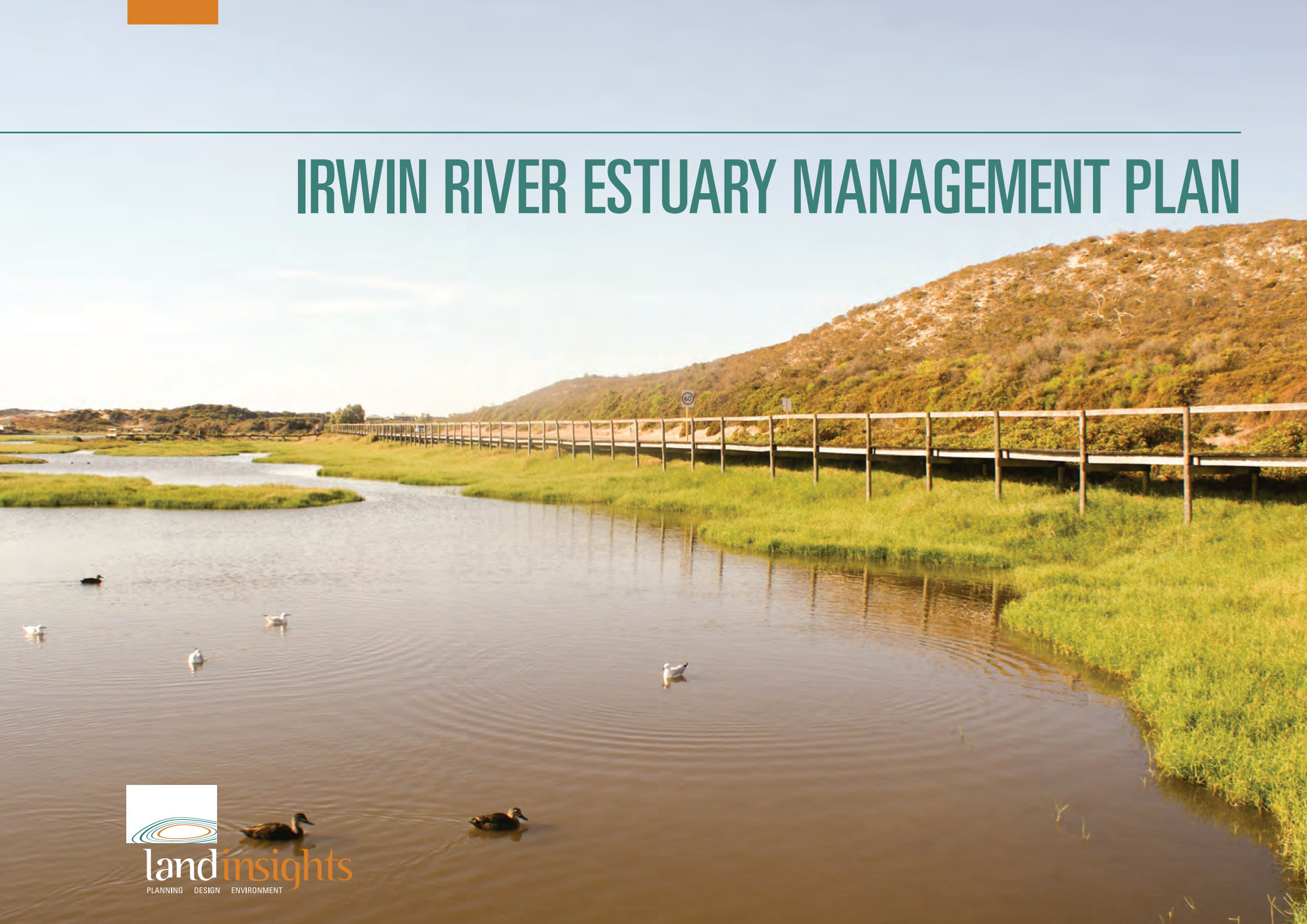
IRWIN RIVER ESTUARY MANAGEMENT PLAN



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Prepared by

Land Insights
PO Box 289, Mt Lawley WA 6929
Fax (08) 9370 5786
admin@landinsights.com.au
www.landinsights.com.au

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The recommendations and background information contained within this report was based on the information in the Irwin River Estuary Coastal Management Plan 2005 (ATA Environmental and Shire of Irwin, 2005) as well as other valuable resources prepared by the Shire of Irwin, Irwin District Historical Society and the Northern Agricultural Catchments Council.

DEFINITIONS & ABBREVIATIONS

Definitions

Amenity – those factors which combine to form the present character and likely future character of an area.

Biodiversity – the variety of life: the different plants, animals and microorganisms and the ecosystems of which they are a part.

Conservation – the protection, management, sustainable use and enhancement of the natural environment.

Development – any change to land use, including housing, any demolition, erection, construction, alteration of or addition to any building or structure on the land and any excavation or other works.

Dieback – the common name given to the pathogen Phytophthora cinnamomi which is a soil borne water mould that invades and destroys the root systems of many native flora species in Western Australia.

Environmentally sustainable development – development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.

Ecological linkage – a series of (both contiguous and non-contiguous) natural areas that, within a landscape context, connect larger natural areas by forming stepping stones of habitat that allow the movement of organisms and genetic material between these larger natural areas.

Ecosystem – a term used to describe a specific environment to include all the biological, chemical and physical resources and the inter-relationships and dependencies that occur between those resources.

Foreshore reserve – the area of land set aside in public ownership to allow for environmental processes and provide protection of ecological values, landscape, visual landscape, indigenous and cultural heritage, and public access, recreation and safety.

Landscape values – natural and/or cultural landscape features that are highly valued, as defined by documented research.

Powercraft – a craft powered by an engine

Remnant vegetation – stands of remaining native vegetation indigenous to a locality.

Reserves – may be either land classified in local planning schemes for public purposes or areas of Crown land reserved for public purposes as determined by the Land Act 1933 and the Land Administration Act 1997.

Threatened Ecological Community – communities which consist of native vegetation which are poorly represented and in danger of extinction.

Threatened Flora – Rare and priority flora protected under the Environmental Protection Act 1986.

Threatened Fauna – Fauna protected under the Wildlife Conservation Act 1950.

Vehicle – A vehicle is propelled by an engine or other mechanical source of power.

Abbreviations

- DAFWA Department of Agriculture and Food Western Australia
- DPaW Department of Parks and Wildlife
- DAA Department of Aboriginal Affairs
- DOP Department of Planning
- DOW Department of Water
- NACC Northern Agricultural Catchments Council
- SOI Shire of Irwin
- TEC Threatened Ecological Community



1.0 INTRODUCTION

1.1 BACKGROUND

The Irwin River Estuary Coastal Management Plan was prepared in 2005 to document management measures and to recommend passive and active facilities for the Irwin River Estuary and the coastal foreshore area to Granny's Beach. It has been almost 10 years since the Management Plan was prepared and a review is now considered necessary in order to integrate new ideas, fresh management approaches and to consider the current values of the community.

Population growth and increasing tourism in the last decade have placed pressure on the Irwin River and estuary and highlighted the need to manage uses and implement facilities to provide for demand.

This Management Plan acknowledges the regional significance of the site with regards to its cultural, heritage and environmental values. By providing and implementing a Management Plan for the Irwin River, the Shire of Irwin aims to maximise the potential for public access and facilities to the area, without compromising its current cultural, environmental, heritage and recreational value.

1.2 OBJECTIVES

The primary objectives of this Management Plan are to provide guidance on:

- an overall conservation plan for the area with regards to native vegetation, flora and fauna and ensuring the environmental sustainability of the area
- protecting environmentally sensitive areas and implementing a rehabilitation program for already degraded areas
- the development of recreation facilities such as walk trails, launching ramps for non-motorised watercraft and picnic areas without altering the amenity of the area
- the development of tourist facilities such as parking and picnic areas to further attract tourists and capitalise on the potential of the area
- revitalising existing areas within Irwin River already set aside for community use
- an ongoing maintenance plan to ensure all facilities within the area are kept to a quality standard.

The priority of the Irwin River Estuary Management Plan is to facilitate improved access, signage and low-key recreational facilities which blend into the natural environment to enable residents and visitors to enjoy this highly valued asset.

1.3 STUDY AREA

The Irwin River lies directly to the south of the Dongara townsite within the Shire of Irwin (Figure 1.1). The Study Area includes the Irwin River and foreshore area from the Priory Lodge (east) to the river mouth. This area is slightly smaller than the Study Area in the 2005 Management Plan which extended south along the coast to Granny's Beach. This area is subject to a separate coastal planning process and therefore it was considered that this management plan should focus only on the Irwin River and estuary area (Figure 1.2).

The Study Area includes the reserves and freehold foreshore lots within and directly adjoining the river. Most of the reserves within the Study Area have management orders with the Shire of Irwin. The boundary of the Study Area has been defined by cadastral boundaries or the extent of the Local Reserve from the Shire's Local Planning Scheme where appropriate.



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1:20,000

Figure 1.1 - Site Context
IRWIN RIVER ESTUARY MANAGEMENT PLAN



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1:7,500

Figure 1.2 - Study Area
IRWIN RIVER ESTUARY MANAGEMENT PLAN

2.0 Management Plan



2.1 INTRODUCTION

This chapter presents the Objectives, Strategies and Actions that form the Management Plan for the Irwin River Estuary. A range of strategies and actions are provided to address environmental values, access, facilities and planning aspects. The strategies provide an over-arching management framework, require ongoing consideration and can be applied to the entire Study Area. Actions are more detailed, are measurable and have a defined timeframe for implementation. They have been identified as appropriate on the spatial interpretation of the Management Plan (Figure 2.1).

The Management Plan should be used as a framework by the Shire of Irwin to inform implementation and budget allocations over a five-plus year period.

2.2 PRIORITIES

The recommendations have been allocated a priority to assist with implementation. Priorities have been classified as follows:

- S: Short term – within the next 2 financial years
- M: Medium term – within the next 5 financial years
- L: Long term – 5+ financial years
- O: Ongoing – as required.

The priorities assigned to each recommendation are advisory only. Priorities can be reviewed as required by the Shire to take into account availability of resources and granting of funding requests.

2.3 RESPONSIBILITIES

The Shire of Irwin is responsible for the recommendations in this plan. In some instances another party may be able to 'partner' the Shire when implementing recommendations.

Responsibilities and partners have been classified as follows:

- Shire of Irwin
- Department of Parks and Wildlife
- Department of Water
- Heritage Advisory Committee
- Irwin District Historical Society
- National Trust of Australia
- Northern Agricultural Catchments Council
- Tidy Towns and Sustainable Committee
- Landgate.

The Shire of Irwin Council is responsible for providing budget allocation and decision-making support to their staff to enable the effective management of the Study Area. It is in the interests of the entire community of Dongara and Port Denison for the Shire Council to invest annually in the maintenance, safety and improvement of the Irwin River infrastructure assets and natural values.

2.4 FUNDING

The Shire may be able to seek funding for certain activities from other sources. Funding opportunities such as these tend to change on a regular basis and should be reviewed each year. Funding can be applied for through the following:

- Coastwest (http://www.planning.wa.gov.au/4978.asp)
- Landcare Australia (http://www.landcareonline.com.au/25years)
- State Government Community NRM Grants (http://www.nrm.wa.gov.au/)
- National Landcare Program (http://www.nrm.gov.au/index.html).

2.5 PLANNING AND TENURE

DISCUSSION

The Study Area is entirely within the Local Planning Scheme Local Reserve, except for Lot 787 containing Denison House which is zoned Special Use SU8 (Figure 4.1). The permitted uses listed in Schedule 4 of the Scheme for Special Use SU8 are:

- Local Authority and Community uses
- Incidental uses to the permitted uses.

This doesn't place many restrictions on the potential use of Denison House, as long as those uses are approved by the Shire.

The tenure throughout the Study Area is shown on Figure 4.2. There are some issues relating to zoning and reservation within the Study Area, namely several freehold lots which are affected by the Local Planning Scheme Local Reserve. These include:

- Lot 9003 (located on either side of the Denison House Special Use area)
- Lots 8, 9, 178, 179, 11 and 12 on Hunts Road along the northern edge of the River
- Lots 202, 5, 1 and 17 on the eastern side of the bridge

OBJECTIVES

- To retain the focus of reserve management on recreation and conservation of natural values

STRATEGIES

- Retain management of reserves within the Irwin River Study Area
- Ensure zoning and tenure is compatible

ACTIONS

NUMBER	ACTION	PRIORITY	RESPONSIBILITY
P1	Liaise with Landgate to seek vesting of all reserves within the Study Area.	M	Shire of Irwin Landgate
P2	Review the need for the reservation of private properties on Hunts Road.	M	Shire of Irwin

2.6 CONSERVATION AND ENVIRONMENTAL VALUES

DISCUSSION

AESTHETICS AND LANDSCAPE

The Irwin River estuary comprises a variety of landscape and has spectacular aesthetic appeal. Landforms include enclosed tree canopies, elevated sites on cliffs and dunes and low-lying and open estuarine flats areas near the river mouth. Key sites and views include:

- the lookout on Church Street is on a highly elevated dune and offers spectacular views across the river and the coast
- the tracks through the dunes adjacent to the caravan park also provide views of the river and ocean
- the pedestrian pathway along the river and the boardwalk provides views across the river through the trees
- the boardwalk near the river mouth provides uninterrupted views across the low-lying estuary area. Covered viewing areas are provided at the river mouth to allow enjoyment of the areas natural features.

The topography and elevation is shown on Figures 5.1 and 5.2.

The aesthetic appeal of the Irwin River is one of the major drawcards for people to visit and use the area. It is important that the natural environment of the river is maintained and managed to retain the aesthetic appeal but also to capitalise on this asset by providing facilities such as walkways, lookout areas and shelters.

VEGETATION CONDITION

The Irwin River foreshore is well covered in vegetation, comprising both native and exotic species. Some areas are in poor condition due to an overwhelming volume of weed species and from past disturbances, however the majority of vegetation is in fairly good condition, contributing to the aesthetic appeal of the Study Area.

Wherever possible all remaining native vegetation should be protected from further disturbance and enhanced through additional planting to replace weed species. Controlled access should be provided where possible, particularly in areas that are disturbed or degraded. This will help reduce disturbance to existing vegetation, especially if user numbers increase. Clearing of vegetation should be restricted to the minimum necessary to provide access and proposed management strategies.

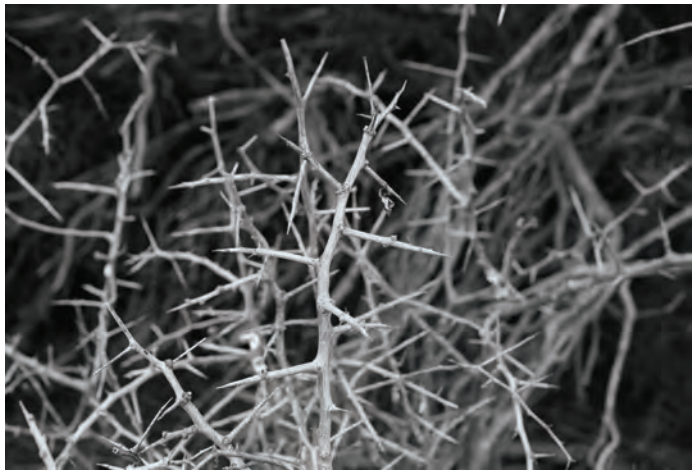
Restoration of the foreshore vegetation involves facilitating the natural regeneration capacity of the native species. The first stage of successful bushland rehabilitation should be weed control as described in the Irwin Estuary Weed Management Plan (NACC, 2013)

WEEDS

The disturbed condition of portions of the Study Area together with surrounding land uses ensure that weeds such as grasses will always pose a problem to management. It is anticipated that localised management of these weeds, conducted prior to any re-vegetation works, will improve the success of the re-vegetation program and enhance natural regeneration.

Resources should be focused towards eradicating introduced species that have the greatest potential to invade other areas and compete with native species. Such species include African Boxthorn, Couch and Wild Oats. The eradication and control of African Boxthorn is of particular importance as it occurs in dense infestations and restricts recreational access to some parts of the estuary. NACC has already commenced identification and eradication of African Boxthorn in accordance with the Irwin Estuary Weed Management Plan (NACC, 2013).

Detailed information on weed control, herbicides and application rates is available in the Irwin Estuary Weed Management Plan (NACC, 2013). Information can also be sought from DAFWA, DPaW, DoW and Environmental Weeds Action Network prior to implementing weed control programs.



DIEBACK

One of the most prolific plant diseases is 'dieback'. Dieback is the name given to a fungal disease that affects over 600 plant species. Phytophthora cinnamomi is the most common form of dieback. Certain plant families are such as Banksias, Dryandra, Hakea, Jarrah, She-oak, Hibbertia and Grass Trees are particularly susceptible. Vehicles, pedestrians and animals are the main transporters that spread the dieback fungi spores.

No evidence of dieback has been found in the Study Area to date. The area should be monitored for any signs of dieback such as plant deaths, sick plants and browning of leaves. "Managing Phytophthora Dieback Guidelines for Local Government" (Dieback Working Group) should be used as a guide to managing dieback should it occur within the Study Area.

FAUNA

Management of native fauna within the Study Area should focus on maintaining or improving habitat for native fauna. By minimising the alteration and loss of the habitats the local populations may be able to be sustained and have more resilience to the effects of predation or disturbance. Native fauna are also highly valued assets and visitors and locals enjoy seeing native animals while walking or bird-watching. Protection of habitats and native fauna can be achieved through:

- Limiting native vegetation removal
- Controlling access to reduce disturbance to vegetation and fauna
- Rehabilitation and re-vegetation of areas within the foreshore
- Weed control measures
- Appropriate fire management
- Increasing community awareness.

