

PART D

REGIONAL WORKS PROGRAM & STRATEGY IMPLEMENTATION



PART D: REGIONAL WORKS PROGRAM & STRATEGY IMPLEMENTATION

Part D describes the process for developing targets including long-term resource condition targets (8+ years), management outcome targets (1-8 years) and management outputs (annually), describes the eight-year work plan for priority waterways in each of the six Waterway Management Areas to achieve targets, and describes the delivery approach and outlines monitoring, evaluation and reporting approach of strategy implementation.

SUMMARY OF SECTIONS IN PART D

4.1 REGIONAL WORK PROGRAM 2014-2022	See page 72.
4.2 COASTAL WATERWAY MANAGEMENT AREA	<p>Establishes a work program for priority waterways in each. Waterway Management Area. The program:</p> <ul style="list-style-type: none"> • identifies values and threats of each waterway • identifies long-term resource condition outcomes • identifies Management Outcome Targets • identifies Management Activities to be undertaken and estimates the quantity and cost associated with works • identifies lead organisation and partners for implementing actions. <p>See pages 73, 105, 132, 149, 159, 169.</p>
4.3 LOWER GLENELG WATERWAY MANAGEMENT AREA	
4.4 UPPER GLENELG WATERWAY MANAGEMENT AREA	
4.5 UPPER HOPKINS WATERWAY MANAGEMENT AREA	
4.6 VOLCANIC PLAINS WATERWAY MANAGEMENT AREA	
4.7 WANNON WATERWAY MANAGEMENT AREA	



SUMMARY OF SECTIONS IN PART D (CONTINUED)

4.8 ESTIMATED EIGHT-YEAR WORK PROGRAM BUDGET	<p>Provides an estimate of an eight-year work program budget including monitoring and maintenance.</p> <p>See page 189.</p>
4.9 DELIVERING THE STRATEGY	<p>Outlines principles that direct implementation of the work program including:</p> <ul style="list-style-type: none"> • description of the tools available to deliver the strategy • an outline of roles and responsibilities of partners • a description of the role of regulation • an outline of management of non-priority waterways. <p>See page 190.</p>
4.10 MONITORING, REPORTING AND EVALUATION	<p>Describes the program to monitor, evaluate and report on progress towards implementing the strategy</p> <p>Identifies process for addressing knowledge gaps that limit the effectiveness of program delivery.</p> <p>See page 197.</p>

*Opposite left: Fencing and revegetation project. Opposite right: Electrofishing fish surveys along the Glenelg River.
Below left: Glenelg estuary, Nelson. Below right: Fitzroy River estuary mouth Tyrendarra.*



Photo: Vin Gannon

4.1 REGIONAL WORK PROGRAM 2014-2022

The Regional Work Program identifies management activities that best contribute to maintaining and improving the values associated with each priority waterway.

The activities are derived using logic models and based on the best available information. A risk assessment process enables threats specific to the values of each waterway to be addressed whilst a feasibility assessment ensures that the selected management activities are achievable.

Lead agencies and partners for delivery of activities are included in work program tables. Lead agencies have a legislative or core responsibility to undertake the works. Only partners with a primary supporting role are listed. Other groups and organisations such as Landcare, industry groups and non-government organisations may also contribute to the implementation of activities

An Implementation Plan will be developed to guide the delivery of the works program. The plan will provide an opportunity to prioritise activities, review and refine outputs, identify potential funding opportunities and confirm delivery partners (see 4.9).

Below: Platypus. Photo: Tim Chandler



4.2 COASTAL WATERWAY MANAGEMENT AREA

The Coastal Waterway Management Area includes estuaries with some immediately upstream freshwater reaches, and wetlands along the entire CMA coast. Land use in the coastal area is mostly for agriculture, predominantly dairy. Coastal waterways are popular with residents and visitors and support a range of recreational activities including fishing, boating, bird watching and swimming.

Threats to the waterways include nutrient and sediment input from both local and upstream sources. Many wetlands are subject to draining, clearing and uncontrolled grazing. Estuaries, which are often close to settlements, are subject to threats associated with urban development.

The major river, estuary and wetland assets in the Coastal Waterway Management Area are as follows.

Brucknell Creek: A tributary of the Hopkins River, it has large sections of intact riparian vegetation including swamp scrub. It supports a high proportion of native fish including Australian grayling, river blackfish, western crayfish and Yarra pygmy perch.

Hopkins River estuary: The estuary is highly valued for recreation and is used for swimming, water skiing and rowing. It is an important nursery area for fish and is recognised under the Go Fishing in Victoria Program as a premier fishing reach. The estuary has significant Indigenous cultural values and forms the border for the Gunditj Mara, Kirrae Whurrong and Tjap Whurrong people.

Lower Merri River and estuary: The proximity of the reaches to the large centre of Warrnambool makes the river and estuary a popular fishing destination. The estuary has two channels to the sea; one flows to Stingray Bay in Warrnambool and another section flows through the DIWA-listed Lower Merri Wetlands and exits at Rutledges Cutting. The wetlands support the EPBC-listed orange-bellied parrot and migratory bird species protected under international agreements.

Lower Surry River and estuary: Both reaches are regionally important fishing destinations. The river has stretches of riparian vegetation in excellent condition. The estuary supports rare and threatened bird species such as the Australasian bittern and intermediate egret.

Lower Moyne River and estuary: The Moyne system has high social and economic values. The system supports an operational port and has very high recreational use particularly for fishing and boating. The estuary and Belfast Lough wetland contain significant EVCs such as saltmarsh and support rare and threatened bird species such as the fairy tern and intermediate egret.

Darlot Creek and lower Fitzroy River and estuary: These waterways have very high cultural values and are part of the Budj Bim National Heritage Landscape. The waterways support rare and threatened species such as the Australasian bittern, intermediate egret, growling grass frog and Glenelg spiny crayfish.

Glenelg River estuary: The Glenelg estuary is listed as a heritage river under the *Heritage Rivers Act* and is DIWA listed. The estuary has intact riparian vegetation in excellent condition and supports rare and threatened species such as the Glenelg spiny crayfish and migratory bird species protected under international agreements such as the fairy tern. The estuary has very high recreational values and is used for swimming, boating and fishing.

Moleside Creek: This creek flows into the Glenelg River estuary. It is a popular area for fishing and camping and supports rare and threatened species such as the Glenelg spiny crayfish.

Lower Eumerella River and Yambuk Lake: This system is a regionally important tourist destination, particularly popular for fishing and boating. The system is a DIWA-listed wetland supporting many rare and threatened bird species such as Australasian bittern, great knot and little egret, and fish species such as Yarra pygmy perch.

Wattle Hill Creek: This creek flows into Fawthrop Lagoon at Portland. A channel drains from the lagoon to the sea. The system supports rare and threatened bird species such as Australasian bittern and great knot.

In addition, to the estuarine wetlands, there are a number of coastal wetlands such as **Long Swamp complex, Bridgewater Lakes, Tower Hill and Lake Condah**. These are described in more detail in *Tables 25, 27, 29 and 31*, respectively.

4.2 (CONTINUED)



Figure 16. Coastal Waterway Management Area indicating priority rivers and estuaries.

Below left: Brucknell Creek

Below right: Yarra Pygmy Perch. Photo: Tarmo A Raadick



4.2.1 RIVERS WITHIN THE COASTAL MANAGEMENT AREA

Table 8. Brucknell Creek (reach 36-13) work program

Basin: HOPKINS		Management Area: COASTAL		
Waterway: BRUCKNELL CREEK		Identification No: 36-13		
Values linked to regional goals				
Significant Invertebrates Riparian (1), Significant Invertebrates Aquatic (5), Significant Fish Non Migratory (4), Significant Fish Migratory (4)				
Long-term resource condition outcomes				
29 - To minimise the probability of extinction and ensure long-term survival of Yarra pygmy perch in the wild and to increase the probability of important populations becoming self-sustaining in the long-term				
30 - To minimise the probability of extinction of the Australian grayling in the wild and to increase the probability of important populations becoming self-sustaining in the long-term				
Management outcome targets				
a - The large riparian trees value has improved to moderate condition				
b - The low flow magnitude threat score has reduced from very high to high				
c - The invasive riparian flora (ground layer) threat will be reduced from moderate to low				
d - There is a reduction in the length of waterway affected by livestock access				
e - There is no increase in the threat of loss of in-stream habitat through sedimentation				
f - Riparian vegetation width improves to between 10 and 30 metres on average across the length of the reach				
Threats addressed by work program				
Degraded Riparian Vegetation – Large Trees (5), Increase in Low Flow Magnitude (5), Invasive Flora (Riparian) – Ground Layer (3), Livestock Access (3), Loss of In-stream Habitat (Sediment) (3), Reduced Vegetation Width (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
36-13.1	Install fence (includes works in reach 36-14)	10 km	landholders / CMA	d, e
36-13.2	Establish stewardship/landholder agreement	10 ha	landholders / CMA	f
36-13.3	Develop Waterway Action Plan	1 no.	CMA	b
36-13.4	Participate in bulk entitlement, licensing and management rule review process	1 no.	CMA	b
36-13.5	Establish native indigenous vegetation	5 ha	landholders / CMA	a, e
36-13.6	Enhance native indigenous vegetation	5 ha	landholders / CMA	a
36-13.7	Establish grass buffer strip	15 ha	landholders / CMA	e
36-13.8	Maintain non-woody weed control	5 ha	land managers / CMA	c

4.2.1 (CONTINUED)

Table 9. Merri River (reach 36-38) work program

Basin: HOPKINS		Management Area: COASTAL		
Waterway: MERRI RIVER		Identification No: 36-38		
Values linked to regional goals				
Recreational Fishing (5)				
Long-term resource condition outcomes				
06 - Maintain the recreational fishing value of assets listed as popular fisheries in a Regional Fishery Management Plan or as a ‘best fishing water’ in A Guide to Angling Inland Waters of Victoria				
Management outcome targets				
a - The large riparian trees value has improved to very good condition				
b - The low flow magnitude threat score has reduced from very high to high				
c - The proportion of zero flow threat score has reduced from moderate to low				
d - The invasive riparian flora (ground layer) threat will be reduced from moderate to low				
e - The invasive riparian trees threat will be reduced from moderate to very low				
f - There is a reduction in the length of waterway affected by livestock access				
g - There is no increase in the threat of loss of in-stream habitat through sedimentation				
Threats addressed by work program				
Degraded Riparian Veg – Large Trees (5), Degraded Water Quality (5), Disturbance of Acid Sulfate Soils (5), Increase in Low Flow Magnitude (5), Increase in Proportion of Zero Flow (3), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (3), Invasive Flora (Riparian) – Tree Layer (3), Livestock Access (3), Loss of In-stream Habitat (Sediment) (3), Reduced Riparian Connectivity (4), Reduced Vegetation Width (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
36-38.1	Undertake dairy best management practice program	500 ha	DEPI / dairy industry / landholders	g
36-38.2	Implement best practice urban stormwater management	500 ha	Warrnambool City Council	n/a
36-38.3	Ensure that works on waterways permits consider management of acid sulfate soils	1 no.	CMA	n/a
36-38.4	Ensure that planning decisions consider management of acid sulfate soils	1 no.	Warrnambool City Council	n/a
36-38.5	Install riparian fence	2 km	landholders / CMA	f
36-38.6	Establish stewardship/landholder agreement	9 ha	landholders / CMA	f
36-38.7	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	9 ha	land managers	n/a
36-38.8	Participate in bulk entitlement, licensing and management rule review process	1 no.	CMA	b, c
36-38.9	Establish native indigenous vegetation	2 ha	landholders / CMA	a, g
36-38.10	Maintain grass buffer strip	5 ha	landholders / CMA	g
36-38.11	Establish non-woody weed control	2 ha	land managers / CMA	d
36-38.12	Establish woody weed control	5 ha	land managers / CMA	e

4.2.1 (CONTINUED)

Table 10. Surry River (reaches 37-03, 37-04 and 37-05) work program

Basin: PORTLAND COAST		Management Area: COASTAL		
Waterway: SURRY RIVER		Identification No: 37-03		
Values linked to regional goals				
Recreational Fishing (5)				
Long-term resource condition outcomes				
06 - Maintain the recreational fishing value of assets listed as popular fisheries in a Regional Fishery Management Plan or as a 'best fishing water' in A Guide to Angling Inland Waters of Victoria				
Management outcome targets				
a - No artificial barrier to fish migration exists				
b - The low flow magnitude threat score has improved from moderate to low				
c - The invasive riparian flora (ground layer) threat will be reduced from high to moderate				
d - There is no increase in the threat of loss of in-stream habitat through sedimentation				
e - Riparian vegetation width improves to between 10 and 30 metres on average across the length of the reach				
Threats addressed by work program				
Barriers to Fish Migration (5), Degraded Water Quality (5), Disturbance of Acid Sulfate Soils (5), Increase in Low Flow Magnitude (3), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (4), Loss of In-stream Habitat (Sediment) (3), Reduced Vegetation Width (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
37-03.1	Implement dairy best management practice program including pasture management	1,000 ha	DEPI / dairy industry / landholders	n/a
37-03.2	Implement dairy best management practice program including nutrient management	1,000 ha	DEPI / dairy industry / landholders	n/a
37-03.3	Ensure appropriate dairy effluent management controls are in place	1 no.	EPA Victoria / DEPI	n/a
37-03.4	Ensure works on waterways decisions consider acid sulfate soils	1 no.	CMA	n/a
37-03.5	Ensure planning decisions consider acid sulfate soils	1 no.	Glenelg Shire Council	n/a
37-03.6	Remove channel	1 no.	waterway manager / CMA	n/a
37-03.7	Remove drain	1 no.	waterway manager / CMA	n/a
37-03.8	Install riparian fence	3.5 km	landholders / CMA	n/a
37-03.9	Establish stewardship/landholder agreement	3.5 ha	landholders / CMA	e
37-03.10	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	14 ha	land managers	n/a
37-03.11	Participate in bulk entitlement, licensing and management rule review process	1 no.	CMA	b
37-03.12	Establish native indigenous vegetation	3.5 ha	landholders / CMA	d
37-03.13	Establish grass buffer strip	3.5 ha	landholders / CMA	n/a
37-03.14	Maintain grass buffer strip	3.5 ha	landholders / CMA	n/a
37-03.15	Modify fishway	1 no.	waterway manager / CMA	a
37-03.16	Establish non-woody weed control	8.4 ha	land managers / CMA	c

4.2.1 (CONTINUED)

Waterway: SURRY RIVER		Identification No: 37-04		
Values linked to regional goals				
Recreational Fishing (5)				
Long-term resource condition outcomes				
06 - Maintain the recreational fishing value of assets listed as popular fisheries in a Regional Fishery Management Plan or as a ‘best fishing water’ in A Guide to Angling Inland Waters of Victoria				
Management outcome targets				
a - The large riparian tree value has improved to excellent condition				
b - The low flow magnitude threat score has improved from moderate to low				
c - The invasive riparian flora (ground layer) threat will be reduced from high to moderate				
d - There is no increase in the threat of loss of in-stream habitat through sedimentation				
e - Riparian vegetation width improves to between 10 and 30 metres on average across the length of the reach				
Threats addressed by work program				
Degraded Riparian Veg – Large Trees (5), Disturbance of Acid Sulfate Soils (5), Increase in Low Flow Magnitude (3), Invasive Fauna (Aquatic) (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (4), Loss of In-stream Habitat (Large Wood) (4), Loss of In-stream Habitat (Sediment) (3), Reduced Riparian Connectivity (3), Reduced Vegetation Width (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
37-04.1	Refer 37-03.1: Implement dairy best management practice program including pasture management			d
37-04.2	Refer 37-03.2: Implement dairy best management practice program including nutrient management			b
37-04.3	Remove channel	1 no.	waterway manager / CMA	n/a
37-04.4	Establish stewardship/landholder agreement	8 ha	landholders / CMA	e
37-04.5	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	32 ha	land managers	n/a
37-04.6	Refer 37-03.11: Participate in bulk entitlement, licensing and management rule review process			b
37-04.7	Refer 37-03.11:	1 no.	waterway manager / CMA	a, d
37-04.8	Participate in bulk entitlement, licensing and management rule review process	1 no.	landholders / CMA	c

4.2.1 (CONTINUED)

Waterway: SURRY RIVER		Identification No: 37-05		
Values linked to regional goals				
Significant EVCs (5), Riparian Vegetation Condition (5)				
Long-term resource condition outcomes				
10 - Riparian vegetation condition is maintained in excellent condition				
Management outcome targets				
a - The large riparian trees value has improved to excellent condition				
b - The invasive riparian flora (ground layer) threat will be reduced from moderate to low				
Threats addressed by work program				
Degraded Riparian Veg - Large Trees (4), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) - Ground Layer (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
37-05.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	42 ha	land managers	n/a
37-05.2	Establish native indigenous vegetation	10.5 ha	landholders / CMA	a
37-05.3	Establish non-woody weed control	17 ha	land managers / CMA	b

Below left: Surry River estuary.
Below right: Glenelg River.



4.2.1 (CONTINUED)

Table 11. Fitzroy River (reach 37-07) work program

Basin: PORTLAND COAST		Management Area: COASTAL		
Waterway: FITZROY RIVER		Identification No: 37-07		
Values linked to regional goals				
Significant Birds Waterway (5), Significant Amphibians (5)				
Long-term resource condition outcomes				
11 - Secure extant populations of growling grass frogs, particularly those occurring in known breeding habitats, and improve their viability through increases in size and/or area of occurrence				
26 - To maintain the existing population and to rehabilitate former breeding sites				
Management outcome targets				
a - No artificial barrier to fish migration exists				
b - The large riparian trees value has improved to very good condition				
c - The low flow magnitude threat score has reduced from high to moderate				
d - The invasive riparian flora (ground layer) threat will be reduced from moderate to low				
e - There is a reduction in the length of waterway affected by livestock access				
f - There is no increase in the threat of loss of in-stream habitat through sedimentation				
g - Riparian vegetation width improves to between 10 and 30 metres on average across the length of the reach				
Threats addressed by work program				
Barriers to Fish Migration (5), Degraded Riparian Vegetation – Large Trees (5), Degraded Water Quality (5), Disturbance of Acid Sulfate Soils (5), Increase in Low Flow Magnitude (4), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (3), Livestock Access (3), Loss of In-stream Habitat (Large Wood) (4), Loss of In-stream Habitat (Sediment) (3), Reduced Riparian Connectivity (3), Reduced Vegetation Width (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
37-07.1	Implement dairy best management practice program including pasture management	500 ha	DEPI / dairy industry / landholders	n/a
37-07.2	Implement dairy best management practice program including nutrient management	500 ha	DEPI / dairy industry / landholders	n/a
37-07.3	Ensure that acid sulfate soils are considered in planning decisions	1 no.	Glenelg Shire Council	n/a
37-07.4	Ensure that acid sulfate soils are considered in works on waterway decisions	1 no.	CMA	n/a
37-07.5	Participate in bulk entitlement, licensing and management rule review process	1 no.	CMA	n/a
37-07.6	Install riparian fence	10 km	landholders / CMA	e
37-07.7	Establish grazing exclusion	22 ha	landholders / CMA	b
37-07.8	Establish stewardship/landholder agreement	4 ha	landholders / CMA	e, g
37-07.9	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	5 ha	land managers	n/a
37-07.10	Establish native indigenous vegetation	22 ha	landholders / CMA	b, f
37-07.11	Construct rock ramp fishway over two stream gauging sites	2 no.	waterway managers / CMA	a
37-07.12	Establish non-woody weed control	4 ha	land managers / CMA	d
37-07.13	Develop Waterway Management Plan	See 37-206.6		n/a

4.2.1 (CONTINUED)

Table 12. Darlot Creek (reach 37-09) work program

Basin: PORTLAND COAST		Management Area: COASTAL		
Waterway: DARLOT CREEK		Identification No: 37-09		
Values linked to regional goals				
Significant Invertebrates Aquatic (5)				
Long-term resource condition outcomes				
24 - To guarantee that the Glenelg spiny crayfish can survive, flourish and retain its potential for evolutionary development in the wild				
Management outcome targets				
a - The large riparian trees value has improved to good condition				
b - The invasive riparian flora (ground layer) threat will be reduced from moderate to low				
c - The invasive riparian trees threat will be reduced from moderate to very low				
d - The length of waterway affected by livestock access is maintained below 25%				
e - The in-stream habitat associated with large wood improved from poor habitat to good habitat				
f - There is no increase in the threat of loss of in-stream habitat through sedimentation				
Threats addressed by work program				
Degraded Riparian Veg - Large Trees (5), Disturbance of Acid Sulfate Soils (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) - Ground Layer (3), Invasive Flora (Riparian) - Tree Layer (3), Livestock Access (1), Loss of In-stream Habitat (Large Wood) (4), Loss of In-stream Habitat (Sediment) (3), Reduced Riparian Connectivity (3), Reduced Vegetation Width (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
37-09.1	Ensure acid sulfate soils are considered in work on waterways decisions	1 no.	CMA	n/a
37-09.2	Ensure acid sulfate soils are considered in planning decisions	1 no.	Glenelg Shire Council	n/a
37-09.3	Install riparian fence	10 km	landholders / CMA	d
37-09.4	Undertake management of wild deer	76 ha	land managers	n/a
37-09.5	Establish native indigenous vegetation	10 ha	landholders / CMA	a, f
37-09.6	Install in-stream large wood	1 km	waterway managers / CMA	e
37-09.7	Establish non-woody weed control	5 ha	land managers / CMA	b
37-09.8	Establish woody weed control	8 ha	land managers / CMA	c

