

# Ayr Creek Reserve Management Plan



Final

June 2016

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## Preface

The Bass Coast Shire Council has developed this Management Plan for the Ayr Creek Reserve to guide management over the next five-years.

The plan sets out an ambitious action plan which will improve and protect the aspects of the reserve which the community value.

The Bass Coast Shire Council and other interested groups will be able to use this plan to guide Council funded works and to access initiative funding from a range of sources to implement the recommended actions in this plan.

## Acknowledgements

The development of this plan has involved the collective effort of a number of departments and individuals. In particular, the authors thank the following:

- **Project Manager** - Diana Whittington –Bass Coast Shire Council
- **Steering Group** - Deirdre Greipsma, Derek Hibbert, Trevor Dando, David Martin, Derek Peters, Richard Clarkson, Heath Kolac, Laurie Gervasi, Paul Lennox (Bass Coast Shire Council) and Adam Dunn (West Gippsland CMA)
- Dave Sutton and John Cuttriss – South Gippsland Conservation Society and Inverloch Residents and Ratepayers Association
- **Community workshop attendees** – David Tessari, Kathryn Tessari, Dave Sutton, John Cuttriss, Debbie Williams

## Acronyms

<b>BCSC</b>	Bass Coast Shire Council
<b>CMA</b>	Catchment Management Authority
<b>EVC</b>	Ecological Vegetation Class
<b>IRRA</b>	Inverloch Residents and Ratepayers Association
<b>SGCS</b>	South Gippsland Conservation Society

# Introduction

## Background

Ayr Creek Reserve is a Council managed drainage reserve located at Inverloch. The reserve is approximately 9ha in size and consists of public land with a modified waterway and wetland.

The reserve supports significant environmental and community values, including revegetation and wildlife, and is popular for recreation, including walking and cycling. A constructed wetland provides nutrient and sediment management, and the creek must be managed to maintain its drainage function to avoid flooding of surrounding properties. The reserve is highly valued by the community and has been the focus of significant investment through volunteer time, funding grants and Bass Coast Shire Council (BCSC) works.

Recent management issues have included flooding, flood mitigation works leading to adverse environmental outcomes and water quality issues in the estuary. Other potential threats include sedimentation, erosion, pest plants and land use changes within the catchment.

A whole of system approach, achieved through development of an integrated management plan for the reserve, is needed to prioritise activities within the reserve and to balance conflicting objectives.

## The Plan

This management plan will ensure comprehensive consideration of the values, assets, threats and opportunities for the reserve and provide a detailed five-year action plan to protect these values. The plan will address threats including erosion, sedimentation, pest plants and poor water quality. It will also address opportunities to improve the recreational experience within the reserve.

## Objective

The objectives for the development of this plan were to:

- Manage expectations and communication with all stakeholders through the development of the plan and seek appropriate input.
- Develop clear goals for management of the reserve, through appropriate participation of stakeholders.
- Identify the values, assets, threats and opportunities and priorities for management activities within the reserve, including maintenance.
- Provide a concise integrated plan to cover all aspects of management of the values of the reserve.

## Scope

This management plan relates to the land and waterways within the Ayr Creek Reserve between Bass Coast Highway and Surf Parade. Additionally, some actions have been identified to protect values within the Ayr Creek estuary and water quality into Andersons Inlet.

The Ayr Creek Reserve has been divided into four reaches (sections) to assist with management planning. The four reaches are:

Reach 1 – Coast to Royal Parade

Reach 2 – Royal Parade to the second footbridge

Reach 3 – Second footbridge to Nesci Court Junction

Reach 4 – Nesci Court Junction to Bass Coast Highway

## Outcome of the plan

A practical and supported plan is in place to guide works, site maintenance and assist with Council budgeting and seeking broader funding. This will result in improvement in the environmental condition of the reserve and maintenance of the drainage asset.

## Development of this plan

### Community and stakeholder engagement

The Ayr Creek Reserve Management Plan has been developed with a broad range of community and stakeholder involvement.

The Bass Coast Shire Council has managed the development of the management plan through a steering group made up of representatives from the departments within Council who have involvement in various aspects of management of the reserve, along with representation from the West Gippsland Catchment Management Authority (CMA).

Representatives from the South Gippsland Conservation Society (SGSC) and Inverloch Residents and Ratepayers Association (IRRA), participated in field inspections and provided valuable documents and photos about the history of management of the reserve and the significant work that these groups have undertaken.

Three key opportunities were provided for broader community input, namely:

1. **Community workshop** – A community workshop was held to allow participants to review the information collated from the review of existing information and field work, identify significant values within the reserve and significant threats to those values, and to identify a long term plan for the reserve (held 17 February 2016).
2. **Draft for public comment** – The draft Ayr Creek Reserve Management Plan was made available for public comment on 26 April 2016.
3. **Public open house** – Bass Coast Shire team members and project team members were available to discuss the draft plan, the public submission process and the Ayr Creek more generally on the 5 May 2016.

Following the closing of submissions on the draft Plan, community and stakeholder comments were considered and the Plan amended accordingly.

## Data sources and information collection

Information on the values within the Ayr Creek Reserve has been sourced from:

- DELWP Biodiversity Interactive Maps and Victorian Biodiversity Atlas.
- Bass Coast Shire Geographic Information System.
- Field investigations. The project team undertook brief field assessments including significant features for the consideration of the plan.
- Existing literature and planning documents for the reserve.
- Community and stakeholder input.

## Existing planning documents relating to Ayr Creek Reserve

A number of current and superseded planning documents relate to the Ayr Creek Reserve. These are listed below:

- Ayr Creek Inverloch – Waterway Rehabilitation Project (2016) - Aquatic Systems Management
- Ayr Creek wetland and creek restoration – Detailed design report (2002) – Hydro Electric Commission
- Fire plan – Ayr Creek Reserve (2015) Bass Coast Shire Council
- A report on a surface drainage investigation within the Upper Ayr Creek Catchment Inverloch (2015) – BES
- Ayr Creek Reserve - 45 Royal Pde – Thumbnail Management Plan (2007) – Bass Coast Shire Council

# Ayr Creek Reserve

## History

The Ayr Creek has undergone significant transformation, from a natural floodplain environment, to farm land, to a highly modified urban waterway and most recently rehabilitated to enhance environmental and stormwater management outcomes. The following diagram summarises the history and characteristics of the Ayr Creek over time.



From 1992, volunteers from the SGCS and IRRRA planned and implemented significant revegetation works within the Ayr Creek Reserve, in partnership with BCSC.

In 2002, SGCS, IRRRA, West Gippsland CMA and BCSC were successful in obtaining a grant to restore the creek closer to its original condition, encourage a healthier ecosystem and improve water quality entering Andersons Inlet from Ayr Creek. The works included:

- converting an existing retarding basin into a multi-zoned stormwater treatment wetland, whilst maintaining its function as a retarding basin
- restoring low stream flows to Reach I of Ayr Creek by altering a drainage outlet structure and creating instream habitat
- transferring the wetland and stormwater flows that were using the underground stormwater network to above ground.



The SGCS, IRRRA and BCSC continue to undertake significant projects to revegetate and rehabilitate the Ayr Creek Reserve and to improve the recreation and aesthetic values. This has included significant weed control work, development of multi-use gravel pathways, the construction of bridges and culvert crossings and the installation of some seating.

In 2009, a surface drainage investigation for Ayr Creek identified significant issues with drainage capacity and some recommendations to increase capacity were made and implemented. Unfortunately, in 2014/2015 flooding in the western end of Dianne Place occurred.

BCSC responded to the flooding by undertaking an urgent and significant channel augmentation project, which resulted in negative environmental and aesthetic outcomes. In order to bring these works into line with best practice management for urban waterway management and stormwater management, BCSC commissioned a consultant to identify actions to achieve a balance between the environmental and drainage outcomes sought for the reserve. This work has been incorporated into this management plan.

