sections of healthy riparian vegetation. Paper barks and flooded gums (*Eucalyptus rudis*) are dominant in low wet areas. Very little upperstorey vegetation exists along large sections of the river. Large numbers of sick and dying trees line the banks. There is very little to no regeneration of native vegetation. |
| **Weeds** | Pasture grasses, watsonia and Lovegrass, dominant in grazing areas where stock access the river. Arum lily and introduced garden weeds are present on lot 1 near the Ravenswood Bridge although the infestation is confined to the domestic frontage. Watsonia and sour sob exist along the south bank adjoining semi rural lots. Watsonia and bracken Fern dominate the understorey east of Ravenswood Caravan Park. Bamboo clumps are present along lot 3. Japanese peppers exist on lot 1525, Crown Reserve. |
| **Bank Stability & Erosion** | Points of undercutting and bank erosion occur along several sections of both banks. Rock walling has been undertaken along a short section to control undercutting. Banks are stabilised by log walling at Ravenswood Hotel. Drainage on the left bank is causing erosion along the riverbank abutting Pericho Close. |
| **Habitat** | Large meanders and bends occur in this reach. The depth of the channel is up to 20 meters at the bends. Fallen trees provide roosting sites for terrestrial animals. |
| **Other Comments** | Crown reserves 26526 and 34502 are zoned for 'public recreation' but are unvested.<br>Reserve 26526 appears to be currently used for grazing and adjoins Lot 63. The 2014 survey revealed these sections as potential revegetation sites.<br>Perth to Mandurah Freeway is now completed and has since lowered in condition rating for the right bank. There is no wall or stabilisation on the left hand bank.<br>There were signs of stock impacts on shoreline between sedges at Lot 12 on day of survey (2014). Stock were present. The condition rating for this section of the reach shows further degradation.<br>The right bank from bridge, heading east has also degraded more over approximately 500 metres. |

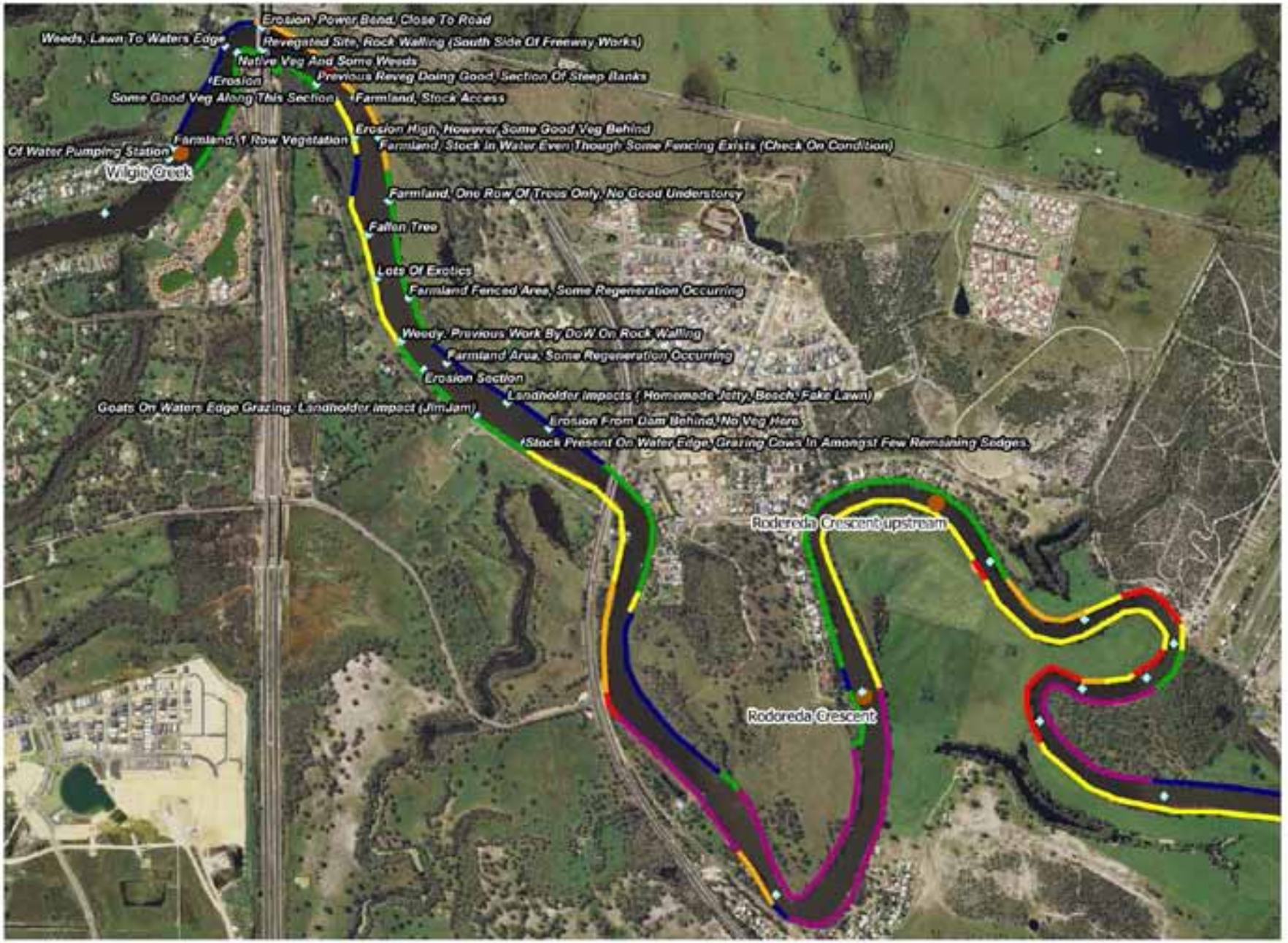
## Reach 2- Wilgie Creek to Rodoreda Crescent

| ISSUES AND ACTIONS |
|---|
| **Issues & Threats** |
| 1. Very little to no regeneration of native vegetation occurring. Large numbers of sick and dying vegetation are affecting the rivers' ecology, bank stability and nutrient stripping capacity of the riparian zone.<br>2. Stock access large sections of river causing erosion and loss of vegetation.<br>3. Unauthorised access by small boats along the foreshore is resulting in destruction of fringing vegetation and erosion.<br>4. Drains contribute nutrients and sediment to the river.<br>5. Increasing urban development is likely to result in higher recreational use and drainage resulting in adverse impacts on fringing vegetation and increased nutrient input.<br>6. Many exotic weeds observed during the 2014 survey.<br>7. Right bank at freeway overpass is not stabilised and presents a risk. The adjacent road is very close to the river, and severe erosion is occurring |
| **Action required** |
| 1. Identify areas of cultural significance through Department of Aboriginal Affairs and liaise with local aboriginal groups.<br>2. Assist regeneration of native vegetation through planting and/or direct seeding at identified sites.<br>3. Continue bank stabilisation programs along the river. Undertake planting of sedges and rushes in sandbags and walling in identified areas to stabilise bank erosion.<br>4. Rehabilitate drains to control erosion and reduce nutrient export.<br>5. Determine classification of all wetlands.<br>6. Determine vesting of all reserves.<br>7. Work with Department Planning and Infrastructure to enforce 5 knot limit.<br>8. Work with key stakeholders including Water Corporation, Shire of Murray, PHCC and local community groups, such as FoR Peel and Murray River Working Group to encourage connection to main sewers.<br>9. Minimise or exclude stock access to the river through fencing and controlled stock access sites or offsite water options. |
| **Future actions** |
| 10. Provide walk, bike and horse trails to reduce human and animal impact on foreshore reserves.<br>11. Introduce poo bags and erect signage to ensure all dogs are restrained on a leash in foreshore reserves to protect riparian vegetation and reduce excrement fouling public reserves and entering the river<br>12. Monitor and review recreational activities along foreshore reserves.<br>13. Produce and implement a long term maintenance plan to control weeds and minimise fire risk.<br>14. Identify and sign historical landmarks.<br>15. Look at potential revegetation/bank stabilisation projects along this reach. |

## Reach 2 - Wilgie Creek to Rodoreda Crescent - Study Area Map



## Reach 2 - Wilgie Creek to Rodoreda Crescent - Foreshore Condition Assessment Map




Lower Murray River Action Plan
Review 2014
Foreshore Condition Assessment

PEEL-HARVEY CATCHMENT COUNCIL (Inc.)

**Legend**

Murray River Reaches

**Grade**

- B2-B3
- B3-C1
- C1
- C1-C2
- C2
- C2-C3
- C3

N
W E
S

0 100 200 300 400 m

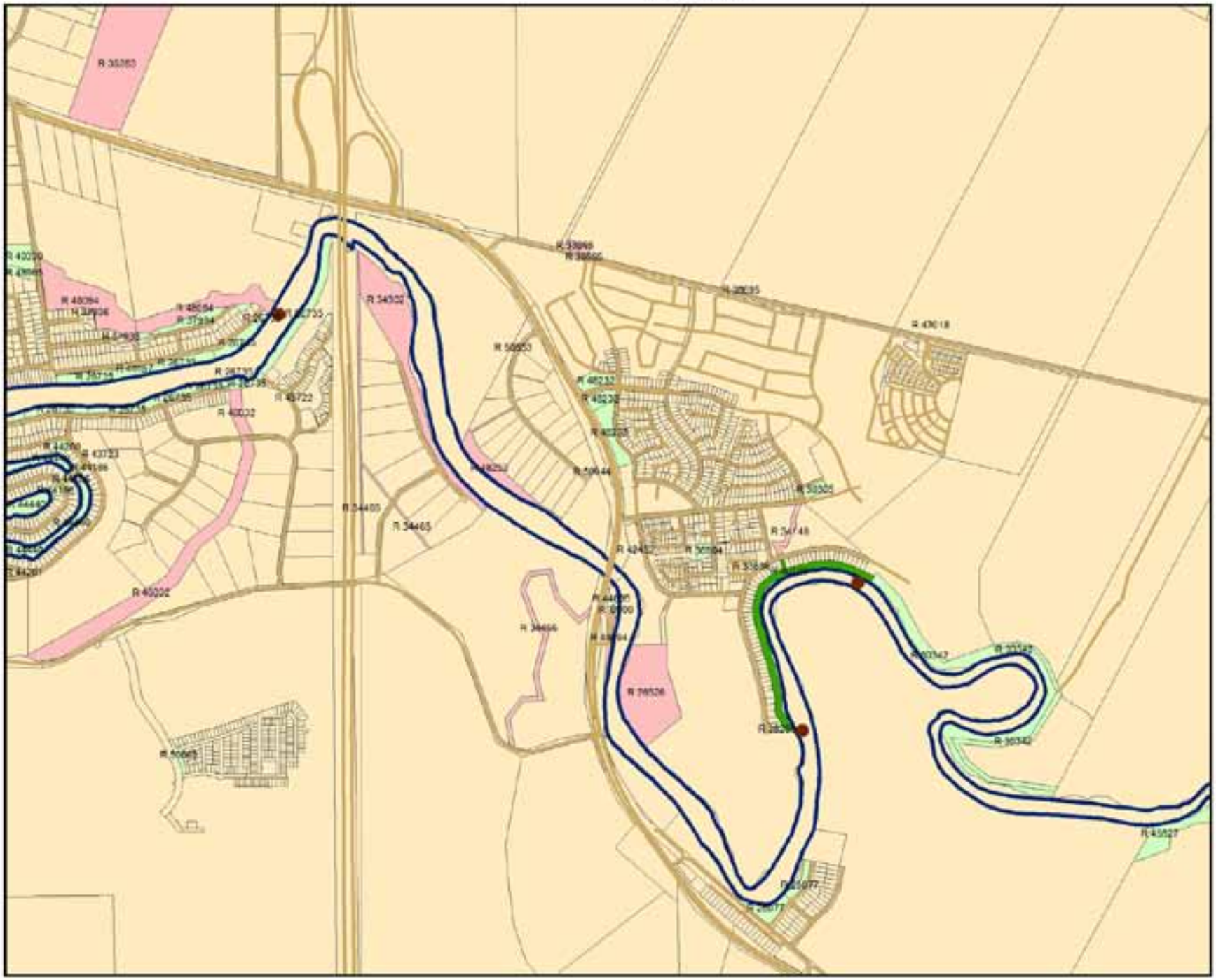
GDA 94 UTM 50
Aerial Photo: Metro South Sep 2013
Prepared by J Garvey
Date: 25/07/2014

Peel-Harvey Catchment Council
Rivers 2 Ramsar
Connecting River Corridors for Landscape Resilience

Australian Government

This project is supported by the Peel-Harvey Catchment Council, through funding from the Australian Government

## Reach 2 - Wilgie Creek to Rodoreda Crescent - **Reserves and Landowners Map**



Lower Murray River Action Plan
Review 2014
Foreshore Condition Assessment

PEEL-HARVEY CATCHMENT COUNCIL (Inc.)