4.2.1 (CONTINUED)

Table 13. Eumeralla River (reach 37-11) work program

Basin: PORTLAND COAST		Management Area: COASTAL		
Waterway: EUMERALLA RIVER		Identification No: 37-11		
Values linked to regional goals				
Recreational Fishing (5)				
Long-term resource condition outcomes				
06 - Maintain the recreational fishing value of assets listed as popular fisheries in a Regional Fishery Management Plan or as a ‘best fishing water’ in A Guide to Angling Inland Waters of Victoria				
Management outcome targets				
a - Bank stability is maintained				
b - The large riparian trees value has improved to very good condition				
c - The invasive riparian flora (ground layer) threat will be reduced from very high to high				
d - Livestock have been excluded from over 50% of the waterway frontage				
e - There is no increase in the threat of loss of in-stream habitat through sedimentation				
f - Riparian vegetation width improves to between 10 and 30 metres on average across the length of the reach				
Threats addressed by work program				
Bank Instability (3), Degraded Riparian Veg - Large Trees (5), Disturbance of Acid Sulfate Soils (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) - Ground Layer (5), Livestock Access (5), Loss of In-stream Habitat (Large Wood) (5), Loss of In-stream Habitat (Sediment) (3), Reduced Riparian Connectivity (3), Reduced Vegetation Width (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
37-11.1	Ensure that acid sulfate soils are considered in works on waterways decisions	1 no.	CMA	n/a
37-11.2	Ensure that acid sulfate soils are considered in planning decisions	1 no.	Moyne Shire	n/a
37-11.3	Install riparian fence	10 km	landholders / CMA	d
37-11.4	Establish stewardship/landholder agreement	37.5 ha	landholders / CMA	d, f
37-11.5	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	100 ha	land managers	n/a
37-11.6	Establish native indigenous vegetation	10 ha	landholders / CMA	a, b, e
37-11.7	Establish non-woody weed control	4 ha	land managers / CMA	c

4.2.1 (CONTINUED)

Table 14. Moyne River (reach 37-16) work program

Basin: PORTLAND COAST		Management Area: COASTAL		
Waterway: MOYNE RIVER		Identification No: 37-16		
Values linked to regional goals				
Recreational Fishing (5)				
Long-term resource condition outcomes				
06 - Maintain the recreational fishing value of assets listed as popular fisheries in a Regional Fishery Management Plan or as a ‘best fishing water’ in A Guide to Angling Inland Waters of Victoria				
Management outcome targets				
a - The low flow magnitude threat score has improved from moderate to low				
Threats addressed by work program				
Disturbance of Acid Sulfate Soils (5), Increase in Low Flow Magnitude (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
37-16.1	Ensure that acid sulfate soils are considered in works on waterways decisions	1 no.	CMA	n/a
37-16.2	Ensure that acid sulfate soils are considered in planning permit decisions	1 no.	Moyne Shire	n/a
37-16.3	Investigate opportunities to improve fish habitat	1 no.	CMA / DEPI - Fisheries	a

Table 15. Moleside Creek (reach 38-14) work program

Basin: GLENELG		Management Area: COASTAL		
Waterway: MOLESIDE CREEK		Identification No: 38-14		
Values linked to regional goals				
Significant Invertebrates Aquatic (5), Significant Birds Riparian (5)				
Long-term resource condition outcomes				
24 - To guarantee that the Glenelg spiny crayfish can survive, flourish and retain its potential for evolutionary development in the wild				
Management outcome targets				
a - The low flow magnitude threat score has reduced from very high to high				
Threats addressed by work program				
Increase in Low Flow Magnitude (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-14.1	Participate in bulk entitlement, licensing and management rule review process	1 no.	CMA	a

4.2.2 ESTUARIES WITHIN THE COASTAL MANAGEMENT AREA

Table 16. Hopkins River estuary (reach 36-201) work program

Basin: HOPKINS		Management Area: COASTAL		
Waterway: HOPKINS RIVER		Identification No: 36-201		
Values linked to regional goals				
Recreational Fishing (5), Significant Birds (5)				
Long-term resource condition outcomes				
02 - By 2033, improve the condition of estuaries across the region				
06 - Maintain the recreational fishing value of assets listed as popular fisheries in a Regional Fishery Management Plan or as a ‘best fishing water’ in A Guide to Angling Inland Waters of Victoria				
Management outcome targets				
a - Bank stability is maintained				
b - The estuarine vegetation has improved to very good condition				
c - All artificial estuary mouth openings will be undertaken using a risk approach and considering multiple objectives				
d - The invasive riparian flora (ground layer) threat will be reduced from moderate to low				
e - There is a reduction in the length of waterway affected by livestock access				
Threats addressed by work program				
Bank Instability (3), Degraded Estuarine Vegetation (3), Degraded Water Quality (5), Intermittently Open Estuaries (0), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (3), Livestock Access (3), Reduced Floodplain and Wetland Connectivity (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
36-201.1	Implement best practice urban stormwater management to manage sediment input to the waterway	1 no.	Warrnambool City Council	n/a
36-201.2	Implement best practice urban stormwater management to manage sediment input to the waterway through appropriate licensing and compliance of discharge to the waterway	1 no.	EPA Victoria	n/a
36-201.3	Install riparian fence	5 km	landholders / CMA	e
36-201.4	Implement EEMSS (including new telemetry station)	1 no.	CMA / land managers	c
36-201.5	Establish native indigenous vegetation	5 ha	landholders / CMA	a, b
36-201.6	Establish woody weed control	3 ha	land managers / CMA	d

4.2.2 (CONTINUED)

Table 17. Merri River estuary (reach 36-238) work program

Basin: HOPKINS		Management Area: COASTAL		
Waterway: MERRI RIVER		Identification No: 36-238		
Values linked to regional goals				
Significant Birds (5)				
Long-term resource condition outcomes				
02 - By 2033, improve the condition of estuaries across the region				
Management outcome targets				
a - The estuarine vegetation has improved to very good condition				
b - The low flow magnitude threat score has reduced from very high to high				
c - There is a reduction in the length of waterway affected by livestock access				
Threats addressed by work program				
Degraded Estuarine Vegetation (3), Degraded Water Quality (5), Disturbance of Acid Sulfate Soils (5), Increase in Low Flow Magnitude (5), Invasive Fauna (Terrestrial) (5), Livestock Access (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
36-238.1	Investigate opportunities for permanent protection of wetlands though land purchase and stewardship payments	1,000 ha	CMA	b
36-238.2	Ensure flows to the estuary are considered in take and use licence decisions	1 no.	Southern Rural Water	b
36-238.3	Ensure that the risk of acid sulfate soils is considered in works on waterways decisions	1 no.	CMA	n/a
36-238.4	Ensure that the risk of acid sulfate soils is considered in planning decisions	1 no.	Warrnambool City Council	n/a
36-238.5	Install riparian fence	50 km	landholders / CMA	n/a
36-238.6	Implement controlled grazing regime in reaches 39, 40 and 43	50 ha	landholders / CMA	c
36-238.7	Implement EEMSS (including new telemetry station)	1 no.	CMA / land managers	a
36-238.8	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	215 ha	land managers	n/a
36-238.9	Participate in bulk entitlement, licensing and management rule review process	1 no.	CMA	a
36-238.10	Establish native indigenous vegetation	15 ha	landholders / CMA	a

4.2.2 (CONTINUED)

Table 18. Wattle Hill Creek estuary (reach 37-201) work program

Basin: PORTLAND COAST		Management Area: COASTAL		
Waterway: WATTLE HILL CREEK		Identification No: 37-201		
Values linked to regional goals				
Significant Birds (5)				
Long-term resource condition outcomes				
02 - By 2033, improve the condition of estuaries across the region				
26 - To maintain the existing population and to rehabilitate former breeding sites for Australasian Bittern				
Management outcome targets				
a - The low flow magnitude threat score has reduced from very high to high				
Threats addressed by work program				
Disturbance of Acid Sulfate Soils (5), Increase in Low Flow Magnitude (5), Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
37-201.1	Ensure the risk of acid sulfate soils is considered in works on waterways decisions	1 no.	CMA	n/a
37-201.2	Ensure the risk of acid sulfate soils is considered in planning decisions	1 no.	Glenelg Shire Council	n/a

Below left: Fitzroy River estuary.



4.2.2 (CONTINUED)

Table 19. Surry River estuary (reach 37-203) work program

Basin: PORTLAND COAST		Management Area: COASTAL		
Waterway: SURRY RIVER		Identification No: 37-203		
Values linked to regional goals				
Significant Birds (5)				
Long-term resource condition outcomes				
02 - By 2033, improve the condition of estuaries across the region				
26 - To maintain the existing population and to rehabilitate former breeding sites for Australasian bittern				
Management outcome targets				
a - The estuarine vegetation has improved to very good condition				
b - All artificial estuary mouth openings will be undertaken using a risk approach and considering multiple objectives				
c - The length of waterway affected by livestock access is maintained below 25%				
Threats addressed by work program				
Degraded Estuarine Vegetation (3), Degraded Water Quality (5), Disturbance of Acid Sulfate Soils (5), Intermittently Open Estuaries (0), Invasive Flora (Riparian) - Tree Layer (2), Livestock Access (1)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
37-203.1	Ensure the risk of acid sulfate soils in considered in works on waterways decisions	1 no.	Glenelg Shire	n/a
37-203.2	Ensure the risk of acid sulfate soils is considered in planning decisions	1 no.	CMA	n/a
37-203.3	Install riparian fences (includes works in reaches 3 and 4)	4 km	landholders / CMA	c
37-203.4	Establish controlled grazing regime (includes works in reaches 3 and 4)	5 ha	landholders / CMA	a
37-203.5	Establish grazing exclusion	4 ha	landholders / CMA	a, c
37-203.6	Implement EEMSS	1 no.	CMA	b
37-203.7	Establish native indigenous vegetation (includes works in reaches 3 and 4)	4 ha	landholders / CMA	a
37-203.8	Establish woody weed control (includes works in reaches 3 and 4)	5 ha	land managers / CMA	a
37-203.9	Maintain woody weed control	1 ha	land managers / CMA	a

4.2.2 (CONTINUED)

Table 20. Fitzroy River estuary (reach 37-206) work program

Basin: PORTLAND COAST		Management Area: COASTAL		
Waterway: FITZROY RIVER		Identification No: 37-206		
Values linked to regional goals				
Significant Birds (5)				
Long-term resource condition outcomes				
02 - By 2033, improve the condition of estuaries across the region				
26 - To maintain the existing population and to rehabilitate former breeding sites for Australasian bittern				
Management outcome targets				
a - The low flow magnitude threat score has reduced from high to moderate				
b - All artificial estuary mouth openings will be undertaken using a risk approach and considering multiple objectives				
Threats addressed by work program				
Disturbance of Acid Sulfate Soils (5), Increase in Low Flow Magnitude (4), Intermittently Open Estuaries (0)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
37-206.1	Ensure take and use licensing assessments consider stream base flows in this catchment	1 no.	Southern Rural Water	a
37-206.2	Ensure that the risk of acid sulfate soils is considered in works on waterways permit decisions	1 no.	CMA	n/a
37-206.3	Ensure the risk of acid sulfate soils is considered in planning decisions	1 no.	Glenelg Shire	n/a
37-206.4	Implement EEMSS	1 no.	CMA / land managers	b
37-206.5	Participate in bulk entitlement, licensing and management rule review process	1 no.	CMA	a
37-206.6	Develop Waterway Action Plan	1 no	CMA	n/a

4.2.2 (CONTINUED)

Table 21. Lake Yambuk (reach 37-211) work program

Basin: PORTLAND COAST		Management Area: COASTAL		
Waterway: LAKE YAMBUK		Identification No: 37-211		
Values linked to regional goals				
Sightseeing (5), Non-Motor Boating (4), Motor Boating (4), Important Bird Habitats (5), Drought Refuges (1), Significant Birds (5)				
Long-term resource condition outcomes				
02 - By 2033, improve the condition of estuaries across the region				
21 - To ensure that identified drought refuges within the Glenelg Hopkins region continue to meet the listing criteria				
22 - To ensure that listed Important Bird Habitats within the Glenelg Hopkins region continue to meet the listing criteria				
26 - To maintain the existing population and to rehabilitate former breeding sites for Australasian bittern				
39 - Maintain the recreational values of Lake Yambuk				
Management outcome targets				
a - The estuarine vegetation has improved to very good condition				
b - All artificial estuary mouth openings will be undertaken using a risk approach and considering multiple objectives				
c - The invasive riparian flora (ground layer) threat will be reduced from very high to high				
d - There is a reduction in the length of waterway affected by livestock access				
Threats addressed by work program				
Degraded Estuarine Vegetation (3), Degraded Water Quality (5), Disturbance of Acid Sulfate Soils (5), Intermittently Open Estuaries (0), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) - Ground Layer (5), Livestock Access (3), Reduced Floodplain and Wetland Connectivity (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
37-211.1	Ensure best management practice for dairy effluent management and compliance with licence conditions	1 no.	EPA Victoria / DEPI	n/a
37-211.2	Ensure that the risk of acid sulfate soils is considered in works on waterways permit decisions	1 no.	CMA	n/a
37-211.3	Ensure that the risk of acid sulfate soils is considered in planning decisions	1 no.	Moyne Shire Council	n/a
37-211.4	Install riparian fence	8 km	landholders / CMA	d
37-211.5	Establish controlled grazing regime	150 ha	landholders / CMA	a
37-211.6	Implement EEMSS	1 no.	CMA	b
37-211.7	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	100 ha	land managers	n/a
37-211.8	Establish non-woody weed control	2 ha	land managers / CMA	c
37-211.9	Develop Waterway Action Plan	1 no.	CMA	n/a

4.2.2 (CONTINUED)

Table 22. Moyne River estuary (reach 37-216) work program

Basin: PORTLAND COAST		Management Area: COASTAL		
Waterway: MOYNE RIVER		Identification No: 37-216		
Values linked to regional goals				
Significant Birds (5)				
Long-term resource condition outcomes				
02 - By 2033, improve the condition of estuaries across the region				
Management outcome targets				
a - The length of waterway affected by livestock access is maintained below 25%				
Threats addressed by work program				
Disturbance of Acid Sulfate Soils (5), Invasive Fauna (Terrestrial) (5), Livestock Access (1), Permanently Open Estuaries (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
37-216.1	Ensure that the risk of acid sulfate soils is considered in works on waterways permit decisions	1 no.	CMA	n/a
37-216.2	Ensure that the risk of acid sulfate soils is considered in planning decisions	1 no.	Moyne Shire	n/a
37-216.3	Install riparian fence	3 km	CMA / landholders	a
37-216.4	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	200 ha	land managers	n/a
37-216.5	Maintain non-woody weed control	5 ha	landholders / CMA	n/a

Below left: Coastal saltmarsh at Belfast Lough (Moyne River estuary).
 Below right: Glenelg River estuary, Nelson



4.2.2 (CONTINUED)

Table 23. Glenelg River estuary (reach 38-201) work program

Basin: GLENELG		Management Area: COASTAL		
Waterway: GLENELG RIVER		Identification No: 38-201		
Values linked to regional goals				
Landscape (3), Recreational Fishing (5), Non-Motor Boating (4), Significant Flora Terrestrial (1), Significant EVCs (5), Significant Birds (5)				
Long-term resource condition outcomes				
02 - By 2033, improve the condition of estuaries across the region				
04 - Maintain access to Glenelg Heritage River corridor for canoeing and kayaking				
05 - Maintain the estuarine vegetation condition in excellent condition				
06 - Maintain the recreational fishing value of assets listed as popular fisheries in a Regional Fishery Management Plan or as a ‘best fishing water’ in A Guide to Angling Inland Waters of Victoria				
Management outcome targets				
a - The low flow magnitude threat score has reduced from very high to high				
b - All artificial estuary mouth openings will be undertaken using a risk approach and considering multiple objectives				
c - The invasive riparian flora (ground layer) threat will be reduced from moderate to low				
Threats addressed by work program				
Degraded Water Quality (5), Disturbance of Acid Sulfate Soils (5), Increase in Low Flow Magnitude (5), Intermittently Open Estuaries (0), Invasive Flora (Riparian) – Ground Layer (3), Invasive Flora (Riparian) – Tree Layer (1)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-201.1	Ensure that the risk of acid sulfate soils is considered in works on waterways permit decisions	1 no.	Glenelg Shire Council	n/a
38-201.2	Ensure that the risk of acid sulfate soils is considered in planning decisions	1 no.	CMA	n/a
38-201.3	Investigate extent of pine wildling infestation in native forest	200 ha	Parks Victoria	c
38-201.4	Undertake Estuary Environmental Flow Assessment (EEFAM), including watering of Holloway Swamp	1 no.	CMA	a
38-201.5	Install riparian fence	2 km	landholders / CMA	n/a
38-201.6	Implement EEMSS	1 no.	CMA	b
38-201.7	Consider estuary water requirements in future EWMP for the Glenelg River	1 no.	CMA	a
38-201.8	Establish non-woody weed control	50 ha	land managers / CMA	c
38-201.9	Establish woody weed control	200 ha	land managers / CMA	n/a

4.2.3 WETLANDS WITHIN THE COASTAL MANAGEMENT AREA




Figure 17. Wetland complexes in the Coastal Waterway Management Area

Below left: Long Swamp.
Below right: Long Swamp reflooding trial (Nature Glenelg Trust).



4.2.3 (CONTINUED)

Table 24. Long Swamp wetland complex

Wetland Complex	Long Swamp	Wetland Type	Deep Freshwater Marsh and Permanent Open Freshwater
Land Tenure	Public	Area of Wetlands	Approx. 1100 ha
Land Manager	Parks Victoria	No. of Wetlands	Four including Long Swamp (West), Long Swamp (East), McFarlanes Swamp and Lake Bongbong
Location and Map			
RCS Regional Significance	Long Swamp is a coastal freshwater wetland which drains to the Glenelg River estuary and to the ocean. This wetland is used by the community for recreation and is of high scenic value. The system is DIWA listed and is noted for its flora and fauna.		
Criteria for Listing in DIWA	<p>It is a good example of a wetland type occurring within a biogeographic region in Australia (Criteria 1)</p> <p>It is a wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail (Criteria 3)</p> <p>The wetland supports native plant or animal taxa or communities which are considered endangered or vulnerable at the national level (Criteria 5)</p> <p>The wetland is of outstanding historical or cultural significance (Criteria 6)</p>		

4.2.3 (CONTINUED)

Table 25. Long Swamp wetland complex (inc. wetlands 20501, 20502, 20613 and 20614) work program

Basin: GLENELG		Management Area: COASTAL		
Waterway: LONG SWAMP WETLAND COMPLEX: LONG SWAMP (EAST)		Identification No: 20501		
Values linked to regional goals				
Important Bird Habitats (5), Drought Refuges (5), Significant Flora (5)				
Long-term resource condition outcomes				
18 - To ensure that the late helmet-orchid can survive, flourish and retain its potential for evolutionary development in the wild. To secure populations or habitat from potentially incompatible land use or catastrophic loss				
21 - To ensure that identified drought refuges within the Glenelg Hopkins region continue to meet the listing criteria				
22 - To ensure that listed Important Bird Habitats within the Glenelg Hopkins region continue to meet the listing criteria				
Management outcome targets				
a - The water regime of the wetland will be improved				
Threats addressed by work program				
Changed Water Regime (3), Disturbance of Acid Sulfate Soils (5), Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
20501.1	Consider the risk to wetland environments from groundwater use associated with forestry in this catchment	1 no.	Southern Rural Water	a
20501.2	Ensure that the risk of acid sulfate soils is considered in works on waterways decisions	1 no.	CMA	n/a
20501.3	Ensure that acid sulfate soils are considered in planning decisions	1 no.	Glenelg Shire Council	n/a
20501.4	Undertake assessment of watering needs and drainage issues	1 no.	CMA	a
20501.5	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	9 ha	land managers	n/a

4.2.3 (CONTINUED)


Waterway: LONG SWAMP WETLAND COMPLEX: LAKE BONGBONG		Identification No: 20502		
Values linked to regional goals				
Significant Amphibians (5), Important Bird Habitats (5)				
Long-term resource condition outcomes				
11 - Secure extant populations of growling grass frogs, particularly those occurring in known breeding habitats, and improve their viability through increases in size and/or area of occurrence				
22 - To ensure that listed Important Bird Habitats within the Glenelg Hopkins region continue to meet the listing criteria				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Disturbance of Acid Sulfate Soils (5), Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
20502.1	Ensure that the risk of acid sulfate soils is considered in works on waterways decisions	1 no.	CMA	n/a
20502.2	Ensure that the risk of acid sulfate soils is considered in planning decisions	1 no.	Glenelg Shire Council	n/a
20502.3	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	3.5 ha	land managers	n/a
Waterway: LONG SWAMP WETLAND COMPLEX: MCFARLANES SWAMP		Identification No: 20613		
Values linked to regional goals				
Important Bird Habitats (5)				
Long-term resource condition outcomes				
22 - To ensure that listed Important Bird Habitats within the Glenelg Hopkins region continue to meet the listing criteria				
Management outcome targets				
a - The wetland buffer vegetation has improved to good condition				
Threats addressed by work program				
Degraded Buffer (4), Disturbance of Acid Sulfate Soils (5), Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
20613.1	Ensure that the risk of disturbance of acid sulfate soils is considered in works on waterways decisions	1 no.	CMA	n/a
20613.2	Ensure that the risk of disturbance of acid sulfate soils is considered in planning decisions	1 no.	Glenelg Shire Council	n/a
20613.3	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	7 ha	land managers	n/a
20613.4	Establish native indigenous vegetation	6 ha	landholders / CMA	a