## **Significance of the Ayr Creek Reserve to Inverloch and the Bass Coast Shire region**

Ayr Creek Reserve is significant to Inverloch as it has the only near continuous:

- north-south corridor
- native vegetation corridor
- off-road shared path.

North of the Reserve, the Ayr Creek catchment is extensively cleared. The Reserve provides a significant area of publically owned bushland within the Bass Coast Shire area and links to the coastal reserve.

The Ayr Creek Reserve is highly valued neighbourhood park, used as a bushland play space, a thoroughfare for school children and other cyclists and an area for passive recreation. As with many other features in Inverloch, it is also highly utilised by seasonal holiday visitors as a pathway to the beach.

## Reach descriptions

Ayr Creek Reserve has been divided into four reaches for planning purposes.

### Reach 1

Through Reach 1, the reserve is narrow varying between 10 to 27 metres wide. The narrowness of the reserve is likely to affect its resilience and ability to withstand threats such as weed infestation and sedimentation to the waterway. Reach 1 stretches for 850 metres between Surf Parade and Royal Parade. This section of the reserve is abutted by well-established properties, although some small scale subdivision is occurring. This section of the Reserve includes a relatively informal narrow earthen track surrounded by relatively dense vegetation. Through this reach, the Ayr Creek is incised with a well-defined stream channel.

### Reach 2

Reach 2 stretches for approximately 390 metres between Royal Parade and the second footbridge, and is the widest section of the reserve being between 60 and 90 metres wide. This reach is also fringed by well-established properties. In most cases the boundary between the reserve and the neighbouring properties is clearly established by existing fencing. Many residents value access to the reserve and include gates opening into the reserve. This reach includes the stormwater wetland/retarding basin, well maintained tracks suitable for bicycles and pedestrians, a bridge, areas of open grass land and dense native plantings.

### Reach 3

Reach 3 has an average width of 60 metres. It is an areas fringed by recent housing development and some established properties. This reach also has well maintained tracks suitable for bicycles and pedestrians and dense native plantings. An area of remnant vegetation including *Melaleuca ericifolia* exists within this reach surrounding a small habitat pond.

### Reach 4

Through Reach 4, the Ayr Creek consists of an east and west branch, before they join near Nesci Court. The waterway is shallow and densely vegetated throughout this reach. This reach also has well maintained tracks suitable for bicycles and pedestrians and dense native plantings. Just downstream of Bass Coast Hwy there is an old farm dam on the Ayr Creek.

## Environmental values

### Estuary

The estuary of the Ayr Creek is an important environment, where freshwater from the catchment is mixed with marine water from the sea. Estuaries are significant areas for fish, used as nurseries, permanent habitat or an important stop on their journey migrating upstream or downstream between the river and the sea.

Ayr Creek flows into Andersons Inlet and the estuary extends upstream to south of Beacon Court. Andersons Inlet is a significant environment recognised for providing habitat for species listed under the Japan-Australia Migratory Bird Agreement (JAMBA) and China-Australia Migratory Bird Agreement (CAMBA) agreements. CAMBA and JAMBA are bilateral agreements between the

governments of Japan and China and the government of Australia for the Protection of Migratory Birds in Danger of Extinction, and their Environment. Anderson Inlet's intertidal mudflats are of world importance for Red-necked Stints, with counts of up to 6,000 individuals recorded.

Andersons Inlet is an extremely popular area for swimming and recreational fishing.



Remnant Swamp Scrub vegetation surrounding an old farm dam on the waterway. The dam provides excellent habitat for frogs and potentially small native fish.

### Plant communities and species

The reserve supports areas of high quality vegetation, both remnant and planted, and provides connectivity with vegetation adjacent to Bass Highway all the way to the foreshore at Andersons Inlet.

Vegetation communities at the site include Swamp Scrub, Wet Heath, Damp Sands Herb-rich Woodland and Swampy Riparian Woodland; the surrounding catchment also includes areas of Coast Banksia and Lowland Forest.

Plant species found within the reserve are listed in Appendix A.

### Fauna species

The wide range of aquatic and terrestrial habitats at the reserve support waterbirds, bushland birds, fish and invertebrates and can act as a refuge during drought.

Bird species sighted at the reserve include White-faced Heron, Royal Spoonbill, Australian White Ibis, Swamp Harriers, Rails, Egrets, Chestnut Teal, Australian Wood Duck, Black-faced Cuckoo-shrike, Red Wattlebird and Flame Robin.

Terrestrial fauna species sighted at the reserve include Koala, Echidna, Blue-tongue Lizards, Wombats and Ringtail Possum. Several frog species are found within the reserve including the Pobblebonk Frog. Specific fauna surveys have not been undertaken at the reserve and it is recognised that many more species would be identified if surveys were undertaken.



Australian White Ibis, Royal Spoonbill, Australian Wood Duck and Pobblebonk Frog have all been found within the Ayr Creek Reserve

Source: <http://www.birdphotos.com.au/> and [www.museumvictoria.com.au](http://www.museumvictoria.com.au)

## Fish species

The Spotted Galaxias has been found within Ayr Creek, along with Short-finned Eel. It is likely that other small native and introduced species may also live within the waterway.



Spotted Galaxias were found in Ayr Creek during drainage works

Source: <http://images.mdba.gov.au/displayimage.php?album=100&pos=95>

## Social and economic values

### Stormwater treatment

The constructed wetland north of Royal Parade provides nutrient and sediment treatment to the water moving through Ayr Creek on its way to the ocean. The wetland also acts as a retarding basin.

Its shallow form and abundant vegetation treat the water by:

- Slowing the flow moving down the creek, allowing sediment to drop out and be trapped.
- Providing large amounts of vegetation surface area for biofilms, that absorb pollutants, to grow on.
- Providing some disinfection through ultraviolet light treatment in open areas.
- Facilitating denitrification.

Ayr Creek collects urban stormwater runoff from roofs and roads in the surrounding neighbourhoods through formal and informal drainage pathways minimising local flooding.

### Amenity and recreation

The reserve is well used by the community with access to natural bushland and green space, paths for walking, running, cycling and dog walking, a thoroughfare away from traffic (particularly important for school children), places to sit and rest and enjoy the scenery, bird watching opportunities and open and bushland spaces for children to play.



Multipurpose tracks, which allow for fire management activities, walking and cycling run the entire length of the reserve. Some seating and viewing areas such as bridges are in place to allow visitors to enjoy the environmental features of the reserve.

The reserve is used by a broad demographic including school children and elderly residents. Access and facilities for people with limited mobility is important.

Swimming does not occur in the estuary channel; however, the downstream embayment is used for swimming and other water sports.

## Threats and management issues

A range of threats are impacting on the values within the Ayr Creek Reserve. The threats were identified through the field investigations and community workshop. A description of how the threats may impact the values is provided below.



### Weeds

- Weed species can outcompete with native species and will often have minimal habitat values. Pasture and grass species and the Coastal Wattle are key weeds within the reserve.



### Altered stream flow

- Low to medium stream flows within Reach 1 of Ayr Creek flow down the existing underground drainage pipes, meaning that the instream values may be water stressed in all but medium to high flow periods.
- Increasing development has also changed the pattern of stream flows with more intense/flashier flows running off the impermeable surfaces of the housing developments.



### Reserve shape and size

- In Reach 1 Ayr Creek Reserve is only 10 metres wide in places. The narrowness of the reserve impacts its resilience, and therefore its ability to support native flora and fauna. Threats such as weeds, sedimentation and invasive fauna are more likely to impact the values of the reserve where the buffer between the surrounding land uses and the waterway is narrow. The narrowness also impacts the reserves ability to support some community values such as shared use pathways.



### Vandalism

- Graffiti and other forms of vandalism have been seen within the reserve. This include damage to the regulatory signage and visitor facilities such as the bridges.



### Invasive fauna

- Cats, foxes and dogs may all impact on the local wildlife values, such as waterbirds, if not managed appropriately.
- Invasive fish species such as Mosquito fish may also be present and predate on the eggs or juveniles of native fish and frogs.