**Legend**

- Murray River Reaches
- Roads
- Murray River

**Reserves**

- Unvested Reserves
- Waterways Commission
- Shire of Murray Vesting
- Freehold Land

0 125 250 500
Metres
Scale: 1:15,000
(When printed on A3)

GDA 94 UTM 50
Aerial Photo: Metm South Sep. 2013
Prepared by C Archibald
Date: 27/05/2014

Peel-Harvey Catchment Council
Rivers 2 Ramsar
Connecting River Corridors
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Australian Government

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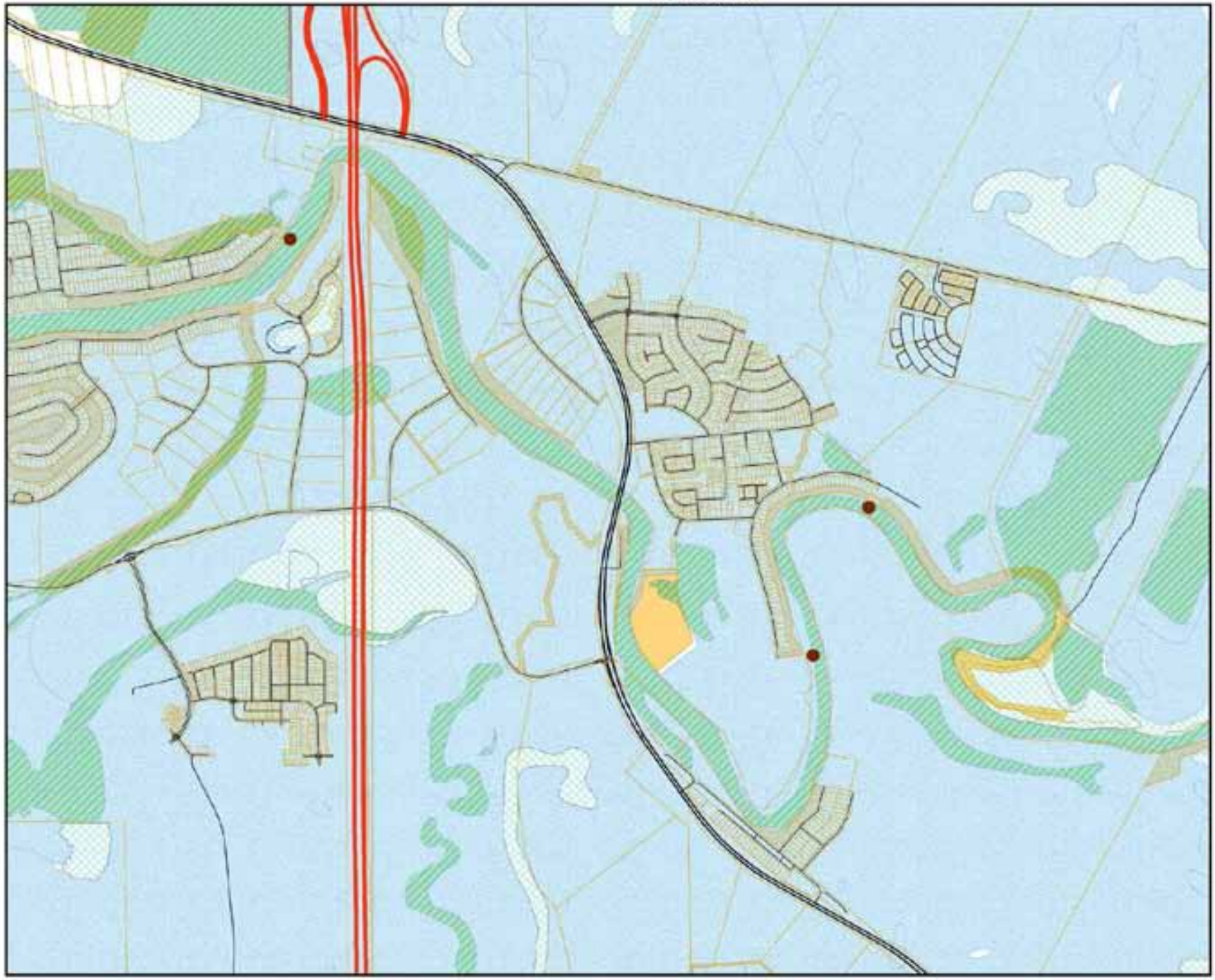
## Reach 2 - Wilgie Creek to Rodoreda Crescent - **Wetland Classification**



Lower Murray River Action Plan
Review 2014
Wetland Classification

PEEL-HARVEY CATCHMENT COUNCIL (Inc.)

**Legend**

- Murray River Reaches

**Roads**

- Highway
- Main Road
- Local Road
- Cadastre
- Reserves

**Wetland Evaluation**

- Conservation
- Multiple Use
- Resource Enhancement

N
W E
S

0 125 250 500
Metres

Scale: 1:15,000
(When printed on A3)

GDA 94 UTM 50
Prepared by C Archibald

Date: 15/10/2014

Peel-Harvey Catchment Council
Rivers 2 Ramsar
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Australian Government

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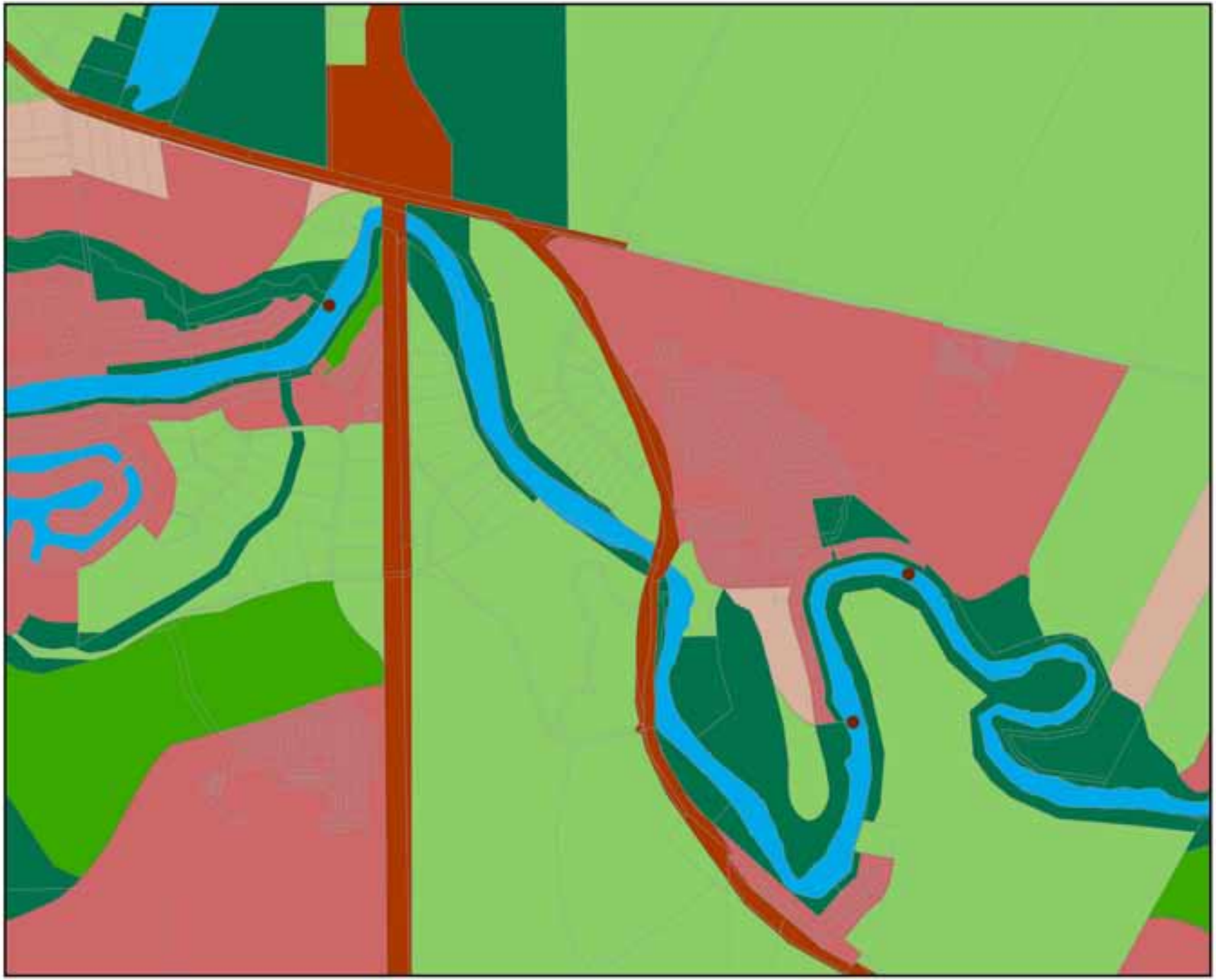
## Reach 2 - Wilgie Creek to Rodoreda Crescent - **Reserves and Landowners Map**



Lower Murray River Action Plan
Review 2014
Peel Regional Scheme Map

PEEL-HARVEY CATCHMENT COUNCIL (Inc.)

**Legend**

- Murray River Reaches
- Cadastre

**Peel Regional Scheme**

- PRIMARY REGIONAL ROADS
- PRIVATE RECREATION
- REGIONAL OPEN SPACE
- RURAL
- URBAN
- URBAN DEFERRED
- WATERWAYS

N
W E
S

0 125 250 500
Metres

Scale: 1:15,000
(When printed on A3)

GDA 94 UTM 50
Prepared by C Archibald

Date: 15/10/2014

Peel-Harvey Catchment Council
Rivers 2 Ramsar
Connecting River Corridors
for Landscape Resilience

Australian Government

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## Reach 3 – Rodoreda Crescent

### Description and Condition

This is a short reach, only 1 km as it has unique issues related to urban development along the right bank.

| **DESCRIPTION** | |
|---|---|
| **Landuse** | Urban development adjoins the right bank reserve, which is vested Department of Water. The left bank is privately owned grazing land. Stock have river access along the left bank. |
| **Fencing** | No fencing |
| **Landforms and Soils** | North of the river P10. South of the river B2. |
| **CONDITION** | |
| **Feature** | **Comments** |
| **Vegetation** | Only one row of native vegetation (mostly flooded gum and melaleucas) protects a large section of the left bank. The understorey on this bank consists of weeds and annual pasture grasses. The fence line from previous rehabilitation has been removed allowing stock access to the new trees and foreshore. Fringing vegetation is dominated by remnant ageing trees and there is very little to no natural regeneration. |
| **Weeds** | Introduced garden plants, including Pampass grass, bamboo and Watsonia as well as trees are dominant along the right bank while annual pasture grasses dominate the left. *Eucalyptus globulus* (Tasmanian bluegums) are present on the left bank. |
| **Bank Stability & Erosion** | Stock access has resulted in some hard panning with bare ground extending down to the river. Undercutting is occurring along sections where bank slope is >45° and there is little to no fringing vegetation. |
| **Habitat** | A Department of Environment Management Plan has been completed for Rodoreda Crescent. |
| **Other Comments** | Only one row of native vegetation (mostly flooded gum and melaleucas) protects a large section of the left bank. The understorey on this bank consists of weeds and annual pasture grasses. The fence line from previous rehabilitation has been removed allowing stock access to the new trees and foreshore. Fringing vegetation is dominated by remnant ageing trees and there is very little to no natural regeneration. Rubbish is also prevalent on western side of Lot 2934. |

## Reach 3 – Rodoreda Crescent

| ISSUES AND ACTIONS |
| --- |
| **Issues & Threats** |
| 1. Fringing vegetation consists of one row of trees with a weed dominated understorey.<br>2. Fringing vegetation is dominated by remnant ageing trees and there is very little to no natural regeneration occurring.<br>3. Fence line from previous planting along the left bank has been removed allowing stock access to new trees and foreshore.<br>4. Stock access has resulted in some hard panning with bare ground extending down to the river.<br>5. Undercutting is occurring along sections where bank slope is >45° and there is little to no fringing vegetation.<br>6. Introduced garden plants and trees dominate right bank due to uncontrolled access of neighbouring properties onto reserve.<br>7. Illegal clearing of vegetation.<br>8. Impact of native vegetation and banks by boats and household furniture.<br>9. Left hand bank |
| **Action required** |
| 1. Identify areas of cultural significance through Department of Aboriginal Affairs and liaise with local aboriginal groups.<br>2. Implement the Department of Water's Management Plan Reserve 40109, Rodoreda Crescent (right bank).<br>3. Liaise with local landowners to delineate foreshore reserve as identified in proposed Peel Regional Plan.<br>4. Minimise or exclude stock access to the river through fencing and controlled stock access sites or offsite water options.<br>5. Determine classification of all wetlands.<br>6. Assist regeneration of native vegetation through planting and/or direct seeding at identified sites.<br>7. Work with Department Planning and Infrastructure to police 5 knot limit, irresponsible activity.<br>8. Create awareness for waterways users through signage. |
| **Future actions** |
| 9. Identify and locate access paths along both banks to provide walkways for local residents and visitors for now and in the future.<br>10. Produce and implement a long term maintenance plan to control weeds and minimise fire risk.<br>11. Identify and sign historical landmarks.<br>12. Work with rural landholder (Lot 330) left hand bank to tackle rubbish problems. Discuss potential revegetation at site. |

## Reach 3 - Rodoreda Crescent - Study Area Map


LEGEND

Murray River Reach 3

Swan Coastal Plain South 1m Orthomosaic - DOLA 01/02

N

Scale 1:3,750

(Approximate when reproduced at A3)

Geocentric Datum of Australia 1994

Note: the data in this map have not been projected. This may result in geometric distortion or measurement inaccuracies.