4.2.3 (CONTINUED)

Waterway: LONG SWAMP WETLAND COMPLEX: LONG SWAMP (WEST)		Identification No: 20614		
Values linked to regional goals				
Important Bird Habitats (5), Drought Refuges (5), Significant Birds (5), Significant Flora (5),Significant Invertebrates (5)				
Long-term resource condition outcomes				
13 - The wetland vegetation condition is increased from good to excellent at sites supporting the ancient greenling damselfly				
17 - To ensure that swamp greenhood orchid can survive, flourish and retain its potential for evolutionary development in the wild. To secure populations or habitat from potentially incompatible land use or catastrophic loss				
21 - To ensure that identified drought refuges within the Glenelg Hopkins region continue to meet the listing criteria				
23 - To ensure that the blue-billed duck can survive, flourish and retain its potential for evolutionary development in the wild				
26 - To maintain the existing population and to rehabilitate former breeding sites of Australasian bittern				
41 - By 2033, improve the condition of wetlands and maintain the diversity of wetland types				
Management outcome targets				
a - The water regime of the wetland will be improved				
b - The invasive wetland flora (weeds) threat will be reduced from moderate to low				
Threats addressed by work program				
Changed Water Regime (3), Degraded Buffer (3), Disturbance of Acid Sulfate Soils (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Wetland) (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
20614.1	Consider the risk to wetland environments from groundwater use associated with forestry in this catchment	1 no.	Southern Rural Water	a
20614.2	Ensure that the risk of disturbance of acid sulfate soils is considered in works on waterways decisions	1 no.	CMA	n/a
20614.3	Ensure that the risk of disturbance of acid sulfate soils is considered in planning decisions	1 no.	Glenelg Shire Council	n/a
20614.4	Undertake assessment of feral pig impact and undertake weed assessment	54 ha	Parks Victoria	b
20614.5	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	54 ha	land managers	n/a
20614.6	Modify outlet	1 no.	waterway manager / CMA	a
20614.7	Establish woody weed control	54 ha	land managers	b

4.2.3 (CONTINUED)

Table 26. Bridgewater Lakes wetland complex

Wetland Complex	Bridgewater Lakes	Wetland Type	Permanent Open Freshwater
Land Tenure	Public	Area of Wetlands	67 ha
Land Manager	Parks Victoria	No. of Wetlands	Four including Bridgewater Lakes North and South and two unnamed wetlands
Location and Map			
RCS Regional Significance	<p>Bridgewater Lakes are a line of lakes along a dune corridor. The area has high social values with water sports, fishing, swimming and bushwalking common activities. The area is an important drought refuge for waterbirds and provides freshwater habitat.</p>		

4.2.3 (CONTINUED)

Table 27. Bridgewater Lakes wetland complex (inc. wetlands 20561, 20562, 20563 and 20565) work program


Basin: PORTLAND COAST		Management Area: COASTAL		
Waterway: BRIDGEWATER LAKES WETLAND COMPLEX: UNNAMED (20561)		Identification No: 20561		
Values linked to regional goals				
Important Bird Habitats (5)				
Long-term resource condition outcomes				
Important Bird Habitats (5)				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
20561.0	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	1 ha	land managers	n/a
Waterway: BRIDGEWATER LAKES WETLAND COMPLEX: BRIDGEWATER LAKES (NORTH)		Identification No: 20561		
Values linked to regional goals				
Important Bird Habitats (5)				
Long-term resource condition outcomes				
22 - To ensure that listed Important Bird Habitats within the Glenelg Hopkins region continue to meet the listing criteria				
Management outcome targets				
a - The wetland buffer vegetation value is maintained in good condition				
b - The invasive wetland flora (weeds) threat will be reduced from moderate to low				
Threats addressed by work program				
Degraded Buffer (3), Invasive Fauna (Terrestrial) (5), Invasive Flora (Wetland) (4), Soil Disturbance (1)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
20562.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	4 ha	land managers	n/a
20562.2	Establish woody and non-woody weed control	2 ha	land managers / CMA	a, b
20562.3	Investigate and implement measures to manage water boat impact on wetland vegetation communities	1 no.	Parks Victoria / DEPI	n/a

4.2.3 (CONTINUED)

Waterway: BRIDGEWATER LAKES WETLAND COMPLEX: UNNAMED (20563)		Identification No: 20563		
Values linked to regional goals				
Important Bird Habitats (5)				
Long-term resource condition outcomes				
22 - To ensure that listed Important Bird Habitats within the Glenelg Hopkins region continue to meet the listing criteria				
Management outcome targets				
a - The wetland buffer vegetation value is improved to good condition				
b - The invasive wetland flora (weeds) threat will be reduced from moderate to low				
Threats addressed by work program				
Degraded Buffer (4), Invasive Fauna (Terrestrial) (5), Invasive Flora (Wetland) (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
20563.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	0.6 ha	land managers	n/a
20563.2	Establish woody and non-woody weed control	0.3 ha	land managers / CMA	a, b
Waterway: BRIDGEWATER LAKES WETLAND COMPLEX: BRIDGEWATER LAKES (SOUTH)		Identification No: 20565		
Values linked to regional goals				
Important Bird Habitats (5)				
Long-term resource condition outcomes				
22 - To ensure that listed Important Bird Habitats within the Glenelg Hopkins region continue to meet the listing criteria				
Management outcome targets				
a - The wetland buffer vegetation value is maintained in good condition				
Threats addressed by work program				
Degraded Buffer (3), Invasive Fauna (Terrestrial) (5), Soil Disturbance (1)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
20565.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	3.9 ha	land managers	n/a
20565.2	Refer 20562.3: Investigate and implement measures to manage water boat impact on wetland vegetation communities			n/a
20565.3	Install riparian fence (on private land only)	3 km	landholders / CMA	a

4.2.3 (CONTINUED)

Table 28. Tower Hill wetland complex

Wetland Complex	Tower Hill	Wetland Type	Permanent Saline
Land Tenure	Public	Area of Wetlands	Approx. 300 ha
Land Manager	Parks Victoria	No. of Wetlands	Three including Tower Hill Lake East and West and Wagon Bay
Location and Map			
RCS Regional Significance	<p>Tower Hill is a unique wetland type formed in a volcanic crater. These wetlands are of high value for their flora and fauna as well as their geomorphology, geology and invertebrates. Socially, Tower Hill is an important tourist attraction due to its scenery, walking tracks, wildlife and facilities. Tower Hill is listed in the Directory of Important Wetlands (DIWA).</p>		
Criteria for Listing in DIWA	<p>It is a good example of a wetland type occurring within a biogeographic region in Australia (Criteria 1) It is a wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail (Criteria 3) The wetland is of outstanding historical or cultural significance (Criteria 6)</p>		

4.2.3 (CONTINUED)

Table 29. Tower Hill wetland complex (inc. wetlands 25630, 25632 and 25638) work program

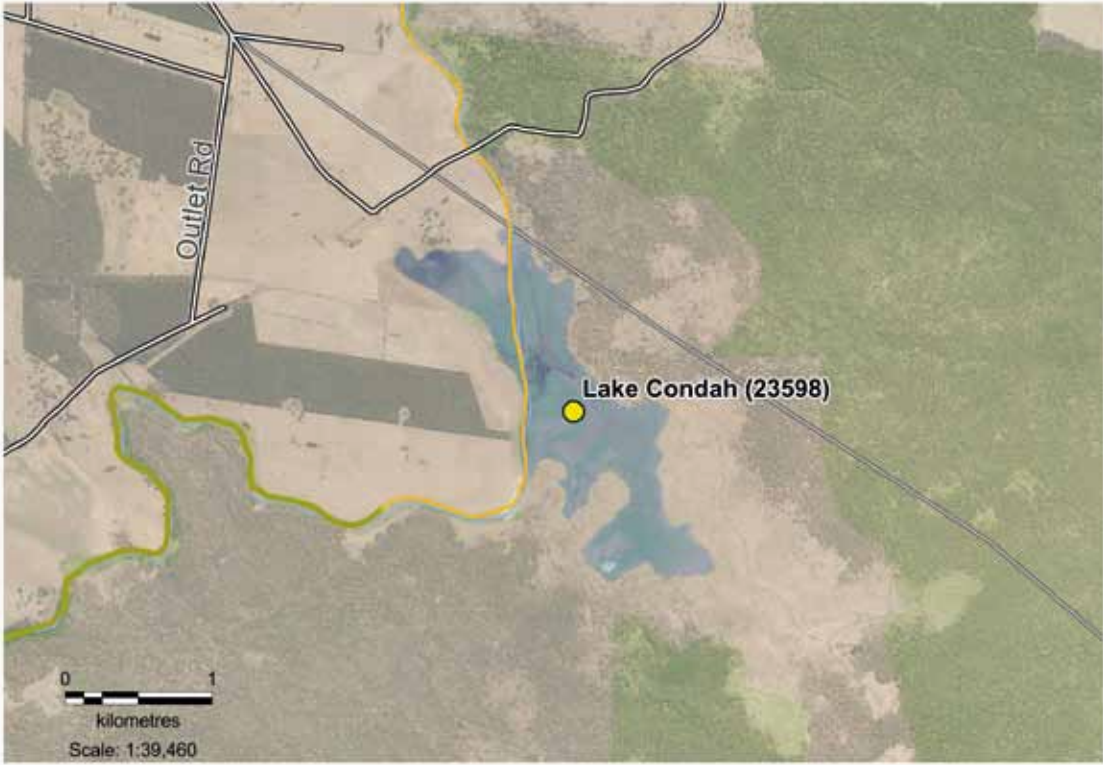
Basin: PORTLAND COAST		Management Area: COASTAL		
Waterway: TOWER HILL WETLAND COMPLEX: TOWER HILL LAKE (WEST)		Identification No: 25630		
Values linked to regional goals				
Significant Amphibians (5), Drought Refuges (5), Significant Birds (5), Significant Flora (5)				
Long-term resource condition outcomes				
11 - Secure extant populations of growling grass frogs, particularly those occurring in known breeding habitats, and improve their viability through increases in size and/or area of occurrence				
19 - To ensure that the proud diuris orchid can survive, flourish and retain its potential for evolutionary development in the wild. To secure populations or habitat from potentially incompatible land use or catastrophic loss				
21 - To ensure that identified drought refuges within the Glenelg Hopkins region continue to meet the listing criteria				
23 - To ensure that the blue-billed duck can survive, flourish and retain its potential for evolutionary development in the wild				
26 - To maintain the existing population and to rehabilitate former breeding sites of Australasian bittern				
31 - To protect high value wetlands known to be utilised by freckled duck				
41 - By 2033, improve the condition of wetlands and maintain the diversity of wetland types				
Management outcome targets				
a - The invasive wetland flora (weeds) threat will be reduced from moderate to low				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5), Invasive Flora (Wetland) (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
25630.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	8 ha	land managers	n/a
25630.2	Establish non-woody weed control	8 ha	land managers / CMA	a

4.2.3 (CONTINUED)

Waterway: TOWER HILL WETLAND COMPLEX: WAGON BAY		Identification No: 25632		
Values linked to regional goals				
Significant Amphibians (5), Drought Refuges (5), Significant Birds (5)				
Long-term resource condition outcomes				
11 - Secure extant populations of growling grass frogs, particularly those occurring in known breeding habitats, and improve their viability through increases in size and/or area of occurrence				
21 - To ensure that identified drought refuges within the Glenelg Hopkins region continue to meet the listing criteria				
26 - To maintain the existing population and to rehabilitate former breeding sites of Australasian bittern				
32 - To protect high value wetlands known to be utilised by freckled duck				
41 - By 2033, improve the condition of wetlands and maintain the diversity of wetland types				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
25632.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	2.5 ha	land managers	n/a
Waterway: TOWER HILL WETLAND COMPLEX: TOWER HILL LAKE (EAST)		Identification No: 25638		
Values linked to regional goals				
Significant Amphibians (5), Drought Refuges (5), Significant Birds (5)				
Long-term resource condition outcomes				
11 - Secure extant populations of growling grass frogs, particularly those occurring in known breeding habitats, and improve their viability through increases in size and/or area of occurrence				
21 - To ensure that identified drought refuges within the Glenelg Hopkins region continue to meet the listing criteria				
23 - To ensure that the blue-billed duck can survive, flourish and retain its potential for evolutionary development in the wild				
26 - To maintain the existing population and to rehabilitate former breeding sites of Australasian bittern				
41 - By 2033, improve the condition of wetlands and maintain the diversity of wetland types				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
25638.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	8 ha	land managers	n/a

4.2.3 (CONTINUED)

Table 30. Lake Condah wetland complex

Wetland Complex	Lake Condah	Wetland Type	Shallow Freshwater Marsh and Deep Freshwater Marsh
Land Tenure	Indigenous Protected Area	Area of Wetlands	159 ha
Land Manager	Private (Traditional owners)	No. of Wetlands	One
Location and Map			
RCS Regional Significance	A seasonal stream-fed wetland which provides rich habitat for a variety of wildlife. Geomorphological features are of national significance; the area contains Indigenous sites of international significance. The area is renowned for short-finned eel, blackfish and many waterbirds. Lake Condah is listed on the DIWA.		
Criteria for Listing in DIWA	It is a good example of a wetland type occurring within a biogeographic region in Australia (Criteria 1) The wetland is of outstanding historical or cultural significance (Criteria 6)		

4.2.3 (CONTINUED)

Table 31. Lake Condah wetland complex (wetland 23598) work program

Basin: PORTLAND COAST		Management Area: COASTAL		
Waterway: LAKE CONDAH WETLAND COMPLEX: LAKE CONDAH		Identification No: 23598		
Values linked to regional goals				
Important Bird Habitats (5), Drought Refuges (3), Significant Birds (5)				
Long-term resource condition outcomes				
27 - To maintain the wetland vegetation condition in excellent condition				
22 - To ensure that listed Important Bird Habitats within the Glenelg Hopkins region continue to meet the listing criteria				
Management outcome targets				
a - The water regime of the wetland will be improved				
b - The wetland buffer vegetation has improved to good condition				
Threats addressed by work program				
Changed Water Regime (1), Degraded Buffer (5), Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
23598.1	Install riparian fence (on private land only)	5 km	landholders / CMA	b
23598.2	Establish grazing exclusion	75 ha	landholders / CMA	b
23598.3	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	75 ha	land managers	n/a
23598.4	Assess wetland water regime	1 no.	CMA	a

Table 32. Summary of key works and outputs for the Coastal Waterway Management Area

OUTPUT	QUANTITY
Install riparian fence	125.5 km
Develop Waterway Action Plans	3 no.
Establish controlled grazing regime	205 ha
Establish grazing exclusion	101 ha
Implement EEMSS	6 no.
Establish landholder agreements	72 ha
Establish terrestrial pest animal control	958.5 ha
Establish native vegetation	101 ha
Enhance native vegetation	5 ha
Establish grass buffer strips	23.5 ha
Modify fish barrier	3 no.
Install large wood	1 km
Modify wetland outlet structure	1 no.
Establish non-woody weed control	184.9
Establish woody weed control	222.3 ha
Total Budget for Coastal Waterway Management Area	\$7,955,700

4.3 LOWER GLENELG WATERWAY MANAGEMENT AREA

The major waterway in the lower Glenelg Management Area is the Glenelg River. It has two major tributaries: the Stokes and Crawford Rivers.

The Glenelg River is the only regulated river in the Glenelg Hopkins region. The Glenelg River between Dartmoor and the sea is classified as a heritage river under the *Heritage Rivers Act*. Land use in the catchment is predominantly grazing and timber production. Waterways are used for stock water and recreational activities such as camping and fishing.

Rivers in this area are in relatively good to moderate condition with many wetlands in good to excellent condition – particularly on the public estate. Major threats to the waterways in this area are associated with unrestricted stock access, pest plants and animals, barriers to fish movement and inadequate flow. More than 60 per cent of the flow of the Glenelg River is diverted to the Wimmera, which creates issues in the Lower Glenelg such as salinity, reduction in water quality and impacts on recreational activities such as camping and fishing. Sand slugs are also moving downstream. By 2020 these are predicted to reach the sections of the river listed under the *Heritage Rivers Act* near Dartmoor. The nearest sand slug has been identified 5 km upstream of Dartmoor.

The major river assets in the Lower Glenelg Waterway Management Area are as follows.

The Glenelg River: The river supports rare and threatened species such as Glenelg spiny crayfish, Glenelg mussel and variegated pygmy perch.

The Crawford River: The river has large stretches of intact riparian vegetation and supports significant fish species such as variegated pygmy perch and has the largest known population of the Glenelg mussel.

Stokes River: The river has some large stretches of riparian vegetation in very good condition including swamp scrub. The river supports significant fish species such as variegated pygmy perch, river blackfish, Glenelg spiny crayfish.

There are several major wetland complexes in this area including: **The Mundi-Selkirk Wetlands; Lindsay-Werrikoo wetland** and **Boiler Swamp**. These systems support significant species such as brolga and swamp everlasting. These are described in more detail in *Tables 37, 39 and 42* respectively.

Below: Crawford River.



Photo: Vin Gannon

4.3 (CONTINUED)



Figure 18. Lower Glenelg Waterway Management Area showing priority reaches

4.3.1 RIVERS WITHIN THE LOWER GLENELG WATERWAY MANAGEMENT AREA

Table 33. Glenelg River (reaches 38-02, 38-03, 38-04, 38-05) work program

Basin: GLENELG		Management Area: LOWER GLENELG		
Waterway: GLENELG RIVER		Identification No: 38-02		
Values linked to regional goals				
Landscape (3), Recreational Fishing (3), Non-Motor Boating (4), Significant Invertebrates Aquatic (5), Significant Flora Terrestrial (5), Significant EVCs (5), Riparian Vegetation Condition (5), Native Fish (4)				
Long-term resource condition outcomes				
06 - Maintain the recreational fishing value of assets listed as popular fisheries in a Regional Fishery Management Plan or as a ‘best fishing water’ in A Guide to Angling Inland Waters of Victoria				
12 - The riparian vegetation of the Glenelg River (38-2) remains in excellent condition				
24 - To guarantee that the Glenelg spiny crayfish can survive, flourish and retain its potential for evolutionary development in the wild				
Management outcome targets				
a - The large riparian tree value has improved to excellent condition				
b - The low flow magnitude threat score has reduced from very high to moderate				
Threats addressed by work program				
Degraded Riparian Vegetation – Large Trees (5), Disturbance of Acid Sulfate Soils (5), Increase in Low Flow Magnitude (5), Invasive Fauna (Aquatic) (5), Invasive Fauna (Terrestrial) (5), Loss of In-stream Habitat (Large Wood) (4)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-02.1	Install riparian fence	6 km	landholders / CMA	a
38-02.2	Establish grazing exclusion	14 ha	landholders / CMA	a
38-02.3	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	56 ha	land managers	n/a
38-02.4	Establish native indigenous vegetation	10 ha	landholders / CMA	a
38-02.5	Deliver environmental water to reach in line with Seasonal Watering Plan	18 ha	CMA / VEWH	b

4.3.1 (CONTINUED)

Waterway: GLENELG RIVER		Identification No: 38-03		
Values linked to regional goals				
Significant Invertebrates Aquatic (5), Significant Fish Non Migratory (5), Significant Birds Riparian (5)				
Long-term resource condition outcomes				
08 - Protect all known populations of variegated pygmy perch and take immediate action to ensure that suitable habitat is appropriately managed in at least three locations				
24 - To guarantee that the Glenelg spiny crayfish can survive, flourish and retain its potential for evolutionary development in the wild				
Management outcome targets				
a - No artificial barrier to fish migration exists				
b - The large riparian tree value has improved to excellent condition				
c - The low flow magnitude threat score has reduced from very high to moderate				
d - The invasive riparian flora (ground layer) threat will be reduced from high to moderate				
e - There is no increase in the threat of loss of in-stream habitat through sedimentation				
Threats addressed by work program				
Barriers to Fish Migration (0), Degraded Riparian Vegetation – Large Trees (4), Increase in Low Flow Magnitude (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (4), Loss of In-stream Habitat (Large Wood) (4), Loss of In-stream Habitat (Sediment) (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-03.1	Investigate barriers to fish migration	59 ha	CMA	a
38-03.2	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	118 ha	land managers	n/a
38-03.3	Establish native indigenous vegetation	30 ha	landholders / CMA	b
38-03.4	Deliver environmental water to reach in line with Seasonal Watering Plan	59 ha	CMA / VEWH	c, d, e
38-03.5	Establish non-woody weed control	46 ha	land managers / CMA	d

4.3.1 (CONTINUED)

Waterway: GLENELG RIVER		Identification No: 38-04		
Values linked to regional goals				
Significant Fish Non Migratory (5), Significant Birds Riparian (5)				
Long-term resource condition outcomes				
08 - Protect all known populations of variegated pygmy perch and take immediate action to ensure that suitable habitat is appropriately managed in at least three locations				
24 - To guarantee that the Glenelg spiny crayfish can survive, flourish and retain its potential for evolutionary development in the wild				
Management outcome targets				
a - The large riparian tree value has improved to excellent condition				
b - The low flow magnitude threat score has reduced from very high to moderate				
c - The invasive riparian flora (ground layer) threat will be reduced from moderate to low				
d - The length of waterway affected by livestock access is maintained below 25%				
e - There is no increase in the threat of loss of in-stream habitat through sedimentation				
Threats addressed by work program				
Bank Instability (5), Degraded Riparian Vegetation – Large Trees (3), Increase in Low Flow Magnitude (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (3), Livestock Access (1), Loss of In-stream Habitat (Large Wood) (4), Loss of In-stream Habitat (Sediment) (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-04.1	Install riparian fence	8 km	landholders / CMA	d
38-04.2	Establish grazing exclusion	8 ha	landholders / CMA	a, d
38-04.3	Establish native indigenous vegetation	8 ha	landholders / CMA	a, e
38-04.4	Deliver environmental water to reach in line with Seasonal Watering Plan	16 ha	CMA / VEWH	b ,c, e
38-03.1	Investigate barriers to fish migration	59 ha	CMA	a
38-03.2	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	118 ha	land managers	n/a
38-03.3	Establish native indigenous vegetation	30 ha	landholders / CMA	b
38-03.4	Deliver environmental water to reach in line with Seasonal Watering Plan	59 ha	CMA / VEWH	c, d, e
38-03.5	Establish non-woody weed control	46 ha	land managers / CMA	d

4.3.1 (CONTINUED)

Waterway: GLENELG RIVER		Identification No: 38-05		
Values linked to regional goals				
Significant Fish Non Migratory (5), Significant Birds Riparian (5)				
Long-term resource condition outcomes				
08 - Protect all known populations of variegated pygmy perch and take immediate action to ensure that suitable habitat is appropriately managed in at least three locations				
Management outcome targets				
a - The large riparian tree value has improved to excellent condition				
b - The low flow magnitude threat score has reduced from very high to moderate				
c - The invasive riparian flora (ground layer) threat will be reduced from moderate to low				
d - The length of waterway affected by livestock access is maintained below 25%				
e - There is no increase in the threat of loss of in-stream habitat through sedimentation				
Threats addressed by work program				
Bank Instability (5), Degraded Riparian Vegetation – Large Trees (3), Increase in Low Flow Magnitude (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (3), Livestock Access (1), Loss of In-stream Habitat (Large Wood) (4), Loss of In-stream Habitat (Sediment) (3), Reduced Vegetation Width (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-05.1	Install riparian fence	9 km	landholders / CMA	d
38-05.2	Establish grazing exclusion	9.5 ha	landholders / CMA	a, d
38-05.3	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	38 ha	land managers	n/a
38-05.4	Establish native indigenous vegetation	9.5 ha	landholders / CMA	a, e
38-05.5	Deliver environmental water to reach in line with Seasonal Watering Plan	19 ha	CMA / VEWB	b, c, e
38-05.6	Establish non-woody weed control	15 ha	land managers / CMA	c

Below left: Stokes River.