Interpretive signage to inform visitors of species of fauna occurring along the foreshore and the river will help increase community awareness and provide interesting features along the walkways. In particular, signage and interpretive information should raise awareness of the occurrence of the Southern Carpet Python within the Study Area. The Southern Carpet Python is non-venomous and signage may minimise unnecessary alarm or intentional killing of the snakes. The local community should be encouraged to grow locally occurring or native plants within gardens to provide additional habitat to maintain fauna populations.

It is important that areas of good quality native vegetation within the Study Area provide ecological links to bushland within adjacent foreshore areas and nearby reserves to enable fauna to disperse and for local populations to be sustained. Connections between vegetation should be maintained and crossings provided across roads. Signage on roads will raise awareness for drivers to be aware of fauna crossing the road.

Access to and within the Study Area should be controlled to ensure there are at least some locations adjacent to the river that have minimal disturbance to fauna. The northern foreshore provides almost continuous access near the river edge, and therefore there is potential for fauna to be disturbed along this section. It is therefore considered appropriate to restrict access near the river along a section of the southern foreshore area to enable fauna to roost with minimal disturbance. Field observations and the white staining of the woodland area on the southern foreshore reserve near the bend in the Irwin River suggest birds frequently use this area for roosting. The wide low margins near the bend and to the east also provide habitat for species such as egrets, heron and grassbirds and the area may provide habitat for frogs if freshwater pools form within the floodplain after high flows. Access should also be restricted along the wide floodplain near the river mouth to provide sheltered refuge from the predominantly southerly winds. This area includes exposed sandy shorelines that may be favoured by some waterbirds and waders. A boardwalk is also located in this area which assist in reducing disturbances to the vegetation and fauna. These areas have been identified as Fauna Habitat Protection Areas.

In the longer term it may be beneficial to consider supplementing the existing fauna habitat within the river system such as providing floating islands that are anchored close to the foreshore and/or timber poles within the river, to provide safe roosting places for waterbirds away from the main disturbances.

PESTS

Several introduced mammal species are known or expected to be found within the Study Area. These include rabbits, foxes, cats and dogs. These species could have significant impact on the local native fauna.

Rabbits have the potential to hinder regeneration efforts and create conditions more suitable for weed species to proliferate. The total removal of rabbits from the area is probably not feasible, however their potential impact on the vegetation and habitats should be controlled through the use of tree guards and brush to protect planted tubestock and re-vegetation.

Foxes and cats predate native fauna, while domestic dogs are known to also disturb and kill native fauna. These species could potentially deplete native populations sufficiently to result in possible local extinction within the foreshore reserve.

Community involvement and awareness promoting control of pets such as cats and dogs, and preventing dumping of unwanted litters is an important aspect of managing predation by introduced species.

Local residents frequently use the current informal trails along the foreshore reserve to walk their dogs. To ensure that this occurs with minimal disturbance to the flora and fauna within the foreshore reserve, dogs should only be permitted on designated walk trails, and must be on a leash at all times.

DRAINAGE

Pollutants that end up in the drainage system and local ground water eventually impact on the water quality within the river causing alterations in the ecosystem and contributing to problems such as algal growth.

Wherever possible, appropriate measures to prevent stormwater run-off from adjoining areas into the Irwin River should be implemented. Local residents of areas adjoining the river system should be informed about the potential implications of their actions and encouraged to reduce possible impacts on the river ecosystem. This involves public education in relation to minimising use of fertilisers and pesticides on gardens, appropriate disposal of paints and chemicals and sensible use of detergents. The DoW has a range of factsheets aimed at community education which can be referred to for further information.

The stormwater drainage system developed for the new subdivision development adjacent to the Irwin River Estuary on Lot 688 Ocean Drive includes swale system designed by ATA Environmental and approved by the Department of Environment. The swale drainage has been designed to retain and treat stormwater run-off from the subdivision development before it enters the river.

The Shire is also encouraged to refer to the DoW's Stormwater Management Manual for Western Australia and a range of brochures on Water Sensitive Urban Design when designing stormwater design across the study area. The Shire's responsibilities for urban water management are outlined in State Planning Policy 2.9 (SPP 2.9) Water Resources (WAPC, 2006) and Better Urban Water Management (WAPC, 2008). The Shire is responsible for contributing to the preparation of district and local water management plans (where required). Local government is also identified as the key agency responsible for implementation of SPP 2.9 with support from DER and DoW.

FLOOD RISK

Floodplain mapping supplied by the then Water Authority of WA (1987) indicates that the greatest flood risk is indicated on the foreshore area across from the Priory and on the northern and southern foreshore of the river next to the bridge (including the residential lots on the northern side and the picnic area on the southern side). The floodplain and flood risk areas are shown in Figure 5.4. There is also a possibility that the river will be vulnerable to the 0.9m sea level rise over the next 10 years as outlined in State Planning Policy 2.6.

This mapping is almost 30 years old and therefore considered slightly outdated, particularly since improvements have been made to the bridge to reduce the impact of flooding on the foreshore. It is likely that the flood extent is not as vast on the northern and southern foreshore areas near the bridge, however further detailed investigation will be required to confirm this.

As a result of the flood risk to the river foreshore areas, there are no proposals to invest significant amounts in infrastructure (such as toilets, buildings and BBQs) in low lying areas. At the same time, it is not considered reasonable to avoid placing low-key recreational facilities in low lying areas because of the chance that a flood may occur. Some low-key structures are proposed such as picnic benches, seating, pathway, signs and canoe launching areas. These structures are not likely to be too costly to replace should a flood occur.

Larger structures proposed in the Management Plan (such as canoe launching facilities and the proposed footbridge) within the floodway should be referred to the Department of Water's Floodplain Management Section for assessment and comment'

BUSHFIRE

Fire is a natural phenomenon in Australia and is largely caused or influenced by summer droughts and lightning storms. It was used deliberately by Aboriginal people prior to European settlement, mainly to assist in hunting practises and for sanitation purposes.

Fire management is important to prevent significant destruction to native vegetation and for safety. Fire is always a threat in vegetated areas and the highest risk is during the summer period and can be started by lightening strikes, campfires or are deliberately lit. Fire management procedures include:

- Prescribed burning
- Strategic firebreaks
- Use of barbeques rather than open campfires
- Prohibited burning period
- Adequate signage at coastal sites
- Fire risk assessments
- Fire Management Plans.

A high density of weed species within the Study Area increases the risk of fire. The African Boxthorn is currently being removed by NACC and this will help to reduce fire risk. Ongoing control and maintenance of African Boxthorn is vital to reduce the risk of fire control.

Roads surround much of the foreshore reserve and adjacent bushland area acting as firebreaks. The river will also assist in limiting the progression of fire.

OBJECTIVES

- Protect the landform, vegetation and fauna from future disturbances caused by human impacts and to restore degraded areas through rehabilitation, access control, management and monitoring

STRATEGIES AND ACTIONS

STRATEGIES

- **Aesthetics and landscape**
  - Encourage the design of car parks, roads and buildings that minimise the visual impact on the surrounding environment.
- **Vegetation**
  - Encourage the use of formal pathways to reduce disturbance to vegetation.
  - Monitor the creation of informal tracks and discourage their use.
  - Limit clearing native vegetation to the minimum required to provide access and facilities.
  - Establish new access tracks and new facilities in cleared and degraded areas where possible.
  - Carry out ongoing rehabilitation of degraded areas through weed control, access control and re-vegetation.
  - Re-vegetate across areas where African Boxthorn has been removed to prevent excessive erosion and establishment of weeds.
  - Collect seeds from the local area for re-vegetation.
  - Encourage the local community and schools to be involved in rehabilitation and management of the river environment.
- **Weeds**
  - Support NACC with their ongoing weed control and implementation of the Irwin Estuary Weed Management Plan.
  - Implement ongoing weed control and prevent re-establishment of African Boxthorn.
  - Prevent use of weed herbicides in close proximity to the river, unless they are appropriate within wetland and riparian environments.
- **Plant diseases**
  - Monitor evidence of plant diseases such as dieback by observing plant deaths and unhealthy vegetation.
  - Follow the Management of Phytophthora Dieback Guidelines for Local Government by the Dieback Working Group (2000) in the event that dieback is detected.
- **Fauna**
  - Provide information to visitors about local fauna in the area through signage and mobile technology.
  - Protect fauna habitat areas from disturbance.
  - Maintain native vegetation along the river foreshore and provide linkages to surrounding vegetation.
- **Pests**
  - Encourage the eradication of rabbits, foxes and feral cats by private landholders.
  - Provide community awareness of the impact that pets can have on the natural environment.

- Ensure that dogs are permitted on walking tracks only and must be on a lead at all times, except where allowed as part of approved dog exercise areas under the Dog Act 1976.

- **Drainage and Flood risk**
  - Increase public awareness of the effect that activities on surrounding land can have on the river environment and on reducing the amount of pollutants and nutrients that can drain into the river in stormwater.
- **Bushfire**
  - Develop and implement a Bushfire Hazard Reduction Plan in consultation with local Volunteer Brigades, FESA and DPaW.
  - Implement fire control measures and fire management within the Irwin River foreshore and surrounding reserves.

ACTIONS

NUMBER	ACTION	PRIORITY	RESPONSIBILITY
E1	Remove African Boxthorn plants within and around the Study Area.	S/O	Shire of Irwin
E2	Re-vegetate in the identified locations, particularly where uncontrolled access has disturbed vegetation and where African Boxthorn plants have been removed.	S/M	Shire of Irwin
E3	Create Fauna Habitat Protection Areas.	I/O	Shire of Irwin



2.7 RECREATIONAL AND SOCIAL VALUES

DISCUSSION

RECREATION NODES

A number of low-key recreation nodes are identified in the Management Plan around the Irwin River Estuary. The nodes are locations where access is available and low-key recreational uses are possible. The purpose of the recreation nodes is to focus activities at certain locations which will relieve pressures from other parts of the Study Area. It is important that the environmental values of the Irwin River are protected to maintain a natural overall feel of the area. These nodes are used for low-key activities such as lookouts, access to walkways, bird-watching, canoeing and picnicking.

A description of the existing uses at each recreation node and the proposed uses and development are outlined in the following table.

SITE	EXISTING USE	PROPOSED USE/ DEVELOPMENT
The lookout at Church Street	Lookout, carpark, pedestrian access to walktrails	Replace signs
Car park at the corner of Hunts Road and Waldeck Street	Informal car park and access to walk trail	Improve directional and locational signage, formalise car park, provide picnic facilities
The foreshore opposite the Priory	Informal car park, informal canoe launching	Directional and locational signage, formalise car park, picnic facilities, canoe launching
The picnic area at Dongara-Denison Bridge	Informal car park, informal canoe launching, some picnic benches, access to walk trail	Directional and locational signage, formalise car park, picnic facilities, canoe launching, events
Denison House	Car park, informal canoe launching, access to walk trail, community uses.	Directional and locational signage, formal canoe launching, investigate commercial uses (canoe hire, tea rooms etc), picnic facilities, community uses.
Carpark on Ocean Drive	Formal car park, access to boardwalks, lookout and birdwatching areas.	No further development, interpretative signage, remain low-key and protect the estuary.

ACCESS

Access to the Irwin River should be managed to provide a balance between ecological conservations and recreation. The bushland and riverine environment provides an enjoyable site for bushwalking and other nature based activities by local residents and visitors to the town. Pedestrian access within the Study Area needs to be provided in a controlled manner to avoid random and indiscriminate access and disturbance of the foreshore area.

A network of informal pedestrian and vehicle access tracks occur within the foreshore reserve. Extensive lengths of boardwalk have already been installed in the southern section of the Irwin River Estuary. Informal tracks should be closed and suitably rehabilitated.

PEDESTRIAN ACCESS

Walktrails and boardwalks offer a coastal experience to walkers, cyclists and horse riders by linking different coastal sites with a formal pathway. They also minimise environmental impacts by confining users to a set path. Recreational trails are highly valued by the community.

The previous Management Plan proposed a series of pathways be created outside of the 1 in 100 year floodway to link with the existing boardwalk on the southern side of the Study Area (including the existing vehicle track). The purpose of this was to provide a year round walk trail which connects with the existing boardwalk with glimpses and viewing opportunities of the river and coast. The walk trail was not formalised and instead the seasonal tracks located closer to the river are still used.

The purpose of the seasonal tracks in the previous Management Plan was to provide visitors with several walk trail options and to enable access to the river margin for fishing activities. As these tracks are regularly used and provide an enjoyable setting within the river environment, it is proposed that they are managed as the main pathway around the river. At present, many of these tracks do not provide year-round access and can only be used during dry periods. To reflect their importance as the main pathways around the river it is recommended that they be upgraded

to facilitate access at all times. Furthermore, as they are located within the floodplain they may require maintenance and repair after major flows or flooding events.

A network of walktrails and boardwalks around the foreshore and coastal areas provide pedestrian access along a majority of the Study Area. The walktrails also provide access between the recreation nodes. It is important that the access points to walktrails remain open to the public and are well maintained. In particular, the access point at the end of Reserve Street requires signage and some maintenance to keep it open to the public and a safe standard.

It should be noted that some of the foreshore walktrails are quite narrow and located in low - lying areas which may become inundated during high rainfall events. This could make the paths susceptible to erosion. It is proposed that these trails are not developed further and are kept natural to blend into the natural environment.

The proposed pedestrian footbridge is a popular idea with the Shire and residents and is recommended in a number of Shire reports (including the Draft Recreation Needs Analysis 2013, the Tourism Development Plan 2013-2018, the Shire of Irwin Bicycle Plan 2014 and the Shire of Irwin Strategic Community Plan 2012-2022). The bridge would benefit local residents and visitors by providing improved access to both sides of the Irwin River. In addition, access to the beach, various walk trails and residential areas will be more convenient and the walking loop can be shortened.

The previous Irwin River Estuary Coastal Management Plan suggested the footbridge could be located at the bend in the river to provide access from the existing lookout on the northern foreshore to the walk trail located along the southern foreshore. Another option is to place the footbridge at the end of Reserve Street to provide direct access to Denison House from the northern side of the river. The location and feasibility of the footbridge requires further consideration.

The proposed walktrails have all been aligned to avoid the proposed Fauna Habitat Protection Area along the southern foreshore. This will minimise disturbance to fauna, particularly birds roosting in the trees. Within the remnant vegetation south-east of Ocean Drive a walk trail already exists providing access from the lookout to Ocean Drive in the north and Richardson Road in the south. This should be further formalised and linked up to the informal path to the east to provide a defined loop walk trail from the lookout and back. In addition, it is recommended that the trail should formally extend south to Richardson Road. Staircases will need to be constructed along the walk trail in areas with steep inclines.

A number of informal tracks are located across the dune adjoining the caravan park near Church Street. Main tracks should be formalised and informal/duplicate tracks rehabilitated to prevent degradation and erosion of the dunes.

VEHICLE ACCESS

Apart from on the sealed roads, vehicle access within the Study Area is restricted to a few small parking areas and access for necessary maintenance and firefighting vehicles.

Modifications should be made to the area fronting Denison House to provide reliable access for canoes and other non-motorised craft. If a launching area is provided near this site, the existing vehicle access point near the southern boundary of the foreshore reserve should be closed and rehabilitated unless there is sufficient demand for two access points to be maintained. Vehicle access to the house and car park should be provided along the eastern side to avoid impacts on the pythons that are known to occur mainly on the western side of the house.

DISABLED ACCESS

The Disability Services Act (1993) Part 5 requires state and local governments to develop and implement a Disability Service Plan. The Shire of Irwin Access and Inclusion Plan 2012-2017 provides guidelines and advice for the consideration of disability access in the Shire. A majority of people with a disability in the survey were either parents with prams or senior people that found it difficult to negotiate steep dunes or paths.

Disabled access can be difficult in areas with steep slopes and undulating topography (which is common in river foreshore areas and coastal areas). Some locations along the Irwin River are too steep to provide disability access to walktrails. However there are a number of flat areas which can provide disabled access to walktrails. Disabled access is available at every recreation node and at the walktrails at Hunts Road car park and at the boardwalks at the southern end of the Study Area.

CAR PARKING

Car parking facilities for visitors should be located at the existing vehicle access points and the main recreation nodes. Parking is currently provided at the following locations:

- Church Street
- Denison House
- Retreat Boulevard West

- Ocean Drive.

Parking is recommended for the following additional locations:

- Formalise the parking area at the corner of Hunts Road and Waldeck Street
- The picnic area at Dongara-Denison Bridge (Clarkson Street)
- The foreshore opposite the Priory Lodge (St Dominics Road)
- To the north-east of Dongara-Denison Bridge (Point Leander Drive).

Presently, an informal car park is located adjacent the northern foreshore reserve at the beginning of the walk trail off Hunts Road at the old depot site. This car park facility should be formalised and/or expanded to provide for the expected increased use of the foreshore reserve by locals and tourists for recreation such as bush walking and fishing. This location also provides disabled access to the walktrail.

Small bitumen car parks are provided along Ocean Drive to accommodate visitors using the beach located between the marina and the mouth of the Irwin River Estuary. These parking areas provide an adequate number of bays, but may need to be expanded and formalised as the number of visitors to the area increases.

FACILITIES

The Irwin River is currently dotted with low-key recreational facilities such as viewing areas, picnic benches, seating, bird-watching areas and grassed picnic areas. It is recommended that facilities remain low key and blend with the natural environment.

The following improvements to facilities are proposed:

- Revitalise the existing picnic area located near the Dongara-Denison Bridge including the provision of additional picnic tables, rubbish disposal facilities and new play equipment. Barbecue facilities can also be provided, with electric or gas burners (which is a safer option than open fires). An innovative and creative approach should be taken in regard to the design of facilities that reflect the natural environment. For example, play equipment could include a tunnel created to appear as a python, and large wooden or concrete birds such as swans, pelicans, egrets, heron and spoonbills to sit on.
- Investigate the possible use of Denison House (discussed further below)
- Provide picnic facilities at Dension House (although this may be influenced somewhat by the final use of the house) including picnic tables, barbecue facilities and rubbish bins.
- Consider the possibility of providing toilets at Denison House (this may depend on the decided use for the house). Toilets are not considered necessary or appropriate within the low-lying areas of the Study Area
- Formalise canoe launching areas in certain locations by improving access and providing platforms (launching areas for non-powered water crafts (such as canoes and kayaks) is discussed below)
- Consider providing facilities for recreational fishing on the northern foreshore of the river such as wooden platforms or jetties.