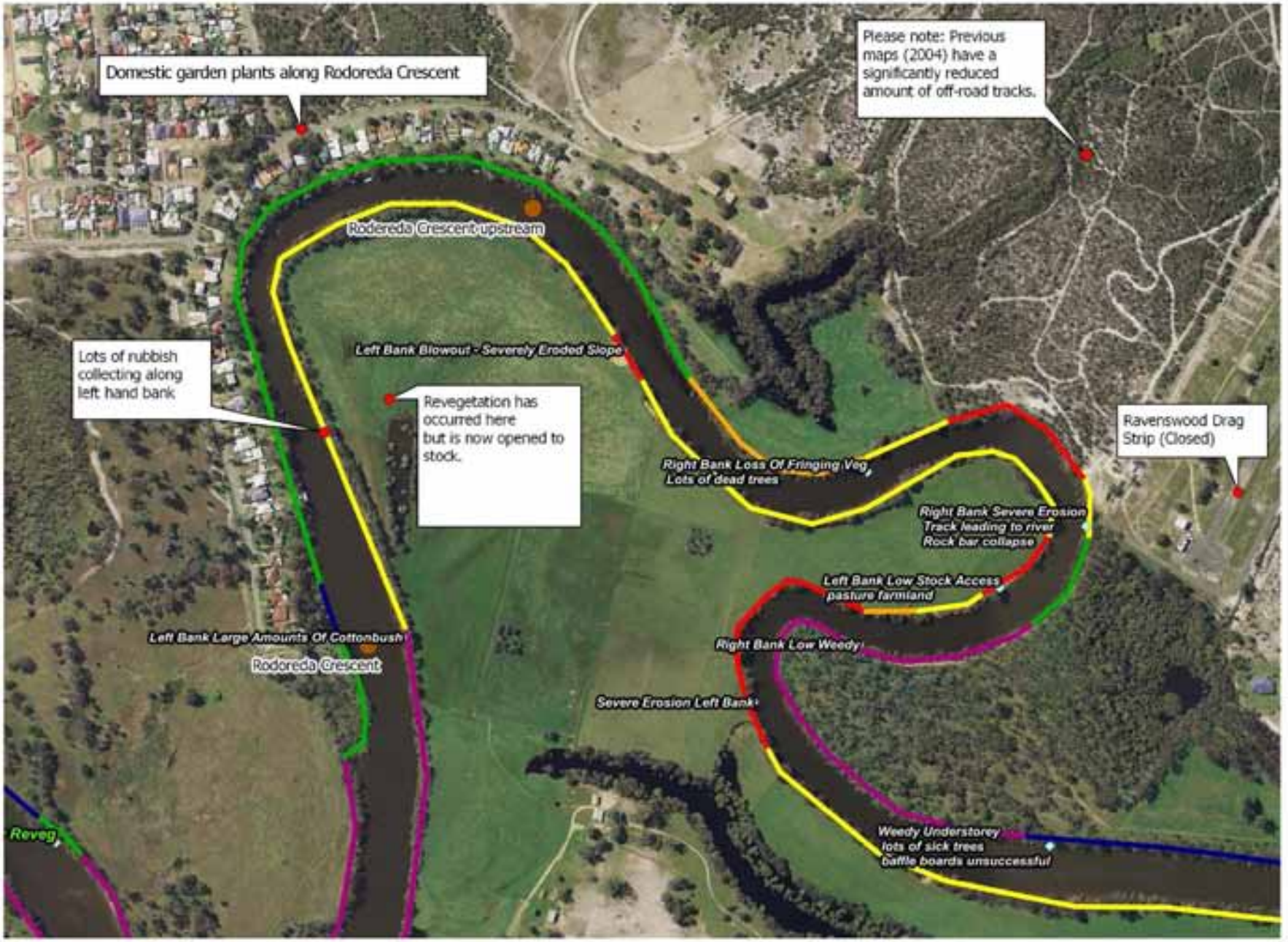
Prepared by: Sandal.
Prepared for: Murray River Action Plan.
Date: Friday, 21 May 2004 10:34

Information derived from this map should be confirmed with the data custodian acknowledged by the agency acronym in the legend.

Department of Environment

WA Crown Copyright 2003

## Reach 3 - Rodoreda Crescent - Condition Description Map




Lower Murray River Action Plan
Review 2014
Foreshore Condition Assessment

PEEL-HARVEY CATCHMENT COUNCIL (Inc.)

**Legend**

- Murray River Reaches

**Grade**

- B2-B3
- B3-C1
- C1
- C1-C2
- C2
- C2-C3
- C3

N
W E
S

0 50 100 150 200 m

GDA 94 UTM 50
Aerial Photo: Metro South Sep.2013
Prepared by J Garvey
Date: 29/07/2014

Peel-Harvey Catchment Council
Rivers 2 Ramsar
Connecting River Corridors
for Landscape Resilience

Australian Government

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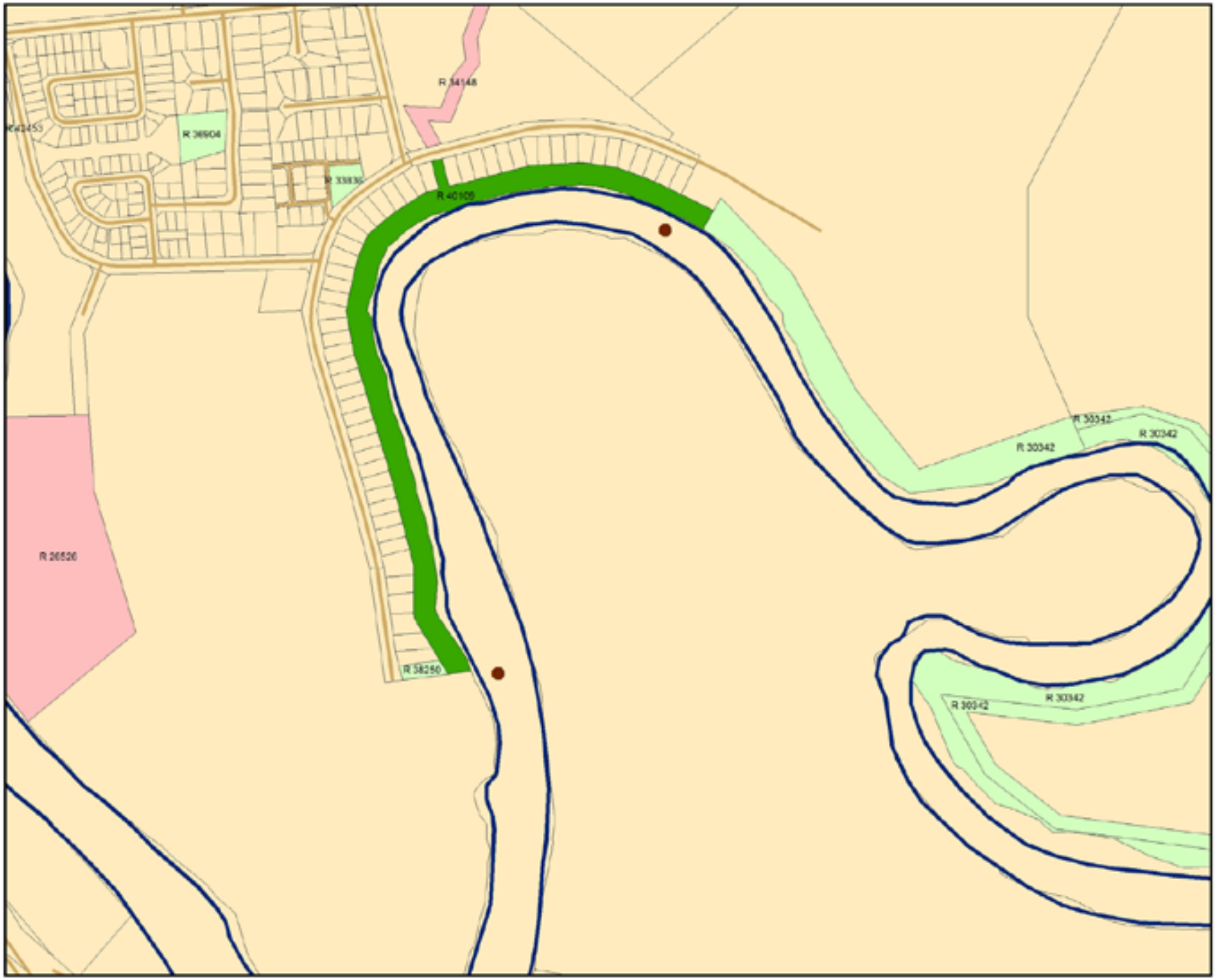
## Reach 3 - Rodoreda Crescent - Reserves and Landowners Map




Lower Murray River Action Plan
Review 2014
Foreshore Condition Assessment

PEEL-HARVEY CATCHMENT COUNCIL (Inc.)

**Legend**

- Murray River Reaches
- Roads
- Murray River

**Reserves**

- Unvested Reserves
- Waterways Commission
- Shire of Murray Vesting
- Freehold Land

N
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S

0 50 100 200
Metres

Scale: 1:5,000
(When printed on A3)

GDA 94 UTM 50
Aerial Photo: Metro South Sep. 2013
Prepared by C Archibald
Date: 27/05/2014

Peel-Harvey Catchment Council
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for Landscape Resilience