### Future subdivision

- Further subdivision and urban development around the reserve will require careful planning to ensure the drainage and stormwater management requirements are balanced with the need to protect environmental values within the reserve.



### Drainage works and reduced overland flow

- Drainage works reduce the spread of water over the floodplain and reduce soil moisture across the broader floodplain. Water dependent vegetation such as Melaleuca may be directly impacted by drainage works through removal, or impacted in the longer term through reduced soil moisture.



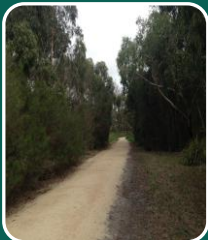
### Flooding

- Past flooding within the reserve has impacted nearby residents in Diane Close. Future development in the upper reaches has the potential to increase the flooding threat.
- Flooding is also a significant benefit for the floodplain flora and aquatic fauna within the reserve.



### Sedimentation

- Impervious surfaces such as roads and footpaths, along with stormwater pipes, convey water and sediment efficiently into the waterway. Sediment can smother instream habitat and convey pollutants into the waterway.



### Fire risk

- Ayr Creek Reserve has significant environmental values. Unfortunately, within an urban environment the risk of fire needs to be mitigated through appropriate management.



### Encroachment

- Open space environments within an urban area are often subject to encroachment by private users. Encroachment may include spreading of gardens or lawn into public land or the construction of private infrastructure on public land.



The table below outlines the threats and the reaches that are currently impacted by these threats.

Threat	Reach 1	Reach 2	Reach 3	Reach 4
Weeds	√	√	√	√
Drainage works			√	√
Reduced overland flow		√	√	√
Reserve shape and size - narrowness	√	√	√	√
Flooding			√	√
Sedimentation	√	√	√	√
Fire risk	√	√	√	√
Encroachment	√	√		
Altered stream flow	√	√	√	√
Reduced water quality	√	√		
Barriers to fish movement	√	√	√	√
Climate change	√	√	√	√
Urban stormwater runoff	√	√	√	√
Rubbish/ Dog faeces		√	√	√
Vandalism	√	√		√
Invasive fauna	√	√	√	√
Future subdivision			√	√

## Current management

### Roles and responsibilities

Management of waterways and public land involves many different government agencies, teams, groups and individuals. There is natural overlap between the roles and responsibilities of different agencies and departments within Council.

Specific roles and responsibilities of agencies and departments within Council who currently undertake management activities along Ayr Creek are listed in in the following table. Activities are subject to the availability of resources identified in the agencies annual budgets.

Agency/ Group	Responsibility
<b>Bass Coast Shire Council</b>	<p>Undertakes the day to day maintenance of assets on Council land adjoining the creek; this includes mowing, litter removal, management of trees and gardens, and path management. BCSC also undertakes removal of large items of litter (rubbish bins and shopping trolleys from the waterway).</p> <p>Flood mitigation – BCSC incorporates the results of flood modelling into municipal planning schemes.</p> <p>Stormwater management – BCSC is the responsible authority for planning, installing and maintaining stormwater infrastructure. BCSC is the principal owner of stormwater infrastructure along Ayr Creek and is responsible for inspections and maintenance to ensure the infrastructure is in good working order.</p>
<b>West Gippsland CMA</b>	<p>Develops and implements a Regional Waterway Strategy that accounts for community needs relating to the use and values of waterways.</p> <p>Carries out works and activities in accordance with the Regional Waterway Strategy to improve the values of waterways</p> <p>Manages the bed and banks of waterways through licencing works on waterways.</p> <p>Floodplain management. – West Gippsland CMA are responsible for flood modelling, mapping and strategy development and providing advice on development applications for land prone to flooding.</p> <p>Undertakes regional planning for native vegetation and control of invasive plants and animals. Authorities such as BCSC must take account of these plans when determining applications for vegetation removal.</p>
<b>EPA Victoria</b>	<p>Licences discharges to waterways and enforces licence conditions associated with those discharges.</p> <p>Responds to water quality incidents and pollution events, such as fish death events.</p>

Agency/ Group	Responsibility
<b>South Gippsland Conservation Society, Inverloch Residents and Ratepayers Association and other community groups</b>	<p>Seek funding and support to implement activities along Ayr Creek Reserve to improve the environmental condition of the reserve and improve water quality running into Andersons Inlet.</p> <p>Work with BCSC to complete an annual action sheet for works within Ayr Creek Reserve.</p>
<b>Surrounding landholders, Individuals and land managers</b>	<p>Ensure that activities on their land do not degrade or cause damage to land, soil or water resources.</p> <p>Responsible for invasive plant and animal control, litter control and mowing on their land.</p> <p>Ensure that gardens and infrastructure do not encroach in to the Ayr Creek Reserve.</p>

## Responsibilities within BCSC for Ayr Creek Reserve

The diagram below outlines the management responsibilities within the Ayr Creek Reserve for the various departments with the BCSC.

Planning team	Sustainable environment team	Infrastructure maintenance team	Asset management team	Infrastructure delivery team
<ul style="list-style-type: none"> <li>ensuring that planned subdivisions and developments contain appropriate water-sensitive urban design features to mitigate increased flows</li> </ul>	<ul style="list-style-type: none"> <li>revegetation</li> <li>managing bushland</li> <li>managing weeds</li> <li>planning and implementing works for the protection of environmental values</li> <li>fire planning</li> <li>environmental engagement and regulatory signage</li> <li>installing rest areas and seating</li> </ul>	<ul style="list-style-type: none"> <li>routine maintenance of creek and drainage line (bed and banks up to 1m from waterway)</li> <li>routine maintenance of infrastructure (drainage lines, signage, tracks, park furniture, bridges/ culverts)</li> </ul>	<ul style="list-style-type: none"> <li>registering and tracking assets</li> <li>investigating the need for new assets</li> <li>planning for asset renewal</li> <li>planning wetland/retarding basin/drainage line inspections</li> <li>commissioning flood modelling</li> </ul>	<ul style="list-style-type: none"> <li>delivering drainage and waterway works</li> <li>community liaison regarding the timing and impact of planned works</li> </ul>

## Long-term management goals for the Ayr Creek Reserve

Using the information gathered through the community and stakeholder input, four goals have been identified to guide the priorities and actions for the next five years in the Ayr Creek Reserve Management Plan. These goals relate to the identified values of the creek. It should be noted that there may be significant time lag in achieving the goals, and it is expected that this will occur in a period greater than the five-year timeframe of the Plan.

Bass Coast Shire Council and the community will work towards the following long-term goals for the Ayr Creek Reserve:

- Ayr Creek Reserve will provide a habitat corridor between the coast at Surf Parade and the Bass Coast Highway that will consist of diverse, healthy and resilient vegetation that will adapt to changing climatic conditions.
- Ayr Creek Reserve will support diverse populations of native water-dependent species including frogs, fish and waterbirds.
- Water quality from the Ayr Creek catchment will meet the Environmental Water Quality Guidelines for Victorian Riverine Estuaries.
- Low flows will support the instream habitats and ecology of Ayr Creek, whilst high flows will be appropriately managed through managed engagement of the floodplain and water sensitive drainage design.

# Action Plan

## Development of the action plan

This action plan has been developed following input from the field work, onsite meetings and site visits and the community workshop. Consideration of the risks posed to the key values from the threats has also been made in formulating the actions.

Some of the actions are ongoing actions, already funded and supported by BCSC, whilst other actions are aspirational and will need to be the subject of funding applications or grants by BCSC and other stakeholders.

## Implementation of actions

### Action plan 2016-2021

The 5-year action plan has been developed with six key action areas.

These are:

<b>Engagement</b> – Activities that involve communicating with stakeholders
<b>Environment</b> – Activities that have the primary aim of protecting the environmental values
<b>Knowledge</b> – Activities that will assist to fill knowledge gaps about how best to manage the reserve
<b>Maintenance</b> – Activities that involve maintaining existing assets within the reserve
<b>Recreation</b> – Activities that enhance the recreational values of the reserve
<b>Stormwater/drainage</b> – Activities that have the primary aim of protecting the stormwater management values of the reserve

Action locations are displayed on the action plan maps and are colour coded to show the area of focus. Locations of actions are approximate and subject to detailed work planning and funding processes.