Rubbish bins are provided at some locations, but visitors are generally encouraged to take their rubbish home.

WATERCRAFT

Canoeing and kayaking is a popular activity along this section of the river. Water craft can be paddled from the river mouth to a short distance east of the Priory. Powered water craft should not be permitted along this stretch of the river .

There are a few informal canoe launching sites scattered along the river. Having multiple launching sites, particularly in close proximity to each other can lead to vegetation disturbance and erosion. It is proposed that launching areas are formalised at certain nodes to reduce the need to disturb vegetation to access the river. Flotation devices may be required in some locations to assist with access (as some areas are steep and slippery) and to reduce erosion.

There may also be potential for a canoe/kayak hire business at the river. This could be established at a number of the nodes including Denison House, the picnic area at Dongara-Denison Bridge or at the Priory Lodge.

DENISON HOUSE

Denison House is a highly valued historical structure. It is located on the southern side of the river and is currently underutilised. A local community arts group and Patchwork Club uses a few rooms in the house, however most of the time the house is not used.

The potential uses for the house include:

- Tea rooms/café
- Small shop displaying local produce, art and craft
- Use by other community groups (e.g. activity rooms for local groups such as bushwalkers, birdwatchers, craft and hobby groups, and parent groups)
- An interpretive centre for visitors to the area and local school children displaying information about the local environment and river system
- Canoe and kayak hire
- Museum or other use by the Irwin District Historical Society.

The use of Denison House will need further consideration by the Shire, particularly in relation to the financial aspects and commercial viability of running a café/tea room or shop from the house. Use of the house will also be influenced on whether a footbridge is constructed across the river at this location. The footbridge will improve access and will draw people from Dongara and the northern side of the river to Denison House. The house and outbuilding however, will require maintenance and improvement prior to public access being encouraged.

INTERPRETATION AND EDUCATION

Public awareness of the value of the Irwin River and surrounding bushland should be promoted through the provision of information using signs and technology. There is an opportunity for provision of information through mobile technology such as an application which can be used on phones or tablets.

The types of signage required throughout the Study Area include:

- Directional – e.g. to indicate location of paths, facilities and points of interest
- Interpretative – e.g. explanations of the natural environment, descriptions of work in progress and the prohibitive areas or measures
- Public safety – e.g. warnings in areas where potential hazards are known.

Directional signs should be located near roads, car parks and pathways to identify access points. Other types of directional signage can be used to direct users to lookout points, seating, picnic areas and the various tracks.

Signage should be clearly visible but should not detract from the aesthetic appeal of the area or viewing points. Directive and interpretative signage should consist of painted waist high posts with plaques or similar labels attached similar to those often used by DPaW, and should blend in reasonably well. Warning signs should be clearly visible and may need to be taller and of more notable design.

Ideas for interpretative signage includes:

- Erect plaques with information on birds along the existing boardwalk along the estuary to assist recognition and identification. Each plaque could identify a particular bird species and provide information regarding its behaviour, habits and where it is likely to be observed.
- Advise visitors that the harmless Southern Carpet Python occurs in the area and not to be alarmed if they are seen
- Information on other native fauna found in the area
- The Aboriginal history of the area
- The European history of the area

This information can also be made available on an application which can be used on mobile phones and tablets. A code can be used to access the information. Different codes can be used along the walk to provide visitors which information as they walk.

Signs should also be used to inform visitors of areas undergoing weed control or rehabilitation. Restrictions such as vehicle access, dog exercising and access to the fauna habitat protection area should be noted on signs.

Local residents of adjoining areas should be informed about the potential implications of their actions and encouraged to reduce possible impacts on the river ecosystem. This should include minimising use of fertilisers and pesticides on gardens, appropriate disposal of paints and chemicals, sensible use of detergents and controlling pet cats and dogs movement within the area. This should be done through leaflets, newsletter articles and on the Shire web site as well as other means.

A public safety sign should be placed near the limestone cliffs in the foreshore reserve in the south – eastern and western section, warning of limestone cliff and potential rock fall and near the crest of the cliff face notifying the public that the area is steep and dangerous. Signage should also be

used to indicate that the seasonal paths may be subject to flooding during high river water levels and may also be slippery or boggy.

COMMUNITY INVOLVEMENT

Community involvement is beneficial as it creates a sense of ownership and helps to achieve better management outcomes. The Shire should work with and encourage locals and community groups where possible to be involved in management of the Irwin River. This can also help to increase community knowledge of the riverine environment, including harmful activities and how to care for the environment. The community have a strong willingness to be involved in continued weed management in the study area, particularly Boxthorn control.

Future strategies that may assist in raising public awareness of coastal issues include:

- River and Coastal Education Program – aimed at increasing public awareness of issues through media articles, forums or guest speakers, talking to primary and high school aged children about looking after the environment and publishing promotional brochures on the River aimed at tourists and locals
- Community Support Program – encourage and support voluntary groups to undertake management of the river and coast (eg. Tidy Towns and Sustainable Committee, Weeds Action Group, Bird Observers Group)
- Training Programs – run short courses on river and coastal management to educate interested people on issues and management.

RESEARCH

Increasing the information base on the Irwin River will be beneficial in determining the scale of impact and what should be done to protect the coast. The demographics of people visiting coastal reserves is important in order to determine the scale of use, facilities required and level of management required to reduce impacts. Research can also help Council with their budgeting. Information can be gathered by conducting a public survey (online or hardcopy), leaving feedback forms at a site along the river (such as Denison House) or providing feedback forms at the Shire office or other tourist sites. It will be beneficial to determine the numbers of visitors and to survey users to determine their expectations, positive experiences and negative experiences.

OBJECTIVES

The objectives for management of recreational uses along the Irwin River are:

- Implement access control and reduce the level of disturbance to the environment caused by vehicles and pedestrians
- To ensure that facilities provided are adequate to provide for future permanent and visitor populations over the next 10 years and the different recreational activities along the river
- To encourage sustainable land uses along the river with minimal environmental impact to ensure enjoyment by future generations
- To further recognise and promote areas of Indigenous and European significance and aim to educate the public of the value and importance of certain sites
- To provide opportunities for local residents and visitors to learn about and be involved in the protection and management of the Irwin River

STRATEGIES AND ACTIONS

STRATEGIES

- **Pedestrian access**
  - Give due regard to SPP 2.6 which provides for public access to foreshore areas and apply these when considering future options for the development of dual use pathways and recreational trails along the coast
  - Informal access tracks should be closed and rehabilitated
  - Monitor the area for the creation of new informal tracks and discourage their use
  - Maintain walking tracks throughout the Study Area and upgrade sections when they start to degrade
  - Provide formal walking access tracks to bird-watching areas, viewing areas, recreation nodes and canoe launching areas
  - Provide appropriate bike facilities along the Study Area
  - Liaise with the caravan park to close informal tracks over the dunes, to formalise existing tracks and direct visitors to formal tracks

- **Vehicular access**
  - Maintain access roads
  - Monitor for the creation of informal access roads and discourage their use
  - Vehicle access should be provided to recreation node sites and discourage vehicle access to the remainder of the river foreshore areas
  - Prohibit trail bike users along the Irwin River foreshore area to reduce disturbance to native vegetation
  - Implement signage on roads directing vehicles people to the access areas, parking areas and recreational nodes
- **Disabled Access**
  - Investigate opportunities for more formal disabled access
  - Ensure disabled access is considered when designing and implementing the actions recommended in this plan and that the Shire of Irwin Access and Inclusion Plan 2012-2017 is referred to
- **Car Parking**
  - Maintain parking areas
  - Monitor for the creation of any new informal parking areas and discourage their use
  - Provide and maintain car parking at recreation node sites
- **Facilities**
  - Ensure nodes are adequately serviced with rubbish bins (or signs to ask visitors to take rubbish home), seating, shelters etc.
  - Maintain picnic areas and facilities
  - Adopt a consistent design style for all furniture
  - Maintain limited areas of grass along the foreshore as informal seasonal picnic areas
- **Water-based activities**
  - Maintain canoe launching sites
- **Signage**
  - Maintain signage throughout the Study Area and ensure it blends into the natural environment and doesn't obscure views
- **Heritage**
  - Continue to liaise with local Indigenous representatives to ensure a culturally sensitive approach to recreational activities, the provision of visitor amenities and management of the river
  - Encourage involvement of indigenous persons in management of the river
  - Include Indigenous heritage and European heritage in interpretative signage
  - Continue to manage and recognise European historic places
- **Community Involvement**
  - Support programs that actively engage the local community in managing the Irwin River (e.g. school education programs, clean-up days etc)
  - Assist and encourage the community with forming environmental community groups
  - Undertake ongoing public education and engagement programs to encourage care for fauna and habitats and reduction of weeds and pests
- **Research**
  - Investigate the number of visitors to the river and survey their experiences and expectations.

ACTIONS

NUMBER	ACTION	PRIORITY	RESPONSIBILITY
R1	Construct a footbridge across the river to provide improved access.	S/M	Shire of Irwin
R2	Revitalise the area across from the Priory Lodge for picnic and general use area.	M/L	Shire of Irwin
R3	Revitalise the picnic area at Dongara Denison Bridge by constructing picnic tables, signage, car parking and a canoe launching area.	M	Shire of Irwin

NUMBER	ACTION	PRIORITY	RESPONSIBILITY
R4	Revitalise Denison House for a variety of community and public uses, including consideration of a gallery for local art, historic centre, environmental education, use by community groups and appropriate commercial facilities such as a tea house/café, shop for local produce and a canoe hiring facility.	S/M	Shire of Irwin Irwin Historical Society
R5	Implement a canoe launching area at Denison House, at the Dongara-Denison Bridge picnic area, at the recreation site at the Priory Lodge, at the Retreat Boulevard West car park and the Hunts Road car park.	S	Shire of Irwin
R6	Consider the possibility of implementing a canoe hiring facility along the river.	L	Shire of Irwin
R7	Investigate the feasibility of providing public amenities at Denison House	L	Shire of Irwin
R8	Provide a designated fishing area on the northern side of the river	S/M	Shire of Irwin
R9	Provide bike facilities at the picnic area near the bridge, at either side of the proposed footbridge, at the carpark along Ocean Drive and at the Church Street lookout.	S/M	Shire of Irwin

NUMBER	ACTION	PRIORITY	RESPONSIBILITY
R10	Provide disabled access to the river and walking tracks where possible at certain nodes including the picnic area, Denison House, Hunts Road car park and the informal car park along Retreat Boulevard West.	S	Shire of Irwin
R11	Formalise car parking at the corner of Hunts Road and Waldeck Street, at the picnic area to the west of Dongara-Denison Bridge, the foreshore opposite the Priory Lodge and to the north-east of the Dongara-Denison Bridge	S	Shire of Irwin
R12	Install entry signage at recreation nodes to notify visitors of the Irwin River facilities and access	S	Shire of Irwin
R13	Install interpretative signage along the walking tracks and at recreation nodes	S/M	Shire of Irwin Irwin Historical Society
R14	Implement information through mobile technology (such as an application)	S/M	Shire of Irwin Irwin Historical Society
R15	Install directional and safety signage where appropriate.	S/M	Shire of Irwin Irwin Historical Society
R16	Upgrade main pathways in seasonally wet areas to enable all-year round access.	S/M	Shire of Irwin

ACTIONS

PLANNING & TENURE

P1. Liaise with Landgate to seek vesting of all reserves within the Study Area.

P2. Review the need for the reservation of private properties on Hunts Road.

P3. Liaise with major landowners of freehold land within the Study Area to investigate opportunities to swap, cede or manage these lands in accordance with this Management Plan.

CONSERVATION & RECREATIONAL VALUES

E1. Remove African Boxthorn plants within and around the study area.

E2. Revegetate in the identified locations, particularly where uncontrolled access has disturbed vegetation and where African Boxthorn plants have been removed.

E3. Create Fauna Habitat Protection Areas.

RECREATIONAL & SOCIAL VALUES

R1. Construct a footbridge across the river to provide improved access.

R2. Revitalise the area across from the Priory Lodge for picnic and general use area.

R3. Revitalise the picnic area at Dongara Denison Bridge by constructing picnic tables, signage, car parking and a canoe launching area.

R4. Revitalise Denison House for a variety of community and public uses, including consideration of a gallery for local art, historic centre, environmental education, use by community groups and appropriate commercial facilities such as a tea house/café, shop for local produce and a canoe hiring facility.

R5. Implement a canoe launching area at Denison House, at the Dongara-Denison Bridge picnic area, at the recreation site at the Priory Lodge, at the Retreat Boulevard West car park and the Hunts Road car park.

R6. Consider the possibility of implementing a canoe hiring facility along the river.

R7. Investigate the feasibility of providing public amenities at Denison House.

R8. Provide a designated fishing area on the northern side of the river.

R9. Provide bike facilities at the picnic area near the bridge, at either side of the proposed footbridge, at the carpark along Ocean Drive and at the Church Street lookout.

R10. Provide disabled access to the river and walking tracks where possible at certain nodes including the picnic area, Denison House, Hunts Road car park and the informal car park along Retreat Boulevard West.

R11. Formalise car parking at the corner of Hunts Road and Waldeck Street, at the picnic area to the west of Dongara-Denison Bridge, the foreshore opposite the Priory Lodge and to the north-east of the Dongara-Denison Bridge.

R12. Install entry signage at recreation nodes to notify visitors of the Irwin River facilities and access.

R13. Install interpretative signage along the walking tracks and at recreation nodes.

R14. Implement information through mobile technology (such as an application).

R15. Install directional and safety signage where appropriate.

R16. Upgrade main pathways in seasonally wet areas to enable all-year round access.

Study Area
Cadastre
Canoe Launching (R5)
Disabled Access (R10)
Entry Signage Locations
Interpretive Signage Locations
Lookouts
Signage Locations
Pedestrian Bridge
Sand Tracks
Walk Trail constructed
Walk Trail unformed
Walkway boardwalk
Denison House Community Centre
Picnic Area - General Use
Picnic Area - Marketplace

N
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landinsights
PLANNING DESIGN ENVIRONMENT

Figure 2.1 - Management Plan
IRWIN RIVER ESTUARY MANAGEMENT PLAN

3.0 Consultation



3.1 INTRODUCTION

The community and stakeholders were consulted in the first stage of the project to determine their visions, opinions and ideas on the future management of the river. Letters were sent to the following stakeholders inviting them to comment:

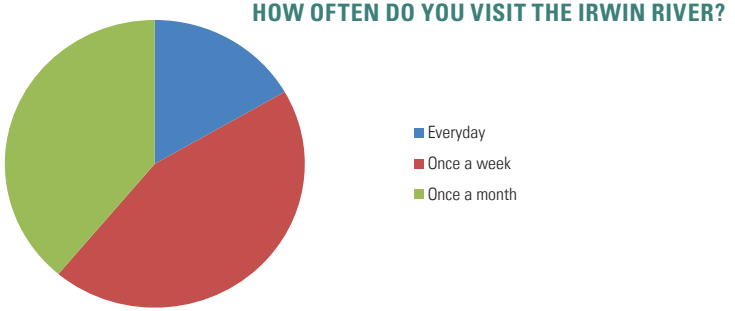
- New Norcia Benedictine Community
- Yamatji Land and Sea Council
- Northern Agricultural Catchments Council (NACC).

NACC and Benedictine Community responded to the letter and contributed some ideas and advice. A community survey was prepared and made available online and in hardcopy form. A notice was placed in the local newspaper, on the Shire website and the Shire and Land Insights Facebook page. The survey closed on the 16th June 2014 and a total of 20 responses were received.

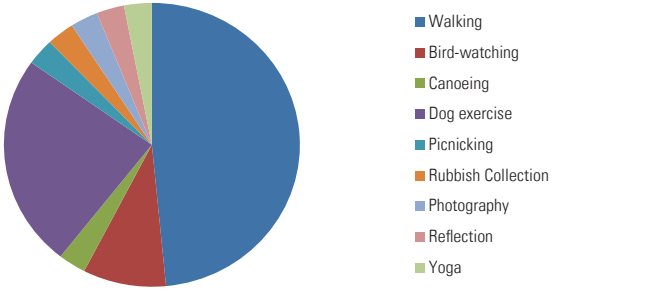
3.2 RESULTS

The summary of the results of the community survey are shown in the pie charts opposite with a break-down of results on subsequent pages.

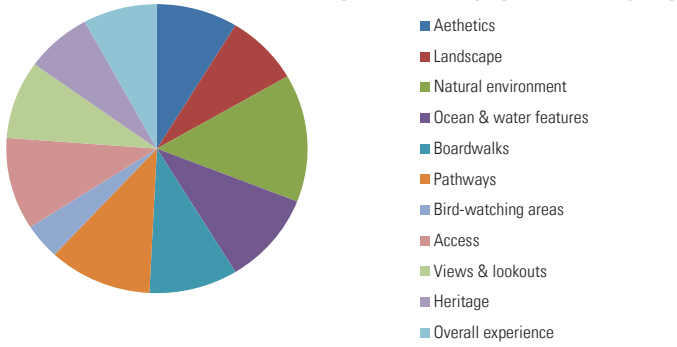
HOW OFTEN DO YOU VISIT THE IRWIN RIVER?



ACTIVITIES AT THE IRWIN RIVER



IMPORTANT VALUES AND FEATURES





HOW OFTEN DO YOU VISIT THE IRWIN RIVER?