Australian Government

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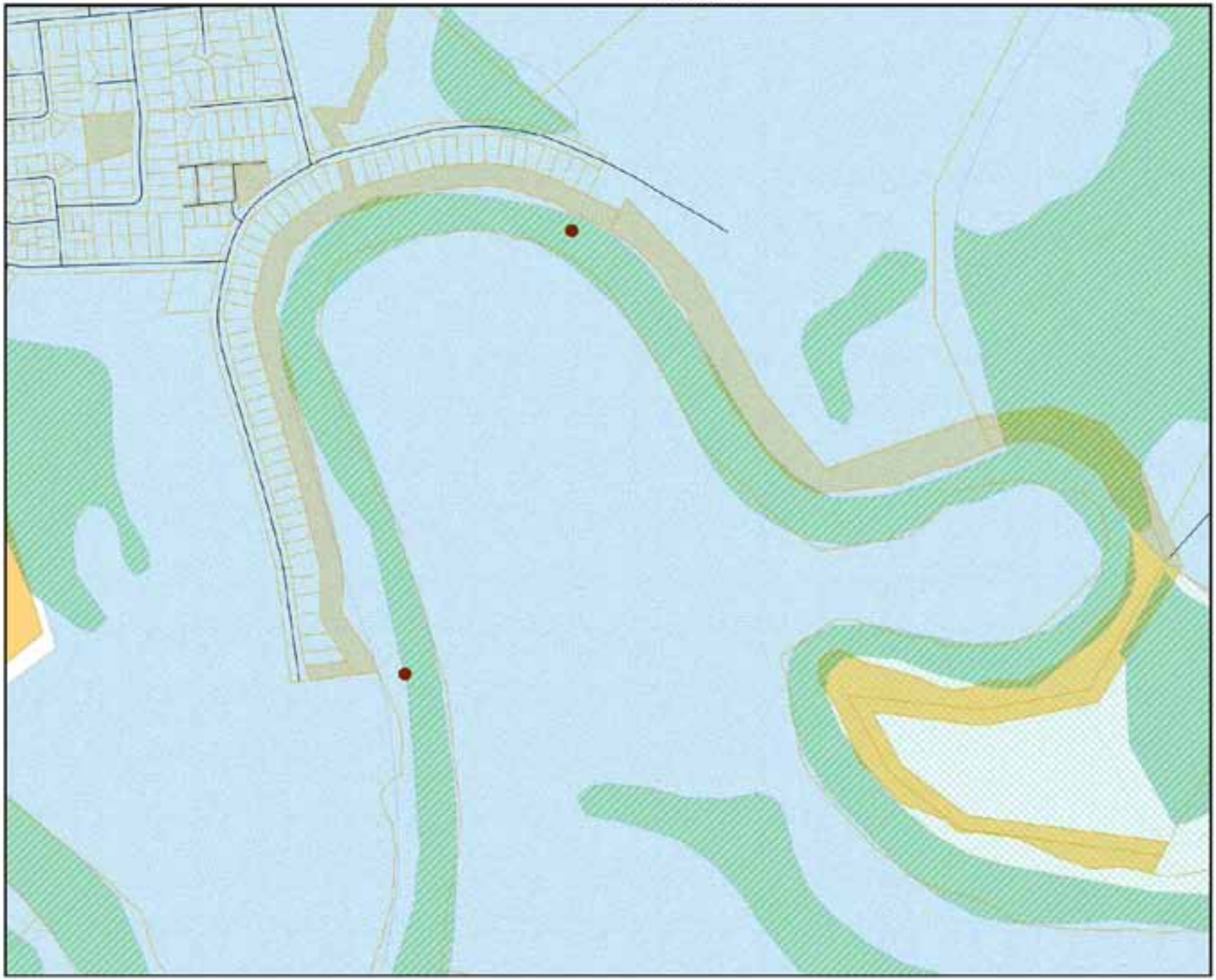
## Reach 3 - Rodoreda Crescent - **Wetland Classification Map**



Lower Murray River Action Plan
Review 2014
Wetland Classification

PEEL-HARVEY CATCHMENT COUNCIL (Inc.)

**Legend**

- Murray River Reaches

**Roads**

- Highway
- Main Road
- Local Road
- Cadastre
- Reserves

**Wetland Evaluation**

- Conservation
- Multiple Use
- Resource Enhancement

N
W E
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0 50 100 200
Metres

Scale: 1:5,000
(When printed on A3)

GDA 94 UTM 50
Prepared by C Archibald

Date: 15/10/2014

Peel-Harvey Catchment Council
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## Reach 3 - Rodoreda Crescent - Peel Regional Scheme Map

Lower Murray River Action Plan
Review 2014
Peel Regional Scheme Map

PEEL-HARVEY CATCHMENT COUNCIL (Inc.)

**Legend**

- Murray River Reaches
- Cadastre

**Peel Regional Scheme**

- PRIMARY REGIONAL ROADS
- PRIVATE RECREATION
- REGIONAL OPEN SPACE
- RURAL
- URBAN
- URBAN DEFERRED
- WATERWAYS

N
W E
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0 50 100 200
Metres

Scale: 1:4,812
(When printed on A3)

GDA 94 UTM 50
Prepared by C Archibald

Date: 15/10/2014

Peel-Harvey Catchment Council
Rivers 2 Ramsar
Connecting River Corridors
for Landscape Resilience

Australian Government

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## Reach 4 - Rodoreda Crescent to Dandalup River Confluence

### Description and Condition

This reach is approximately 5.8 km long and includes Crown Land vested with the Shire of Murray. Remaining land is in private ownership.

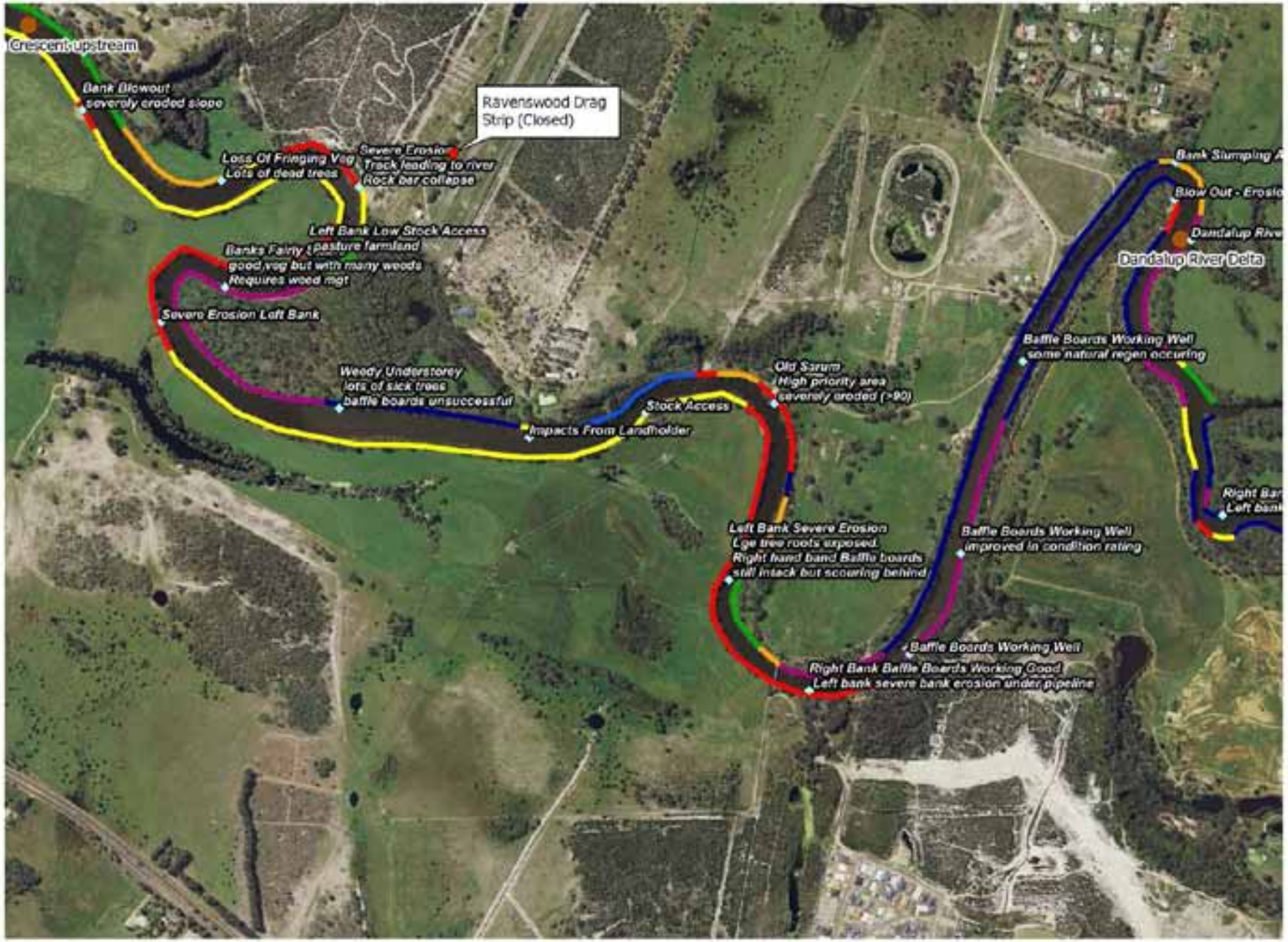
| **DESCRIPTION** | |
|---|---|
| **Landuse** | Sections of the right bank in front of lot 22, 52 and 41 and a section of the left bank abutting lot 331 are vested with the Shire of Murray. Land adjoining the foreshore reserves and the river is predominantly grazed rural land. Stock have access to both banks. A (DLI) C class reserve 45616 abuts a special rural subdivision but remains unvested. |
| **Fencing** | Little to no fencing on either right or left bank. |
| **Landforms and Soils** | Predominantly P10 both north and south of the river. Some large sections of P6a. There is a small area of B2 north of the river. Small pockets of P7 to be found on the southern banks. |
| **CONDITION** | |
| **Feature** | **Comments** |
| **Vegetation** | Stock grazing has degraded this area. Most grazed areas retain one or two rows of upperstorey species, swamp paperbark (*Melaleuca rhaphiophylla)*, marri (*Corymbia calophylla*) and flooded gum (*Eucalyptus rudis)* with very little to no understorey present. Wet areas support stands of sedges and rushes and upperstorey vegetation. There are many old and dying trees with no regeneration occurring. |
| **Weeds** | Exotic weeds such as olive trees, watsonia, sour sob and mistletoe are scattered along both banks of the river. The level of infestation is currently low but has the potential to increase rapidly. Pasture grasses are present either side of the river but are controlled by stock grazing. |
| **Bank Stability & Erosion** | Stock access has resulted in some hard panning with bare ground extending down to the water. Areas of undercutting are present where bank slope is >45°. Severe slumping occurs where there is little protective vegetation. Slumping is prevalent on the south bank opposite the Dandalup River confluence and associated wet areas. |
| **Habitat** | This reach has well vegetated reserves abutting the river, acting as a corridor for terrestrial animals. |
| **Other Comments** | Private Lot 52 has severely degraded (vehicle impact) since 2003, observed from aerial photos. Further investigation warranted.<br>Old Sarum Pacing Lodge, is severely degraded, with some points >90% eroded. Many old remnant trees barely holding on to the right bank.<br>This is a potential high priority project site for the PHCC and Shire of Murray to undertake activities.<br>Baffle boards have been installed at various places along this reach, along both banks. There has been success at some of the sites, and not at others. It appears that the positions in the river and waterflow have some influence on the success or failure of this kind of bank stabilisation. Further investigation recommended. |

## Reach 4 - Rodoreda Crescent to Dandalup River Confluence

| ISSUES AND ACTIONS |
|---|
| **Issues & Threats** |
| 1. Fringing vegetation consists of one row of trees with a weed dominated understorey.<br>2. Fringing vegetation is dominated by remnant ageing trees and there is very little to no natural regeneration occurring.<br>3. Fence line from previous planting along the left bank has been removed allowing stock access to new trees and foreshore.<br>4. Stock access has resulted in some hard panning with bare ground extending down to the river.<br>5. Undercutting is occurring along sections where bank slope is >45° and there is little to no fringing vegetation.<br>6. Introduced garden plants and trees dominate right bank due to uncontrolled access of neighbouring properties onto reserve (right bank). |
| **Action required** |
| 1. Identify areas of cultural significance through Department of Aboriginal Affairs and liaise with local aboriginal groups.<br>2. Implement Department of Water Management Plan Reserve 40109, Rodoreda Crescent (right bank).<br>3. Minimise or exclude stock access to the river through fencing and controlled stock access sites or offsite water options.<br>4. Assist regeneration of native vegetation through planting and/or direct seeding at identified sites.<br>5. Determine classification of all wetlands.<br>6. Work with Department Planning and Infrastructure to enforce 5 knot limit. |
| **Future actions** |
| 7. Identify and locate access paths along both banks to provide walkways for local residents and visitors for now and in the future.<br>8. Produce and implement a long term maintenance plan to control weeds and minimise fire risk.<br>9. Identify and sign historical landmarks.<br>10. Create awareness for waterways users through signage.<br>11. Work with local councils to address high priority areas. |

## Reach 4 - Rodoreda Crescent to Dandalup River Confluence- Study Area Map

## Reach 4 - Rodoreda Crescent to Dandalup River Confluence- Condition Description Map




Lower Murray River Action Plan
Review 2014
Foreshore Condition Assessment

Legend

- Murray River Reaches

Grade

- B2-B3
- B3-C1
- C1
- C1-C2
- C2
- C2-C3
- C3

N
W E
S

0 50 100 150 200 m

GDA 94 UTM 50
Aerial Photo: Metro South Sep.2013
Prepared by J Garvey
Date: 29/07/2014

Peel-Harvey Catchment Council
Rivers 2 Ramsar
Connecting River Corridors for Landscape Resilience