Below right: Crawford River.



4.3.1 (CONTINUED)

Table 34. Crawford River (reach 38-15 and 38-16) work program

Basin: GLENELG		Management Area: LOWER GLENELG		
Waterway: CRAWFORD RIVER		Identification No: 38-15		
Values linked to regional goals				
Significant Fish Non Migratory (5)				
Long-term resource condition outcomes				
08 - Protect all known populations of variegated pygmy perch and take immediate action to ensure that suitable habitat is appropriately management in at least three locations				
Management outcome targets				
a - The large riparian tree value has improved to excellent condition				
b - The invasive riparian flora (ground layer) threat will be reduced from moderate to low				
c - There is no increase in the threat of loss of in-stream habitat through sedimentation				
Threats addressed by work program				
Degraded Riparian Vegetation – Large Trees (3), Increase in Low Flow Magnitude (3), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (3), Loss of In-stream Habitat (Sediment) (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-15.1	Ensure best management practice is applied to forestry operations in this catchment for sediment management	1 ha	forestry industry	c
38-15.2	Ensure best management practice is applied to forestry operations in this catchment for nutrient management	1 ha	forestry industry	n/a
38-15.3	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	42 ha	land managers	n/a
38-15.4	Participate in bulk entitlement, licensing and management rule review process	1 no.	CMA	n/a
38-15.5	Establish native indigenous vegetation	21 ha	landholders / CMA	a, c
38-15.6	Establish non-woody weed control	34 ha	land managers / CMA	b

4.3.1 (CONTINUED)

Waterway: CRAWFORD RIVER		Identification No: 38-16		
Values linked to regional goals				
Significant Fish Non Migratory (5), Significant Birds Waterway (5)				
Long-term resource condition outcomes				
08 - Protect all known populations of variegated pygmy perch and take immediate action to ensure that suitable habitat is appropriately management in at least three locations				
Management outcome targets				
a - The large riparian tree value has improved to excellent condition				
b - The invasive riparian flora (ground layer) threat will be reduced from moderate to low				
c - Livestock have been excluded from over 50% of the waterway frontage				
d - There is no increase in the threat of loss of in-stream habitat through sedimentation				
Threats addressed by work program				
Degraded Riparian Vegetation – Large Trees (5), Degraded Water Quality (5), Increase in Low Flow Magnitude (3), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (3), Livestock Access (5), Loss of In-stream Habitat (Large Wood) (5), Loss of In-stream Habitat (Sediment) (3), Reduced Riparian Connectivity (5), Reduced Vegetation Width (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-16.1	Refer 38-15.1: Ensure best management practice is applied to forestry operations in this catchment for sediment management			n/a
38-16.2	Install riparian fence	27 km	landholders / CMA	c
38-16.3	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	36 ha	land managers	n/a
38-16.4	Establish native indigenous vegetation	27 ha	landholders / CMA	a, d
38-16.5	Establish non-woody weed control	14 ha	land managers / CMA	b

Table 35. Stokes River (reaches 38-20 and 38-21) work program

Basin: GLENELG	Management Area: LOWER GLENELG
Waterway: STOKES RIVER	Identification No: 38-20
Values linked to regional goals	
Significant Fish Non Migratory (5)	
Long-term resource condition outcomes	
08 - Protect all known populations of variegated pygmy perch and take immediate action to ensure that suitable habitat is appropriately management in at least three locations	
Management outcome targets	
a - The large riparian tree value has improved to excellent condition	
b - There is no increase in the threat of loss of in-stream habitat through sedimentation	

4.3.1 (CONTINUED)

Threats addressed by work program				
Degraded Riparian Vegetation – Large Trees (3), Increase in Low Flow Magnitude (3), Invasive Fauna (Terrestrial) (5), Loss of In-stream Habitat (Sediment) (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-20.1	Ensure that forestry best management practice is implemented in this catchment for sediment management	500 ha	forestry industry	b
38-20.2	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	25 ha	land managers	n/a
38-20.3	Participate in bulk entitlement, licensing and management rule review process	1 no.	CMA	n/a
38-20.4	Establish native indigenous vegetation	13 ha	landholders / CMA	a, b
Waterway: STOKES RIVER		Identification No: 38-20		
Values linked to regional goals				
Significant Fish Non Migratory (5), Significant Birds Riparian (5)				
Long-term resource condition outcomes				
08 - Protect all known populations of variegated pygmy perch and take immediate action to ensure that suitable habitat is appropriately management in at least three locations				
Management outcome targets				
a - The large riparian tree value has improved to excellent condition				
b - The invasive riparian flora (ground layer) threat will be reduced from moderate to low				
c - There is a reduction in the length of waterway affected by livestock access				
d - There is no increase in the threat of loss of in-stream habitat through sedimentation				
Threats addressed by work program				
Degraded Riparian Vegetation – Large Trees (5), Increase in Low Flow Magnitude (3), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (3), Livestock Access (3), Loss of In-stream Habitat (Large Wood) (4), Loss of In-stream Habitat (Sediment) (3), Reduced Riparian Connectivity (3), Reduced Vegetation Width (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-21.1	Refer 38-20.1: Ensure that forestry best management practice is implemented in this catchment for sediment management			d
38-21.2	Install riparian fence	16 km	landholders / CMA	c
38-21.3	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	32 ha	land managers	n/a
38-21.4	Refer 38-20.3: Participate in bulk entitlement, licensing and management rule review process			n/a
38-21.5	Establish native indigenous vegetation	16 ha	landholders / CMA	a, d
38-21.6	Establish non-woody weed control	13 ha	land managers / CMA	b

4.3.2 WETLANDS WITHIN THE LOWER GLENELG WATERWAY MANAGEMENT AREA

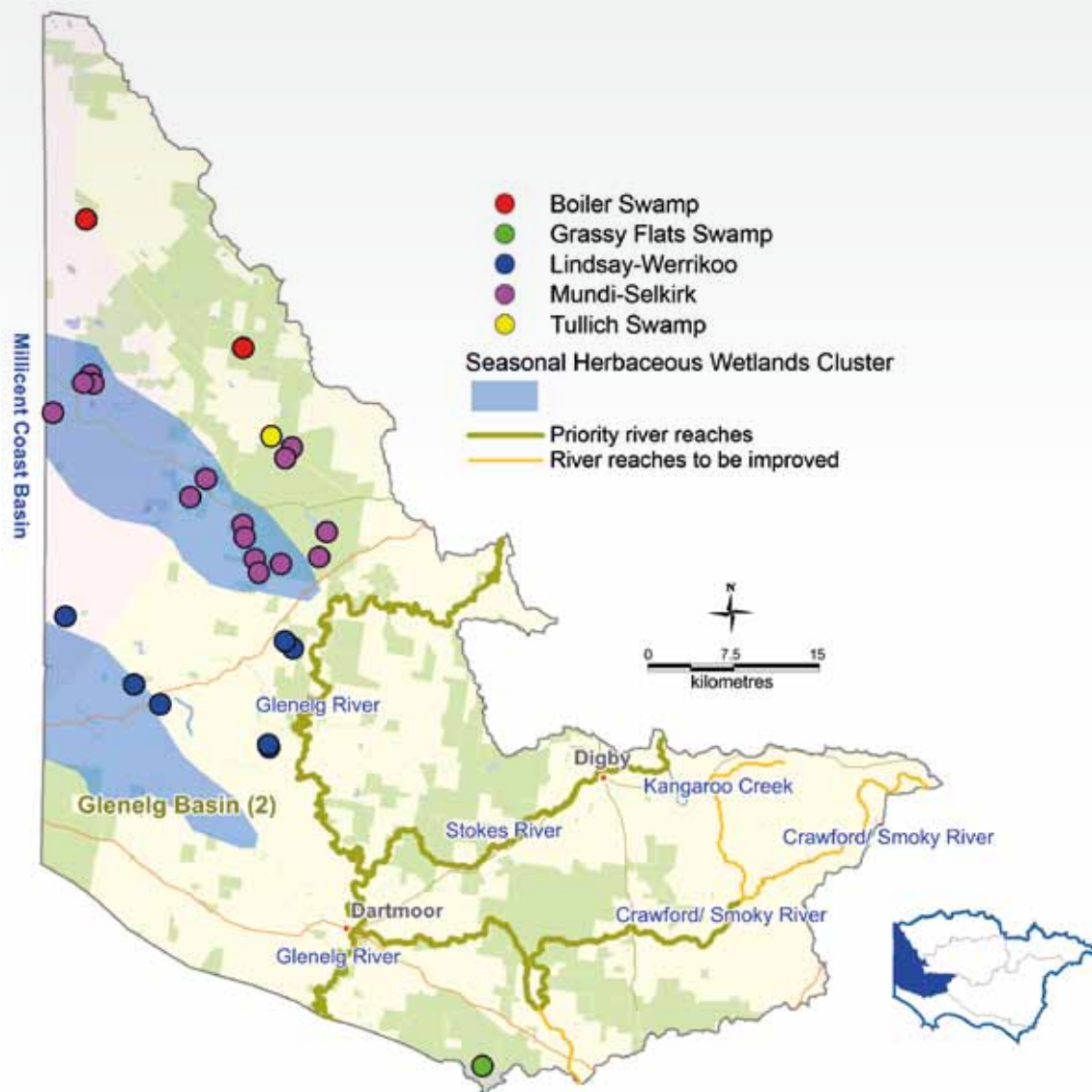
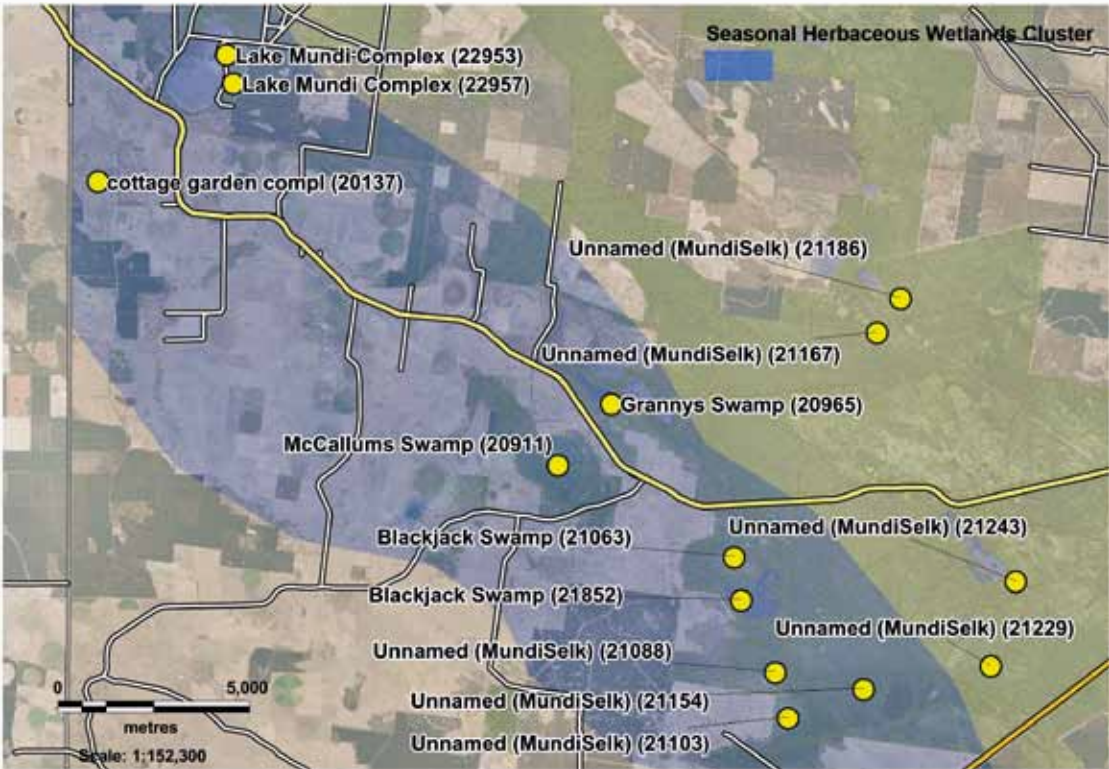


Figure 19. Wetland complexes in the Lower Glenelg Waterway Management Area

4.3.2 (CONTINUED)

Table 36. Mundi-Selkirk wetland complex

Wetland Complex	Mundi-Selkirk Wetlands	Wetland Type	Shallow Freshwater Marsh, Freshwater Meadow and Deep Freshwater Marsh
Land Tenure	Public and private	Area of Wetlands	2,032 ha
Land Manager	Parks Victoria, DEPI and private	No. of Wetlands	Approx. 20 wetlands including McCallums Swamp, Blackjack Swamp, Mill Swamp, Cemetery Swamp, Grannys Swamp, Argyle Swamp, Lake Mundi and Mosquito Swamp
Location and Map			
RCS Regional Significance	<p>The Mundi-Selkirk Wetlands consist of numerous freshwater meadows, shallow freshwater marshes and some deep freshwater marshes on forested and cleared land aligned along a former coastline. This wetland complex supports important brolga habitat and includes numerous seasonally herbaceous wetlands (a threatened ecological community under the <i>EPBC Act</i>).</p> <p>Although not listed within the RCS, the GHWS has identified this wetland complex as being regionally significant due to the brolga habitat and seasonally herbaceous wetlands.</p>		
Criteria for Listing in DIWA	<p>It is a good example of a wetland type occurring within a biogeographic region in Australia (Criteria 1)</p> <p>It is a wetland which plays an important ecological or hydrological role in the natural functioning of a major wetland system/complex (Criteria 2)</p> <p>It is a wetland which is important as the habitat for animal taxa at a vulnerable stage in their lifecycles, or provides a refuge when adverse conditions such as drought prevail (Criteria 3)</p>		

4.3.2 (CONTINUED)

Table 37. Mundi-Selkirk wetland complex (inc. wetlands 20137, 20911, 20965, 21063, 21088, 21103, 21154, 21167, 21186, 21229, 21243, 21852, 22953, and 22957) work program

Basin: GLENELG and MILICENT COAST		Management Area: LOWER GLENELG		
Waterway: MUNDI-SELKIRK WETLAND COMPLEX: UNNAMED (20137)		Identification No: 20137		
Values linked to regional goals				
Significant EVCs (5)				
Long-term resource condition outcomes				
27 - To maintain the wetland vegetation condition in excellent condition				
Management outcome targets				
a - The wetland buffer vegetation value has improved to excellent condition				
b - The invasive wetland flora (weeds) threat will be reduced from high to low				
c - Livestock have been excluded from over 50% of the waterway frontage				
Threats addressed by work program				
Degraded Buffer (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Wetland) (4), Livestock Access to Buffer (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
20137.1	Install riparian fence (on private land only)	1 km	landholders / CMA	a, b, c
20137.2	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	7.5 ha	land managers	n/a
Waterway: MUNDI-SELKIRK WETLAND COMPLEX: MCCALLUMS SWAMP		Identification No: 20911		
Values linked to regional goals				
Significant EVCs (5), Wetland Vegetation Condition (5)				
Long-term resource condition outcomes				
27 - To maintain the wetland vegetation condition in excellent condition				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
20911.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	248 ha	land managers	n/a

4.3.2 (CONTINUED)

Waterway: MUNDI-SELKIRK WETLAND COMPLEX: GRANNY’S SWAMP		Identification No: 20965		
Values linked to regional goals				
Significant EVCs (5), Wetland Vegetation Condition (5), Significant Birds (4)				
Long-term resource condition outcomes				
09 - Protect the Victorian brolga populations by ensuring that they can breed successfully to maintain and increase population sizes, and flock at consistently used sites without disturbance				
27 - To maintain the wetland vegetation condition in excellent condition				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
20965.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	63 ha	land managers	n/a
Waterway: MUNDI-SELKIRK WETLAND COMPLEX: UNNAMED (21063)		Identification No: 21063		
Values linked to regional goals				
Significant EVCs (5), Wetland Vegetation Condition (5), Significant Birds (4)				
Long-term resource condition outcomes				
09 - Protect the Victorian brolga populations by ensuring that they can breed successfully to maintain and increase population sizes, and flock at consistently used sites without disturbance				
27 - To maintain the wetland vegetation condition in excellent condition				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
21063.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	8 ha	land managers	n/a

4.3.2 (CONTINUED)

Waterway: MUNDI-SELKIRK WETLAND COMPLEX: UNNAMED (21088)		Identification No: 21088		
Values linked to regional goals				
Significant EVCs (5), Wetland Vegetation Condition (5)				
Long-term resource condition outcomes				
27 - To maintain the wetland vegetation condition in excellent condition				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
21088.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	6 ha	land managers	n/a
Waterway: MUNDI-SELKIRK WETLAND COMPLEX: UNNAMED (21103)		Identification No: 21103		
Values linked to regional goals				
Significant EVCs (5), Wetland Vegetation Condition (5)				
Long-term resource condition outcomes				
27 - To maintain the wetland vegetation condition in excellent condition				
Management outcome targets				
a - The invasive wetland flora (weeds) threat will be reduced from moderate to low				
Threats addressed by work program				
Invasive Flora (Wetland) (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
21103.1	Establish non-woody weed control	38 ha	land managers / CMA	a

4.3.2 (CONTINUED)

Waterway: MUNDI-SELKIRK WETLAND COMPLEX: UNNAMED (21154)		Identification No: 21154		
Values linked to regional goals				
Significant EVCs (5), Wetland Vegetation Condition (5), Significant Birds (4)				
Long-term resource condition outcomes				
09 - Protect the Victorian brolga populations by ensuring that they can breed successfully to maintain and increase population sizes, and flock at consistently used sites without disturbance				
27 - To maintain the wetland vegetation condition in excellent condition				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
21154.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	23 ha	land managers	n/a
Waterway: MUNDI-SELKIRK WETLAND COMPLEX: UNNAMED (21167)		Identification No: 21167		
Values linked to regional goals				
Significant EVCs (5), Wetland Vegetation Condition (5)				
Long-term resource condition outcomes				
27 - To maintain the wetland vegetation condition in excellent condition				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
21167.2	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	1 ha	land managers	n/a

4.3.2 (CONTINUED)

Waterway: MUNDI-SELKIRK WETLAND COMPLEX: UNNAMED (21186)		Identification No: 21186		
Values linked to regional goals				
Significant EVCs (5), Wetland Vegetation Condition (5), Significant Birds (4)				
Long-term resource condition outcomes				
09 - Protect the Victorian brolga populations by ensuring that they can breed successfully to maintain and increase population sizes, and flock at consistently used sites without disturbance				
27 - To maintain the wetland vegetation condition in excellent condition				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
21186.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	0.5 ha	land managers	n/a