- Everyday – 16.67%
- Once a week – 44.44%
- Once a month – 38.89%

WHAT IS YOUR MAIN ACTIVITY WHEN YOU VISIT THE IRWIN RIVER?

- Walking – 48.45% (16)
- Bird-watching – 9.09% (3)
- Canoeing – 3.03% (1)
- Dog exercise – 24.24% (8)
- Picnicking – 3.03% (1)
- Rubbish collecting – 3.03% (1)
- Photography – 3.03% (1)
- Reflection – 3.03% (1)
- Yoga – 3.03% (1)

WHICH VALUES OR FEATURES OF THE IRWIN RIVER ARE MOST IMPORTANT TO YOU?

- Aesthetics – 8.54% (11)
- Landscape – 7.7% (10)
- Natural environment – 14.5% (18)
- Ocean and water – 10.25% (13)
- Boardwalks –9.39% (12)
- Pathways – 11.1% (14)
- Bird-watching areas – 3.4% (5)
- Access – 11.1% (13)
- Views and lookouts – 8.54% (11)
- Heritage – 6.83% (9)

WHAT DO YOU DISLIKE ABOUT THE IRWIN RIVER?

- That so many people, especially land administrators ignore the value and capacity of the entire river
- Nothing
- Boxthorn
- Lack of facilities
- No rubbish bins on north side. Lack of simple facilities and quality of the pathways.
- Weeds and rubbish
- Vehicles & scooters accessing walkways
- Boxthorn invasion
- The fact it is largely ignored
- No easy access for kayaks
- Proliferation of Boxthorn and other weeds
- Poor access
- No access from one side of the river to the other. I think the Irwin River requires a footbridge crossing near Denison House to allow pedestrians another access point.

WHAT DOES AN IDEAL IRWIN RIVER LOOK LIKE?

- A place for passive recreation, particularly for the preservation and restoration of its wildlife and bird life. Managed invasive plant removal, restoration of original vegetation. Monitoring to remove salinity levels from the upper reaches. Restoration of turtle population and night bird species.
- A walking and bike link between the town centre and the foreshore ie foot bridge across river linking north with south.
- Keep it as natural as possible whilst introducing better access and visitor friendly areas. Picnic tables and access for water craft as examples.
- Natural attributes with good facilities
- Unspoilt natural environment with firm pathway and some simple amenities such as a picnic table and perhaps a BBQ
- Less weeds, fire breaks, points of interest
- Kept as natural as possible, minor track maintenance
- Left in its natural state
- Parks alongside the river (near the bridge, at the priory and at the retreat/Denison House). Small craft launching facilities at these locations. Keeping the environment as natural as possible with minimal sign pollution
- Well developed passive trails, info areas, environmental group activity. Use Moore River Guilderton's example.
- Well used, signs to guide people in terms of heritage, direction and environmental values, activities on water like canoeing, weeds under control, lots of places to sit and meditate/ rest. Activate Denison House
- A centre of community focus and enjoyment
- Identification of the flora, fauna, interpretive signage, walk bridge, steps down from Point Leander into the Park on the Port Denison side of the bridge, launch for kayaks, weed management, renovated more appealing Denison House
- More signage and access
- Purpose should be to link towns. Low key management but interesting trail is needed
- Accessible pathways, directional and informative signage, better maintained parks and park infrastructure, footbridge, canoe launching facility, more bins for rubbish, better weed eradication program.

OTHER COMMENTS

- Protection of entire river system riparian environment. Understanding of the river's history, part of ancient palaeo river system laid down 65 million yrs ago. Celebration and respect for the Aboriginal cultural heritage over more than 40,000 years.
- It is an utilised recreational & tourism assets that could have BBQ areas, improved bike and walk tracks and informative sites outlining birds etc
- No powered craft on the river.

- Get some actions in place
- Access to the river needs to be improved on both sides of the river. Some more boardwalks may be required to improve the pathway so more people can enjoy it
- Extend solar lighting along Ocean drive walkway
- Beautiful
- It is an under-valued resource worthy of high quality protection and management
- Enhance/improve access so it can be enjoyed
- Need more bins for rubbish
- Denison House should be the most significant attractor for visitors walking from Dongara.

4.0 Planning Context



4.1 ZONING

The Study Area is entirely within the Local Reserve, except for Lot 787 containing Denison House which is zoned Special Use SU8 (Figure 4.1). The permitted uses listed in Schedule 4 of the Scheme for Special Use SU8 are:

- Local Authority and Community uses
- Incidental uses to the permitted uses.

This doesn't place many restrictions on the potential use of Denison House, as long as those uses are approved by the Shire.

As identified in Section 2.5, there are some issues relating to zoning and reservation within the Study Area, namely several freehold lots which are affected by the Local Planning Scheme Local Reserve. These include:

- Lot 9003 (located on either side of the Denison House Special Use area) is partially reserved as Local Reserve along the foreshore edge
- Lots 8, 9, 178, 179, 11 and 12 on Waldeck Street along the northern edge of the River are shown as Local Reserve along the foreshore edge
- Lots 202, 5, 1 and 17 to the eastern side of the bridge are also within Local Reserve and are freehold.

The Study Area is wholly located within Policy Area B of the Shire of Irwin Local Planning Strategy. The Strategy is currently being revised and it is possible that the Policy Areas and planning strategies relating to the river will change.

4.2 TENURE

Ownership and title details are included in the table opposite and displayed on Figure 4.2:

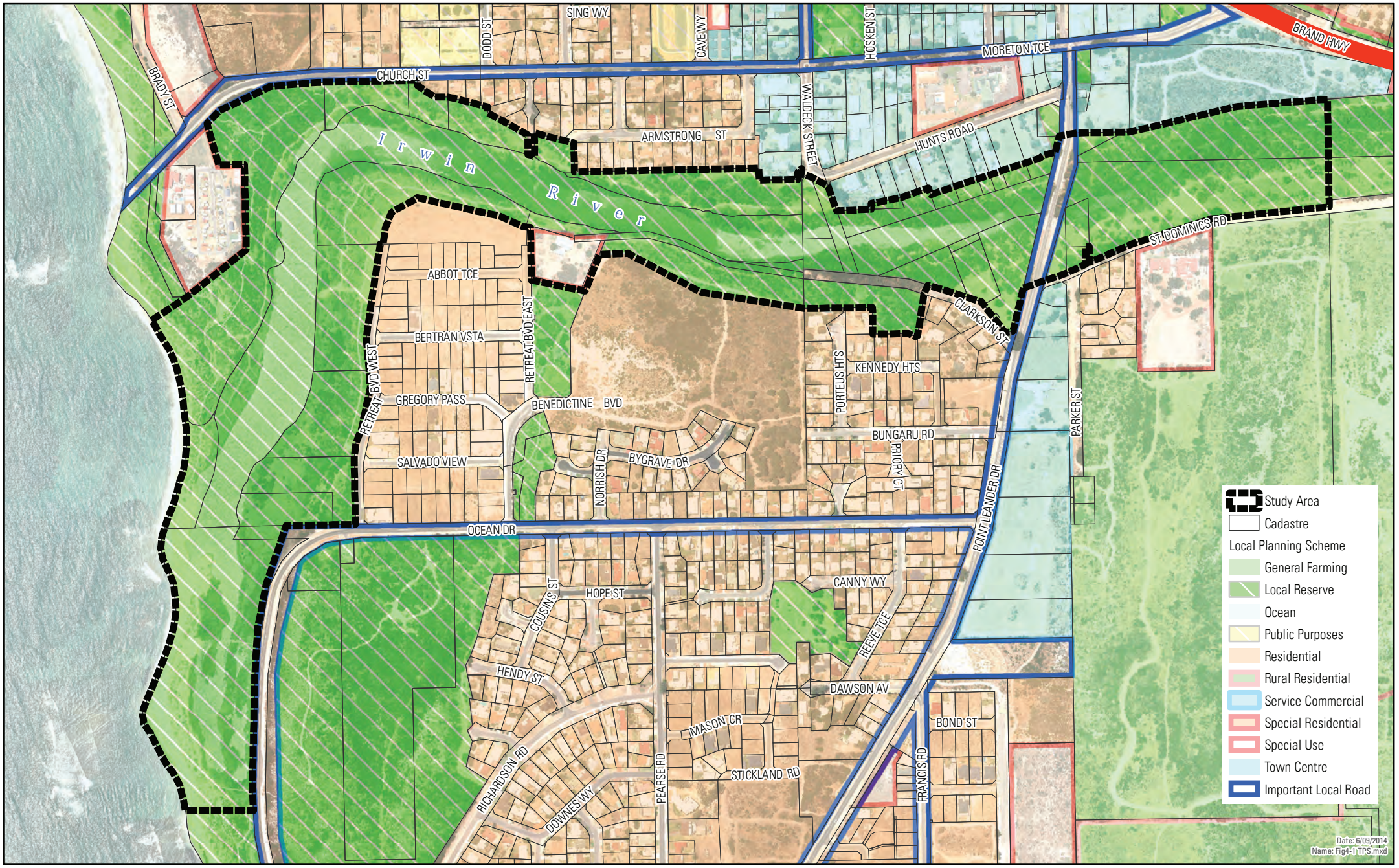
LOT/ RESERVE	OWNER/MANAGEMENT ORDERS	PLAN	ZONE/ RESERVE	TENURE
Lot 202	Dominican Priory Inc	DP58229	Local Reserve	Freehold
Lot 5	Shire of Irwin	D1935	Local Reserve	Freehold
Lot 1	Shire of Irwin	P349	Local Reserve	Freehold
Lot 17	Shire of Irwin	P202	Local Reserve	Freehold
Lot 100/ R41167	Shire of Irwin	P194625	Local Reserve	Reserve
Lot 86/ R41780	Shire of Irwin	P41780	Local Reserve	Reserve
Lot 85/ R41780	Shire of Irwin	P202	Local Reserve	Reserve
Lot 84/ R41780	Shire of Irwin	P202	Local Reserve	Reserve
Lot 12	Private landowner	P202	Town Centre/ Local Reserve	Freehold
Lot 11	Private landowner	P202	Town Centre/ Local Reserve	Freehold
Lot 179	Private landowner	D39616	Town Centre/ Local Reserve	Freehold
Lot 178	Private landowner	D39616	Town Centre/ Local Reserve	Freehold
Lot 9	Private landowner	P202	Town Centre/ Local Reserve	Freehold
Lot 8	Private landowner	P202	Town Centre/ Local Reserve	Freehold
Lot 11502/ R38068	Shire of Irwin	D61511	Local Reserve	Reserve
Lot 12047/ R38068	Shire of Irwin	D46155	Local Reserve	Reserve
Lot 176	Shire of Irwin	D5896	Local Reserve	Freehold
Lot 5	Water Corporation	P202	Local Reserve	Freehold
Lot 177	Shire of Irwin	D5896	Local Reserve	Freehold

LOT/ RESERVE	OWNER/MANAGEMENT ORDERS	PLAN	ZONE/ RESERVE	TENURE
Lot96/ R43499	Shire of Irwin	D66232	Local Reserve	Reserve
Lot81/ R38736	Shire of Irwin	P215729	Local Reserve	Reserve
Lot 9003	Benedictine Community of New Norcia Inc	P57287	Residential/ Local Reserve	Freehold
Lot 787	Shire of Irwin	P57287	Special Use	Freehold
Lot 9003	Benedictine Community of New Norcia Inc	P57287	Residential/ Local Reserve	Freehold
Lot 75/ R33758	Shire of Irwin	D46379	Local Reserve	Reserve
Lot 374/ R33399	Shire of Irwin	D46675	Local Reserve	Reserve
Lot 77/ R33399	Shire of Irwin	D55907	Local Reserve	Reserve
Lot 87/ R41781	Shire of Irwin	P222386	Local Reserve	Reserve
Lot300/ R38046	Shire of Irwin	P50241	Local Reserve	Reserve
Lot788/ R42293	Shire of Irwin	P57287	Local Reserve	Reserve
Lot3000/ R42293	Shire of Irwin	P41466	Local Reserve	Reserve
Lot 11946/ R42293	Shire of Irwin	D82942	Local Reserve	Reserve
Lot 95/ R42293	Shire of Irwin	P13803	Local Reserve	Reserve
Lot 590/ R41087	Shire of Irwin	P216835	Local Reserve	Reserve

Recommendations relating to tenure are provided in Chapter 2.

4.3 LITERATURE REVIEW

A review of State and Local documents and policies which relate to the Study Area is provided at Appendix A.



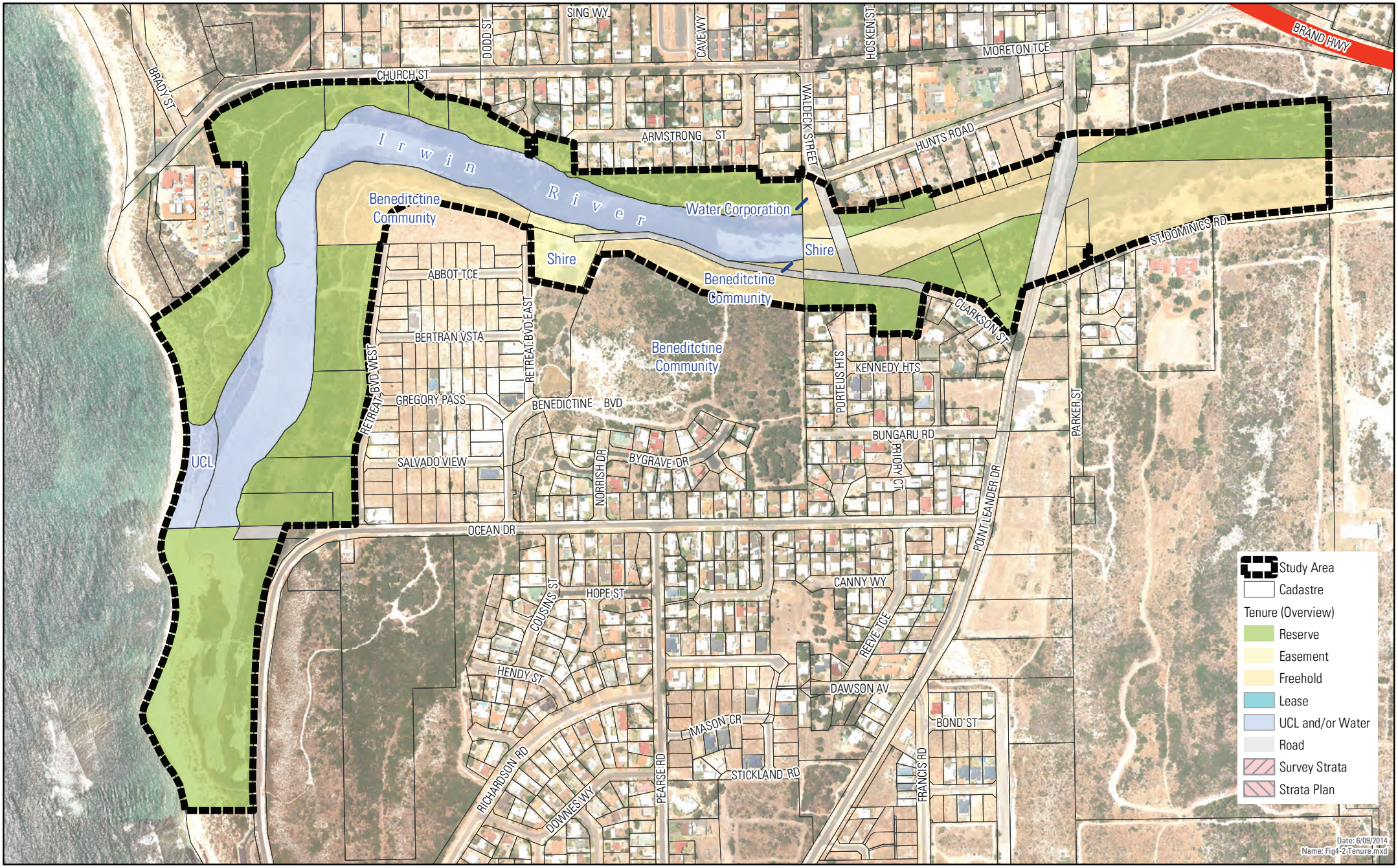
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Figure 4.1 - Local Planning Scheme
IRWIN RIVER ESTUARY MANAGEMENT PLAN



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Figure 4.2 - Tenure
IRWIN RIVER ESTUARY MANAGEMENT PLAN

5.0 Environmental Context



5.1 CLIMATE

Dongara is located within the Mediterranean climate zone and experiences hot dry summers and cold, wet winters. It has 7 - 8 dry months per year. The annual mean daily minimum and maximum temperatures for nearby Geraldton are 13.6°C and 25.9°C respectively. The annual mean rainfall in Dongara is approximately 458mm per year (Bureau of Meteorology, 2014).

5.2 GEOLOGY AND SOILS

The geology of the Irwin River Study Area is comprised of Tamala limestone on the southern side of the river, east of the bend and Holocene Safety Bay Sand (Qrs) (calcareous aeolian and beach sand) along the remainder (Geological Survey of Western Australia, 1974). Safety Bay Sand is primarily composed of rounded quartz and calcium carbonate grains. These sand dunes are mobile, especially along the coast. Alluvium, consisting of sand, silt and clay, occurs along the river including the foreshore areas, on the southern side of the river bend and at the mouth of the estuary.

5.3 TOPOGRAPHY AND LANDFORM

The Study Area has a varied landform consisting of low-lying wet areas near the waterline, steep cliffs, rolling dunes and elevated foreshore areas. The topography and elevation are shown in Figures 5.1 and 5.2 respectively.

5.4 VEGETATION

The Study Area lies within the Geraldton Hills subregion of the Geraldton Sandplains bioregion. The Geraldton Sandplains bioregion comprises mainly proteaceous scrubheaths, rich in endemics, on the sandy earths of an extensive, undulating and lateritic sandplain mantling Permian to Cretaceous strata.