Australian Government

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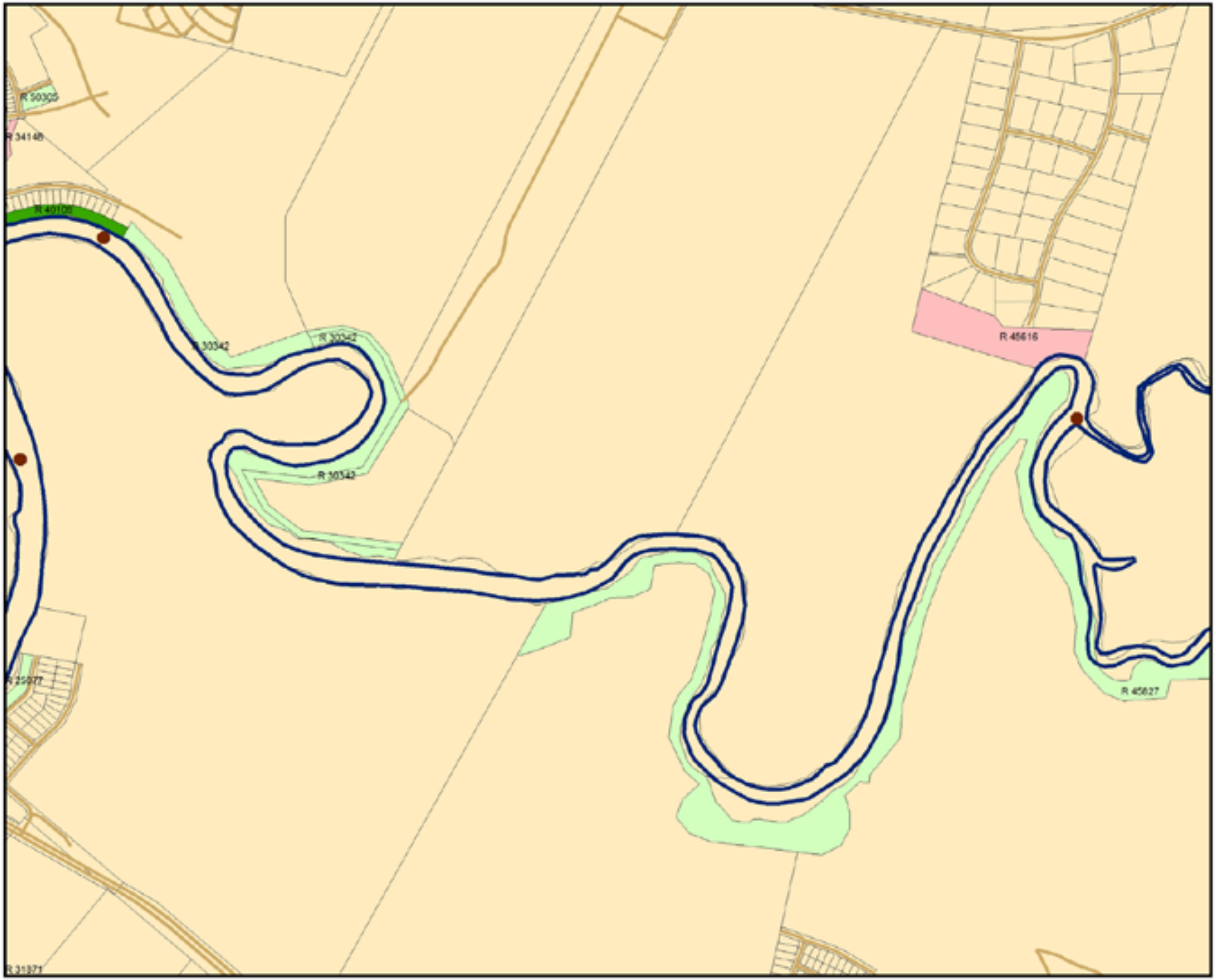
## Reach 4 - Rodoreda Crescent to Dandalup River Confluence- **Reserves and Landowners Map**




Lower Murray River Action Plan
Review 2014
Foreshore Condition Assessment

PEEL-HARVEY CATCHMENT COUNCIL (Inc.)

**Legend**

- Murray River Reaches
- Roads
- Murray River

**Reserves**

- Unvested Reserves
- Waterways Commission
- Shire of Murray Vesting
- Freehold Land

N W E S

0 125 250 500
Metres

Scale: 1:10,000
(When printed on A3)

GDA 94 UTM 50
Aerial Photo: Metro South Sep. 2013
Prepared by C Archibald
Date: 27/05/2014

Peel-Harvey Catchment Council
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Australian Government

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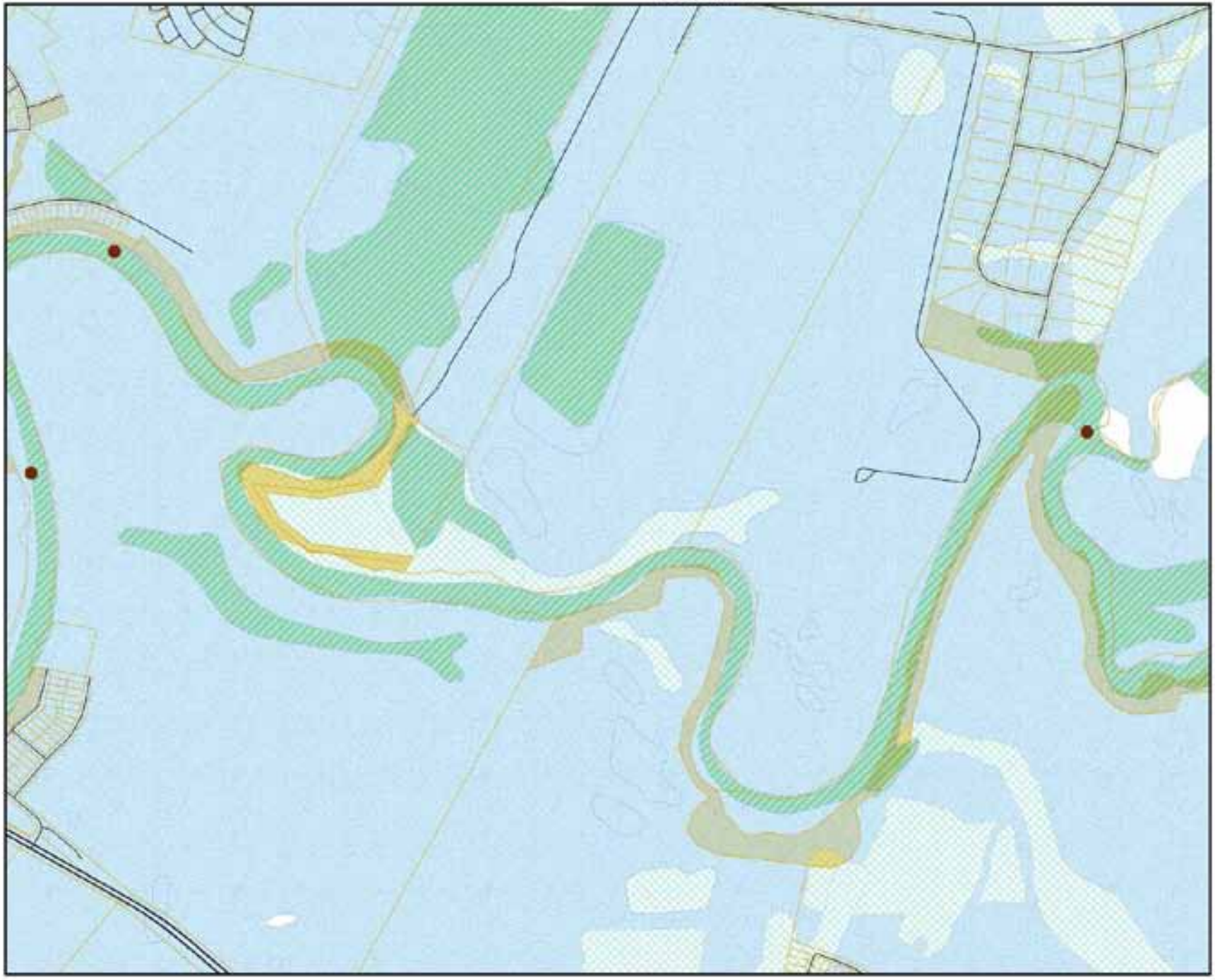
## Reach 4 - Rodoreda Crescent to Dandalup River Confluence- **Wetland Classification**



Lower Murray River Action Plan
Review 2014
Wetland Classification

PEEL-HARVEY CATCHMENT COUNCIL (Inc.)

**Legend**

- Murray River Reaches

**Roads**

- Highway
- Main Road
- Local Road
- Cadastre
- Reserves

**Wetland Evaluation**

- Conservation
- Multiple Use
- Resource Enhancement

N
W E
S

0 125 250 500
Metres

Scale: 1:10,000
(When printed on A3)

GDA 94 UTM 50
Prepared by C Archibald

Date: 15/10/2014

Peel-Harvey Catchment Council
Rivers 2 Ramsar
Connecting River Corridors
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## Reach 4 - Rodoreda Crescent to Dandalup River Confluence- **Peel Regional Scheme Map**

## Reach 5 - Dandalup River Inlet to 5km-bend

### Description and Condition

This reach is approximately 4.4 km long and includes a backwater, and numerous meanders and bends. The left bank vested is with the Shire of Murray as part of the Ravenswood Sanctuary Development (now called 'Murray River Country Estate'), and has been successfully revegetated with an improvement in condition compared to 2003. Most of the area is fenced from stock, however one section remains unfenced in the upstream section near 5km bend. The right bank is still grazed.

| **DESCRIPTION** | |
|---|---|
| **Landuse** | The right bank is privately owned rural land used for stock grazing. The left bank is vested with the Shire of Murray. A small citrus orchard exists on lot 2, right bank. Sections along both banks show evidence of stock access to the river and grazing of riparian vegetation. |
| **Fencing** | No fencing along left bank but stock are excluded from the reserve abutting the Ravenswood Sanctuary Development (now called 'Murray River Country Estate'). Little to no fencing exists on the right bank. |
| **Landforms and Soils** | Predominantly P10 and P6a with a small section of P3. Low lying wet areas along both banks. |
| **CONDITION** | |
| **Feature** | **Comments** |
| **Vegetation** | Stock grazing has degraded this area. Most grazed areas retain one or two rows of upperstorey species, swamp paperbark (*Melaleuca rhaphiophylla)* flooded gum (*Eucalyptus rudis)* and marri (*Corymbia calophylla*), with very little to no understorey present. There is some natural regeneration of flooded gum (*Eucalyptus rudis)* along the left bank, possibly due to the more fertile soil type and low lying topography. There are small pockets of remnant vegetation in low-lying areas. |
| **Weeds** | Bridal creeper, fig trees, olive trees, bamboo and watsonia infestations occur along sections of both banks. Weeds currently occur in isolated pockets. |
| **Bank Stability & Erosion** | Large sections of this reach are affected by bank slumping and undercutting. Stock access has resulted in a loss of vegetation and bank erosion. |
| **Habitat** | A backwater exists to the south of the Dandalup River confluence and a connected wetland occurs in this reach. These areas provide important off stream spawning areas for native fish and a refuge to aquatic and terrestrial organisms in summer. An island exists in the middle of the reach and has the potential to be an important refuge for terrestrial animals if feral animals can be excluded through appropriate fencing. |
| **Other Comments** | Due to human impact and natural meanders along this reach, impact of bank slumping, undercutting and instream deposition is significant in areas where bank slope is >45°. |

## Reach 5 - Dandalup River Inlet to 5km-bend

| ISSUES AND ACTIONS |
|---|
| **Issues & Threats** |
| 1. Large sections of the riverbank are affected by bank slumping and undercutting.<br>2. Loss of vegetation and stock access is resulting in exposed soil and increased erosion.<br>3. Fringing vegetation consists of one row of trees with a weed dominated understorey.<br>4. Wake erosion from increased boat usage is affecting bank stability.<br>5. Weeds such as olives, bamboo, figs and watsonia are encroaching on riparian vegetation. |
| **Action required** |
| 1. Identify areas of cultural significance through Department of Aboriginal Affairs and liaise with local aboriginal groups.<br>2. Minimise or exclude stock access to the river through fencing and controlled stock access sites or offsite water options (right bank only as stock have been removed from left bank Reserve 45827).<br>3. Determine classification of all wetlands.<br>4. Assist regeneration of native vegetation through planting at designated sites.<br>5. Undertake bank and toe stabilisation at designated sites.<br>6. Work with the DPI to enforce 5 knot limit.<br>7. Work with landowners to fence off and revegetate wetlands, drains and tributaries discharging into the river.<br>8. Develop appropriate passive recreational opportunities and access points. |
| **Future actions** |
| 9. Introduce additional boat signage to create awareness of impacts to foreshore<br>10. Produce and implement a long term maintenance plan to control weeds and minimise fire risk.<br>11. Identify and sign historical landmarks. |

## Reach 5 - Dandalup River Inlet to 5km-bend - Study Area Map


LEGEND

Murray River Reach 5

Swan Coastal Plain South 1m Orthomosaic - DOLA 01/02

N

Scale 1:5,428

(Approximate when reproduced at A3)

Geocentric Datum of Australia 1994

Note: the data in this map have not been projected. This may result in geometric distortion or measurement inaccuracies.