Waterway: MUNDI-SELKIRK WETLAND COMPLEX: UNNAMED (21229)		Identification No: 21229		
Values linked to regional goals				
Significant EVCs (5), Wetland Vegetation Condition (5)				
Long-term resource condition outcomes				
27 - To maintain the wetland vegetation condition in excellent condition				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
21229.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	4.8 ha	land managers	n/a

4.3.2 (CONTINUED)

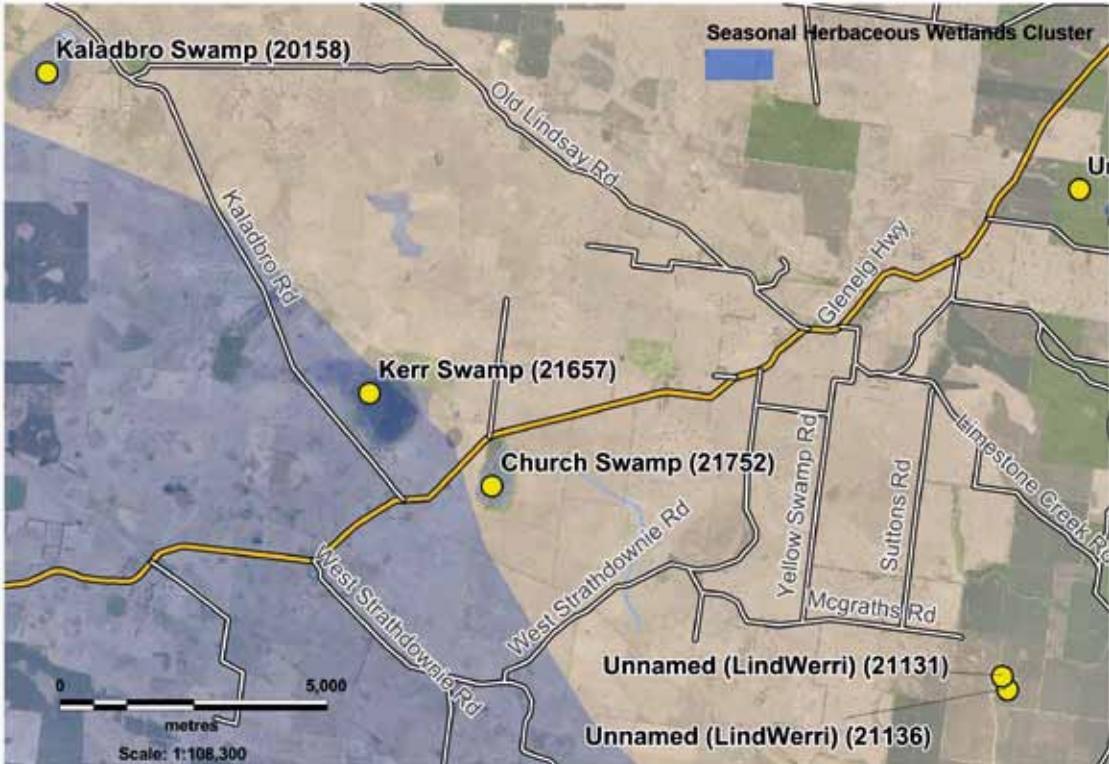
Waterway: MUNDI-SELKIRK WETLAND COMPLEX: UNNAMED (21243)		Identification No: 21243		
Values linked to regional goals				
Significant EVCs (5), Wetland Vegetation Condition (5)				
Long-term resource condition outcomes				
27 - To maintain the wetland vegetation condition in excellent condition				
Management outcome targets				
a - The water regime of the wetland will be improved				
Threats addressed by work program				
Changed Water Regime (3), Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
21243.1	Undertake water regime assessment	1 no.	CMA	a
21243.2	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	30 ha	land managers	n/a
Waterway: MUNDI-SELKIRK WETLAND COMPLEX: BLACKJACK SWAMP		Identification No: 21852		
Values linked to regional goals				
Significant EVCs (5), Wetland Vegetation Condition (5)				
Long-term resource condition outcomes				
27 - To maintain the wetland vegetation condition in excellent condition				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
21852.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	24 ha	land managers	n/a

4.3.2 (CONTINUED)

Waterway: MUNDI-SELKIRK WETLAND COMPLEX: UNNAMED (22953)		Identification No: 22953		
Values linked to regional goals				
Significant EVCs (5), Wetland Vegetation Condition (5)				
Long-term resource condition outcomes				
27 - To maintain the wetland vegetation condition in excellent condition				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
22953.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	13 ha	land managers	n/a
Waterway: MUNDI-SELKIRK WETLAND COMPLEX: UNNAMED (22957)		Identification No: 22957		
Values linked to regional goals				
Significant EVCs (5), Wetland Vegetation Condition (5)				
Long-term resource condition outcomes				
27 - To maintain the wetland vegetation condition in excellent condition				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
22957.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	16.7 ha	land managers	n/a

4.3.2 (CONTINUED)

Table 38. Lindsay-Werrikoo wetland complex

Wetland Complex	Lindsay-Werrikoo Wetlands	Wetland Type	Freshwater Meadow, Shallow Freshwater Marsh and Deep Freshwater Marsh
Land Tenure	Public and private	Area of Wetlands	406 ha
Land Manager	Parks Victoria, DEPI and private	No. of Wetlands	Seven including Kaladbro, Mill, Church, Kerr and several unnamed wetlands
Location and Map			
RCS Regional Significance	<p>The Lindsay-Werrikoo wetlands consists of a high density mosaic of freshwater meadows, shallow freshwater marshes and deep freshwater marshes mainly on cleared land aligned along a former shoreline. This wetland complex supports important brolga habitat and includes numerous seasonally herbaceous wetlands (a threatened ecological community under the EPBC Act).</p> <p>Although not listed within the RCS, the GHWS has identified this wetland complex as being regionally significant due to the brolga habitat and seasonally herbaceous wetlands.</p>		
Criteria for Listing in DIWA	<p>It is a good example of a wetland type occurring within a biogeographic region in Australia (Criteria 1)</p> <p>It is a wetland which plays an important ecological or hydrological role in the natural functioning of a major wetland system/complex (Criteria 2)</p> <p>It is a wetland which is important as the habitat for animal taxa at a vulnerable stage in their lifecycles, or provides a refuge when adverse conditions such as drought prevail (Criteria 3)</p>		

4.3.2 (CONTINUED)

Table 39. Lindsay-Werrikoo wetland complex (inc wetlands 20158, 21131, 21136, 21166, 21180, 21657, 21752 and 20568) work program

Basin: GLENELG and MILICENT COAST		Management Area: LOWER GLENELG		
Waterway: LINDSAY-WERRIKOO WETLAND COMPLEX: KALADBRO SWAMP		Identification No: 20158		
Values linked to regional goals				
Significant Birds (5)				
Long-term resource condition outcomes				
09 - Protect the Victorian brolga populations by ensuring that they can breed successfully to maintain and increase population sizes, and flock at consistently used sites without disturbance				
23 - To ensure that the blue-billed duck can survive, flourish and retain its potential for evolutionary development in the wild				
Management outcome targets				
a - The water regime of the wetland will be improved				
b - The wetland buffer vegetation value has improved to excellent condition				
Threats addressed by work program				
Changed Water Regime (5), Degraded Buffer (5), Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
20158.1	Assessment of water regime and drainage issues, including impact of dam on wetland	1 no.	CMA	a
20158.2	Install riparian fence (on private land only)	1 km	landholders / CMA	b
20158.3	Establish controlled grazing regime (private land only)	4 ha	landholders / CMA	b
20158.4	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	4 ha	land managers	n/a
Waterway: LINDSAY-WERRIKOO WETLAND COMPLEX: UNNAMED (21131)		Identification No: 21131		
Values linked to regional goals				
Significant EVCs (5), Wetland Vegetation Condition (5)				
Long-term resource condition outcomes				
27 - To maintain the wetland vegetation condition in excellent condition				
Management outcome targets				
a - The invasive wetland flora (weeds) threat will be reduced from high to low				
Threats addressed by work program				
Degraded Buffer (4), Invasive Fauna (Terrestrial) (5), Invasive Flora (Wetland) (4)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
21131.1	Undertake weed mapping and impact assessment	1.5 ha	CMA	a
21131.2	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	1.5 ha	land managers	n/a

4.3.2 (CONTINUED)

Waterway: LINDSAY-WERRIKOO WETLAND COMPLEX: UNNAMED (21136)		Identification No: 21136		
Values linked to regional goals				
Significant EVCs (5), Wetland Vegetation Condition (5)				
Long-term resource condition outcomes				
27 - To maintain the wetland vegetation condition in excellent condition				
Management outcome targets				
a - The invasive wetland flora (weeds) threat will be reduced from very high to low				
Threats addressed by work program				
Degraded Buffer (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Wetland) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
21136.1	Undertake weed mapping and impact assessment	2.6 ha	CMA	a
21136.2	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	2.6 ha	land managers	n/a
Waterway: LINDSAY-WERRIKOO WETLAND COMPLEX: UNNAMED (21166)		Identification No: 21166		
Values linked to regional goals				
Significant Birds (5)				
Long-term resource condition outcomes				
09 - Protect the Victorian brolga populations by ensuring that they can breed successfully to maintain and increase population sizes, and flock at consistently used sites without disturbance				
23 - To ensure that the blue-billed duck can survive, flourish and retain its potential for evolutionary development in the wild				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
21166.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	0.4 ha	land managers	n/a

4.3.2 (CONTINUED)

Waterway: LINDSAY-WERRIKOO WETLAND COMPLEX: MILL SWAMP		Identification No: 21180		
Values linked to regional goals				
Significant Birds (5)				
Long-term resource condition outcomes				
09 - Protect the Victorian brolga populations by ensuring that they can breed successfully to maintain and increase population sizes, and flock at consistently used sites without disturbance				
23 - To ensure that the blue-billed duck can survive, flourish and retain its potential for evolutionary development in the wild				
26 - To maintain the existing population and to rehabilitate former breeding sites of Australasian bittern				
Management outcome targets				
a - The invasive wetland flora (weeds) threat will be reduced from very high to low				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5), Invasive Flora (Wetland) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
21180.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	1.4 ha	land managers	n/a
21180.2	Establish non-woody weed control	14 ha	landholders / CMA	a
Waterway: LINDSAY-WERRIKOO WETLAND COMPLEX: KERR SWAMP		Identification No: 21657		
Values linked to regional goals				
Significant Birds (5)				
Long-term resource condition outcomes				
26 - To maintain the existing population and to rehabilitate former breeding sites of Australasian bittern				
Management outcome targets				
a - The water regime of the wetland will be improved.				
b - The wetland buffer vegetation value has improved to excellent condition				
c - The invasive wetland flora (weeds) threat will be reduced from very high to low				
Threats addressed by work program				
Changed Water Regime (3), Degraded Buffer (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Wetland) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
21657.1	Assessment of water regime and drainage impact	1 no.	CMA	a
21657.2	Install riparian fence (on private land only)	1 km	landholders / CMA	b
21657.3	Establish controlled grazing regime (private land only)	4 ha	landholders / CMA	b
21657.4	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	4 ha	land managers	n/a
21657.5	Modify outlet	1 no.	waterway manager / CMA	n/a
21657.6	Establish non-woody weed control	185 ha	land managers / CMA	c

4.3.2 (CONTINUED)

Waterway: LINDSAY-WERRIKOO WETLAND COMPLEX: CHURCH SWAMP		Identification No: 21752		
Values linked to regional goals				
Significant Birds (5)				
Long-term resource condition outcomes				
09 - Protect the Victorian brolga populations by ensuring that they can breed successfully to maintain and increase population sizes, and flock at consistently used sites without disturbance				
23 - To ensure that the blue-billed duck can survive, flourish and retain its potential for evolutionary development in the wild				
26 - To maintain the existing population and to rehabilitate former breeding sites of Australasian bittern				
Management outcome targets				
a - The water regime of the wetland will be improved.				
b - The wetland buffer vegetation value has improved to excellent condition				
Threats addressed by work program				
Changed Water Regime (3), Degraded Buffer (5), Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
21752.1	Remove drain	1 no.	waterway manager / CMA	a
21752.2	Install riparian fence (on private land only)	2.05 km	landholders / CMA	b
21752.3	Establish controlled grazing regime	50 ha	landholders / CMA	b
21752.4	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	4 ha	land managers	n/a
21752.5	Investigate the water regime and outlet impact	1 no.	CMA	a
21752.6	Modify outlet	1 no.	waterway manager / CMA	a

4.3.2 (CONTINUED)

Table 40. Grassy Flats Swamp (wetland 20568) work program

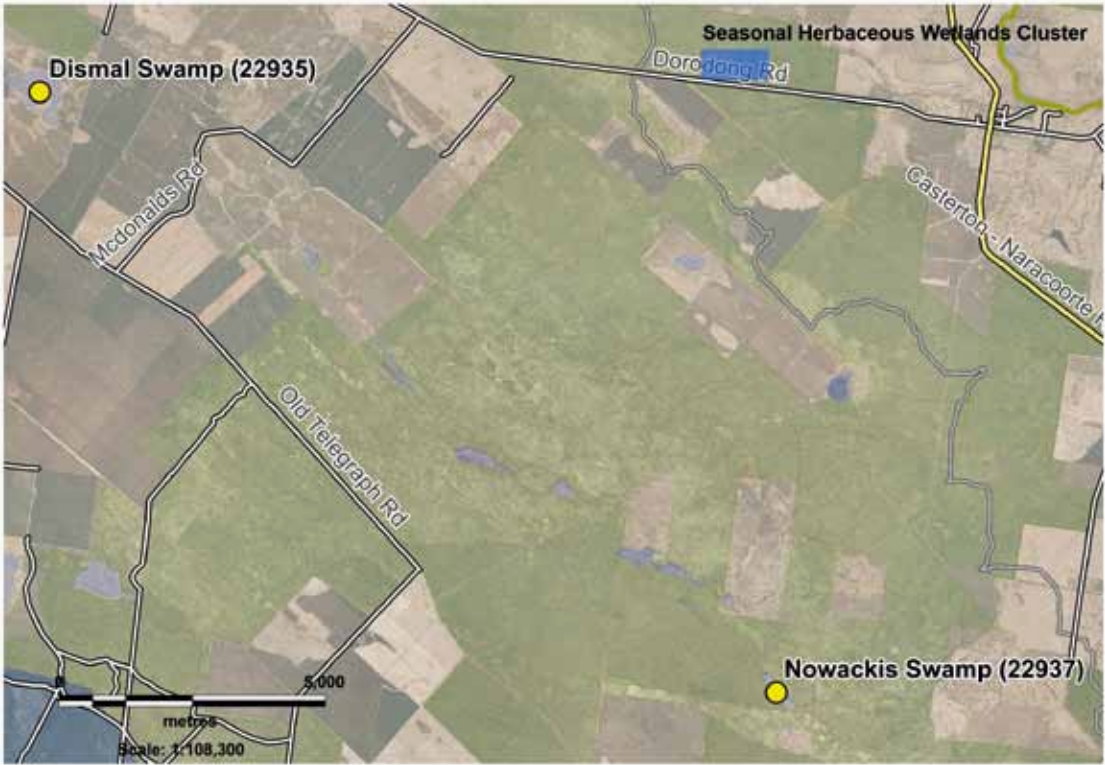
Basin: GLENELG		Management Area: LOWER GLENELG		
Waterway: GRASSY FLATS SWAMP		Identification No: 20568		
Values linked to regional goals				
Significant Birds (5)				
Long-term resource condition outcomes				
16 - To ensure that swamp everlasting can survive, flourish and retain its potential for evolutionary development in the wild To secure populations or habitat from potentially incompatible land use or catastrophic loss				
Management outcome targets				
a - The water regime of the wetland will be improved				
Threats addressed by work program				
Changed Water Regime (5), Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
20568.1	Remove levee	1 km	waterway manager / CMA	a
20568.2	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	10 ha	land managers	n/a
20568.3	Modify outlet	1 no.	waterway manager / CMA	a

Below: Brolgas in Kaladbro Swamp.



4.3.2 (CONTINUED)

Table 41. Boiler Swamp wetland complex

Wetland Complex	Boiler Swamp	Wetland Type	Shallow Freshwater Marsh and Deep Freshwater Marsh
Land Tenure	Public and private	Area of Wetlands	193 ha
Land Manager	Public and private	No. of Wetlands	60 wetlands (in Victoria) including Bullock Swamp, Dismal Swamp, Castines Swamp, Horseshoe Swamp, Nowackis Swamp and Cattleyard Swamp
Location and Map			
RCS Regional Significance	Boiler Swamp is of high conservation value for its flora and fauna. This wetland system is frequented by two species listed under JAMBA and CAMBA. These wetlands are DIWA listed.		
Criteria for Listing in DIWA	<p>It is a good example of a wetland type occurring within a biogeographic region in Australia (Criteria 1)</p> <p>It is a wetland which plays an important ecological or hydrological role in the natural functioning of a major wetland system/complex (Criteria 2)</p>		

4.3.2 (CONTINUED)

Table 42. Boiler Swamp wetland complex (inc. wetlands 22937 and 22935) work program

Basin: GLENELG and MILICENT COAST		Management Area: LOWER GLENELG		
Waterway: BOILER SWAMP WETLAND COMPLEX: NOWACKIS SWAMP		Identification No: 22937		
Values linked to regional goals				
Significant Birds (5)				
Long-term resource condition outcomes				
09 - Protect the Victorian brolga populations by ensuring that they can breed successfully to maintain and increase population sizes, and flock at consistently used sites without disturbance				
26 - To maintain the existing population and to rehabilitate former breeding sites of Australasian bittern				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
22937	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	63 ha	land managers	n/a
Waterway: BOILER SWAMP WETLAND COMPLEX: UNNAMED (22935)		Identification No: 22935		
Values linked to regional goals				
Significant Amphibians (5), Significant Birds (5)				
Long-term resource condition outcomes				
11 - Secure extant populations of growling grass frogs, particularly those occurring in known breeding habitats, and improve their viability through increases in size and/or area of occurrence				
23 - To ensure that the blue-billed duck can survive, flourish and retain its potential for evolutionary development in the wild				
Management outcome targets				
a - The water regime of the wetland will be improved				
Threats addressed by work program				
Changed Water Regime (3), Invasive Fauna (Terrestrial) (5), Invasive Flora (Wetland) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
22935.1	Consider the risk to wetland environments from groundwater use associated with forestry in this catchment when assessing take and use licences for groundwater	1 no.	Southern Rural Water	a
22935.2	Remove channel	1 no.	waterway manager / CMA	a
22935.3	Remove drain	1 no.	waterway manager / CMA	a
22935.4	Remove levee	1 km	waterway manager / CMA	a
22935.5	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	6 ha	land managers	n/a

4.3.2 (CONTINUED)

Table 43. Tullich Swamp (Wetland 21141) work program

Basin: GLENELG		Management Area: LOWER GLENELG		
Waterway: TULLICH SWAMP		Identification No: 21141		
Values linked to regional goals				
Significant Amphibians (5), Significant Birds (5)				
Long-term resource condition outcomes				
11 - Secure extant populations of growling grass frogs, particularly those occurring in known breeding habitats, and improve their viability through increases in size and/or area of occurrence				
26 - To maintain the existing population and to rehabilitate former breeding sites of Australasian bittern				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
21141.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	4 ha	land managers	n/a

Table 44. Summary of key works and outputs for Lower Glenelg Waterway Management Area

OUTPUT	QUANTITY
Assessment of wetland water regime	4 no.
Install riparian fence	71.05 km
Establish pest animal control	889.4 ha
Establish native vegetation	134.5 ha
Deliver environmental water to reach in line with Seasonal Watering Plan	112 ha
Modify wetland outlet structure	3 no.
Establish non-woody weed control	359 ha
Total Budget for Lower Glenelg Waterway Management Area	\$4,086,250

4.4 UPPER GLENELG WATERWAY MANAGEMENT AREA

The major waterway in the Upper Glenelg Management Area is the Glenelg River. It has five major tributaries: the Wando and Chetwynd Rivers, Mathers and Pigeon Ponds Creeks and Steep Bank Rivulet.

The Glenelg River is the only regulated river in the Glenelg Hopkins region. Land use in the catchment is predominantly grazing and timber production. Waterways are valued for sand extraction, stock and domestic water, and recreational activities such as boating, camping and fishing.

The Upper Glenelg is regarded as one of the most severely eroded catchments in Victoria. This erosion has deposited four to eight million cubic metres of sand into the Glenelg River and its tributaries, significantly impacting on in-stream values. Other major threats to the waterways in this area are associated with unrestricted stock access, pest plants and animals, barriers to fish movement and inadequate flow.

The major river assets in the Upper Glenelg Waterway Management Area are as follows.

The Glenelg River: The river supports rare and threatened species such as Glenelg spiny crayfish, Glenelg mussel, variegated pygmy perch and Wimmera bottlebrush. It provides water for agriculture and urban townships.

The Wando River: This river supports rare and threatened species such as the variegated pygmy perch.

There are several priority wetlands including: **The Dergholm** (Youpayang) wetland complex, **Beniagh Swamp**, **Victoria Lagoon**, **Moora Moora Reservoir** and **Rocklands Reservoir**. Many of these act as drought refuges for key species such as the brolga, Australasian bittern and blue-billed duck.