Eleven vegetation complexes are recognised in the Dongara area, all belonging to the Irwin Botanical District of the South-West Botanical Province. The Irwin River Estuary is a part of the Irwin System Vegetation Complex. The river channels are lined with Eucalyptus camaldulensis and Casuarina huegeliana (now Allocasuarina huegeliana). The floodplain was formerly occupied by York Gum (Eucalyptus loxophleba) woodland with scattered Red River Gum (Eucalyptus camaldulensis) and Casuarina, of which odd trees remain. The principal understorey species are likely to have been Acacia acuminata and Acacia rostellifera (Beard, 1976).

VEGETATION ASSESSMENT

ATA Environmental conducted a flora and vegetation survey of the Study Area in 2005. The principal purpose of the survey was to identify the type and condition of the vegetation at the site, to compile a preliminary species list and to identify the presence of any potential significant flora with the Study Area. It should be noted that the survey was not undertaken in accordance with the EPA's guidelines for flora surveys as outlined in Guidance Statement No. 51 Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (EPA, 2004). This was due to the timing of the surveys in January and May, which was not suitable for the identification of many annual and ephemeral species including potentially significant flora.

A vegetation survey was also conducted as part of the Irwin Estuary Weed Management Plan in 2013. The purpose of the survey was to identify vegetation communities and to complete on-ground assessments of priority weeds to determine location and extent. Further information, including maps, is provided in the Irwin Estuary Weed Management Plan (NACC, 2013).

VEGETATION TYPE

The Flora Survey by ATA Environmental identified 14 discrete vegetation types. These vegetation communities are outlined in the table at Appendix B and reproduced on Figure 5.3. (Note: * - denotes introduced (weed) species).

THREATENED FLORA

A search for the presence of threatened flora and vegetation communities was undertaken for the Irwin River foreshore area. This investigation encompassed a review of the following databases:

- DPaW's 'Threatened (Declared Rare) and Priority Flora' database.
- DPaW's 'Threatened and Priority Flora List' which contain species that are Threatened (Conservation code T or X for those presumed to be extinct) poorly known (Priority P1, P2, P3) or require monitoring (Priority P4)
- Western Australian Herbarium Specimen database

No Threatened or Priority species have been identified within or directly surrounding the Study Area. There are 24 species of Threatened and Priority Flora identified in the entire Shire.

- Most of the threatened and priority species identified in the Shire are not typically riverine or coastal species and therefore would not be expected to occur within the site. One species, Wurmbea tubulosa (T) has the potential to occur within the site as its preferred habitat includes river banks and seasonally wet places. This species would not have been identifiable during the 2005 flora survey as a result of the timing of the survey which was undertaken outside of the June to August flowering period. No Threatened or Priority species were identified during the January or May 2005 surveys.

THREATENED ECOLOGICAL COMMUNITIES

A search of DPaW's Threatened Ecological Communities (TEC) database was undertaken for the Irwin River Estuary area. The search identified one Critically Endangered TEC:

- Greenough River Flats-Acacia rostellifera low forest with scattered Eucalyptus camaldulensis (Red River Gum) on Greenough Alluvial Flats.

The TEC is located across the western half of the Study Area. This community was not identified within the Irwin River Foreshore Reserve or Coastal Foreshore Reserve during the 2005 flora survey.

VEGETATION CONDITION

The condition of the vegetation of the study was assessed using the condition rating scale of Keighery published in Bush Forever (Government of Western Australia, 2000). Keighery's condition rating scale ranges from Pristine to Completely Degraded.

The vegetation types within the Study Area were identified in the 2005 flora survey as in Excellent to Degraded condition. Figure 5.3 shows the vegetation condition across the Study Area. Degraded condition is due to the varying density of weeds throughout the area, which includes some of the more aggressive weeds such as African Boxthorn. A description of the vegetation condition ratings for those conditions identified during the flora survey are outlined in the table below.

CONDITION	DESCRIPTION
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very Good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.

5.5 FAUNA

NATIVE FAUNA

ATA Environmental conducted a fauna habitat assessment of the Study Area in 2005. Principal fauna habitat types and important breeding sites from the Study Area were identified. It was found that portions of the Irwin River presently support relatively intact native vegetation and therefore support a range of fauna typical of the habitats available. The main habitats offered by the site are the river and estuary, adjoining vegetation or sandy floodplain areas of scrub and woodlands, and coastal dunes.

THREATENED FAUNA

In addition to the on-site fauna investigations, a threatened fauna database search was undertaken in 2014. The following databases were searched:

- DPaW's Threatened Fauna databases to identify potential scheduled and threatened species within the region

- The Western Australian Museum database to identify potential vertebrate fauna within the area
- Commonwealth Department of Environment online database of fauna of national environmental significance to identify species potentially occurring with the area that are protected under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

Species unlikely to occur in the Study Area because of a lack of suitable habitat (e.g. seals, whales, coots, stilts, etc) have been deleted from the list even if they are present in the search results.

Further information on threatened fauna is provided in the following table:

COMMON NAME	SCIENTIFIC NAME	CONSERVATION STATUS
Australian Lesser Noddy	Anous tenuirostris	T
Baudin's Black Cockatoo	Calyptorhynchus baudinii	T
Carnaby's Black Cockatoo	Calyptorhynchus latirostris	T
Chuditch	Dasyurus geoffroii	T
Pelegrine Falcon	Falco peregrinus	S
Carpet Python	Morelia spilota	S
Common Sandpiper	Actitis hypoleucos	1A
Fork-Tailed Swift	Apus pacificus	1A
Eastern Great Egret	Ardea modesta	1A
Ruddy Turnstone	Arenaria interpres	1A
Sharp-tailed Sandpiper	Calidris acuminata	1A
Red-necked Stint	Calidris ruficollis	1A
Eastern Reef Egret	Egretta sacra	1A
White-bellied Sea-eagle	Haliaeetus leucogaster	1A
Rainbow bee-eater	Merops ornatus	1A
Grey-tailed Tattler	Tringa brevipes	1A
Common Greenshank	Tringa nebularia	1A
Marsh Sandpiper	Tringa stagnatilis	1A
Terek Sandpiper	Xenus cinereus	3
Black-striped Snake	Neelaps calonotos	3

Categories:

- T – Threatened Species
- S – Other Specially Protected Fauna
- 1A – Migratory Birds Protected under International Agreement
- 3 – Priority Three – Poorly-Known Species

John and Beth Fitzhardinge (September 2005) have provided a detailed list of birds that breed in the area, birds always present, birds occasionally present and migratory waders. This list has been included as Appendix C.

5.6 SITE CONTAMINATION

A search of the Department of Environment Regulation Contaminated Sites Database did not indicate any contaminated sites in the Study Area or surrounding area. The previous land uses across the Study Area do not indicate that contaminated sites will be suspected.

5.7 HYDROLOGY

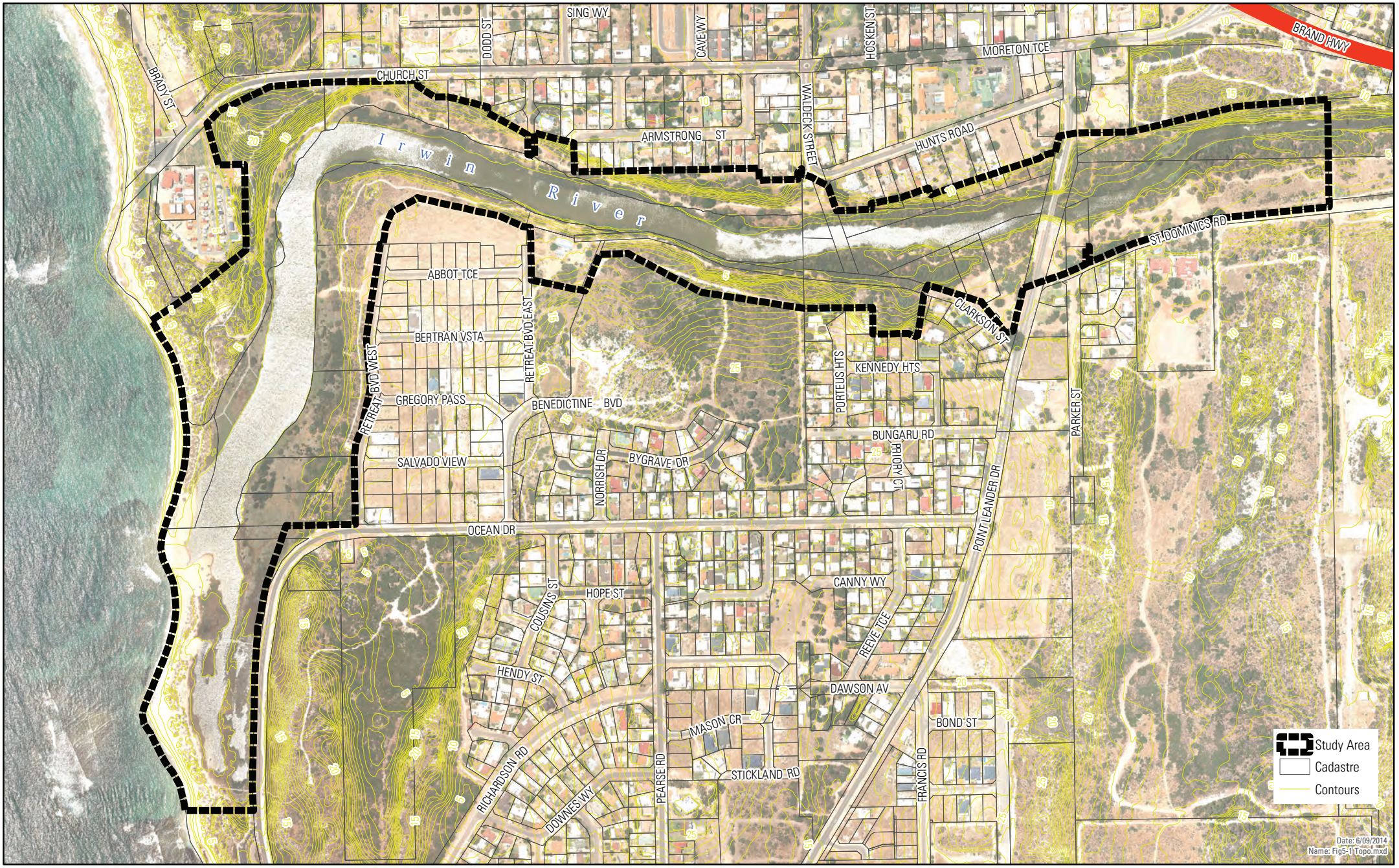
The Irwin River commences in the north-east portion of the Greenough River Basin and flows south-west through largely cleared sandy and erosional plains, passing through hilly terrain closer toward the coast, and eventually discharging into the ocean at Dongara. The mouth of the river is a coastal lagoon system, which is blocked by a sandbar for much of the year.

The Irwin River is unique to the Western Australian coast, as it permanently runs fed by springs, and as a result it opens periodically all year round. The river has a catchment of over 4,480km2 above the gauging station at Mondara (Everall Consulting Biologist, 1998). Flash flooding can occur within the river following rainfall within the catchment, however river flows are typically low. The estuary and lower river are affected by tides when the seasonal sand bar is breached.

Floodplain mapping supplied by the then Water Authority of WA (1987) indicates the 1 in 100 year floodplain limit reaches levels of 9m near the Priority, between 6m and 7m AHD at the bridge, declining to about 4m AHD at the bend in the river where it turns south, and less than 1.8m AHD near the southern extent of the estuary. The greatest flood risk is indicated on the foreshore area across from the Priory and on the northern and southern foreshore of the river next to the bridge (including the residential lots on the northern side and the picnic area on the southern side). The floodplain and flood risk is shown in Figure 5.4.

This mapping is almost 30 years old and therefore considered slightly outdated, particularly since improvements have been made to the bridge to reduce the impact of flooding on the foreshore. It is likely that the flood extent is not as vast on the northern and southern foreshore areas near the bridge.



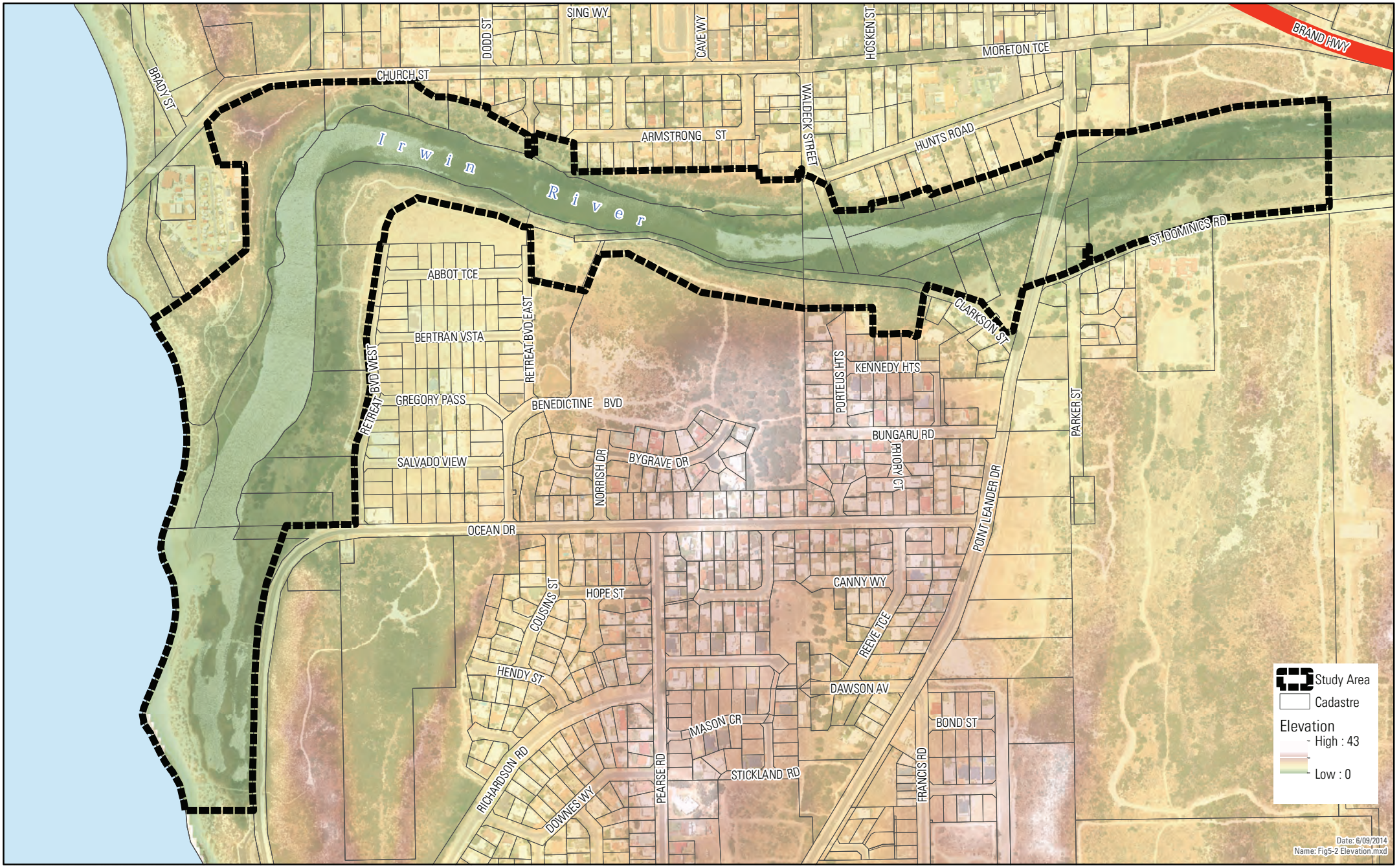


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Figure 5.1 - Topography
IRWIN RIVER ESTUARY MANAGEMENT PLAN