Prepared by: Gendal.
Prepared for: Murray River Action Plan
Date: Thursday, 3 June 2004 13:24

Information derived from this map should be confirmed with the data custodian acknowledged by the agency acronym in the legend.

Department of Environment

## Reach 5 - Dandalup River Inlet to 5km-bend - Condition Description Map


Lower Murray River Action Plan
Review 2014
Foreshore Condition Assessment

PEEL-HARVEY CATCHMENT COUNCIL (Inc.)

**Legend**

Murray River Reaches

**Grade**

- B2-B3
- B3-C1
- C1
- C1-C2
- C2
- C2-C3
- C3

N
W E
S

0 50 100 150 200 m

GDA 94 UTM 50
Aerial Photo: Metro South Sep 2013
Prepared by J Garvey
Date: 29/07/2014

Peel-Harvey Catchment Council
Rivers 2 Ramsar
Connecting River Corridors for Landscape Resilience

Australian Government

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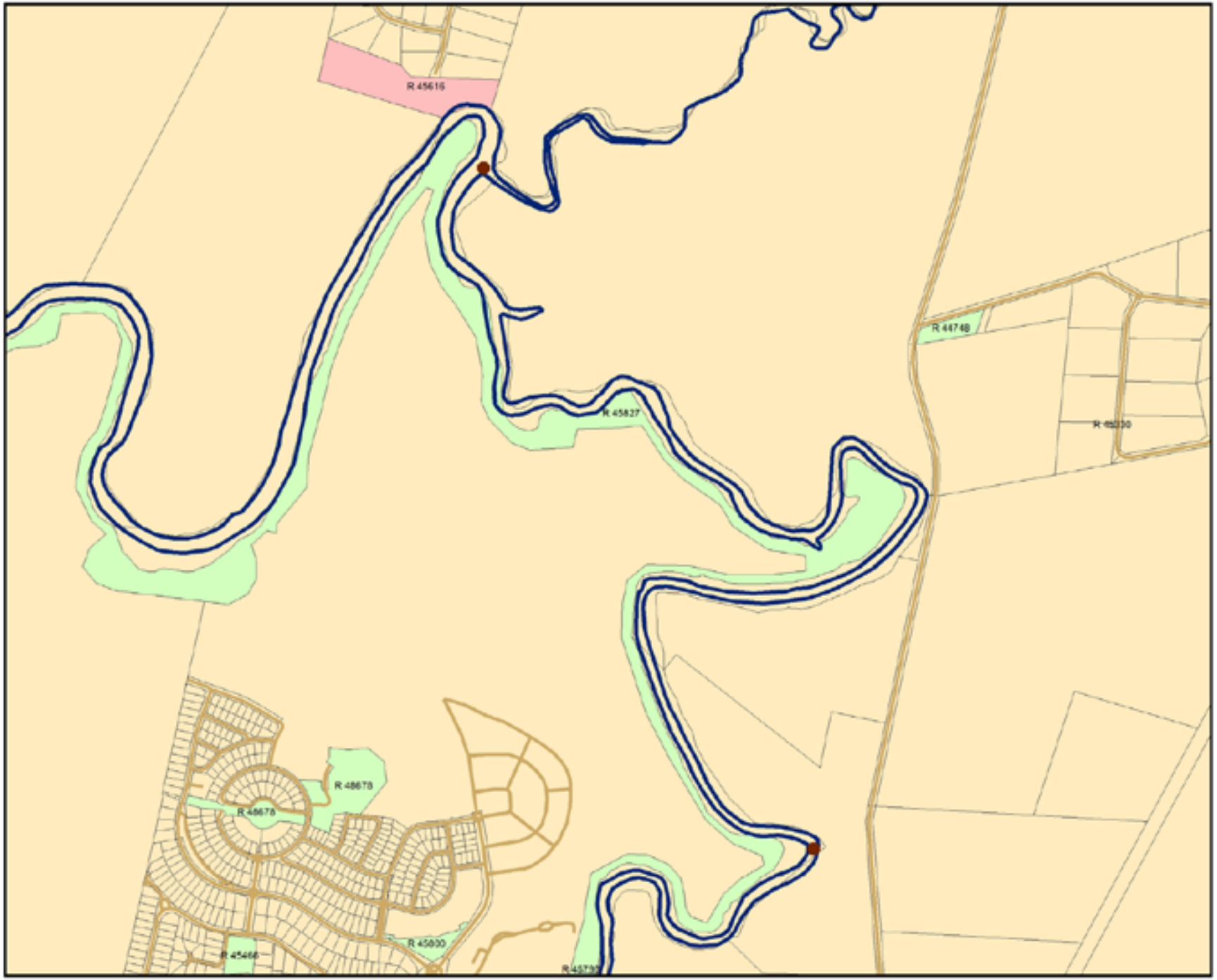
## Reach 5 - Dandalup River Inlet to 5km-bend - Reserves and Landowners Map




Lower Murray River Action Plan
Review 2014
Foreshore Condition Assessment

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**Legend**

- Murray River Reaches
- Roads
- Murray River

**Reserves**

- Unvested Reserves
- Waterways Commission
- Shire of Murray Vesting
- Freehold Land

N
W E
S

0 125 250 500
Metres

Scale: 1:10,000
(When printed on A3)

GDA 94 UTM 50
Aerial Photo: Metro South Sep. 2013
Prepared by C Archibald
Date: 27/05/2014

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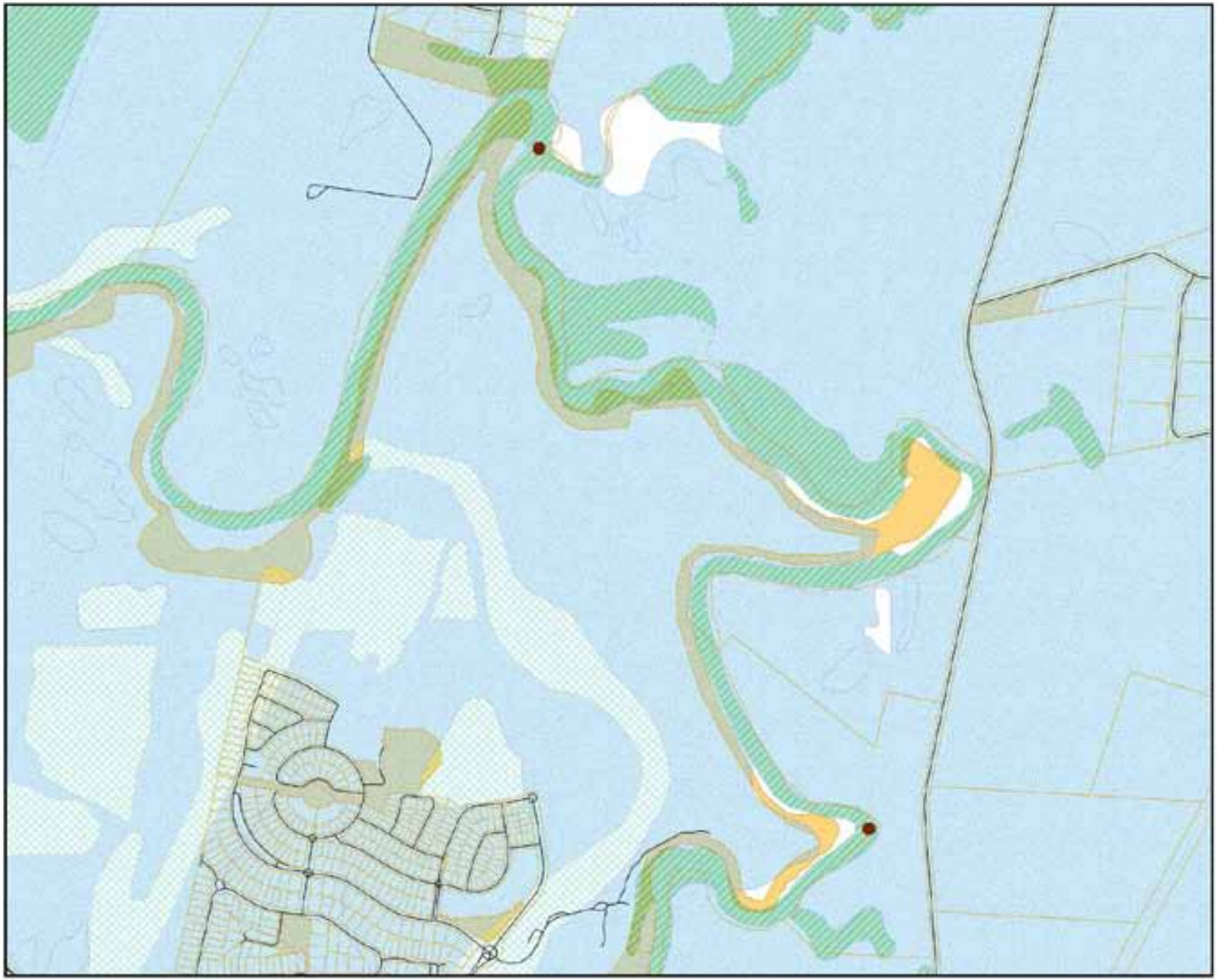
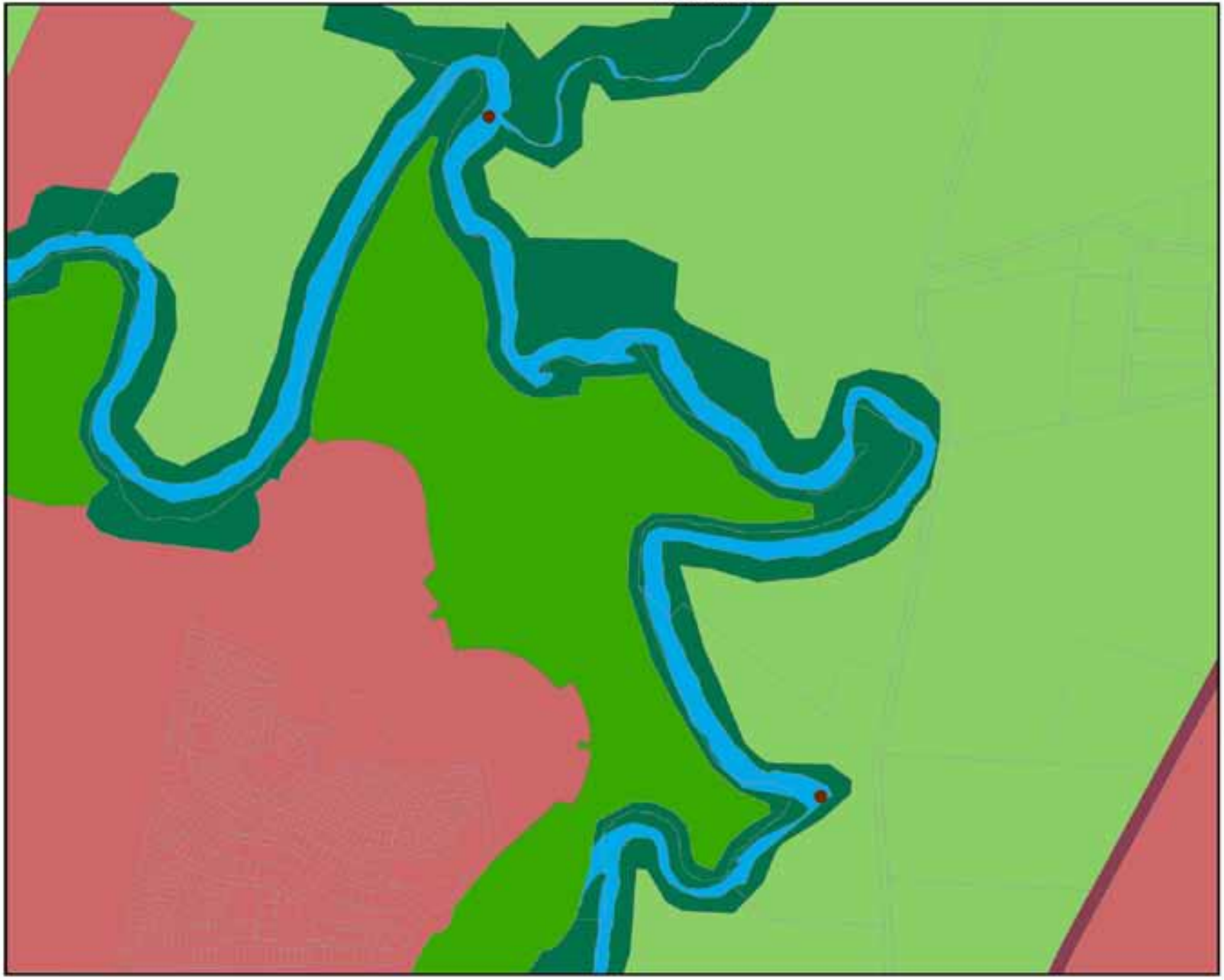
## Reach 5 - Dandalup River Inlet to 5km-bend - **Wetland Classification**