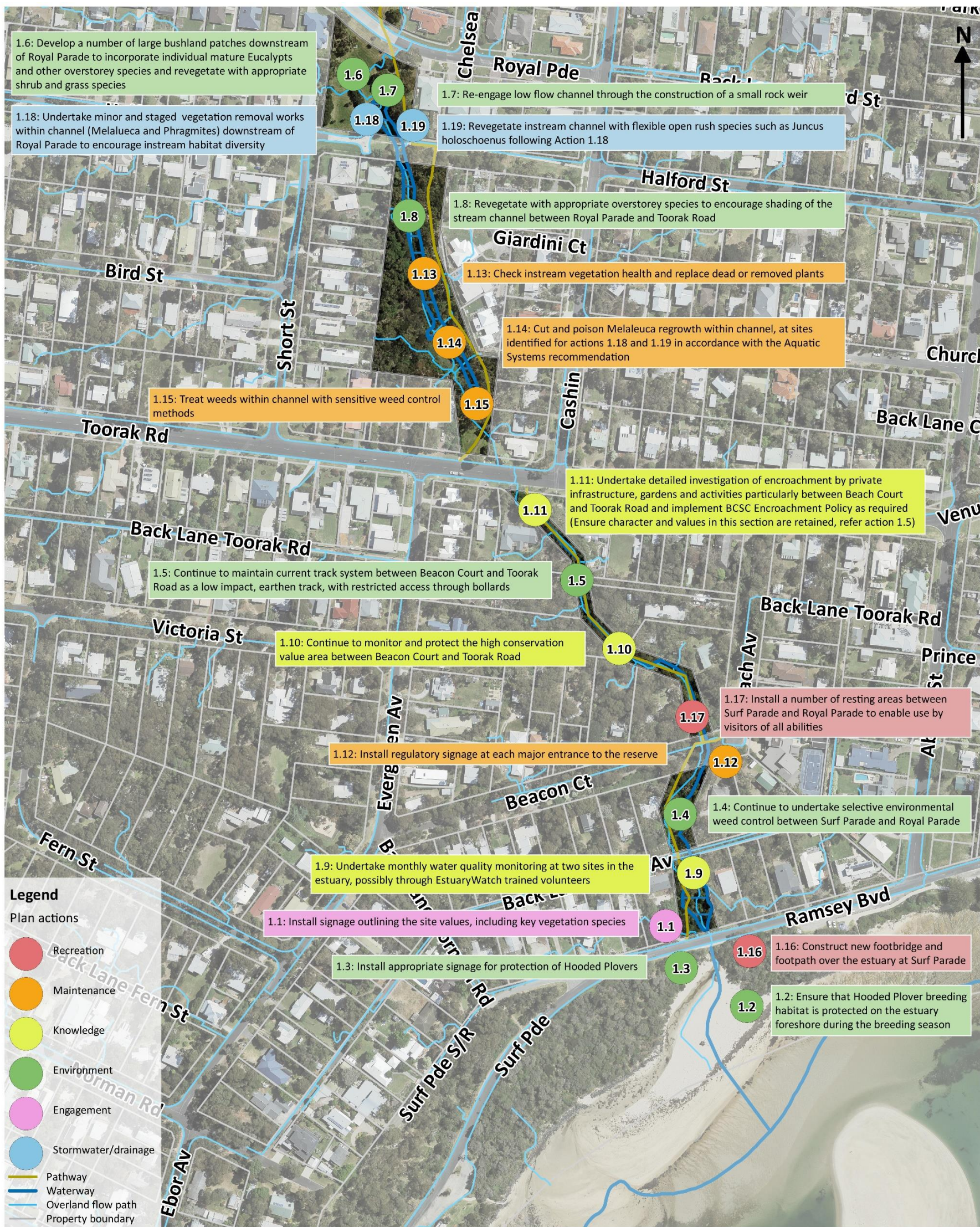
## Action plan reach I

Action No.	Reach I - Action	Responsibility
1.1	Install signage outlining the site values, including key vegetation species	Bass Coast Shire Council
1.2	Ensure that Hooded Plover breeding habitat is protected on the estuary foreshore during the breeding season	Bass Coast Shire Council
1.3	Install appropriate signage for protection of Hooded Plovers	Bass Coast Shire Council
1.4	Continue to undertake selective environmental weed control between Surf Parade and Royal Parade	Bass Coast Shire Council
1.5	Continue to maintain current track system between Beacon Court and Toorak Road as a low impact, earthen track, with restricted access through bollards	Bass Coast Shire Council
1.6	Develop a number of large bushland patches downstream of Royal Parade to incorporate individual mature Eucalypts and other overstorey species and revegetate with appropriate shrub and grass species	Bass Coast Shire Council
1.7	Re-engage low flow channel through the construction of a small rock weir	Bass Coast Shire Council
1.8	Revegetate with appropriate overstorey species to encourage shading of the stream channel between Royal Parade and Toorak Road	Bass Coast Shire Council

Action No.	Reach I - Action	Responsibility
1.9	Undertake monthly water quality monitoring at two sites in the estuary, possibly through EstuaryWatch trained volunteers	Aspirational action
1.10	Continue to monitor and protect the high conservation value area between Beacon Court and Toorak Road	Bass Coast Shire Council
1.11	Undertake detailed investigation of encroachment by private infrastructure, gardens and activities particularly between Beach Court and Toorak Road and implement BCSC Encroachment Policy as required (ensure character and values in this section are retained, refer action 1.5)	Bass Coast Shire Council
1.12	Install regulatory signage at each major entrance to the reserve	Bass Coast Shire Council
1.13	Check instream vegetation health and replace dead or removed plants	Bass Coast Shire Council
1.14	Cut and poison Melaleuca regrowth within channel, at sites identified for actions 1.18 and 1.19 in accordance with the Aquatic Systems recommendation.	Bass Coast Shire Council
1.15	Treat weeds within channel with sensitive weed control methods	Bass Coast Shire Council
1.16	Construct new footbridge and footpath over the estuary at Surf Parade	Bass Coast Shire Council
1.17	Install a number of resting areas between Surf Parade and Royal Parade to enable use by visitors of all abilities	Bass Coast Shire Council

Action No.	Reach I - Action	Responsibility
I.18	Undertake minor and staged vegetation removal works within channel (Melaleuca and Phragmites) downstream of Royal Parade to encourage instream habitat diversity	Bass Coast Shire Council
I.19	Revegetate instream channel with flexible open rush species such as <i>Juncus holoschoenus</i> , following Action I.18	Bass Coast Shire Council





## Ayr Creek Reserve - reach 1 Coast to Royal Pde

0 25 50 75 100 m



(c) Bass Coast Shire Council 2016

## Action plan reach 2

Activity No.	Reach 2 – Activity	Responsibility
2.1	Develop a number of large bushland patches on western side of reserve along fence line by planting appropriate mid-storey, shrub and grass species around individual mature Eucalypts to extend the vegetated area	Bass Coast Shire Council
2.2	Install bird hide overlooking wetland	Aspirational action
2.3	Establish interpretative signage within bird hide identifying key environmental values and the history of the project	Bass Coast Shire Council
2.4	Investigate removal of spoil dumps from the upper batter left bank near the second footbridge	Bass Coast Shire Council
2.5	Undertake flood modelling project to determine if additional pipelines or other drainage solutions are required (as per Overall action 9)	WGCMA
2.6	Undertake post works survey suitable for use in flood modelling project	Bass Coast Shire Council
2.7	Replace current regulatory signage	Bass Coast Shire Council