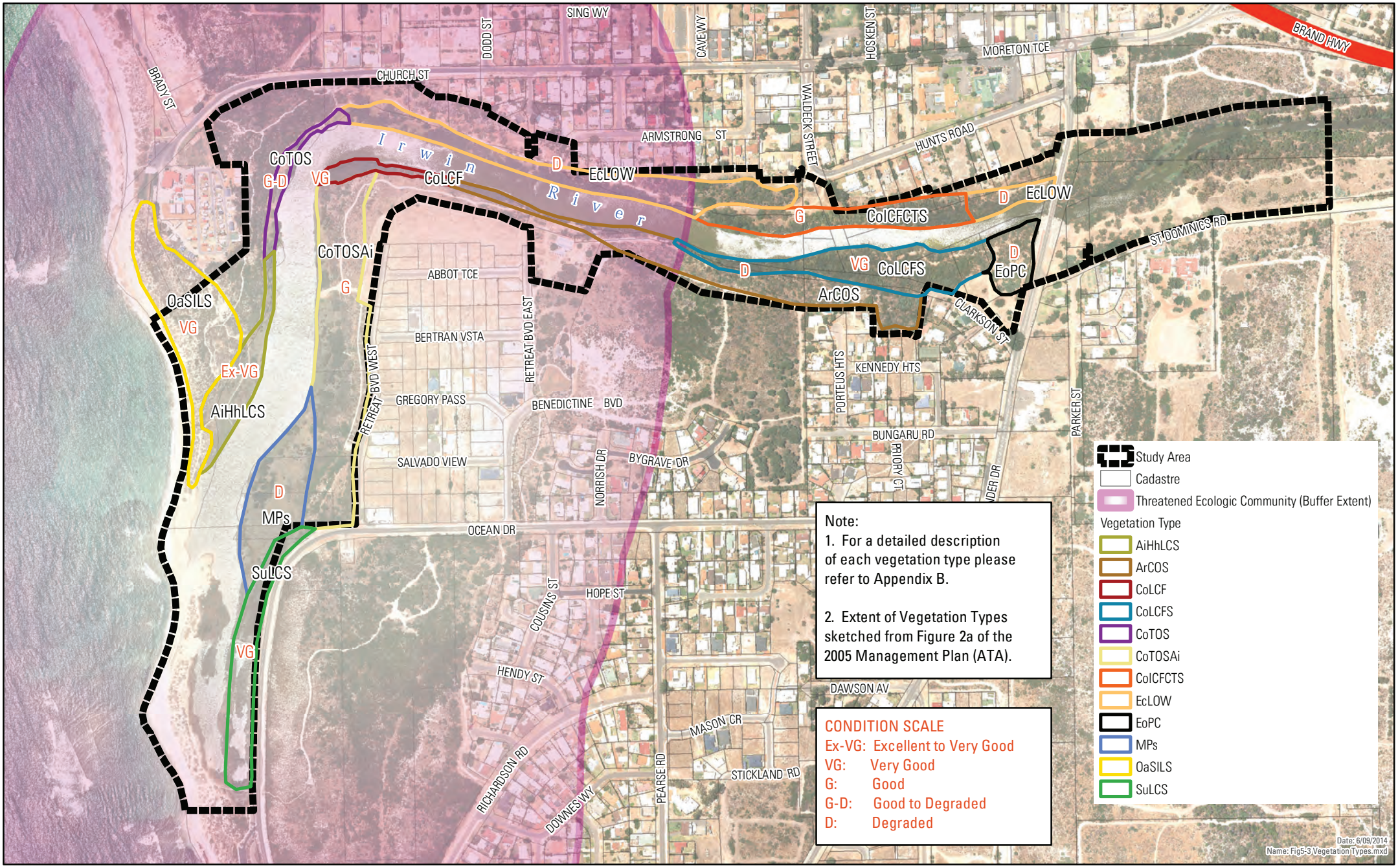


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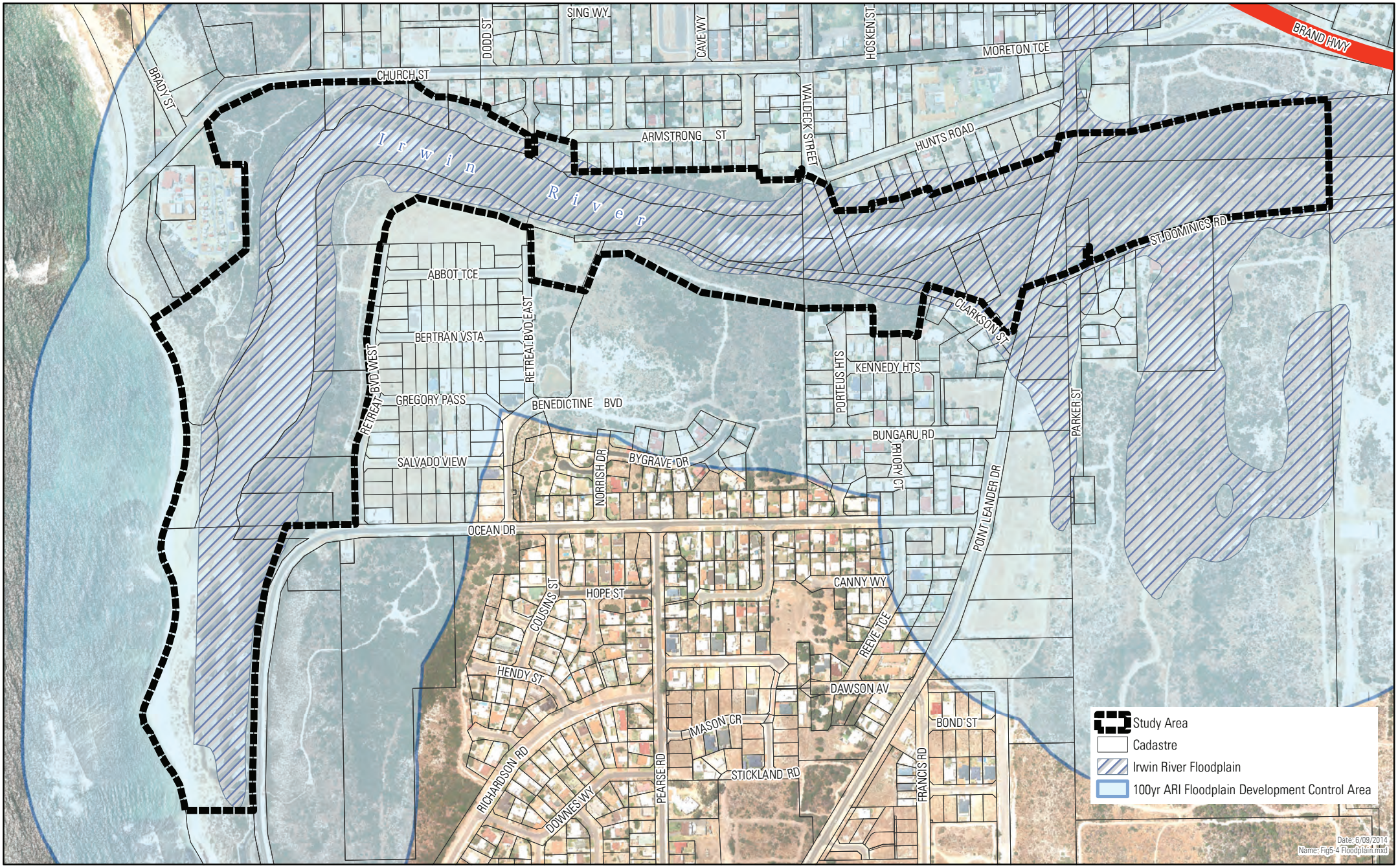
Figure 5.2 - Elevation
IRWIN RIVER ESTUARY MANAGEMENT PLAN



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Figure 5.3 - Vegetation Types
IRWIN RIVER ESTUARY MANAGEMENT PLAN



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Figure 5.4 - 100 Year ARI Floodplain
IRWIN RIVER ESTUARY MANAGEMENT PLAN



6.0 Social Context

6.1 POPULATION AND DEMOGRAPHICS

Dongara and Port Denison have a thriving rock lobster fishing industry and are ever increasing in popularity as a destination for tourists. The 2011 Census by the Australian Bureau of Statistics indicates that the population of the Shire was 3567 with 2764 of these residing in the twin towns of Dongara and Port Denison. The population of Dongara and Port Denison has increased 25.74% (544 people) over 10 years between the 2001 census and 2011 census (Australian Bureau of Statistics, http://www.abs.gov.au, 2014).

The Shire of Irwin Council is currently planning for services and facilities to cater for an increased population and tourist numbers in the next 15-20 years. The Dongara-Port Denison District Structure Plan envisages an additional 10,258 new dwellings and a population of 23,195 (Shire of Irwin, 2013).

Tourism WA statistics indicate that the number of visitors to the Coral Coast has increased between the years 2011 and 2012. The total number of visitors increased by 13.5% (3 year average is 10.7%) from 654,100 people to 742,500 people and the number of nights stayed in the region increased by 21% (3 year average is 4.3%). The purpose of the visit is predominantly holiday or leisure (Tourism WA, 2012).

The population and visitor numbers of the Shire have a direct effect on the pressures on the Shire's natural environment and recreational facilities. The purpose of this management plan is to provide for the expected use.

6.2 CURRENT LAND USE

EXISTING RECREATIONAL FACILITIES

The Shire of Irwin has installed some facilities within and surrounding the Study Area to accommodate tourists, holiday makers and locals including the following:

- The Irwin River Estuary Nature Walk Trail shelter which is located on the northern foreshore on Church Road. It has good viewing opportunities upstream and downstream and of the coast. A wooden staircase provides access from the walk trail below to the viewing area. A small car park is located off Church Road, which provides access to the lookout.
- A boardwalk is located along the south - western edge of the foreshore reserve. The boardwalk begins just below the bend in Ocean Road and runs to the southernmost end of the estuary which it crosses providing access to the western foreshore. On the western side of the estuary the boardwalk has several deviations allowing greater access and viewing opportunities within the wetter areas. A gazebo is also located nearby and provides some protection from the sun and wind. A small car park is located close to where the boardwalk crosses the water to enable access to the western foreshore of the estuary and the adjacent beach.
- Another boardwalk exists on the western side of the river and a few gazebos and short boardwalk deviations over the estuary have been provided to allow for greater enjoyment and observation of the environment.
- A picnic area is located in the foreshore area adjacent to the Irwin River near the Dongara-Denison Bridge and has some wooden picnic benches. The area is well shaded and has potential to be improved to encourage increased use, particularly by families with young children.
- A staircase leads up to a lookout located at the crest of a dune within remnant vegetation on the eastern side of Ocean Drive, south of the bend. The lookout provides clear views of the estuary and coast. While the lookout is outside of the Study Area, this feature links with the walk trails along the river.
- Denison House is currently used by a local artist group. The site is in a degraded state, however has potential to be rehabilitated and used by the public and as an attraction for the area.

RECREATIONAL AND EDUCATIONAL VALUES

At present, the Irwin River area and adjoining bushland are used for bushwalking, fishing and bird watching. The river between the bridge and coastline, is used by canoeists and other non – motorised craft users.

The river mouth and coastline is used by local residents and visitors for recreational activities, which include fishing, wind surfing, surfing, snorkelling, sunbathing, beach walking and exploring.

The management of public access to the foreshore reserve and adjacent coastline will need to consider a balance between the coastal, riverine and bushland ecological values as well as the importance of the site to local residents, tourists and holiday makers for recreational activities.

6.3 SURROUNDING LAND USE

Directly north of the Irwin River is the Dongara townsite residential area and civic land uses (such as the Shire Administration Building, visitor centre, library and police station). The town centre is a short walk to the north of the river. A number of private properties back onto the foreshore reserve along the northern edge of the river.

A caravan and camping park is located to the north-west of the Study Area. A number of informal pathways lead from the caravan park to the river and ocean. Some formal pathways provide access to the Church Road lookout, river and coast.

A new residential subdivision is located on the southern side of the river, near the river bend. A number of lots are still for sale and the final stage of the subdivision is yet to be implemented. The land to the east of Denison House is zoned Residential R15 with a small area zoned R30 next to Denison House. This area has not been developed yet but there is potential it could also be developed for residential use in the future.

The historic Priory Hotel is located at the south-east side of the Study Area. The cleared area on the foreshore once served as a recreational ground for the Priory but ceased being used after bad flooding to the area many years ago. Russ Cottage is another historic building located to the south of the bridge.

6.4 HISTORICAL LAND USE

INDIGENOUS HISTORY

A search of the Indigenous Affairs Aboriginal Site Register revealed that two registered Aboriginal sites have been recorded from the vicinity of the Study Area. These sites are listed in the table below:

NAME	SITE ID	LOCATION	DESCRIPTION
Dongara	5632	This site is located to the north-east of the Study Area, however part of the site extends across the eastern side of the Study Area.	Man-made structure
Irwin River	18907	This site extends across a majority of Dongara and Port Denison and stretches across the eastern and central part of the Study Area.	Historical, mythological

EUROPEAN HISTORY

The Heritage Council of Western Australia identifies a number of heritage places within or directly surrounding the Study Area. These places are listed in the table below. Sites of the State Register of Heritage Places are shown on Figure 6.1.



NAME	LISTING	LOCATION	DESCRIPTION
Irwin River Place No. 12480	Shire of Irwin Municipal Inventory	Irwin River	The Irwin River Mouth has high historic significance, given its connection to the establishment of the first port and harbourmaster's house dating from the early 1850's and the wreck of the Albatross. The area has high aesthetic significance, and as such makes a high contribution to the character of the area. The area has high social significance given its aesthetic qualities and the high use of the walktrails for recreation by the community.
Denison House Place No 01221	State Register Shire of Irwin Municipal Inventory Register of National Estate	Southern foreshore	Location 688 at the mouth of the Irwin River was the first tillage lease in the Irwin District to John Smith in 1859, a miller and stonemason. Smith constructed the first steam driven flourmill in c.1862 and a cottage consisting of three rooms at the site. Smith closed his mill and sold the property to Dr. George Bartlett in1897. The Benedictine Community purchased the property in 1944. The residence was most recently acquired by the Shire of Irwin for the purpose of Public Open Space and Recreation. Using the stone from the mill, Dr. Bartlett built "Denison House" just west of the mill site. Footings of the mill are still visible. Dr. Bartlett ran his medical practice from Denison House and his wife Florence is credited with the design and construction of the terraced gardens on the banks of the river below the house, work was said to be often carried out by her under lamplight. She also operated a conservatory at the rear of the building.

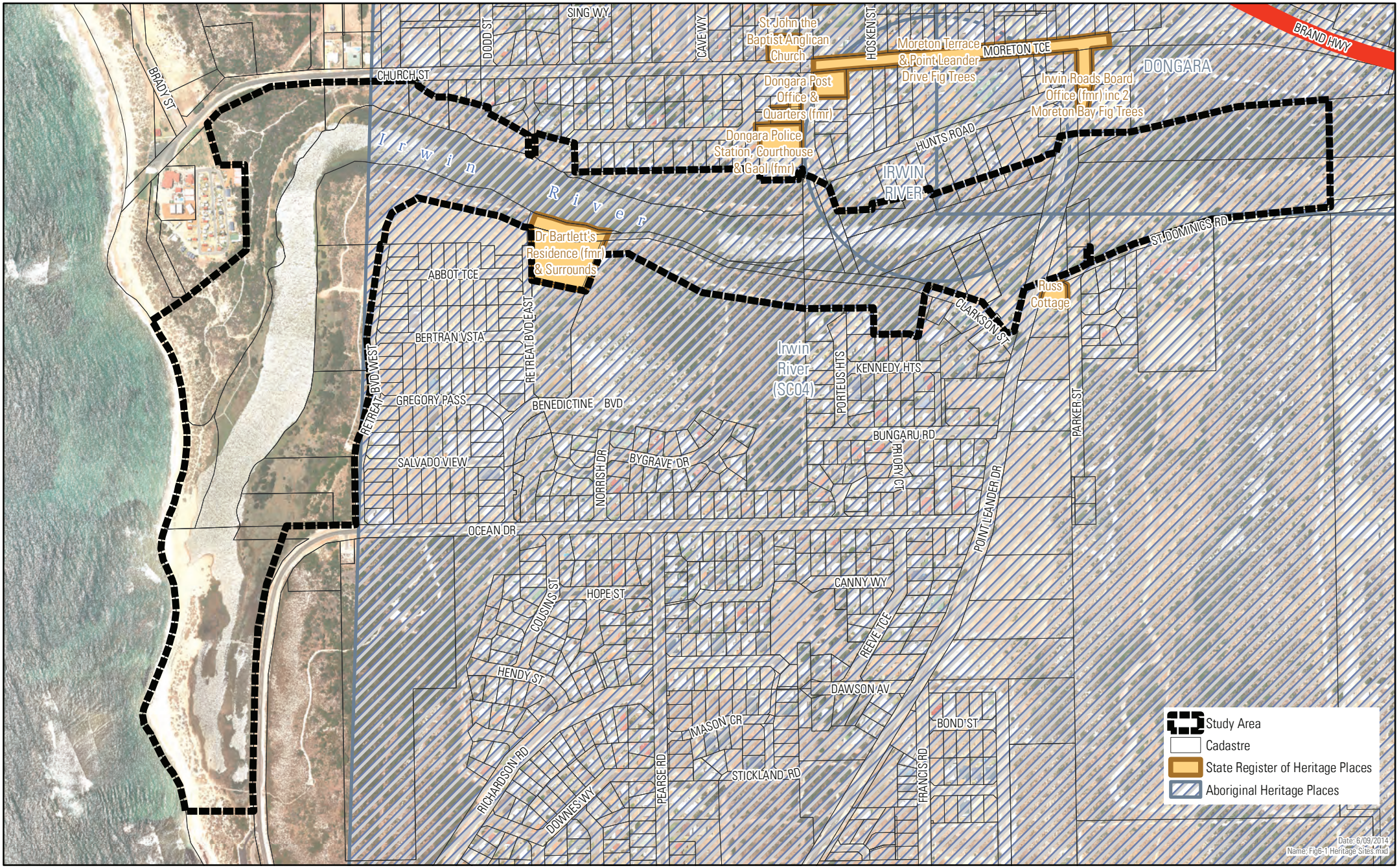
NAME	LISTING	LOCATION	DESCRIPTION
Quarry Site Place No 11859	Shire of Irwin Municipal Inventory	Southern foreshore, east of Denison House	The site is of historic significance given its use from the mid 1860's as a source of building materials for many buildings in the town.
E.W Clarksons House and Blacksmiths Shop Place No 11838	Shire of Irwin Municipal Inventory	South of the picnic area, south west of the Dongara-Denison Bridge	The house known as Clarkson's and the adjacent blacksmith's shop site have historic significance for their connection to Edward Clarkson, early blacksmith. The house has high aesthetic appeal given its simple style, river setting and surrounding gardens and as such makes a high contribution to the character of the town.

NAME	LISTING	LOCATION	DESCRIPTION
Russ Cottage Place No 01230	State Register Shire of Irwin Municipal Inventory Register of National Estate	South-east of the Dongara-Denison Bridge	Built by Titus Russ, who is believed to have brought stone to the site in a wheel barrow from the quarry south of the river. Russ Cottage is of cultural heritage significance for the following reasons: • is an integral part of the historic coastal township of Dongara • a good example of a random rubble limestone building in the Victorian Georgian style, its simple construction demonstrating the methods used during the early development of Dongara • the place is an obvious landmark and contributes to a significant streetscape • the place was constructed for the Russ family, early European settlers of the Irwin District. Since 1971, the place has been highly valued by the local community as a museum housing items of local historic memorabilia, and contributes to the sense of place of the Dongara community.