## Reach 5 - Dandalup River Inlet to 5km-bend - **Peel Regional Scheme Map**



## Reach 6 - 5 km-bend to Pinjarra Townsite Weir

### Description and Condition

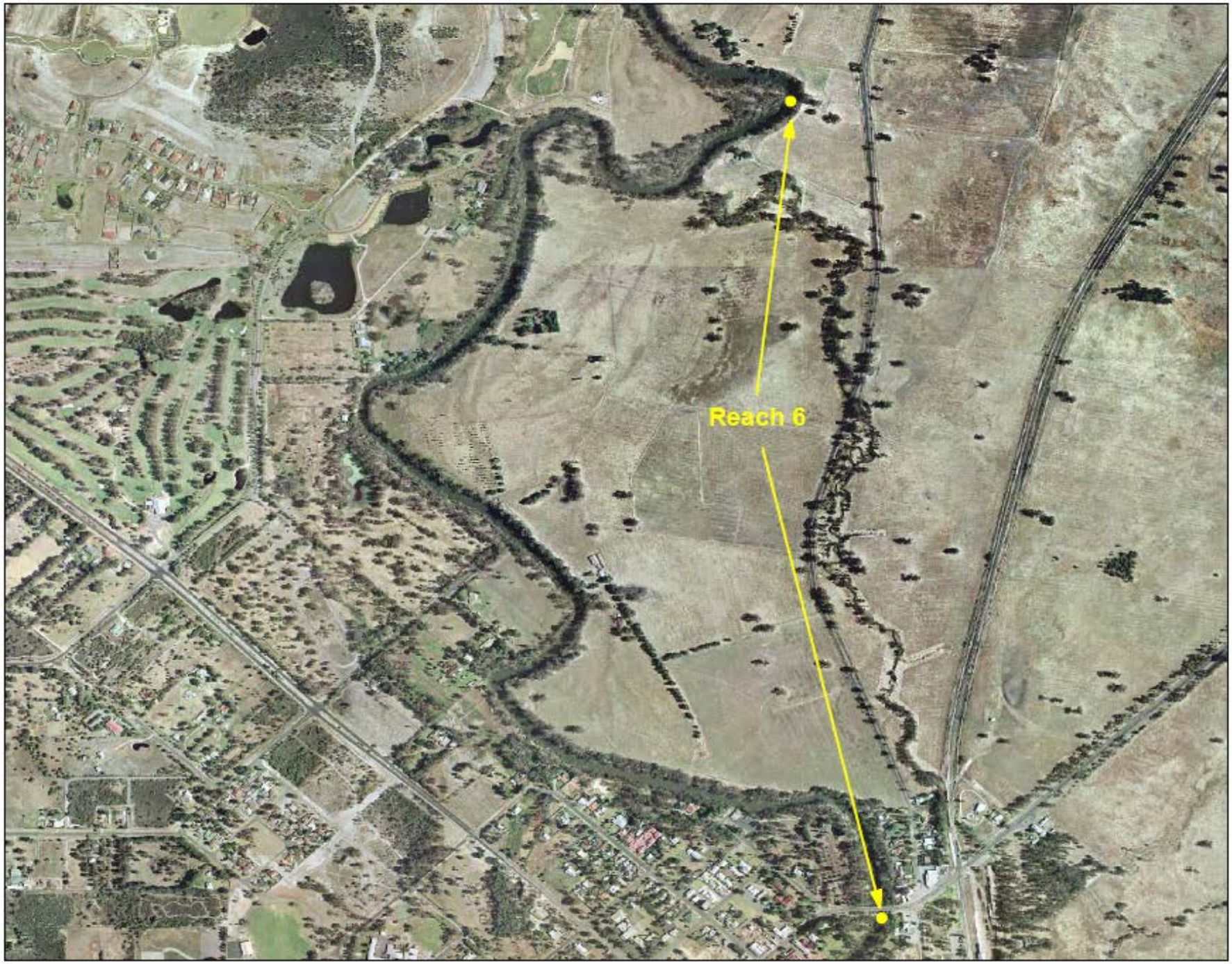
This reach is approximately 4 km long. Both banks of the river are privately owned and most landowners still have and are executing their riparian rights.

| **DESCRIPTION** | |
|---|---|
| **Landuse** | Rural grazing land dominates the right bank, with urban blocks located close to the Pinjarra Bridge. There is evidence of stock access to the river along this reach. The left bank consists of semi urban and urban blocks with a few small reserves, vested with the Shire of Murray. |
| **Fencing** | There is little to no fencing on either side of the river. An isolated stretch exists on the right bank near the urban blocks. |
| **Landforms and Soils** | P10 soils dominate with some sections of P6a. Near the Pinjarra Townsite small areas of P6b and P1a exist. |
| **CONDITION** | |
| **Feature** | **Comments** |
| **Vegetation** | This reach is highly degraded with a patchy overstorey of swamp paperbark (*Melaleuca rhaphiophylla)* and flooded gum (*Eucalyptus rudis)*. There is very little to no understorey present and very little natural regeneration. Weeds dominate the understorey. |
| **Weeds** | There is an infestation of weeds along this reach, probably due to the proximity of urban development. Weeds include olive trees, bamboo, watsonia, love grass, arum lily, nasturtiums and other domestic garden plants. Pasture grasses are dominant in the rural area along the right and left banks. |
| **Bank Stability & Erosion** | Stock access has resulted in severe erosion and bank slumping along the right bank. |
| **Habitat** | This reach is highly degraded with a patchy overstorey of swamp paperbark (*Melaleuca rhaphiophylla)* and flooded gum (*Eucalyptus rudis)*. There is very little to no understorey present and very little natural regeneration. Weeds dominate the understorey. |
| **Other Comments** | Stock access is a major contribution to degradation on right bank, and exotic garden weeds dominate left bank. |

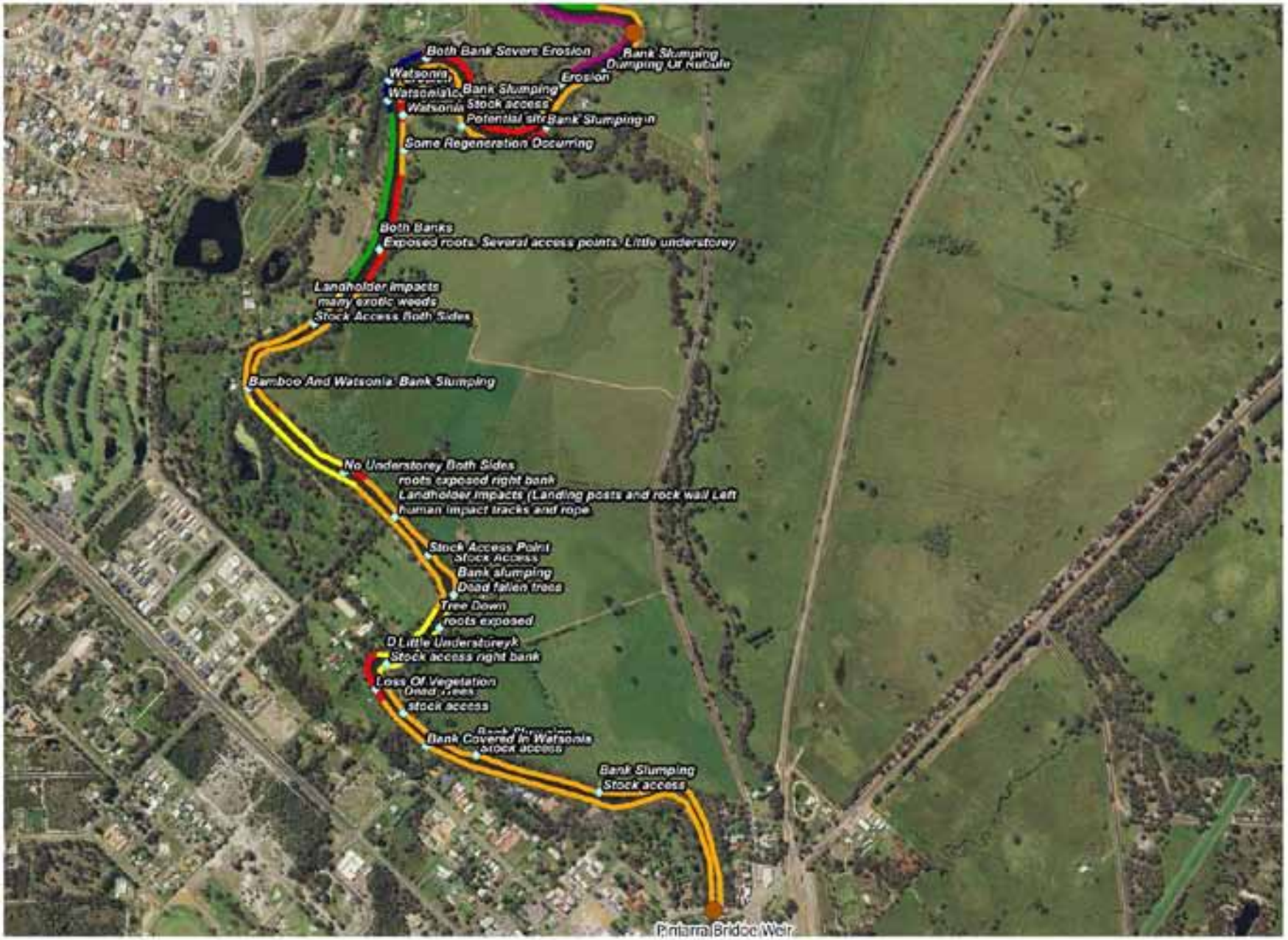
## Reach 6 - 5 km-bend to Pinjarra Townsite Weir

| ISSUES AND ACTIONS |
|---|
| **Issues & Threats** |
| 1. Stock access has resulted in severe erosion and bank slumping along the right bank.<br>2. Fringing vegetation is dominated by remnant ageing trees and there is very little to no natural regeneration occurring.<br>3. Weeds dominate the understorey. Woody weeds such as olives, figs and bamboo are widespread.<br>4. Increased boat usage is resulting in wake erosion. |
| **Action required** |
| 1. Identify areas of cultural significance through Department of Aboriginal Affairs and liaise with local aboriginal groups.<br>2. Minimise or exclude stock access to the river through fencing and controlled stock access sites or offsite water options. Consult community (part of this).<br>3. Assist regeneration of native vegetation through planting and/or direct seeding at identified sites. Undertake bank and toe stabilisation where possible.<br>4. Work with landowners to fence off and revegetate wetlands, drains and tributaries discharging into the river.<br>5. Work with the DPI to enforce 5 knot limit.<br>6. Determine classification of any wetlands within this reach. |
| **Future actions** |
| 7. Produce and implement a weed eradication and maintenance plan.<br>8. Develop appropriate passive recreational opportunities such as walk trails.<br>9. Introduce additional boat signage to reduce wake erosion.<br>10. Identify and sign historical landmarks. |