<b>Activity No.</b>	<b>Reach 2 – Activity</b>	<b>Responsibility</b>
2.8	Undertake works as identified in Council’s annual works program that support a reduction in fire risk and aid in fire suppression activities and maintain access trails to a standard that allows for emergency and fire access	Bass Coast Shire Council
2.9	Inspect instream structures for slumping/scour	Bass Coast Shire Council
2.10	Top up structures within channel	Bass Coast Shire Council
2.11	Add sand to upstream side of structures for sealing	Bass Coast Shire Council
2.12	Inspect for scour around pipe outlets	Bass Coast Shire Council
2.13	Check bridge abutments for erosion	Bass Coast Shire Council
2.14	Inspect levee for collapse or settling of fill	Bass Coast Shire Council
2.15	Check jute master attachment on levee and check/replace vegetation on levee	Bass Coast Shire Council
2.16	Check for bypass leakage around walled sections of levee	Bass Coast Shire Council

Activity No.	Reach 2 – Activity	Responsibility
2.17	Check instream vegetation health and replace dead or removed plants	Bass Coast Shire Council
2.18	Cut and poison Melaleuca regrowth within channel at work sites for actions 2.28 and 2.30	Bass Coast Shire Council
2.19	Treat weeds within channel with sensitive weed control methods	Bass Coast Shire Council
2.20	Control Melaleuca regrowth along levee at works sites for actions 2.26 and 2.29	Bass Coast Shire Council
2.21	Continue to remove <i>Acacia longifolia</i> (Coast wattle) from Reach 2	Bass Coast Shire Council
2.22	Install board walk to bird hide along western side of wetland, overlooking open water zone	Aspirational action
2.23	Establish a cleared path suitable for all abilities access to the current seating overlooking wetland and ensure a clear line of site to the open water zone of wetland	Bass Coast Shire Council
2.24	Install resting area and seating near second footbridge	Bass Coast Shire Council
2.25	Rehabilitate first footbridge through removal of graffiti and repainting/staining	Bass Coast Shire Council

Activity No.	Reach 2 – Activity	Responsibility
2.26	Complete levee to past lower bridge, tie in with retarding basin wall (min. 10.2m AHD top)	Bass Coast Shire Council
2.27	Install a flood gate on Diane Cres outlet (leave grill top pit)	Bass Coast Shire Council
2.28	Insert three small grade control/riffle structures into the channel bed @ chn 60, chn 100 and chn 160 and regrade right bank. Plant channel with Juncus - 4 metres downstream of toe of riffles	Bass Coast Shire Council
2.29	Flattening of the batters of the newly constructed levee should be undertaken for ease of maintenance. Existing minimum height of 10.8m AHD to be maintained for crest of levee	Bass Coast Shire Council
2.30	Redress levee - cover with Jutemaster matting and plant rushes along toe and Carex between 100 mm and 450mm above bed. Plant Lomandra and <i>Eucalyptus ovata</i> to right bank only	Bass Coast Shire Council
2.31	Regrade first 10 metres of the track side channel and remove existing fill bank on upstream side of channel	Bass Coast Shire Council
2.32	Breach the small levee on the east side of the track drain in segments to allow flow through	Bass Coast Shire Council

Activity No.	Reach 2 – Activity	Responsibility
2.33	Reset wetland through: <ul style="list-style-type: none"> <li>- deepening sediment zone</li> <li>- extending sediment zone into rock area</li> <li>- removal of Melaleuca, Typha and Water Couch from inlet zone</li> <li>- reprofile outlet zone to form a deep and shallow marsh zone, a discharge pool and to add a safety bench profile</li> <li>-Install a new outlet pit</li> </ul>	Bass Coast Shire Council



**Ayr Creek Reserve - reach 2  
Royal Pde to second footbridge**



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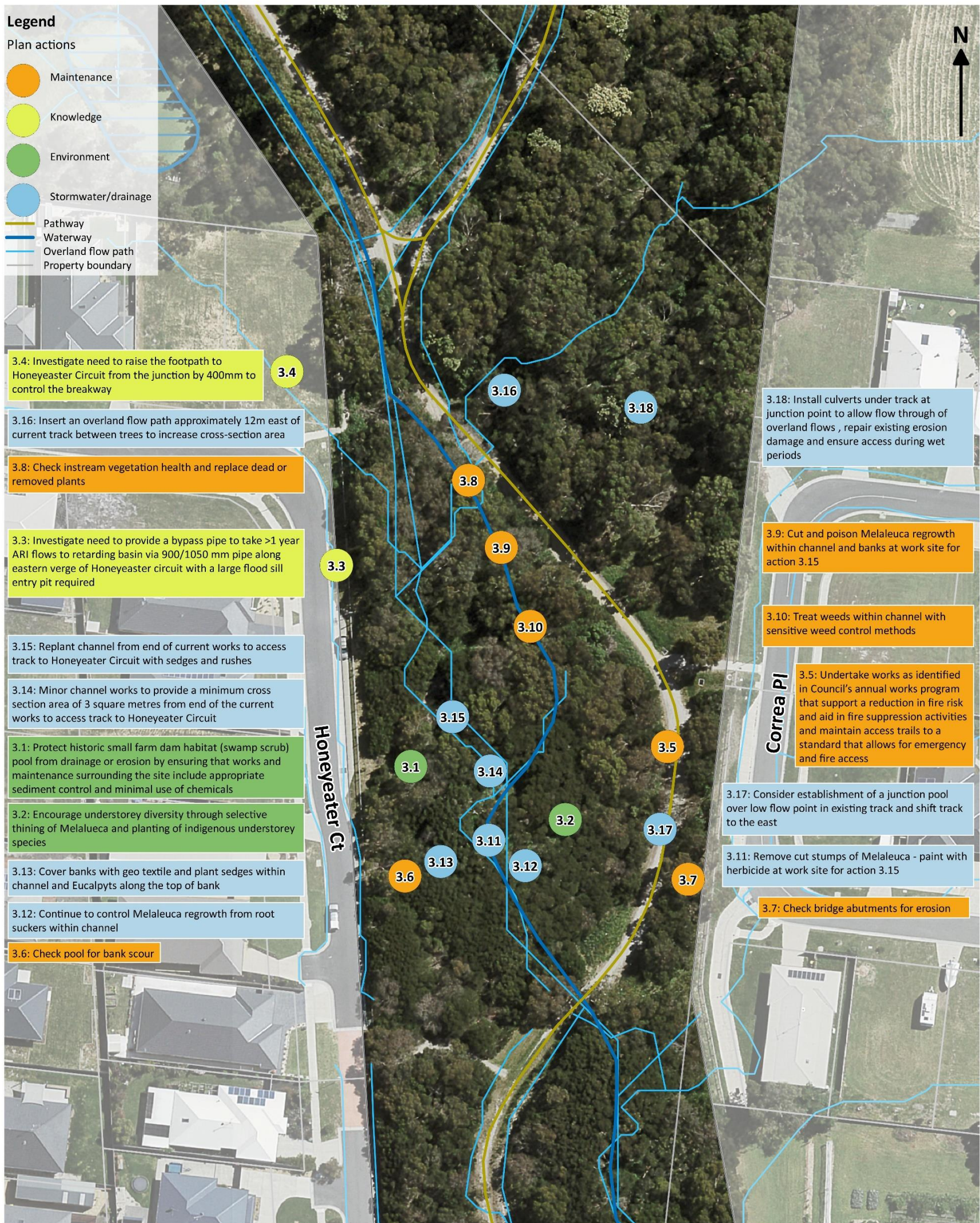
### Action plan reach 3

Activity No.	Reach 3 – Activity	Responsibility
3.1	Protect historic small farm dam habitat (swamp scrub) pool from drainage or erosion by ensuring that works and maintenance surrounding the site include appropriate sediment control and minimal use of chemicals	Bass Coast Shire Council
3.2	Encourage understorey diversity through selective thinning of Melaleuca and planting of indigenous understorey species	Bass Coast Shire Council
3.3	Investigate need to provide a bypass pipe to take >1 year ARI flows to retarding basin via 900/1050 mm pipe along eastern verge of Honeyeater circuit with a large flood sill entry pit required	Bass Coast Shire Council
3.4	Investigate need to raise the footpath to Honeyeater Circuit from the junction by 400mm to control the breakaway	Bass Coast Shire Council
3.5	Undertake works as identified in Council's annual works program that support a reduction in fire risk and aid in fire suppression activities and maintain access trails to a standard that allows for emergency and fire access	Bass Coast Shire Council
3.6	Check pool for bank scour and rectify	Bass Coast Shire Council
3.7	Check bridge abutments for erosion	Bass Coast Shire Council