NAME	LISTING	LOCATION	DESCRIPTION
Priory Lodge and Grounds Place No 01229	Shire of Irwin Municipal Inventory Register of National Estate	South east of the Study Area.	The Priory Lodge, former Dongara Hotel, St. Dominic's Priory and Dominican Ladies College, has considerable significance for its prominent place in the social development of the town for over 100 years. There are two main buildings joined by a timber breezeway. The building to the east being the hotel (former priory) and the building to the west being accommodation (former school). The Dongara Hotel was built as a single storey limestone rubble structure by William Criddle in 1881. In 1902 the Dominican Sisters purchased the building, added the second storey and renamed the building St. Dominic's Priory. The large school building to the west was opened in 1926 and named The Dominican Ladies College. The school operated until 1971, when a flood from the Irwin River destroyed the tennis courts, school playground and inundated the building with mud. In the mid 1980's new owners renovated the building and the hotel licence was restored as The Priory Lodge.

NAME	LISTING	LOCATION	DESCRIPTION
Pearse House Place No 01224	State Register Shire of Irwin Municipal Inventory Register of the National Estate Aboriginal Heritage Sites Register	Hunts Road, northern foreshore	Pearse House (fmr), Dongara, comprising a single-storey masonry wall and corrugated iron roof residence built in Victorian Georgian style, underground cellar, and mature plantings. It has cultural heritage significance for the following reasons: • one of the earliest extant residences built in Dongara and one of the most substantial in the town at that time • was built for early settler and prominent identity in the district, Francis Pearse • makes a positive contribution to the character of Dongara • is a good example of a number of Victorian Georgian buildings of the same era in the town.
Herbert's House Place No 11816	Shire of Irwin Municipal Inventory	Hunts Road, northern foreshore	The cottage, Lot 183 Hunts Road has historic significance for its connection to merchant Francis Pearse and the Herbert family. Further it is a good example of a stone cottage of its era and adds to the character of the town.
Backwater Place No 01223	Shire of Irwin Municipal Inventory Register of National Estate	Hunts Road, northern foreshore	The house known as 'Delmage's was built in 1885 and has high historic significance for its connection with James Delmage, a well known local identity. In addition the two storey style and garden setting gives the place aesthetic significance. The place makes a high contribution to the historic character of the town.

NAME	LISTING	LOCATION	DESCRIPTION
Delmage Cottage Place No 01222	Shire of Irwin Municipal Inventory Register of National Estate	Hunts Road, northern foreshore	The former Delmage Cottage has historic significance for its connection with the development of the town and its association with the Delmage family. Further the building enhances the historic character of the town given its simple style and use of local materials. This small cottage was built for James Delmage when he first arrived in Dongara in the early 1880s.
Criddle's House Place No 01222	Shire of Irwin Municipal Inventory	Hunts Road, northern foreshore	Albert Criddle's House has historic significance for its connection to the early development of the town. It was built for Albert Criddle by local builder Charles Osborn about 1914.



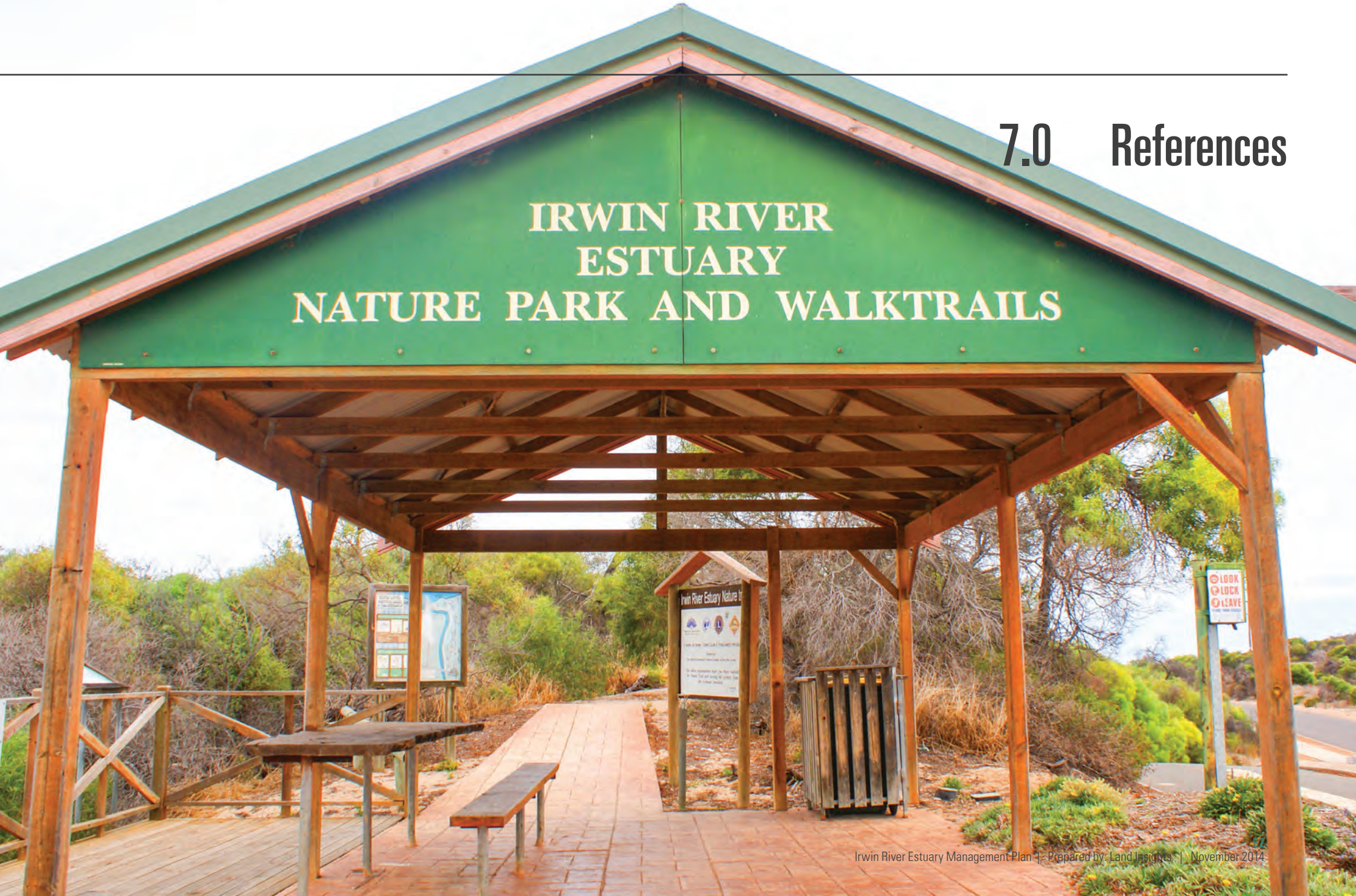
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Figure 5.1 - Heritage
IRWIN RIVER ESTUARY MANAGEMENT PLAN

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Appendix A
Literature Review

REPORT	SUMMARY AND RELEVANT INFORMATION	COMMENT
Mid-West Regional Planning and Infrastructure Framework 2011	The Shire of Irwin is included in the Batavia Coast sub-region. It states that the sub-region has a *high level of natural amenity due to its close proximity to the coast, Moresby Range and the Murchison, Greenough, Buller and Irwin Rivers and includes major tourism experiences along the length of the coastline*.	The Management Plan will provide recommendations to improve facilities and services along the Irwin River to enhance experiences by tourists and locals.
Batavia Coastal Strategy	The Batavia Coast Strategy provides regional and local directions for future coastal planning and management along the Batavia Coast. The Strategy states that tourism development *in the region, including permanent developments, tour operations, and events of a temporary nature (such as surfing and windsurfing competitions), may be both appropriate and desirable at certain locations along the Batavia Coast*.	Actions recommended in the plan will encourage increased tourist use along the river in line with the Batavia Coastal Strategy.

Shire of Irwin Strategic Community Plan 2012-2022	The vision identified in the Strategic Community Plan is *a motivated, progressive and friendly community, offering a brilliant blend of opportunity, natural beauty and heritage, with an enviable lifestyle*.
	
	Objective 2 is to *respect and understand our natural and built environment and conserve our heritage*. One of the key issues identified by the community is increased interface is desired with the Irwin River.
	
	The outcomes and strategies of relevance to achieve objective 2 are as follows:
	
	• Outcome: Recognise and retain our places of heritage value
	  ○ Continue to maintain, enhance and utilise Shire heritage buildings
	• Outcome: Manage and protect coastal environment and the Irwin River environment
	  ○ Support environmental community organisations and initiatives that promote coastal protection, foreshore and river reserve management, such as Northern Agricultural Catchment Council
	  ○ Review and implement an Irwin River Estuary
		The Management Plan will provide recommendations which will help deliver the strategies and outcomes of the Strategic Community Plan.

REPORT	SUMMARY AND RELEVANT INFORMATION	COMMENT

	Management Plan, including noxious weed eradication.
	• Outcome: Conserve and protect our natural and built environment through land-use management, planning and development strategies
	  o Continue to maintain Shire reserves
	• Outcome: Our natural assets and open spaces are accessible and amenable
	  o Review and update the Shared footpaths and Cycle Network Plan
	  o Conduct a feasibility study for a footbridge over the Irwin River.	

Port Denison Foreshore Master Plan 2013	The study area for the Foreshore Master Plan extends from Grannie's Beach to the obelisk and there is no overlap with this study. The recommendations in the Plan focus on improving access and car parking, acknowledgement of heritage, improved facilities for picnics and low-key recreation and landscaping.	There is no overlap with this Management Plan, however some of the recommendations could be relevant. There is some potential to link to activity area at Port Denison Foreshore to the Irwin River/Estuary.
Community Engagement Report and Findings 2012	Relevant feedback from the 2012 Community Engagement Survey results are as follows: Strengths and Weaknesses • Not enough arts and crafts facilities (use old Monastery) Greatest wish for the Shire: • Increased tourism • Improved community facilities and amenities • Maintenance and careful development of ocean and foreshore • Maintain beautiful landscaping, parks and open spaces. What makes the Shire a special place to live:	The community engagement survey provides useful and relevant suggestions for the study area. It includes suggestions such increasing tourism potential, improving facilities and footpaths and maintaining the natural environment. The survey also provides a good indication of what the community values and therefore, what values and features of the study area should be preserved and enhanced.

REPORT	SUMMARY AND RELEVANT INFORMATION	COMMENT
	• Natural beauty and clean environment • Good facilities and community clubs • Heritage buildings and trees. Improvements to services and facilities: • Improve parks and playgrounds, including provision of shade and amenity • Enhance the visitor's centre, tourism promotion and access • Improvements to signage, roads, footpaths and walking trails • Improved disability access. Natural environment: • Maintain and protect the natural environment • Develop attractions, facilities and amenities at beach and foreshore (improved shade, more toilets, manage motorbikes, artificial reef, picnic facilities) • Maintain a clean and tidy town and natural environment • Improved interface with the Irwin River (environment management, walk trails, landscaping) • Maintain and improve park lands and open spaces. Built environment: • Maintain and improve heritage buildings / appearance (old shire building, old monastery, Denison House) • Develop public attractions and amenities including walking trails, shaded areas, footbridge, pool, community and tourism centre, picnic facilities, BBQ's etc. Economy:	

REPORT	SUMMARY AND RELEVANT INFORMATION	COMMENT
	• Define 'tourist town' and promote/develop tourism opportunities. Social well-being: • Maintain and improve sport/recreation/social facilities and programs (including community events) • Maintain and improve parklands and open spaces.	
Walking Trails	The Shire of Irwin have identified a number of walking trails around the Irwin River and estuary.	The identification of these walking trails and the publication of the maps will assist locals and tourists at finding and navigating their way around the study area.
Town Centre Precinct Plan 2009	Identifies a number of sub-precincts, some of which adjoin the Study Area: • Precinct 2 – Irwin River Tourist Residential • Precinct 4 – Brand Highway Town Entry • Precinct 6 – Civic • Precinct 7 – Point Leander Drive Commercial The Precinct Plan identifies the appropriate land uses, development requirements and restrictions for each of the above precincts. Precinct 2 has the most relevance to this study as it overlaps the study area in some parts. It notes that the community would like to see: • *better access to and use of the river flood plain* • *Appropriate zoning to optimise value of riverine environment.* It identifies that Council would like to see: • *improved access to and use of the river flood plain* • *Appropriate development to optimise value of the land* • *A high quality restaurant/cafe overlooking the river* • *Improved traffic management to the Hunts Road-Waldeck Street corner* The objectives of the precinct are:	The objectives and recommendations of this management Plan align with the objectives and priorities for Precinct 2. The Management Plan will aim for improved access, low-key recreational use along the river foreshore and compatibility with the reserve and adjoining lots.

REPORT	SUMMARY AND RELEVANT INFORMATION	COMMENT
	to remain as an area of potential • *expansion for the main shopping focus for the town* • *The existing character maintained and enhanced* • *New compatible land uses with some tourist oriented development* • *Two storey buildings preferred as maximum height* • *Residential Coding of R30 (300m2 per lot) in order to encourage housing variety in the town centre* • *Increased pedestrian permeability through lots to the River* • *New tree planting to the street to recognise the transition from Moreton Terrace to riverine species*	
Tourism Development Plan 2013-2018	The Tourism Development Plan identifies the Irwin River as *an attraction that provides passive tourism through interpretive walk trails along the banks, however appropriate use of the river for the likes of kayaks and canoes should be encouraged to further enhance the appeal*. It also identifies technology as an *increasingly important in destination marketing not only for major tourist destinations but also for smaller destinations allowing them to compete in a far wider marketplace. The Shire will need to embrace the use of technology if it is to position itself as a must visit destination*. Actions within the Plan with particular relevance to this study include: • Action 4.2 – Seek Expression of Interest for river based activity • Action 5.3 – Conduct a feasibility study for a new footbridge over the Irwin River • Action 5.7 – Monitor the outcomes of the feasibility study for a new footbridge over the Irwin River	The recommendations in this Management Plan will aim to improve access and recreational use, including use of non-powered water craft. The acknowledgement of technology as a growing field supports the recommendations in the Management Plan to make use of mobile technology and applications which can be used by tourists and locals to find out more about the activities sin the town and information about the Irwin River. A feasibility study for the footbridge/suspension beach is currently being undertaken.
Shire of Irwin Bicycle Plan 2014	The Bike Plan provides a strategic vision for the cycling in the Shire and seeks to make the region (particularly Dongara and Port Denison) safer and more attractive for cyclists. Four key theses guide the plan including	The recommendations of the Bike Plan should be included in the Irwin River Management Plan.

REPORT	SUMMARY AND RELEVANT INFORMATION	COMMENT
	safety, regional and internal connectivity, path consistency and cycle facilities. It proposes to implement new signage, provision of new paths, to upgrade paths and to implement and maintain cycle facilities. The identified issues and constraints in the study area include: • Lack of surveillance • Hazardous at the Irwin River bridge • No path connection to the picnic site at the bridge • Uneven surface along the boardwalk The Plan proposes the following within the study area: • Install new network paths along the southern side of the river • Install a pedestrian footbridge across the river • Install bike facilities at the Church St lookout, the picnic area at the bridge and along Ocean Drive • Construct a rest area at the picnic area at the bridge.	
Public Open Space Strategy 2011	The Strategy states *The Shire will continue to progress the obtaining of a River Reserve to be held in public ownership for the Irwin River from the Pell Bridge to the river mouth. This will be of enormous benefit to future generations. (From the Strategy)* The Strategy states that the Shire's foreshore areas complement the active open space areas and are an important part of the overall public parkland provision. It states that *recreational activity in these areas is confined to recreation nodes, which need to be managed and located so as to avoid environmental damage such as erosion or habitat/vegetation loss and degradation*. It also identifies the Irwin River as a tourist attraction due to the trails,	The recommendations within the Management Plan align with the objectives of the Public Open Space Strategy. It will identify activity nodes, make recommendations relating to land tenure and reserves and consider the pedestrian bridge. The Management Plan can also take into consideration the two precincts proposed in the Strategy and to provide mostly for tourism at the Dongara side and conservation and recreation at the river mouth.

REPORT	SUMMARY AND RELEVANT INFORMATION	COMMENT
	boardwalks and bird observation areas. The Strategy recommends a review of the recreational activity network along the river and to consider the river in two precincts – the first Dongara Town centre with a civic/tourist focus and the River Mouth and environs with a recreation/conservation focus. Recommendation 14 is that *management of the Irwin River foreshore areas need to be reviewed in order to build on and continue the considerable work that has already taken place in creating walk trails and passive recreation nodes. This should consider the river foreshore in two precincts, the Town Centre River Foreshore and the River Mouth Foreshore.* The River is Identification No. 13 in the Open Space Schedule. The recommendations include: • *Review management plans for this section of the river and build on and continue the considerable work that has already taken place in creating walk trails and passive recreation nodes.* • *Review to consider the proximity of this foreshore area to the Dongara town centre* • *Further investigate possibility of pedestrian bridge in vicinity of old Monastery building.* The Irwin River Mouth is Identification No. 14. Recommendations include: • *Key environmental and recreation asset* • *Review management plans for this section of the river and build on and continue the considerable work that has already taken place in creating walk trails and passive recreation nodes* • *Create activity nodes at identifiable locations linked by walk trails.*	

REPORT	SUMMARY AND RELEVANT INFORMATION	COMMENT
Coastal Development Strategy 2000	The Coastal Development Strategy includes the coastal area from Little Mexico Beach at the southern boundary of the Shire, to North Cliff Head. It does not include Dongara or Port Denison. The primary objective of the Strategy was to put into place mechanisms to address the squatters shacks along the coast.	The Strategy doesn't extend to Dongara or the Irwin River and therefore does not have any direct relevance to this study.
Draft Dongara Town Centre Revitalisation Site Analysis and Concept Investigation 2014	The study area for the Revitalisation Plan is to the north of the Study Area for this project and includes the Dongara town centre and surrounds. It identifies that a pedestrian link is desirable from the town centre study area to the Irwin River trail from Waldeck Street and another from the other side of the bridge to the northern side of the river. Two concept options are identified for the town. Both recommend pedestrian linkages to the river from Waldeck Street and from the eastern side of the bridge. The first concept recommends a medical centre to the north-east of the bridge with a small parking area and link to the river. The second concept plan recommends a memorial park which becomes part of a heritage/river walk trail and a link to the river.	The townsite revitalisation plan is located outside of the study area, however it shows a few links to the river. These recommendations will be considered in the management plan.
Dongara-Port Denison District Structure Plan 2013	The Structure Plan identifies the river as *reserve, residential* expansion area south of Irwin River, higher density *residential* north of Irwin River and *District Town Centre* north of the river. The key strategies for recreation areas are: • *Enhance access to Irwin River* • *Connectivity to District Centre* • *Place activation* • *Tourism (heritage)* • *Environmental and coastal management plans.* The key strategies for the District Town centre of relevance include:	The key strategies identified in the District Structure Plan align with the objectives of the Management Plan. These will be further considered in the project and integrated into the recommendations where possible.