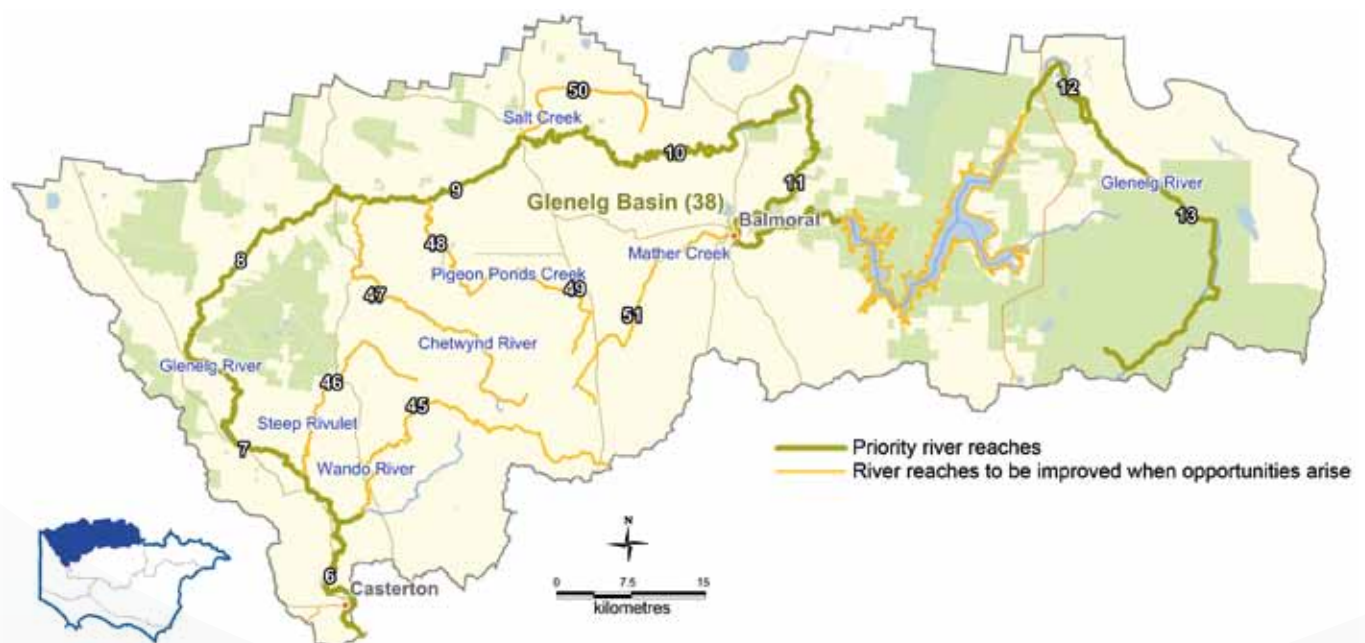


Figure 20. Upper Glenelg Waterway Management Area indicating priority rivers reaches

4.4.1 RIVERS WITHIN THE UPPER GLENELG WATERWAY MANAGEMENT AREA

Table 45. Glenelg River (reaches 38-06, 38-07, 38-08, 38-09, 38-10, 38-11, 38-12 and 38-13) work program

Basin: GLENELG		Management Area: UPPER GLENELG		
Waterway: GLENELG RIVER		Identification No: 38-06		
Values linked to regional goals				
Significant Invertebrates Aquatic (5), Significant Fish Non Migratory (5)				
Long-term resource condition outcomes				
08 - Protect all known populations of variegated pygmy perch and take immediate action to ensure that suitable habitat is appropriately managed in at least three locations				
24 - To guarantee that the Glenelg spiny crayfish can survive, flourish and retain its potential for evolutionary development in the wild				
Management outcome targets				
a - No artificial barrier to fish migration exists				
b - The large riparian trees value has improved to good condition				
c - The low flow magnitude threat score has reduced from high to moderate				
d - The in-stream habitat associated with large wood improved from poor habitat to good habitat				
e - There is no increase in the threat of loss of in-stream habitat through sedimentation				
Threats addressed by work program				
Barriers to Fish Migration (4), Degraded Riparian Vegetation – Large Trees (5), Increase in Low Flow Magnitude (4), Invasive Fauna (Aquatic) (5), Livestock Access (5), Loss of In-stream Habitat (Large Wood) (4), Loss of In-stream Habitat (Sediment) (3), Reduced Vegetation Width (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-06.1	Establish ecological assessment (instream)	1 no.	CMA	d
38-06.2	Undertake invasive species assessment (carp)	1 no.	CMA	n/a
38-06.3	Undertake property assessment	10 ha	CMA	a
38-06.4	Licenced sand and gravel extraction	1 km	CMA	e
38-06.5	Maintain riparian fence	50 km	landholders / CMA	b
38-06.6	Establish native indigenous vegetation	5 ha	landholders / CMA	b
38-06.7	Deliver environmental water to reach in line with Seasonal Watering Plan	22 ha	CMA / VEWH	c
38-06.8	Install in-stream large wood	1 km	waterway manager / CMA	d

4.4.1 (CONTINUED)

Waterway: GLENELG RIVER		Identification No: 38-07		
Values linked to regional goals				
Recreational Fishing (5), Significant Fish Non Migratory (5)				
Long-term resource condition outcomes				
06 - Maintain the recreational fishing value of assets listed as popular fisheries in a Regional Fishery Management Plan or as a ‘best fishing water’ in A Guide to Angling Inland Waters of Victoria				
08 - Protect all known populations of variegated pygmy perch and take immediate action to ensure that suitable habitat is appropriately managed in at least three locations				
Management outcome targets				
a - No artificial barrier to fish migration exists				
b - The large riparian trees value has improved to good condition				
c - There is a reduction in the length of waterway affected by livestock access				
d - The in-stream habitat associated with large wood improved from poor habitat to good habitat				
e - There is no increase in the threat of loss of in-stream habitat through sedimentation				
Threats addressed by work program				
Bank Instability (5), Barriers to Fish Migration (0), Degraded Riparian Vegetation – Large Trees (5), Invasive Fauna (Aquatic) (5), Livestock Access (3), Loss of In-stream Habitat (Large Wood) (4), Loss of In-stream Habitat (Sediment) (4)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-07.1	Undertake invasive species assessment (carp)	92 ha	CMA	n/a
38-07.2	Licensed sand and gravel extraction	0.3 km	CMA	e
38-07.3	Install riparian fence	30 km	landholders / CMA	c
38-07.4	Establish controlled grazing regime	5 ha	landholders / CMA	b, c
38-07.5	Establish grazing exclusion	95 ha	landholders / CMA	b, c
38-07.6	Establish inland aquatic pest animal control	33 ha	CMA	n/a
38-07.7	Establish native indigenous vegetation	50 ha	landholders / CMA	b, e
38-07.8	Deliver environmental water to reach in line with Seasonal Watering Plan	33 ha	CMA / VEWH	e
38-07.9	Investigate and remove the fish barriers	1 no.	CMA	a
38-07.10	Install in-stream large wood	1 km	waterway manager / CMA	d

4.4.1 (CONTINUED)

Waterway: GLENELG RIVER			Identification No: 38-08		
Values linked to regional goals					
Significant Flora Terrestrial (5), Significant Fish Non Migratory (5)					
Long-term resource condition outcomes					
08 - Protect all known populations of variegated pygmy perch and take immediate action to ensure that suitable habitat is appropriately managed in at least three locations					
20 - To ensure that Wimmera bottlebrush can survive, flourish and retain its potential for evolutionary development in the wild					
Management outcome targets					
a - The large riparian trees value has improved to good condition					
b - The low flow magnitude threat score has reduced from very high to moderate					
c - There is a reduction in the length of waterway affected by livestock access					
d - The in-stream habitat associated with large wood improved from poor habitat to good habitat					
e - There is no increase in the threat of loss of in-stream habitat through sedimentation					
Threats addressed by work program					
Bank Instability (3), Degraded Riparian Vegetation – Large Trees (5), Increase in Low Flow Magnitude (5), Invasive Fauna (Aquatic) (5), Livestock Access (3), Loss of In-stream Habitat (Large Wood) (4), Loss of In-stream Habitat (Sediment) (4), Reduction in High Flow Magnitude (3), Reduced Riparian Connectivity (1), Reduced Vegetation Width (3)					
Work program					
Activity ID	Management Activity		Quantity	Lead agency / Partners	MOT link
38-08.1	Undertake invasive species assessment (carp)		1 no.	CMA	n/a
38-08.2	Licensed sand and gravel extraction		0.3 km	CMA	e
38-08.3	Install riparian fence		75 km	landholders / CMA	c
38-08.4	Establish controlled grazing regime		5 ha	landholders / CMA	a, c
38-08.5	Establish grazing exclusion		195 ha	landholders / CMA	a, c
38-08.6	Establish inland aquatic pest animal control		37 ha	CMA	n/a
38-08.7	Develop Environmental Water Management Plan		1 no.	CMA / VEWH	b
38-08.8	Establish native indigenous vegetation		150 ha	landholders / CMA	a
38-08.9	Deliver environmental water to reach in line with Seasonal Watering Plan		37 ha	CMA / VEWH	b, e
38-08.10	Install in-stream large wood		1 km	waterway manager / CMA	d

4.4.1 (CONTINUED)

Waterway: GLENELG RIVER		Identification No: 38-09		
Values linked to regional goals				
Significant Flora Terrestrial (5), Significant Fish Non Migratory (5)				
Long-term resource condition outcomes				
08 - Protect all known populations of variegated pygmy perch and take immediate action to ensure that suitable habitat is appropriately managed in at least three locations				
20 - To ensure that Wimmera bottlebrush can survive, flourish and retain its potential for evolutionary development in the wild				
Management outcome targets				
a - The large riparian trees value has improved to good condition				
b - The low flow magnitude threat score has reduced from very high to moderate				
c - There is a reduction in the length of waterway affected by livestock access				
d - There is no increase in the threat of loss of in-stream habitat through sedimentation				
Threats addressed by work program				
Degraded Riparian Vegetation – Large Trees (5), Increase in Low Flow Magnitude (5), Invasive Fauna (Aquatic) (5), Livestock Access (3), Loss of In-stream Habitat (Large Wood) (4), Loss of In-stream Habitat (Sediment) (4), Reduction in High Flow Magnitude (3), Reduced Vegetation Width (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-09.1	Implement best management practice on grazing properties	1 ha	landholders / DEPI	d
38-09.2	Undertake invasive species assessment (carp)	1 no.	CMA	n/a
38-09.3	Licenced sand and gravel extraction	0.3 km	CMA	d
38-09.4	Install riparian fence	120 km	landholders / CMA	c
38-09.5	Establish controlled grazing regime	25 ha	landholders / CMA	a, c
38-09.6	Establish grazing exclusion	375 ha	landholders / CMA	a, c
38-09.7	Implement inland aquatic pest animal control	22 ha	CMA	n/a
38-09.8	Refer 38-08.7: Develop Environmental Water Management Plan			b
38-09.9	Establish native indigenous vegetation	150 ha	landholders / CMA	a
38-09.9	Deliver environmental water to reach in line with Seasonal Watering Plan	22 ha	CMA / VEWH	b, d

4.4.1 (CONTINUED)

Waterway: GLENELG RIVER		Identification No: 38-10		
Values linked to regional goals				
Significant Flora Terrestrial (5)				
Long-term resource condition outcomes				
20 - To ensure that Wimmera bottlebrush can survive, flourish and retain its potential for evolutionary development in the wild				
Management outcome targets				
a - The large riparian trees value has improved to good condition				
b - The low flow magnitude threat score has reduced from very high to moderate				
c - The invasive riparian flora (ground layer) threat will be reduced from moderate to low				
d - Livestock have been excluded from over 50% of the waterway frontage				
Threats addressed by work program				
Degraded Riparian Vegetation - Large Trees (5), Degraded Water Quality (5), Increase in Low Flow Magnitude (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) - Ground Layer (3), Livestock Access (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-10.1	Install riparian fence	5 km	landholders / CMA	d
38-10.2	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	100 ha	land managers	n/a
38-10.3	Establish native indigenous vegetation	5 ha	landholders / CMA	a
38-10.4	Deliver environmental water to reach in line with Seasonal Watering Plan	58 ha	CMA / VEWH	b
38-10.5	Establish non-woody weed control	30 ha	land managers / CMA	c
38-10.6	Establish grazing exclusion	10 ha	land managers / CMA	a, d

Below left: Wimmera bottlebrush (*Callistemon wimmerensis*)



4.4.1 (CONTINUED)

Waterway: GLENELG RIVER		Identification No: 38-11		
Values linked to regional goals				
Significant Invertebrates Aquatic (5), Significant Flora Terrestrial (5), Significant Amphibians (5)				
Long-term resource condition outcomes				
11 - Secure extant populations of growling grass frogs, particularly those occurring in known breeding habitats, and improve their viability through increases in size and/or area of occurrence.				
20 - To ensure that Wimmera bottlebrush can survive, flourish and retain its potential for evolutionary development in the wild				
24 - To guarantee that the Glenelg spiny crayfish can survive, flourish and retain its potential for evolutionary development in the wild				
Management outcome targets				
a - No artificial barrier to fish migration exists				
b - The large riparian trees value has improved to good condition				
c - The low flow magnitude threat score has reduced from very high to moderate				
d - There is no increase in the threat of loss of in-stream habitat through sedimentation				
Threats addressed by work program				
Barriers to Fish Migration (4), Degraded Riparian Vegetation - Large Trees (5), Increase in Low Flow Magnitude (5), Invasive Fauna (Aquatic) (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) - Shrub Layer (2), Loss of In-stream Habitat (Sediment) (4), Reduction in High Flow Magnitude (3), Thermal Water Pollution (4)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-11.1	Undertake invasive species assessment (carp)	1 no.	CMA	n/a
38-11.2	Assessment of fish barrier	1 no.	CMA	a
38-11.3	Refer 38-08.7: Develop Environmental Water Management Plan			n/a
38-11.4	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	50 ha	land managers	n/a
38-11.5	Establish native indigenous vegetation	5 ha	landholders / CMA	b, d
38-11.6	Deliver environmental water to reach in line with Seasonal Watering Plan	53 ha	CMA	c
38-11.7	Establish non-woody weed control	20 ha	land managers / CMA	n/a

4.4.1 (CONTINUED)

Waterway: GLENELG RIVER		Identification No: 38-12		
Values linked to regional goals				
Significant EVCs (5), Riparian Vegetation Condition (5)				
Long-term resource condition outcomes				
10 - Riparian vegetation condition is maintained in excellent condition				
Management outcome targets				
a - The large riparian trees value has improved to good condition				
b - The low flow magnitude threat score has reduced from very high to moderate				
c - The proportion of zero flow threat score has reduced from high to moderate				
d - The invasive riparian flora (ground layer) threat will be reduced from moderate to low				
Threats addressed by work program				
Degraded Riparian Vegetation - Large Trees (4), Increase in Low Flow Magnitude (5), Increase in Proportion of Zero Flow (4), Invasive Fauna (Aquatic) (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (3), Loss of In-stream Habitat (Large Wood) (5), Reduction in High Flow Magnitude (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-12.1	Establish ecological assessment	1 no.	CMA	n/a
38-12.2	Undertake invasive species assessment (carp)	1 no.	CMA	n/a
38-12.3	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	5 ha	land managers	n/a
38-12.4	Establish native indigenous vegetation	10 ha	landholders / CMA	a
38-12.5	Deliver environmental water to reach in line with Seasonal Watering Plan	22 ha	CMA	b, c

Below: Glenelg River



4.4.1 (CONTINUED)

Waterway: GLENELG RIVER		Identification No: 38-13		
Values linked to regional goals				
Significant Invertebrates Aquatic (5), Significant Amphibians (5)				
Long-term resource condition outcomes				
24 - To guarantee that the Glenelg spiny crayfish can survive, flourish and retain its potential for evolutionary development in the wild				
3 - Guarantee that the brown toadlet survives and prospers in the wild, and maintains its potential to evolve				
Management outcome targets				
a - The low flow magnitude threat score has reduced from very high to high				
b - The proportion of zero flow threat score has reduced from high to moderate				
Threats addressed by work program				
Increase in Low Flow Magnitude (5), Increase in Proportion of Zero Flow (4), Invasive Fauna (Aquatic) (5), Invasive Fauna (Terrestrial) (5), Reduction in High Flow Magnitude (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-13.1	Undertake invasive species assessment (carp)	22 ha	CMA	n/a
38-13.2	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	22 ha	land managers	n/a
38-13.3	Investigate opportunities to improve environmental water outcomes from Moora Moora Reservoir	1 no.	CMA / GWMW	a, b
38-13.4	Deliver environmental water to reach in line with Seasonal Watering Plan	22 ha	CMA / VEWH	a, b

Below: Installed large woody debris provides habitat in the Glenelg River



4.4.1 (CONTINUED)

Table 46. Wando River (reach 44) work program

Basin: GLENELG		Management Area: UPPER GLENELG		
Waterway: WANDO RIVER		Identification No: 38-44		
Values linked to regional goals				
Significant Fish Non Migratory (4)				
Long-term resource condition outcomes				
08 - Protect all known populations of variegated pygmy perch and take immediate action to ensure that suitable habitat is appropriately managed in at least three locations				
Management outcome targets				
a - No artificial barrier to fish migration exists				
b - The large riparian tree value has improved to excellent condition				
c - The low flow magnitude threat score has reduced from very high to high				
d - The invasive riparian flora (ground layer) threat will be reduced from high to moderate				
e - Livestock have been excluded from over 50% of the waterway frontage				
f - There is no increase in the threat of loss of in-stream habitat through sedimentation				
Threats addressed by work program				
Barriers to Fish Migration (4), Degraded Riparian Vegetation – Large Trees (5), Increase in Low Flow Magnitude (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (4), Livestock Access (5), Loss of In-stream Habitat (Large Wood) (5), Loss of In-stream Habitat (Sediment) (3), Reduced Riparian Connectivity (4), Reduced Vegetation Width (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-44.1	Implement best management practice for forestry operations	1 no	forestry industry	c, f
38-44.2	Participate in bulk entitlement, licensing and management rule review process	1 no.	CMA	c
38-44.3	Undertake fish barrier assessment	1 no.	CMA	a
38-44.4	Install riparian fence	3 km	landholders / CMA	e
38-44.5	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	60 ha	land managers	n/a
38-44.6	Establish native indigenous vegetation	3 ha	landholders / CMA	b, f
38-44.7	Establish non-woody weed control	3 ha	land managers / CMA	d
38-44.8	Establish grazing exclusion	6 ha	land managers / CMA	b, e

4.4.2 WETLANDS WITHIN THE UPPER GLENELG WATERWAY MANAGEMENT REGION

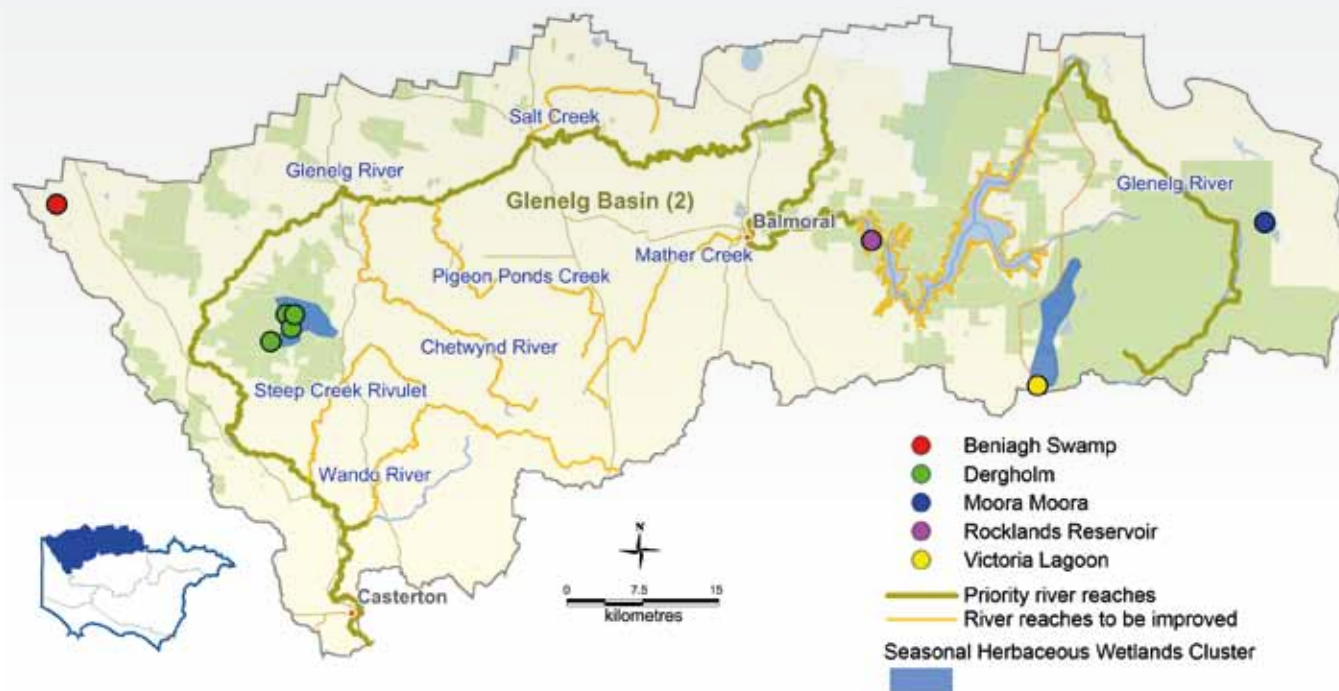



Figure 21. Wetland complexes in the Upper Glenelg Waterway Management Area

4.3.2 (CONTINUED)