Activity No.	Reach 3 – Activity	Responsibility
3.8	Check instream vegetation health and replace dead or removed plants	Bass Coast Shire Council
3.9	Cut and poison Melaleuca regrowth within channel and banks at work site for action 3.15	Bass Coast Shire Council
3.10	Treat weeds within channel with sensitive weed control methods	Bass Coast Shire Council
3.11	Remove cut stumps of Melaleuca - paint with herbicide at work site for action 3.15	Bass Coast Shire Council
3.12	Continue to control Melaleuca regrowth from root suckers within channel at work site for action 3.15	Bass Coast Shire Council
3.13	Cover banks with geo textile and plant sedges within channel and Eucalypts along the top of bank	Bass Coast Shire Council
3.14	Minor channel works to provide a minimum cross section area of 3m <sup>2</sup> from end of the current works to access track to Honeyeater Circuit	Bass Coast Shire Council
3.15	Replant channel from end of current works to access track to Honeyeater Circuit with sedges and rushes	Bass Coast Shire Council
3.16	Insert an overland flow path approximately 12m east of current track between trees to increase cross-section area.	Bass Coast Shire Council

Activity No.	Reach 3 – Activity	Responsibility
3.17	Consider establishment of a junction pool over low flow point in existing track and shift track to the east	Bass Coast Shire Council
3.18	Install culverts under track at junction point to allow flow through of overland flows, repair existing erosion damage and ensure access during wet periods	Bass Coast Shire Council



**Ayr Creek Reserve - reach 3  
Second footbridge to Nesci Court track junction**



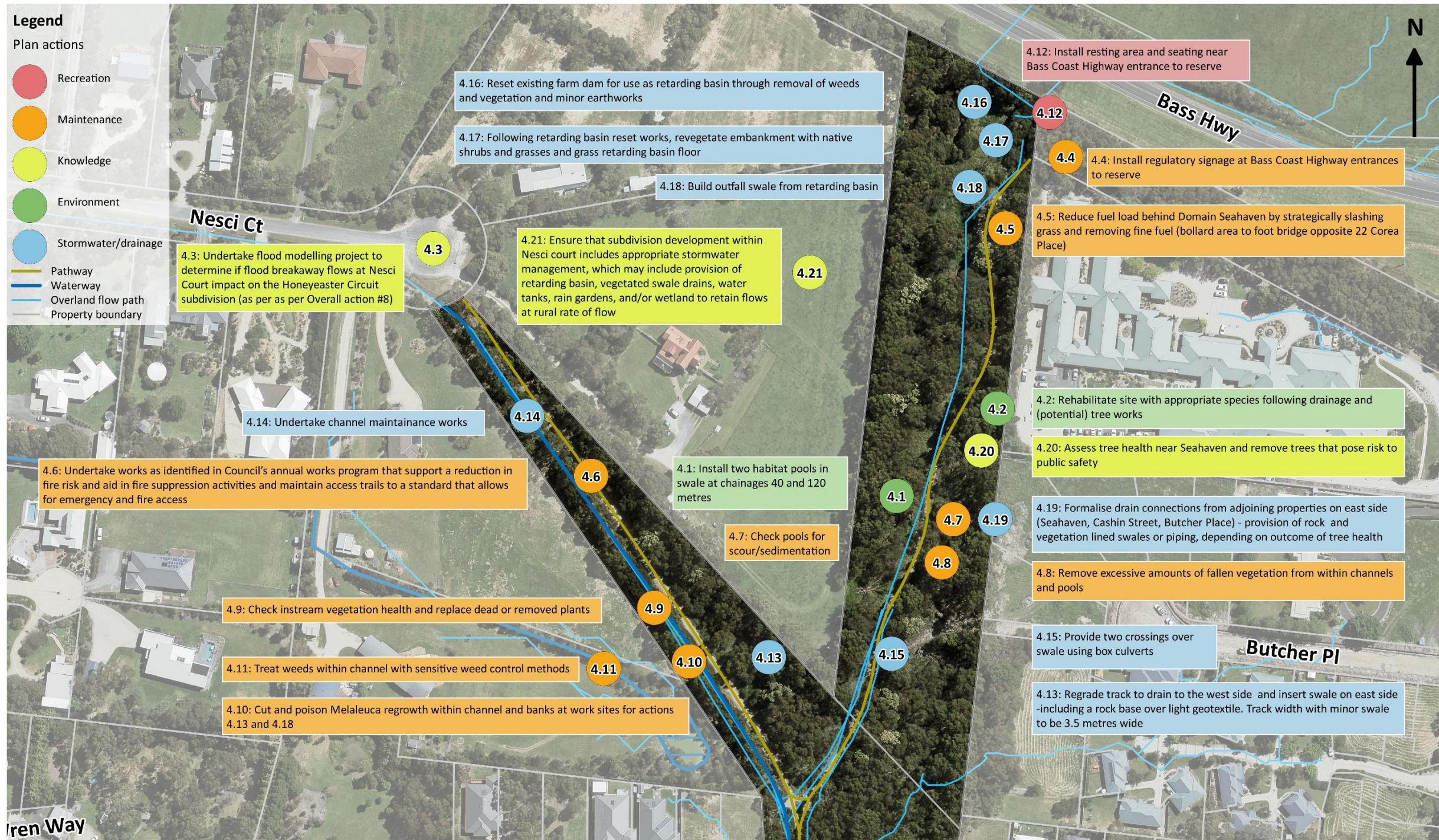
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## Action plan reach 4

Activity No.	Reach 4 – Activity	Responsibility
4.1	Install two habitat pools in swale at chainages 40m and 120m	Bass Coast Shire Council
4.2	Rehabilitate site with appropriate species following drainage and (potential) tree works	Bass Coast Shire Council
4.3	Undertake flood modelling project to determine if flood breakaway flows at Nesci Court impact on the Honeyeater Circuit subdivision (as per as per Overall action 9)	Bass Coast Shire Council
4.4	Install regulatory signage at Bass Coast Highway entrances to reserve	Bass Coast Shire Council
4.5	Reduce fuel load behind Domain Seahaven by strategically slashing grass and removing fine fuel (bollard area to foot bridge opposite 22 Corea Place)	Bass Coast Shire Council
4.6	Undertake works as identified in Council's annual works program that support a reduction in fire risk and aid in fire suppression activities and maintain access trails to a standard that allows for emergency and fire access	Bass Coast Shire Council
4.7	Check pools for scour/sedimentation and rectify	Bass Coast Shire Council

Activity No.	Reach 4 – Activity	Responsibility
4.8	Remove excessive amounts of fallen vegetation from within channels and pools	Bass Coast Shire Council
4.9	Check instream vegetation health and replace dead or removed plants	Bass Coast Shire Council
4.10	Cut and poison Melaleuca regrowth within channel and banks at work sites for actions 4.13 and 4.18	Bass Coast Shire Council
4.11	Treat weeds within channel with sensitive weed control methods	Bass Coast Shire Council
4.12	Install resting area and seating near Bass Coast Highway entrance to reserve	Bass Coast Shire Council
4.13	Regrade track to drain to the west side and insert swale on east side -including a rock base over light geotextile. Track width with minor swale to be 3.5 metres wide	Bass Coast Shire Council
4.14	Undertake channel maintenance works	Bass Coast Shire Council
4.15	Provide two crossings over swale using box culverts	Bass Coast Shire Council