REPORT	SUMMARY AND RELEVANT INFORMATION	COMMENT
	• *Connectivity between existing and District Centre expansion across the Irwin River* • *Provide for mixed use and tourism development* • *Enhance access to Irwin River* • *Provide for mixed use and tourism development* • *Links to passive and recreational opportunities* The key strategies for existing urban are: • *Housing diversity and increased density* • *Enhance access to Irwin River*	
Draft North Coast Development Analysis	The North Coast Development Analysis considers the land from the northern end of Dongara's private rural land to the northern boundary of the Shire and does not extend into the study area. It reviews the issues impacting on planning and development in the area.	The North Coast Development Analysis does not contain any recommendations that directly affect the study area.
Draft Recreation Needs Analysis	The Recreation Needs Analysis says the following about the study area: *The Irwin River Nature Trail is a popular trail for bird watching and the pathway route along the foreshore provides a very scenic walk linking lookouts, fishing sports playgrounds and BBQ areas along the beach.* *A pedestrian bridge across the Irwin River would be of major benefit to the pathway network. It would be a highly attractive destination point in itself, providing an excellent vantage point to see the river and surrounds, and link Dongara with Port Denison, providing a much needed pedestrian link between the two town sites. This would allow many more children and families to access the school and other public facilities via walking or cycling rather than having to drive to a point that is only a short distance across the river.* *A crossing near the old Monastery linking Reserve Street to Retreat Boulevard appears to be a good potential location. Investigations need*	The Recreation Needs Analysis identifies the benefits of providing a footbridge across the Irwin River. It also notes the social and recreational importance of the river and that improvements should continually be made to improve facilities.

REPORT	SUMMARY AND RELEVANT INFORMATION	COMMENT
	to be made into the feasibility of constructing an appropriate pedestrian crossing over the Irwin River. *Pathways and Trails should continue to be supported and upgraded by the Shire principally because they support walking, which is the most participated in physical activity by all Australians and especially older persons of which the Shire of Irwin has a high proportion within its demographics. Paths and trails also support cycling and running which are also top 10 physical activities amongst Australians.* It recommends that: *The Shire of Irwin conduct a feasibility study for a potential pedestrian crossing over the Irwin River at an appropriate location*	
Irwin Estuary Weed Management Plan	The Management Plan indicates that 39 weed species are located along the Irwin River. 3 species with the highest environmental impact were identified as Very High Priority, 13 were assigned as High Priority and 11 as Medium Priority. Weeds within the study area include African Boxthorn, Japanese Pepper, Geraldton Carnation Weed, Pepper Tree and a variety of grasses. It recommends that weeds are managed by targeting specific species and by controlling weeds at specific locations. Very high priority weeds include: • Geraldton Carnation Weed • African Boxthorn • Japanese Pepper High priority weeds include: • Wild Oats • Wild or Mediterranean Turnip	The recommendations of the Irwin Estuary Weed Management Plan will be implemented over time. This will help improve the environmental quality of the river foreshore and the visual amenity.

REPORT	SUMMARY AND RELEVANT INFORMATION	COMMENT
	• Wild Radish • Fountain Grass • Couch Grass • Kikuyu Grass • Pyp Grass • African Lovegrass • Tambookie Grass • Whiteflower Fumitory • Lantana • Ice Plant • Crownbeard. Recommended management actions are provided for each weed species to provide the best options for control. Priority weed species have also been mapped to show the distribution of weeds that need to be controlled.	
Dr Bartlett's Residence and Surrounds Conservation Plan 2009	The Conservation Plan for Denison House/Dr Bartlett's Residence was prepared to provide an overview of the significance of the building and associated structures, the works required to improve and maintain the site and a guide for the continued future use of the building. The building was constructed in 1897 and served as a residence and surgery for Dr Bartlett. It consists of a single storey stone walled, corrugated asbestos roofed residence in the Federation Bungalow style and adjacent stone building, several small buildings and a stone terraced and landscaped grounds. The building is in fair condition and will require some maintenance. Key issues identified in the plan include: • The retention of surrounding space and landscape	This document highlights the significance of Denison House and it's cultural and social value. It also provides a number of ideas for its potential use and the work required for improvements and maintenance. The Irwin River Estuary Management Plan echoes the recommendations of the Conservation Plan and encourages the active use of Denison House and retention of its historical value.

REPORT	SUMMARY AND RELEVANT INFORMATION	COMMENT
	• Appropriate conservation of the materials comprising the fabric of significant elements • Removal of redundant intrusive elements • Re-construction of elements of the building fabric to assist in conservation • Upgrading the presentation of the place and removing inappropriate works so as to reflect the original concepts and treatments • Implementation of a regular maintenance and upkeep regime • Obtaining professional; heritage advice when contemplating change. A total of 37 policies are recommended for the site to address the above issues.	
Register of Heritage Places – Assessment Documentation	The Assessment Document by Heritage Council of WA includes information on the history and current condition of Denison House.	Denison House is an important historical feature within the Study Area. It is a major node where people can start, end or pause on their journey around the river. The walking trail passes straight by the house and a small boat/canoe launching area could be situated at this site. The history of Denison House and the area is important should be communicated to visitors through signage, online information and other means.
Shire of Irwin Access and Inclusion Plan 2012 – 2017	The overarching goal of Access and Inclusion Plan 2012-2017 is to provide equity of access and inclusion to Council services, facilities and functions provided by the Shire of Irwin by identifying and redressing barriers that either restrict or prevent the full participation of people with disabilities. The plan sets to ensure that areas of the greatest need and impact for people with a disability are initiated first. The six outcomes upon which the Shire of Irwin Access and Inclusion Plan has been based will assist representatives of the Shire of Irwin to design and develop fair and equitable disability related policies to guide it into the future. These outcomes are:	The Access and Inclusion Plan should be considered when implementing access recommendations contained within the Irwin River Management Plan.

REPORT	SUMMARY AND RELEVANT INFORMATION	COMMENT
	1. People with disabilities have the same opportunities as other people to access the services of, and any events organised by the Shire of Irwin; 2. People with disabilities have the same opportunities as other people to access buildings and other facilities of the Shire of Irwin; 3. People with disabilities receive information from the Shire of Irwin in a format that will enable them to access the information as readily as other people are able to access it; 4. People with disabilities receive the same level and quality of service as other people from the staff of the Shire of Irwin; 5. People with disabilities have the same opportunities as other people to make complaints to the Shire of Irwin; 6. People with disabilities have the same opportunities as other people to participate in any public consultation by the Shire of Irwin. The plan includes a range of strategies and tasks to achieve these 6 outcomes.	
Australia's Coral Coast – Overnight Visitor Fact Sheet Years Ending December 2010/2011/2012– Tourism WA	The Visitor Fact Sheet is a compilation of data from the National and international Visitor Surveys of visitors travelling in WA. The data in the fact sheet indicate that the number of visitors and the number of nights stayed along the Coral Coast increased between 2011 and 2012. The purpose of the visit is predominantly holiday and leisure followed by visiting family and friends and business. Highest accommodation occupancy rates are during the autumn and winter months, although occupancy is relatively steady all year round.	The Tourism WA fact sheet identifies that there is an increase in the number of visitors and the number of nights stayed along the Coral Coast. This places demand on holiday and recreation sites. The Irwin River Management Plan includes recommendations to accommodate an increase in use associated with increased visitor numbers.

Appendix B
Vegetation Types

(extracted from *Irwin River Estuary Coastal Management Plan* (2005) by ATA Environmental)

NAME	DESCRIPTION	CONDITION	LOCATION
SuLCS	*Suaeda australis* Low Closed Shrubland with scattered *Scaevola crassifolia*, * *Tetragonia decumbens*, * *Digitaria ciliaris* (Summer grass) and *Anthoceris littorea* on sandy soils.	Very Good	Extends along the estuary foreshore to the southern most extent of the study area.
MpS	*Persicaria decipiens* over Sedgeland of *Mesomelaena pseudostygia* over * *Digitaria ciliaris* (Summer grass) and * *Cynodon dactylon* (Couch) with scattered *Casuarina obesa* (Swamp Sheoak) on clayey sandy soils.	Degraded	North-west of the bend in Ocean Drive and covers an area of approximately one hectare
CoTOSAi	*Casuarina obesa* (Swamp Sheok) Tall Open Shrubland over Low Open Shrubland *Atriplex isatidea* over *Acanthocarpus preissii* dominated Herbland with scattered *Persicaria decipiens* on clayey sandy soils.	Good	From the bend in Ocean Drive north to the bend in the Irwin River. Approximately 9ha in size.
CoLCF	*Casuarina obesa* (Swamp Sheok) Low Closed Woodland over *Atriplex isatidea*, * *Lycium ferocissimum* (African Boxthorn) and *Acacia rostellifera* on sandy clayey soils. The first 20m of foreshore reserve associated with CoLCF vegetation type is dominated by weeds and is comprised of * *Avena fatua* (Wild Oat) * *Cynodon dactylon* (Couch) and *Juncus kraussii* subsp. *australiensis* (Sea Rush) with scattered *Eucalyptus camaldulensis* (Red River Gum).	Very Good Degraded	Occurs within the south - eastern foreshore reserve below the river bend. This vegetation covers an area of approximately 0.4ha.
CoOS	*Casuarina obesa* Open Shrubland over degraded grassland of * *Cynodon dactylon* (Couch) and * *Digitaria ciliaris* (Summer grass) with scattered *Eucalyptus camaldulensis* (Red River Gum), * *Schinus terebinthifolia* (Japanese Pepper) and * *Phoenix canariensis* (Date Palm) on clayey sandy soils.	Degraded	A thin strip of approximately 100m in length along the southern foreshore near the river bend.

NAME	DESCRIPTION	CONDITION	LOCATION
ArCOS	*Acacia rostellifera* Closed to Open Shrubland with scattered *Santalum acuminatum* (Quandong), * *Arundo donax* (False Bamboo) and * *Phoenix canariensis* (Date Palm) on sandy soils.	Good to Degraded	Extends along the southern foreshore reserve from Denison House to the residential development in the east.
CoLCFS	*Casuarina obesa* (Swamp Sheoak) Low Closed Forest over Low Open Shrubland of *Atriplex isatidea*, *Threlkeldia diffusa* and * *Lycium ferocissimum* (African Boxthorn) over *Mesomelaena pseudostygia* dominated sedgeland on sandy soils.	Very Good	Occurs along the southern foreshore reserve to the west of the bridge.
EcPc	*Eucalyptus camaldulensis* (Red River Gum) to 15m with scattered * *Phoenix canariensis* (Date Palm), *Casuarina obesa* (Swamp Sheoak) and * *Schinus terebinthifolia* on clayey sandy soils.	Degraded	This vegetation type is associated with the picnic area adjacent to the Dongara – Denison bridge.
EcLOW	*Eucalyptus camaldulensis* (Red River Gum) Low Open Woodland over * *Ehrharta calycina*, Poaceae sp. and * *Avena fatua* (Wild Oat) with scattered * *Lycium ferocissimum* (African Boxthorn), *Casuarina obesa* (Swamp Sheoak) and * *Schinus terebinthifolia* (Japanese Pepper) on clayey sandy soils.	Degraded	Occurs within the northern foreshore reserve adjacent to the Dongara – Denison bridge covering an area of less than 0.5ha. It also extends along the northern foreshore near the river bend covering an area of approximately 25ha.
CoLCFCTS	*Casuarina obesa* Low Closed Forest to Closed Tall Scrub over * *Avena fatua* (Wild Oat), Poaceae sp. and * *Cynodon dactylon* (Couch) with scattered * *Lycium ferocissimum* (African Boxthorn) and *Eucalyptus camaldulensis* (Red River Gum) on clayey sand.	Good	Occurs south of the corner of Waldeck Street and Hunts Road on the northern side of the river. This vegetation covers an area of approximately 1ha.
CoTOS	*Casuarina obesa* (Swamp Sheoak) Tall Open Shrubland over * *Avena fatua* (Wild Oat), * *Cynodon dactylon* (Couch), * *Stenotaphrum secundatum* (Buffalo grass) with scattered *Atriplex isatidea* and *Eucalyptus camaldulensis* (Red River Gum) on clayey sandy soils.	Good to Degraded	Occurs within the north - eastern foreshore reserve near the river bend and covers an area of approximately 0.5ha.
AiHhLCS	*Atriplex isatidea* and *Halosarcia halocnemoides* (Shrubby Samphire) dominated Low Closed Shrubland on sandy soils.	Excellent to Very Good	Occurs along the western foreshore on sandy soils.

NAME	DESCRIPTION	CONDITION	LOCATION
OaSILS	*Olearia axillaris* and *Spinifex longifolius* (Beach Spinifex) Low Shrubland over * *Carpobrotus edulis* with * *Tetragonia decumbens*, *Rhagodia baccata* (Berry Saltbush) and * *Lycium ferocissimum* (African Boxthorn) on sandy soils.	Very Good	This vegetation type occurs along the coastline from the estuary south to the Caravan Park.

Appendix C
Bird Species List

This species list was provided to the Shire of Irwin by John and Beth Fitzhardinge.

BIRDS THAT BREED IN THE AREA	
Osprey	*Pandion haliaetus*
Darter	*Anhinga melanogaster*
Little Pied Cormorant	*Phalacrocorax melanoleucos*
Pied Cormorant	*Hypoleucos varius*
Little Black Cormorant	*Phalacrocorax sulcirostris*
Red Capped Dotterel	*Erythrogonys cinctus*
Magpie Lark	*Grallina cyanoleuca*
Willie Wagtail	*Rhipidura leucophrys leucophrys*
Australian Raven	*Corvus coronoides*
Pied Butcherbird	*Cracticus nigrogularis*
Welcome Swallow	*Hirundo neoxena*
Tree Martin	*Hirundo nigricans*
Black-faced Cuckoo-shrike	*Coracina novaehollandiae*
Grey Fantail	*Rhipidura fuliginosa*
Clamorous Reed Warbler	*Acrocephalus stentoreus*
Splendid Fairy-Wren	*Malurus splendens*
White-winged Fairy-Wren	*Malurus leucopterus*
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*
Nankeen Night Heron	*Nycticorax caledonicus*
Black-shouldered Kite	*Elanus caeruleus*
Brown Goshawk	*Accipiter fasciatus*
Nankeen Kestrel	*Falco cenchroides cenchroides*
Red Wattlebird	*Anthochaera carunculata*
Singing Honeyeater	*Lichenostomus virescens*
Tawny-crowned Honeyeater	*Phylidonyris melanops*
Crimson Chat	*Ephthianura tricolor*
Mistletoe Bird	*Dicaeum hirundinaceum*
Spotted Pardalote	*Pardalotus punctatus*
Striated Pardalote	*Pardalotus striatus*
Silvereye	*Zosterops lateralis*
Boobook Owl	*Ninox novaeseelandiae*
Tawny Frogmouth	*Podargus strigoides*

BIRDS ALWAYS PRESENT	
Silver Gull	*Larus novaehollandiae*
Pacific Gull	*Larus pacificus*
Caspian Tern	*Sterna caspia*
Crested Tern	*Sterna bergii*
White-faced Heron	*Ardea novaehollandiae*
Great Egret	*Ardea alba*
Little Egret	*Ardea garzetta*
Australian Pelican	*Pelecanus conspicillatus*
Pacific Black Duck	*Anas superciliosa*
Grey Teal	*Anas gracilis*
Pied Stilt	*Cladorhynchus leucocephalus*
Galah	*Cacatua roseicapilla*
Sacred Kingfisher	*Todiramphus sanctus*

BIRDS OCCASIONALLY PRESENT	
Black Swan	*Cygnus atratus*
Yellow-billed Spoonbill	*Platalea flavipes*
Red-necked Avocet	*Recurvirostra novaehollandiae*
Mountain Duck (Australian Shelduck)	*Tadorna tadornoides*
Chestnut Teal	
Shoveler	*Anas castanea*
Yellow-throated Miner	*Anas rhynchotis*
Little Corella	*Manorina flavigula*
Laughing Kookaburra	*Cacatua sanguinea*
Rainbow Bee-eater	*Dacelo novaeguineae*
Pied Oystercatcher	*Merops ornatus*
	Haematopus longirostris

MIGRATORY WADERS	
Eastern Curlew	*Numenius madagascariensis*
Grey-tailed Tattler	*Tringa brevipes*
Common Sandpiper	*Tringa hypoleucos*
Greenshank	*Tringa nebularia*
Knot	*Calidris tenuirostris*
Red-necked Stint	*Calidris ruficollis*
Sanderling	*Calidris alba*
Curlew Sandpiper	*Calidris ferruginea*
Ruddy Turnstone	*Arenaria interpres*



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PO Box 289, Mt Lawley WA 6929
Phone: (08) 9271 8506 | Email: admin@landinsights.com.au | Web: www.landinsights.com.au