Table 47. Dergholm (Youpayang) wetland complex

Wetland Complex	Dergholm wetlands	Wetland Type	Shallow Freshwater Marsh and Deep Freshwater Marsh
Land Tenure	Public and private	Area of Wetlands	228 ha
Land Manager	Parks Victoria, DEPI and private	No. of Wetlands	25 including Smokey Swamp, Green Swamp, Brown Reedy Swamp, Sampey Swamp
Location and Map			
RCS Regional Significance	Dergholm wetlands are a network of shallow and deep freshwater marshes. They support a diverse range of flora and fauna of high conservation value. The wetlands are DIWA listed.		
Criteria for Listing in DIWA	<p>It is a good example of a wetland type occurring within a biogeographic region in Australia (Criteria 1)</p> <p>It is a wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail (Criteria 3)</p>		

4.4.2 (CONTINUED)

Table 48. Dergholm wetlands complex (inc. wetlands 22985, 22994, 23000 and 23003) work program

Basin: GLENELG		Management Area: UPPER GLENELG		
Waterway: DERGHOLM WETLAND COMPLEX: SMOKEY SWAMP		Identification No: 22985		
Values linked to regional goals				
Significant Birds (5)				
Long-term resource condition outcomes				
09 - Protect the Victorian brolga populations by ensuring that they can breed successfully to maintain and increase population sizes, and flock at consistently used sites without disturbance				
26 - To maintain the existing population and to rehabilitate former breeding sites of Australasian bittern				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
22985.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	29 ha	land managers	n/a
Waterway: DERGHOLM WETLAND COMPLEX: UNNAMED (22994)		Identification No: 22994		
Values linked to regional goals				
Significant EVCs (5), Wetland Vegetation Condition (5)				
Long-term resource condition outcomes				
27 - To maintain the wetland vegetation condition in excellent condition				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
22994.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	3.4 ha	land managers	n/a

4.4.2 (CONTINUED)

Waterway: DERGHOLM WETLAND COMPLEX: SAMPEY SWAMP		Identification No: 23000		
Values linked to regional goals				
Significant EVCs (5), Wetland Vegetation Condition (5)				
Long-term resource condition outcomes				
27 - To maintain the wetland vegetation condition in excellent condition				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
23000.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	2 ha	land managers	n/a
Waterway: DERGHOLM WETLAND COMPLEX: UNNAMED (23003)		Identification No: 23003		
Values linked to regional goals				
Significant EVCs (5), Wetland Vegetation Condition (5)				
Long-term resource condition outcomes				
27 - To maintain the wetland vegetation in excellent condition				
Management outcome targets				
a - The invasive wetland flora (weeds) threat will be reduced from moderate to low				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5), Invasive Flora (Wetland) (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
23003.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	1.5 ha	landholders	n/a
23003.2	Establish non-woody weed control	1.5 ha	landholders / CMA	a

4.4.2 (CONTINUED)

Table 49. Beniagh Swamp (wetland 23078) work program

Basin: GLENELG		Management Area: UPPER GLENELG		
Waterway: BENIAGH SWAMP		Identification No: 23078		
Values linked to regional goals				
Significant Birds (5)				
Long-term resource condition outcomes				
09 - Protect the Victorian brolga populations by ensuring that they can breed successfully to maintain and increase population sizes, and flock at consistently used sites without disturbance				
23 - To ensure that the blue-billed duck can survive, flourish and retain its potential for evolutionary development in the wild				
Management outcome targets				
a - The wetland buffer vegetation value has improved to very good condition				
Threats addressed by work program				
Degraded Buffer (3), Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
23078.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	145 ha	land managers	n/a
23078.2	Establish native indigenous vegetation	72 ha	landholders / CMA	a

4.4.2 (CONTINUED)

Table 50. Victoria Lagoon (wetland 27624) work program

Basin: GLENELG		Management Area: UPPER GLENELG		
Waterway: VICTORIA LAGOON		Identification No: 27624		
Values linked to regional goals				
Significant Birds (5)				
Long-term resource condition outcomes				
09 - Protect the Victorian brolga populations by ensuring that they can breed successfully to maintain and increase population sizes, and flock at consistently used sites without disturbance				
26 - To maintain the existing population and to rehabilitate former breeding sites of Australasian bittern				
Management outcome targets				
a - The wetland buffer vegetation has improved to moderate condition				
Threats addressed by work program				
Degraded Buffer (5), Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
27624.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	2.7 ha	land managers	n/a
27624.2	Establish native indigenous vegetation	3 ha	landholders / CMA	a

Table 51. Moora Moora Reservoir (wetland 27669) work program

Basin: GLENELG		Management Area: UPPER GLENELG		
Waterway: MOORA MOORA RESERVOIR		Identification No: 27669		
Significant Amphibians (5)				
Long-term resource condition outcomes				
11 - Secure extant populations of growling grass frogs, particularly those occurring in known breeding habitats, and improve their viability through increases in size and/or area of occurrence				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
27669.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	15 ha	land managers	n/a

4.4.2 (CONTINUED)

Table 52. Rocklands Reservoir (wetland 27675) work program

Basin: GLENELG		Management Area: UPPER GLENELG		
Waterway: ROCKLANDS RESERVOIR		Identification No: 27675		
Values linked to regional goals				
Significant Amphibians (5), Significant Birds (5)				
Long-term resource condition outcomes				
11 - Secure extant populations of growling grass frogs, particularly those occurring in known breeding habitats, and improve their viability through increases in size and/or area of occurrence				
23 - To ensure that the blue-billed duck can survive, flourish and retain its potential for evolutionary development in the wild				
35 - To protect high value wetlands known to be utilised by freckled duck				
Management outcome targets				
No measurable outcome targets able to be set for eight-year implementation period for the threats addressed by the work program				
Threats addressed by work program				
Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
27675.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	15 ha	land managers	n/a
27624.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	2.7 ha	land managers	n/a

Table 53. \

OUTPUT	QUANTITY
Install riparian fence	288 km
Establish controlled grazing regime	35 ha
Establish grazing exclusion	665 ha
Establish terrestrial pest animal control	450.6 ha
Establish native vegetation	443 ha
Deliver environmental water to reach in line with Seasonal Watering Plan	269 ha
Modify fish barrier	1 no.
Install in-stream large wood	3 km
Establish non-woody weed control	59.5 km
Total Budget for Upper Glenelg Waterway Management Area	\$8,311,000

4.5 UPPER HOPKINS WATERWAY MANAGEMENT AREA

The major waterways in the Upper Hopkins Management Area are the Hopkins River, Mt Emu Creek, Trawalla Creek and Fiery Creek.

The area has been extensively cleared except for pockets of forest at the top of the catchment. Land use in the catchment is predominantly grazing and cropping with a small amount of timber production. Waterways are valued for stock water and recreational activities such as camping and fishing.

The main threats to the waterways in this area are associated with unrestricted stock access, weeds, barriers to fish movement, inadequate flow, cropping of wetlands and changes to wetland hydrology.

The major river assets in the Upper Hopkins Waterway Management Area are as follows.

Mt Emu Creek: This creek is the main tributary of the Hopkins River and supports rare and threatened species such as the growling grass frog.

Trawalla Creek: This waterway supports significant species such as the growling grass frog.

The region contains some of the most important wetlands in the Glenelg Hopkins region. It supports a significant number of Seasonally Herbaceous Wetlands and some regionally important wetlands such as **Lake Muirhead**, **Mt William Swamp** and **Cockajemmy Lakes**.

These wetlands are quite large and support many important bird species. These are described in more detail in *Tables 57, 59 and 61* respectively.

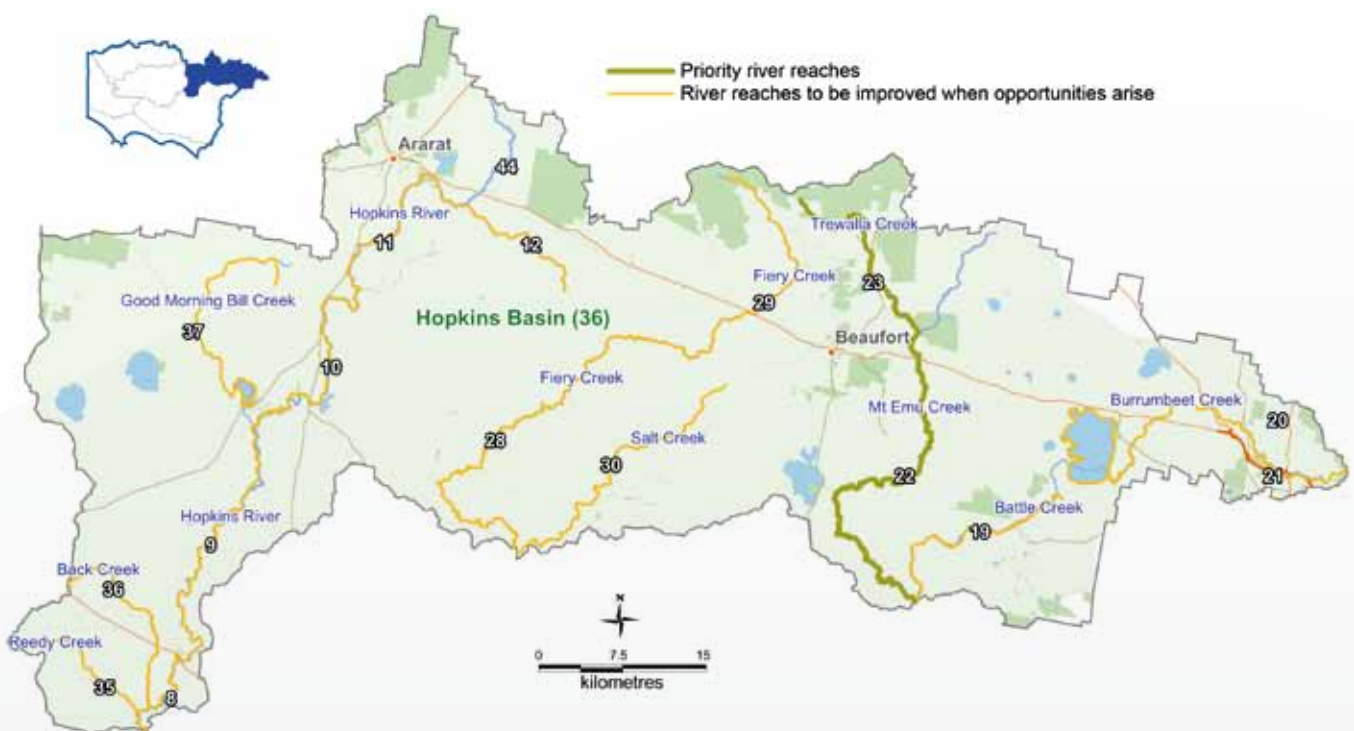


Figure 22. Upper Hopkins Waterway Management Area showing priority reaches

4.5.1 RIVERS WITHIN THE UPPER HOPKINS WATERWAY MANAGEMENT AREA

Table 54. Mt Emu Creek (reach 36-22) work program

Basin: HOPKINS		Management Area: UPPER HOPKINS		
Waterway: MT EMU CREEK		Identification No: 36-22		
Values linked to regional goals				
Significant Amphibians (5)				
Long-term resource condition outcomes				
11 - Secure extant populations of growling grass frogs, particularly those occurring in known breeding habitats, and improve their viability through increases in size and/or area of occurrence				
Management outcome targets				
a - Bank stability is maintained				
b - The low flow magnitude threat score has reduced from very high to high				
c - The proportion of zero flow threat score has reduced from high to moderate				
d - Livestock have been excluded from over 50% of the waterway frontage				
e - There is no increase in the threat of loss of in-stream habitat through sedimentation				
f - Riparian vegetation width improves to between 10 and 30 metres on average across the length of the reach				
Threats addressed by work program				
Bank Instability (3), Degraded Water Quality (5), Increase in Low Flow Magnitude (5), Increase in Proportion of Zero Flow (4), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (4), Livestock Access (5), Loss of In-stream Habitat (Sediment) (3), Reduced Riparian Connectivity (4), Reduced Vegetation Width (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
36-22.1	Implement forestry operations use best management practice in this catchment	1 no.	forestry industry	b, e
36-22.2	Participate in bulk entitlement, licensing and management rule review process	1 no.	CMA	b, c
36-22.3	Develop Waterway Action Plan including geomorphic investigation	1 ha	CMA	a
36-22.4	Install riparian fence	20 km	landholders / CMA	d
36-22.5	Establish controlled grazing regime	1 ha	landholders / CMA	d
36-22.6	Establish stewardship/landholder agreement	20 ha	landholders / CMA	d, f
36-22.7	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	108 ha	land managers	n/a
36-22.8	Establish native indigenous vegetation	16 ha	landholders / CMA	e

4.5.1 (CONTINUED)

Table 55. Trawalla Creek (reach 36-23) work program

Basin: HOPKINS		Management Area: UPPER HOPKINS		
Waterway: TRAWALLA CREEK		Identification No: 36-23		
Values linked to regional goals				
Significant Amphibians (5)				
Long-term resource condition outcomes				
11 - Secure extant populations of growling grass frogs, particularly those occurring in known breeding habitats, and improve their viability through increases in size and/or area of occurrence				
Management outcome targets				
a - The large riparian trees value has improved to good condition				
b - The low flow magnitude threat score has reduced from very high to high				
c - The proportion of zero flow threat score has reduced from high to moderate				
d - There is a reduction in the length of waterway affected by livestock access				
e - There is no increase in the threat of loss of in-stream habitat through sedimentation				
f - Riparian vegetation width improves to between 10 and 30 metres on average across the length of the reach				
Threats addressed by work program				
Degraded Riparian Vegetation – Large Trees (5), Degraded Water Quality (5), Increase in Low Flow Magnitude (5), Increase in Proportion of Zero Flow (4), Invasive Fauna (Terrestrial) (5), Livestock Access (3), Loss of In-stream Habitat (Sediment) (3), Reduced Riparian Connectivity (5), Reduced Vegetation Width (4)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
36-23.1	Implement forestry and cropping best management practices in this catchment to minimise sediment input	1 no.	forestry industry / DEPI	e
36-23.2	Install riparian fence	8 km	landholders / CMA	d
36-23.3	Establish controlled grazing regime	1 ha	landholders / CMA	a, d
36-23.4	Establish grazing exclusion	7 ha	landholders / CMA	a, d
36-23.5	Identify opportunities to amend Crown land water frontage licences – grazing licences to riparian management	8 ha	CMA / DEPI	f
36-23.6	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	42 ha	land managers	n/a
36-23.7	Participate in bulk entitlement, licensing and management rule review process	1 no.	CMA	b, c
36-23.8	Establish native indigenous vegetation	8 ha	landholders / CMA	a, e
36-23.9	Maintain grass buffer strip	42 ha	landholders / CMA	e

4.5.2 WETLANDS WITHIN THE UPPER HOPKINS WATERWAY MANAGEMENT AREA

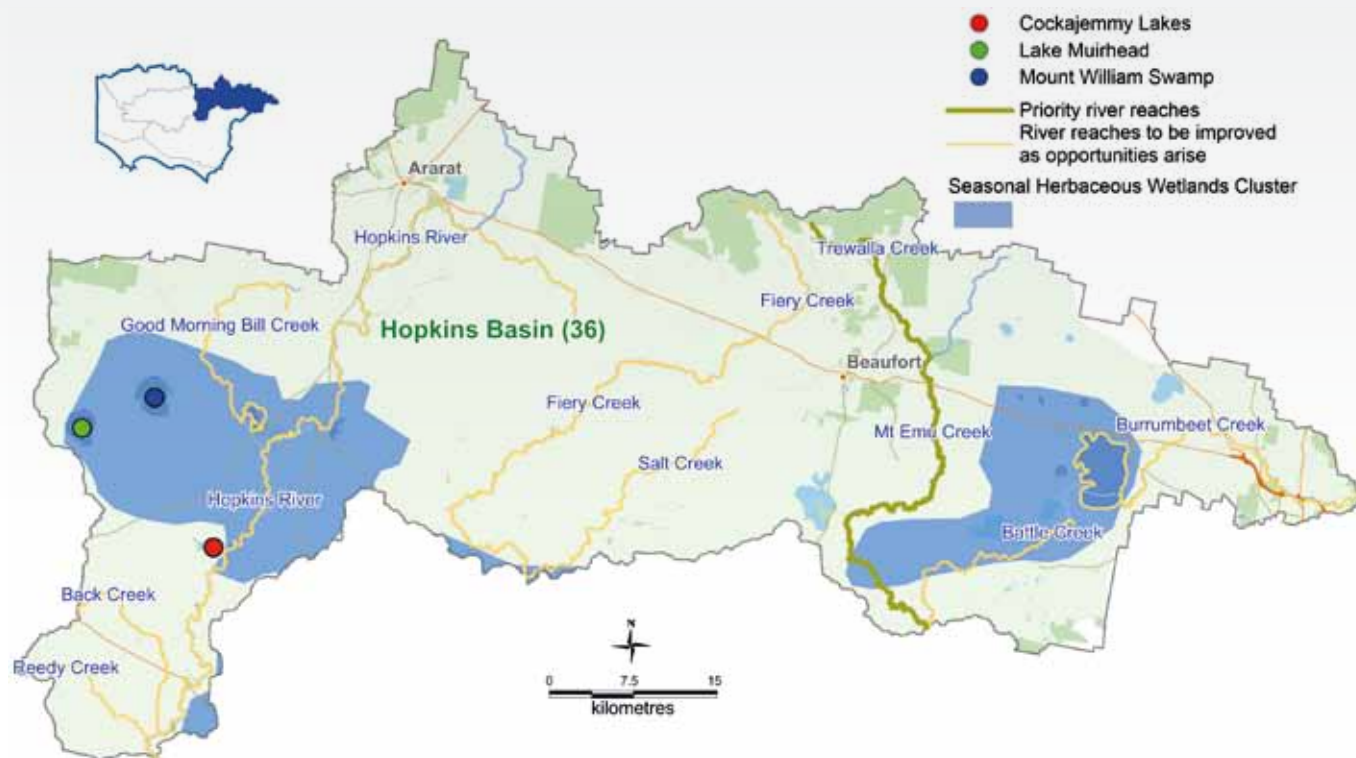


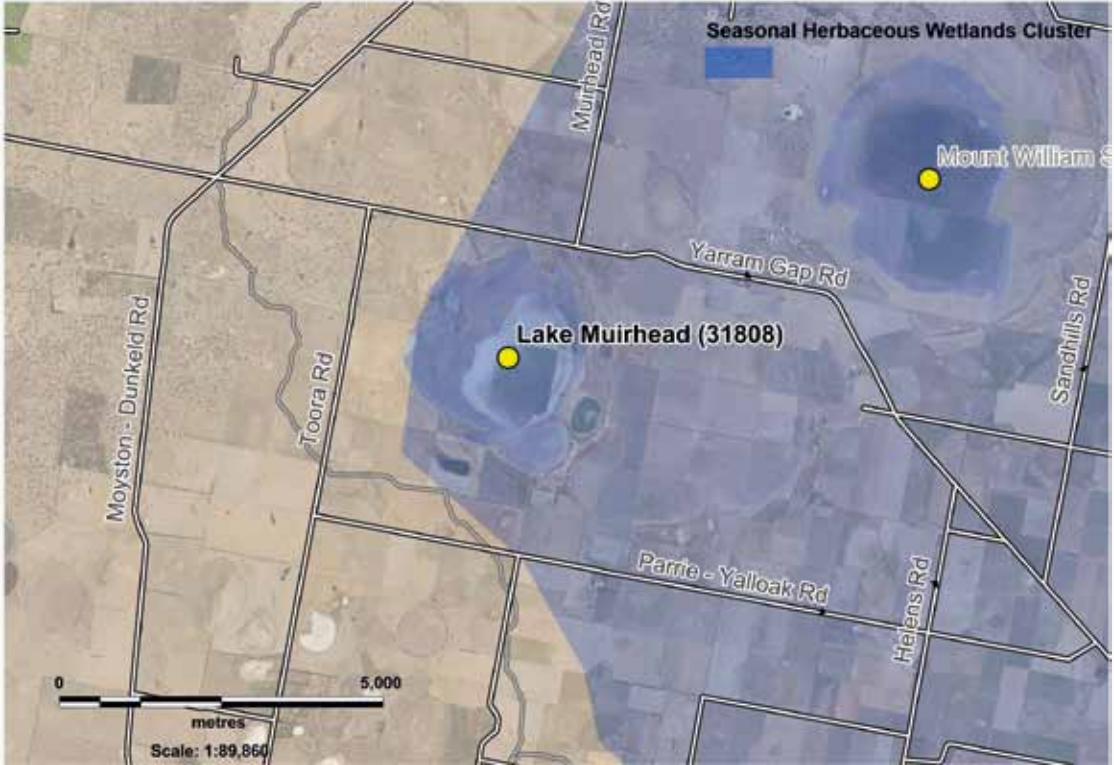
Figure 23. Priority wetlands in the Upper Hopkins Management Area

Below left: Mt William Swamp.
Below right: Lake Muirhead.