Activity No.	Reach 4 – Activity	Responsibility
4.16	Reset existing farm dam for use as retarding basin through removal of weeds and vegetation and minor earthworks	Bass Coast Shire Council
4.17	Following retarding basin reset works, revegetate embankment with native shrubs and grasses and grass retarding basin floor	Bass Coast Shire Council
4.18	Build outfall swale from retarding basin and bring under track down east side	Bass Coast Shire Council
4.19	Formalise drain connections from adjoining properties on east side (Seahaven, Cashin Street, Butcher Place) - provision of rock and vegetation lined swales or piping, depending on outcome of tree health assessment	Bass Coast Shire Council
4.20	Assess tree health near Seahaven and remove trees that pose risk to public safety	Bass Coast Shire Council
4.21	Ensure that subdivision development within Nesci court includes appropriate storm water management, which may include provision of retarding basin, vegetated swale drains, water tanks, rain gardens, and/or wetland to retain flows at rural rate of flow	Bass Coast Shire Council



**Ayr Creek Reserve - reach 4  
Nesci Court track junction to Bass Coast Highway**



(c) Bass Coast Shire Council 2016

## Overall actions

Activity No.	Overall actions	Responsibility
1	Undertake annual planning for volunteer group works (through a site walk with volunteers) and complete the "Annual action sheet for environmental volunteer groups"	Bass Coast Shire Council
2	Develop a summary document of the annual works program for the Ayr Creek Reserve	Bass Coast Shire Council
3	Engage residents and reserve users with information/aids regarding responsible use of the reserve with dogs	Bass Coast Shire Council
4	Develop and/or engage with community about Open Space Management Standards for Ayr Creek Reserve.	Bass Coast Shire Council
5	Update the Ayr Creek Reserve walking trail brochure. Include recommended pathway to beach via Evergreen Avenue	Bass Coast Shire Council
6	Install signage indicating intersections of shared pathway and roads. Key sites are Toorak Road and Royal Parade, other sites should be investigated. Signage to target both pathway users and drivers	Bass Coast Shire Council
7	Undertake waterbird and terrestrial bird survey through reserve at year 1 and year 5	Bass Coast Shire Council



Activity No.	Overall actions	Responsibility
8	Continue to review projected climatic conditions within the reserve as a result of climate change - i.e. rainfall, suitable vegetation types, storm flows, rainfall intensity	WGCMA
9	Undertake flood study	Bass Coast Shire Council
10	Implement best practice drainage practices for the Ayr Creek Reserve, along with long term planning for development in the catchment.	Bass Coast Shire Council
11	Work within the planning guidelines to identify opportunities to enhance reserve size or features and maintain character of the reserve when considering subdivision planning approvals	Bass Coast Shire Council
12	Undertaken mid-term review of the Ayr Creek Management Plan in 2019 and final review in 2021	Bass Coast Shire Council
13	Undertake detailed mapping and identification of weed and non-indigenous species within the reserve and prioritise removal and replacement in annual works program	Bass Coast Shire Council
14	Undertake detailed assessment of vegetation communities within reserve and identify appropriate future revegetation zones and species based on projected changes to hydrology and climate	Bass Coast Shire Council
15	Undertake maintenance of grassed areas, bushland, paths and park furniture in accordance with agreed maintenance schedule	Bass Coast Shire Council

Activity No.	Overall actions	Responsibility
16	Maintain public safety through management of overhanging vegetation near tracks	Bass Coast Shire Council
17	Continue annual fire management planning in conjunction with CFA and emergency management.	Bass Coast Shire Council
18	When planning new revegetation programs, use appropriate plant species and take into account surrounding infrastructure.	Bass Coast Shire Council
17	Undertake audit to understand what is needed to upgrade paths and entrances to reserve to ensure it is suitable for access by people with limited mobility and mobility aids. Implement recommendations following audit	Bass Coast Shire Council
18	Ensure that resting areas and seats are suitable for people with limited mobility and mobility aids	Bass Coast Shire Council
19	Inform community before capital works commence on Ayr Creek Reserve through Council webpage and social media	Bass Coast Shire Council

## Monitoring, evaluation and review of the plan

Monitoring, evaluation and reporting (MER) are integral components of natural resource management programs. A simple MER approach is recommended for this plan.

To determine the effectiveness of the plan, it is recommended that BCSC produce:

- A short implementation report for the community every year outlining:
  - a summary of activities completed
  - a summary of key issues or events that occurred within the reserve.
- A mid-term review report (2019) of implementing the plan, including:
  - the findings from the short annual implementation reports
  - progress against the activity targets
  - review of stakeholder participation and satisfaction.
- A final review (2022) of the implementation of the plan.

## APPENDIX A – Species present within Ayr Creek Reserve

### Native Flora

Common Name	Scientific Name
<b>Overstorey</b>	
Swamp Gum	<i>Eucalyptus ovata</i>
Messmate	<i>Eucalyptus obliqua</i>
Blackwood	<i>Acacia melanoxylon</i>
Silver Wattle	<i>Acacia dealbata</i>
Black Wattle	<i>Acacia mearnsii</i>
Coast Banksia	<i>Banksia integrifolia</i>
Coast Wattle	<i>Acacia sophorae or longifolia</i>
<b>Mid Storey</b>	
Sweet Bursaria	<i>Bursaria spinosa</i>
Swamp Paperbark	<i>Melaleuca ericifolia</i>
Prickly Tea-Tree	<i>Leptospermum continentale</i>
Shiny Cassinia	<i>Cassinia longifolia</i>
Common Cassinia	<i>Cassinia aculeata</i>
Tree Everlasting	<i>Ozothamnus ferrugineus</i>
Scented Paperbark	<i>Melaleuca squarrosa</i>
Prickly Moses	<i>Acacia verticillata</i>
Hop Goodenia	<i>Goodenia ovata</i>
Large Leaf Bush Pea	<i>Pultenaea daphnoides</i>
Kangaroo Apple	<i>Solanum aviculare</i>
Narrow Leaf Wattle (Sallow Wattle)	<i>Acacia mucronata</i>
Myrtle Wattle	<i>Acacia myrtifolia</i>
Scrub Sheoak	<i>Allocasuarina paludosa</i>

Common Name	Scientific Name
Golden Spray	<i>Viminaria juncea</i>
<b>Ground Covers</b>	
Tasman Flax-lily	<i>Dianella tasmanica</i>
Black-anther Flax-lily	<i>Dianella revoluta</i>
Spiny-headed Mat-rush	<i>Lomandra longifolia</i>
Tall Sword-sedge	<i>Lepidosperma elatius</i>
Long Purple-flag	<i>Patersonia occidentalis</i>
Thatch Saw-sedge	<i>Gahnia radula</i>
Common Tussock-grass	<i>Poa labillardieri</i>
Bower Spinach	<i>Tetragonia implexicoma</i>
Tall Sedge	<i>Carex appressa</i>
Weeping Grass	<i>Microlaena stipiodes</i>
<b>Water Plants</b>	
Water Ribbons	<i>Triglochin procerum</i>
Tall Rush	<i>Juncus procerus</i>
Swamp Clubrush	<i>Isolepis inundata</i>
Common Reed	<i>Phragmites australis</i>

Source: Ayr Creek Management Plan (2007)