## Reach 6 - 5km-bend to Pinjarra Townsite Weir- Study Area Map



## Reach 6 - 5km-bend to Pinjarra Townsite Weir- Condition Description Map




Lower Murray River Action Plan
Review 2014
Foreshore Condition Assessment

Legend

Murray River Reaches

Grade

- B2-B3
- B3-C1
- C1
- C1-C2
- C2
- C2-C3
- C3

N
W E
S

0 50 100 150 200 m

GDA 94 UTM 50
Aerial Photo: Metro South Sep.2013
Prepared by J Garvey
Date: 29/07/2014

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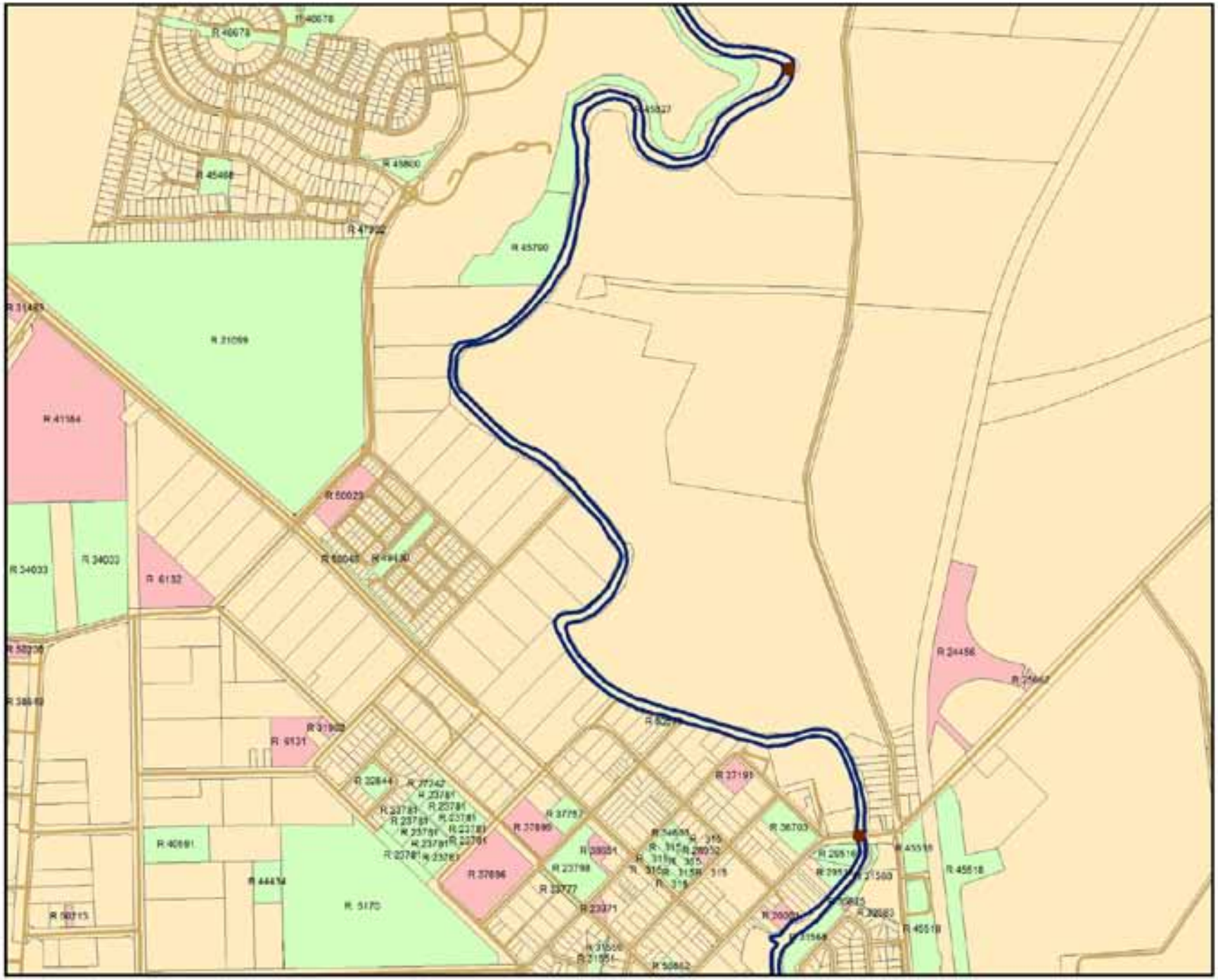
## Reach 6 - 5km-bend to Pinjarra Townsite Weir- Reserves and Landowners Map



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Review 2014
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**Legend**

- Murray River Reaches
- Roads
- Murray River

**Reserves**

- Unvested Reserves
- Waterways Commission
- Shire of Murray Vesting
- Freehold Land

0 125 250 500
Metres

Scale: 1:10,000
(When printed on A3)

GDA 94 UTM 50
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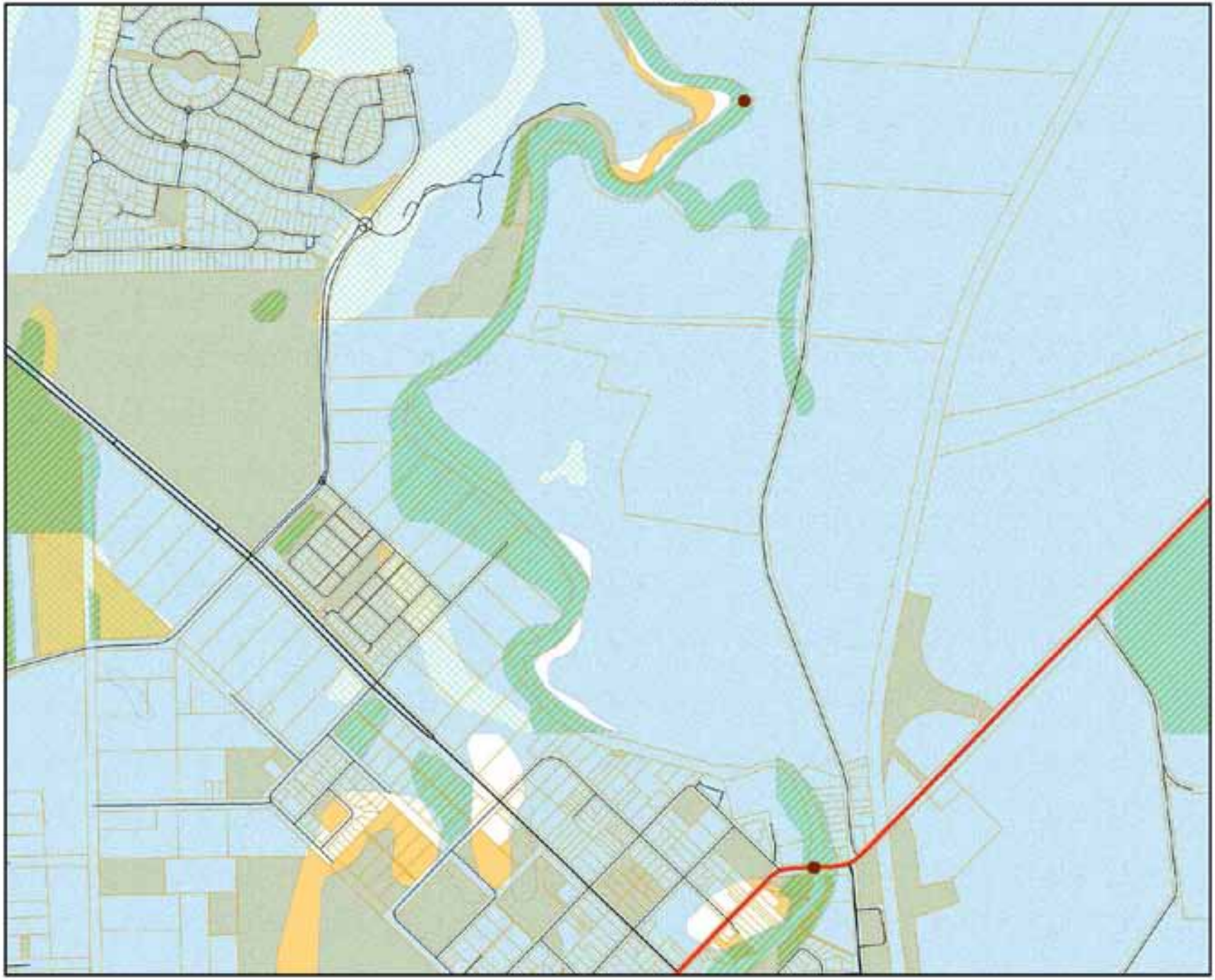
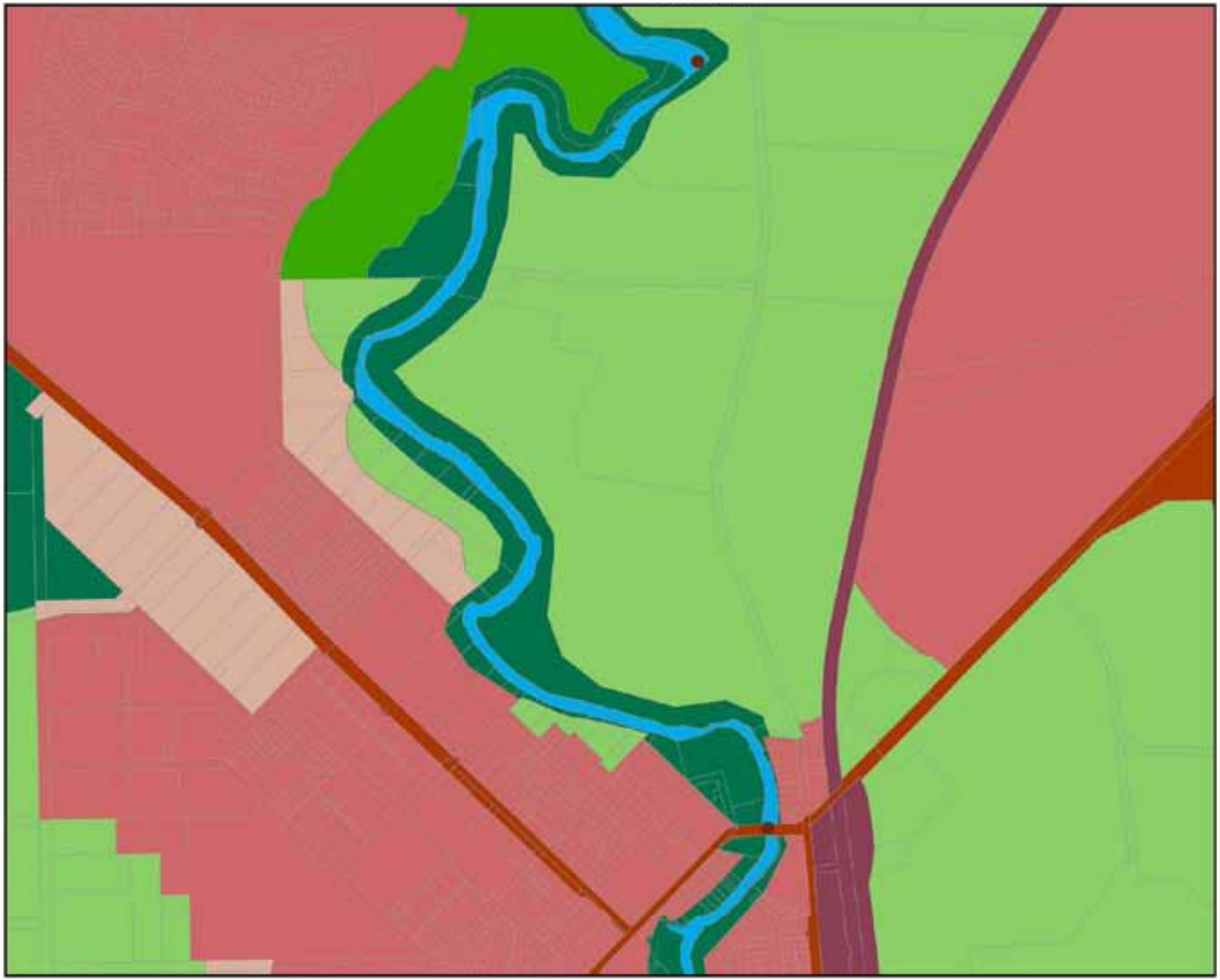
## Reach 6 - 5km-bend to Pinjarra Townsite Weir- **Wetland Classification**



## Reach 6 - 5km-bend to Pinjarra Townsite Weir- **Peel Regional Scheme Map**



# Lower Murray River Action Plan

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2003

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