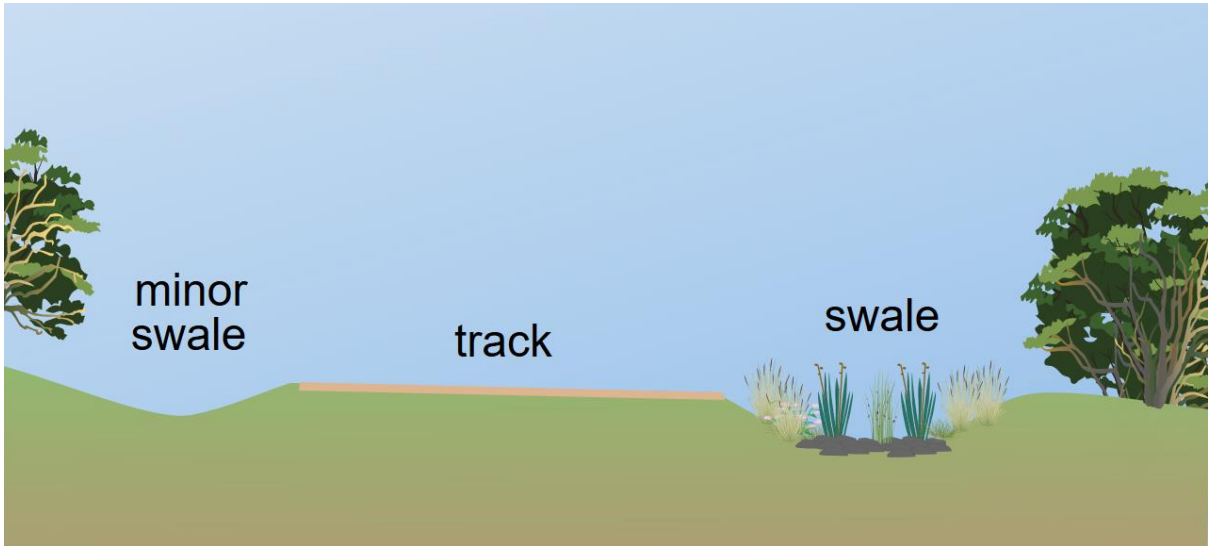
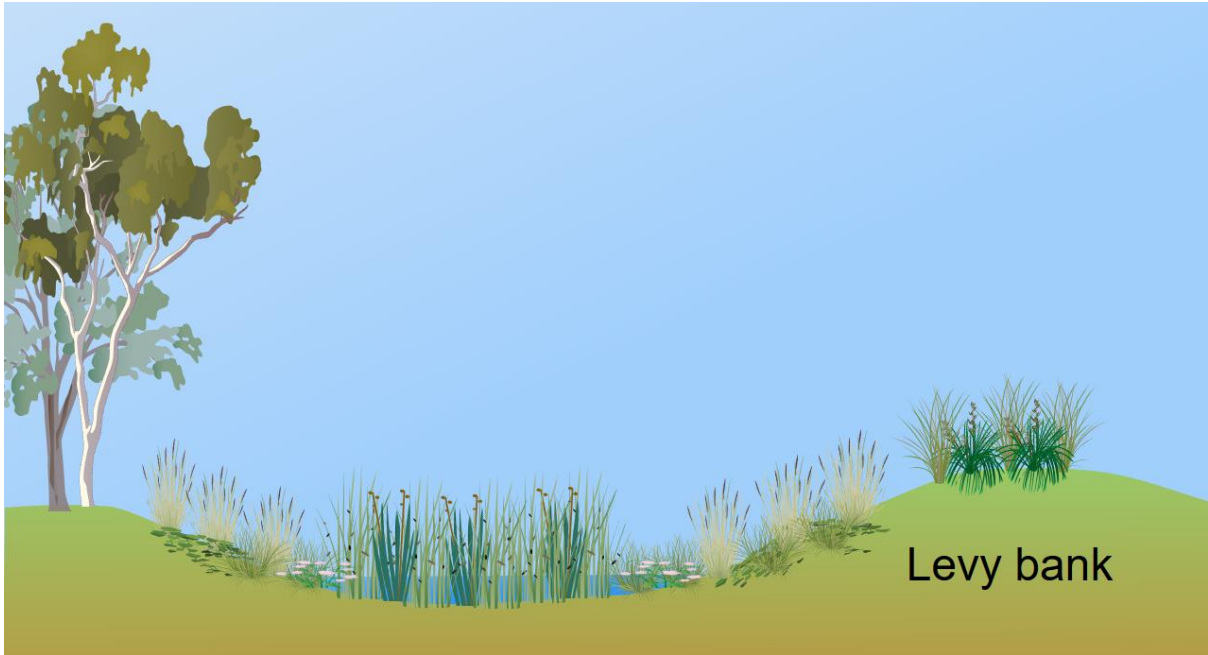
### Weed species within the reserve

Common Name	Scientific Name
Coast Wattle	<i>Acacia sophorae</i> or <i>longifolia</i>
Blackberry	<i>Rubus fruticosus</i> L. agg.
Thistle Spear	<i>Cirsium vulgare</i>
Sweet Pittosporum	<i>Pittosporum undulatum</i>
Onion Grass	<i>Romulea rosea</i> var. <i>australis</i>
Cape Weed	<i>Arcototherca calendula</i>
Milk Thistle	<i>Sonchus oleraceus</i>
Kikuyu Grass	<i>Pennisetum clandestinum</i>
Herb species such as oxalis	
Lawn and pasture grass species and flat weeds	

Source: Ayr Creek Management Plan (2007)

# APPENDIX B – Species recommended for planting along the modified waterway

Channel modification works are planned for drainage lines within the reserve and in some areas have already been undertaken. Follow up planting will be undertaken to restore the channel. The graphics below show the planned outcome.



The suggested species to be planted are listed below:

Common Name	Scientific Name	Density plants /m <sup>2</sup>
<b>Non Levee upper bank</b>		1
Manna Gum	<i>Eucalyptus viminalis</i>	
Swamp Gum	<i>Eucalyptus ovata</i>	
<b>Upper bank - levee</b>		6
Spiny-headed Matt-rush	<i>Lomandra longifolia</i>	
Black-anther Flax-lily	<i>Dianella revoluta</i>	
<b>Ephemeral Zone - 0.5-1.0 m above bed</b>		8
Tall Sedge	<i>Carex appressa</i>	
Bidgee Widgee	<i>Acaena novae-zelandiae</i>	
Creeping Bossiaea	<i>Bossiaea prostrata</i>	
<b>Toe to 0.5 m above bed</b>		6
Tall Sedge	<i>Carex appressa</i>	
Swamp Club-sedge	<i>Isolepis inundata</i>	
Swamp Stonecrop	<i>Crassula helmsii</i>	
Slender Knotweed	<i>Persicaria decipiens</i>	
<b>Bed</b>		6
Pale Rush	<i>Juncus pallidus</i>	
Rush	<i>Juncus articulatus</i> x	

Source: Ayr Creek Inverloch Waterway rehabilitation Project (Aquatic Systems 2016)



## APPENDIX C – Suggested vegetation species and communities for each reach within the reserve

Suggested EVCs for each reach are listed below, along with a broad description of the EVC. Vegetation planning at Ayr Creek Reserve needs to consider the impact on soil moisture and hydrology associated with the drainage/stormwater works along with the future impacts of climate change. It is likely that these will result in a significantly drier site, which is less likely to support species such as Swamp Paperbark (*Melaleuca ericaefolia*). Further information and suggested species can be found at <http://www.depi.vic.gov.au/environment-and-wildlife/biodiversity/evc-benchmarks#gipp> .

### Reach 1

#### **EVC 3: Damp sands herb-rich woodland**

Description:

A low, grassy or bracken-dominated eucalypt forest or open woodland to 15 m tall with a large shrub layer and ground layer rich in herbs, grasses, and orchids. Occurs mainly on flat or undulating areas on moderately fertile, relatively well-drained, deep sandy or loamy topsoils over heavier subsoils (duplex soils).

### Reach 2, 3 and 4

#### **EVC 16: Lowland forest**

Description:

Eucalypt forest to 20 m tall on relatively fertile, moderately well-drained soils in areas of relatively high rainfall. Characterised by the diversity of life forms and species in the understorey including a range of shrubs, grasses and herbs.

#### **EVC 8: Wet heathland**

Description:

A low, generally treeless heathland although sometimes emergent eucalypts may be present. Occurs on lower slopes, flats or depressions, which are infertile and subjected to prolonged water logging. Understorey is often dominated by a range of sedges, grasses and shrubs.



### **EVC 83: Swampy Riparian Woodland**

#### Description:

Woodland to 15 m tall generally occupying low energy streams of the foothills and plains. The lower strata are variously locally dominated by a range of large and medium shrub species on the stream levees in combination with large tussock grasses and sedges in the ground layer.