4.5.2 (CONTINUED)

Table 56. Lake Muirhead

Wetland Complex	Lake Muirhead	Wetland Type	Deep Freshwater Marsh
Land Tenure	Public and private	Area of Wetlands	330 ha
Land Manager	Parks Victoria and private	No. of Wetlands	One
Location and Map			
RCS Regional Significance	Lake Muirhead is a large permanent, freshwater swamp that is an example of an uncommon mechanism for wetland formation in Victoria. It is a major flocking site for brolga as well as other bird species. It is a DIWA wetland.		
Criteria for Listing in DIWA	<p>It is a good example of a wetland type occurring within a biogeographic region in Australia (Criteria 1)</p> <p>It is a wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail (Criteria 3)</p> <p>The wetland supports 1% or more of the national populations of any native plant or animal taxa (Criteria 4)</p>		


4.5.2 (CONTINUED)

Table 57. Lake Muirhead (wetland 31808) work program

Basin: HOPKINS		Management Area: UPPER HOPKINS		
Waterway: LAKE MUIRHEAD		Identification No: 31808		
Values linked to regional goals				
Drought Refuges (5), Significant Birds (5)				
Long-term resource condition outcomes				
09 - Protect the Victorian brolga populations by ensuring that they can breed successfully to maintain and increase population sizes, and flock at consistently used sites without disturbance				
21 - To ensure that identified drought refuges within the Glenelg Hopkins region continue to meet the listing criteria				
23 - To ensure that the blue-billed duck can survive, flourish and retain its potential for evolutionary development in the wild				
36 - To protect high value wetlands known to be utilised by freckled duck				
Management outcome targets				
a - The water regime of the wetland will be improved				
b - The wetland buffer vegetation value has improved to excellent condition				
c - Livestock have been excluded from over 75% of the wetland perimeter				
Threats addressed by work program				
Changed Water Regime (3), Degraded Buffer (5), Degraded Water Quality (3), Invasive Fauna (Terrestrial) (5), Livestock Access to Buffer (3), Reduced Wetland Area (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
31808.1	Investigate opportunities for permanent environmental protection	3.5 ha	CMA	n/a
31808.2	Undertake assessment of water regime and drainage	1 no.	CMA	a
31808.3	Remove drain	1 no.	waterway manager / CMA	a
31808.4	Modify levee	1 km	waterway manager / CMA	a
31808.5	Install riparian fence (on private land only)	7 km	landholders / CMA	b, c
31808.6	Establish controlled grazing regime (private land only)	14 ha	landholders / CMA	b, c
31808.7	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	14 ha	land managers	n/a
31808.8	Maintain grass buffer strip	3.5 ha	landholders / CMA	b

4.5.2 (CONTINUED)

Table 58. Mount William Swamp

Wetland Complex	Mount William Swamp	Wetland Type	Deep Freshwater Marsh
Land Tenure	Public and private	Area of Wetlands	635 ha
Land Manager	Parks Victoria and private	No. of Wetlands	One
Location and Map			
RCS Regional Significance	<p>Mount William Swamp is a large, freshwater swamp surrounded by grazing land. The wetland is a good example of a reed-dominated freshwater marsh which is not common in the Victorian midlands. The wetland supports many waterbird species including brolga. Duck hunting is popular. The wetland is DIWA listed.</p>		
Criteria for Listing in DIWA	<p>It is a good example of a wetland type occurring within a biogeographic region in Australia (Criteria 1)</p> <p>It is a wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail (Criteria 3)</p> <p>The wetland supports 1% or more of the national populations of any native plant or animal taxa (Criteria 4)</p>		


4.5.2 (CONTINUED)

Table 59. Mount William Swamp (wetland 31816) work program

Basin: HOPKINS		Management Area: UPPER HOPKINS		
Waterway: MOUNT WILLIAM SWAMP		Identification No: 31816		
Values linked to regional goals				
Drought Refuges (5), Significant Birds (5)				
Long-term resource condition outcomes				
09 - Protect the Victorian brolga populations by ensuring that they can breed successfully to maintain and increase population sizes, and flock at consistently used sites without disturbance				
21 - To ensure that identified drought refuges within the Glenelg Hopkins region continue to meet the listing criteria				
23 - To ensure that the blue-billed duck can survive, flourish and retain its potential for evolutionary development in the wild				
37 - To protect high value wetlands known to be utilised by freckled duck				
Management outcome targets				
a - The water regime of the wetland will be improved				
b - The wetland buffer vegetation value has improved to excellent condition				
Threats addressed by work program				
Changed Water Regime (3), Degraded Buffer (5), Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
31816.1	Undertake assessment of water regime and drainage as outlined in the Greater Grampians Wetland Strategy	1 no.	CMA	a
31816.2	Remove drain	1 no.	CMA	a
31816.3	Install riparian fence (on private land only)	7 km	landholders / CMA	b
31816.4	Investigate opportunities to purchase land within Mt William Swamp for permanent environmental protection	10 ha	CMA	b
31816.5	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	10 ha	land managers	n/a

4.5.2 (CONTINUED)

Table 60. Cockajemmy Lakes wetland complex

Wetland Complex	Cockajemmy Lakes	Wetland Type	Permanent Saline and Semi Permanent Saline
Land Tenure	Public and private	Area of Wetlands	Approx. 150 ha
Land Manager	Parks Victoria and private	No. of Wetlands	Ten
Location and Map			
RCS Regional Significance	<p>Mount William Swamp is a large, freshwater swamp surrounded by grazing land. The wetland is a good example of a reed-dominated freshwater marsh which is not common in the Victorian midlands. The wetland supports many waterbird species including brolga. Duck hunting is popular. The wetland is DIWA listed.</p>		
Criteria for Listing in DIWA	<p>It is a good example of a wetland type occurring within a biogeographic region in Australia (Criteria 1)</p> <p>It is a wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail (Criteria 3)</p> <p>The wetland supports 1% or more of the national populations of any native plant or animal taxa (Criteria 4)</p>		

4.5.2 (CONTINUED)

Table 61. Cockajemmy Lakes wetland complex work program

Basin: HOPKINS		Management Area: UPPER HOPKINS		
Waterway: COCKAJEMMY LAKES		Identification No: COCKAJEMMY		
Values linked to regional goals				
Important Bird Habitats (1), Drought Refuges (5), Significant Birds (5)				
Long-term resource condition outcomes				
21 - To ensure that identified drought refuges within the Glenelg Hopkins region continue to meet the listing criteria				
22 - To ensure that listed important bird habitats within the Glenelg Hopkins region continue to meet the listing criteria				
Management outcome targets				
a - The water regime of the wetland will be improved				
b - The wetland buffer vegetation value has improved to excellent condition				
c - The water quality status of Cockajemmy Lakes has been determined				
Threats addressed by work program				
Changed Water Regime (3), Degraded Buffer (5), Degraded Water Quality (-1), Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
Cockajemmy.1	Undertake assessment of water regime and land use impacts	1 no.	CMA	a, c
Cockajemmy.2	Install riparian fence (on private land only)	29 km	landholders / CMA	b
Cockajemmy.3	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	1,800 ha	land managers	n/a

Table 62. Summary of key works and outputs in the Upper Hopkins Waterway Management Area

OUTPUT	Quantity
Assessment of wetland water regime	3 no.
Install riparian fence	71 km
Establish controlled grazing regime	2 ha
Establish grazing exclusion	21 ha
Establish landholder agreements	28 ha
Establish terrestrial pest animal control	1974 ha
Establish native vegetation	24 ha
Maintain grass buffer strips	45.5 ha
Total estimated budget for the Upper Hopkins Waterway Management Area	\$3,342,500

4.6 VOLCANIC PLAIN WATERWAY MANAGEMENT AREA

The Victorian Volcanic Plain (VVP) is one of 15 listed national 'biodiversity hotspots'. However, the VVP Waterway Management Area has been almost entirely cleared for agriculture – primarily grazing and cropping.

Consequently, many of the rivers and wetlands are in poor to moderate condition. Some larger wetlands such as Lake Bolac are used for recreational activities such as boating, camping and fishing.

The main threats to the waterways are associated with unrestricted stock access, pest plants and animals, barriers to fish movement, inadequate flow, and cropping and drainage of wetlands.

The major river asset in this area is **Mt Emu Creek** as it supports threatened species such as the Corangamite water skink.

The area is well known for its wetland values. Important saline and freshwater wetlands are the **Woorndoo-Hopkins wetland complex**, **Lake Elingamite**, the Ramsar-listed **Lake Bookar** and the **Nerrin Nerrin wetland complex**. These are described in more detail in *Tables 65, 67, 68 and 70* respectively.

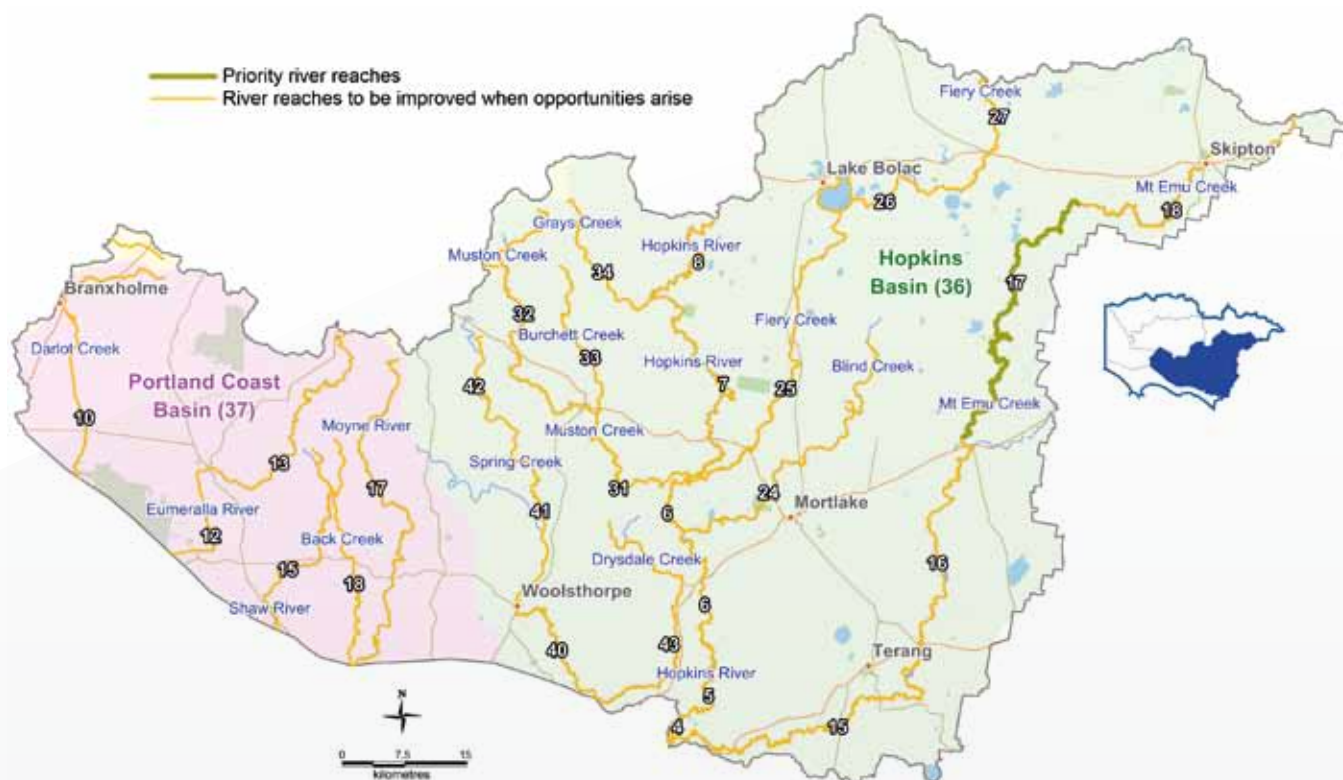


Figure 24. Volcanic Plain Waterway Management Area showing priority reaches

4.6.1 RIVERS WITHIN THE VOLCANIC PLAIN WATERWAY MANAGEMENT AREA

Table 63. Mt Emu Creek (reach 36-17) work program

Basin: HOPKINS		Management Area: VOLCANIC PLAIN		
Waterway: MT EMU CREEK		Identification No: 36-17		
Values linked to regional goals				
Significant Reptiles Riparian (5)				
Long-term resource condition outcomes				
01 - All extant populations of the Corangamite water skink are maintained in systems of reserves or areas managed specifically for their conservation, and are able to be maintained in the longer-term				
Management outcome targets				
a - Bank stability is maintained				
b - No artificial barrier to fish migration exists				
c - The large riparian trees value has improved to very good condition				
d - The low flow magnitude threat score has reduced from very high to high				
e - The invasive riparian flora (ground layer) threat will be reduced from moderate to low				
f - Livestock have been excluded from over 50% of the waterway frontage				
Threats addressed by work program				
Bank Instability (3), Barriers to Fish Migration (4), Bed Instability (Degradation) (3), Degraded Riparian Vegetation – Large Trees (5), Increase in Low Flow Magnitude (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (3), Livestock Access (5), Loss of In-stream Habitat (Sediment) (3), Reduced Riparian Connectivity (5), Reduced Vegetation Width (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
36-17.1	Participate in bulk entitlement, licensing and management rule review process	1 no.	CMA	d
36-17.2	Investigate fish barrier	1 no.	CMA	b
36-17.3	Develop Waterway Action Plan including geomorphic investigation	1 no.	CMA	a
36-17.4	Install riparian fence	22 km	landholders / CMA	f
36-17.5	Establish controlled grazing regime	5 ha	landholders / CMA	c
36-17.6	Identify opportunities to amend Crown land water frontage licences from grazing to riparian management	5 ha	CMA / DEPI	f
36-17.7	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	116 ha	land managers	n/a
36-17.8	Enhance native indigenous vegetation	33 ha	landholders / CMA	c
36-17.9	Establish non-woody weed control	47 ha	land managers / CMA	e

4.6.2 WETLANDS WITHIN THE VOLCANIC PLAIN WATERWAY MANAGEMENT AREA



Figure 25. Priority wetlands in the Volcanic Plain Waterway Management Area

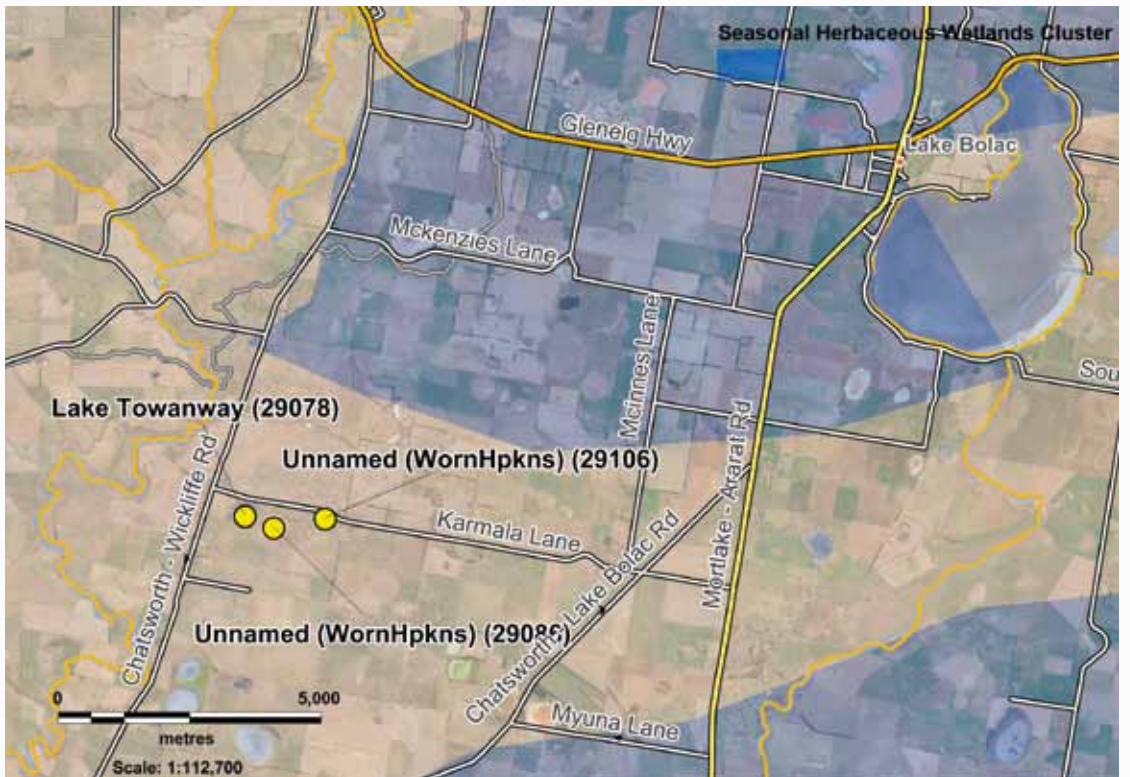
Below left: Lake Elingamite.

Below right: Seasonal herbaceous wetland.



4.6.2 (CONTINUED)

Table 64. Woorndoo-Hopkins wetland complex

Wetland Complex	Woorndoo-Hopkins Wetlands	Wetland Type	Woorndoo-Hopkins Wetlands
Land Tenure	Public and private	Area of Wetlands	Public and private
Land Manager	DEPI and private	No. of Wetlands	DEPI and private
Location and Map			
RCS Regional Significance	Woorndoo Wetlands are a string of lunette wetlands between Woorndoo and the Hopkins River. Current land uses include nature conservation, grazing and duck hunting. These wetlands are DIWA-listed and provide habitat for a number of threatened bird species.		
Criteria for Listing in DIWA	It is a good example of a wetland type occurring within a biogeographic region in Australia (Criteria 1) It is a wetland which plays an important ecological or hydrological role in the natural functioning of a major wetland system/complex (Criteria 2)		

4.6.2 (CONTINUED)

Table 65. Woorndoo-Hopkins wetland complex (inc. wetlands 29078, 29086 and 29106) work program

Basin: HOPKINS		Management Area: VOLCANIC PLAIN		
Waterway: WOORND OO-HOPKINS WETLAND COMPLEX: LAKE TOWANWAY		Identification No: 29078		
Values linked to regional goals				
Significant Birds (5)				
Long-term resource condition outcomes				
41 - By 2033, improve the condition of wetlands and maintain the diversity of wetland types				
Management outcome targets				
a - The wetland buffer vegetation value has improved to excellent condition				
Threats addressed by work program				
Degraded Buffer (4), Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
29078.1	Install riparian fence (on private land only)	1 km	landholders / CMA	a
29078.2	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	19 ha	land managers	n/a
Waterway: WOORND OO-HOPKINS WETLAND COMPLEX: UNNAMED (29086)		Identification No: 29086		
Values linked to regional goals				
Significant Birds (5)				
Long-term resource condition outcomes				
40 - To protect high value wetlands known to be utilised by musk duck				
41 - By 2033, improve the condition of wetlands and maintain the diversity of wetland types				
Management outcome targets				
a - The water regime of the wetland will be improved				
b - The wetland buffer vegetation value has improved to excellent condition				
Threats addressed by work program				
Changed Water Regime (3), Degraded Buffer (5), Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
29086.1	Undertake water regime assessment	1 no.	CMA	a
29086.2	Install riparian fence (on private land)	1 km	landholders / CMA	b
29086.3	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	18 ha	land managers	n/a

4.6.2 (CONTINUED)


Waterway: WOORNDOPHOPKINS WETLAND COMPLEX: UNNAMED (29106)		Identification No: 29106		
Values linked to regional goals				
Significant Birds (4)				
Long-term resource condition outcomes				
41 - By 2033, improve the condition of wetlands and maintain the diversity of wetland types				
Management outcome targets				
a - The wetland buffer vegetation has improved to good condition				
b - Invasive flora (wetland) has been maintained at low levels				
Threats addressed by work program				
Degraded Buffer (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Wetland) (2)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
29106.1	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	12 ha	land managers	n/a
29106.2	Establish non-woody weed control	12 ha	land managers / CMA	a, b

Table 66. Lake Elingamite (wetland 32200) work program

Basin: HOPKINS		Management Area: VOLCANIC PLAIN		
Waterway: LAKE ELINGAMITE		Identification No: 32200		
Values linked to regional goals				
Significant Birds (5)				
Long-term resource condition outcomes				
23 - To ensure that the blue-billed duck can survive, flourish and retain its potential for evolutionary development in the wild				
Management outcome targets				
a - The water regime of the wetland will be improved				
b - The wetland buffer vegetation has improved to good condition				
Threats addressed by work program				
Changed Water Regime (3), Degraded Buffer (5), Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
32200.1	Undertake assessment of water regime and outlets	1 no.	Parks Victoria /CMA	a
32200.2	Install riparian fence (on private land only)	1 km	landholders / CMA	b
32200.3	Establish controlled grazing regime (private land only)	5 ha	landholders / CMA	b
32200.4	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	5 ha	land managers	n/a
32200.5	Modify outlet	1 no.	CMA	a

4.6.2 (CONTINUED)

Table 67. Lake Bookar (part of the Western District Lakes Ramsar site)

Wetland Complex	Lake Bookar	Wetland Type	Permanent Saline
Land Tenure	Public and private	Area of Wetlands	480 ha
Land Manager	Parks Victoria and private	No. of Wetlands	One
Location and Map			
RCS Regional Significance	Lake Bookar is listed as part of the Western District Lakes (WDL) Ramsar site. It is a permanent, brackish lake formed between basalt flows. It is a high value wetland for its ecological and educational features and particularly for its birdlife. It is DIWA listed.		
Criteria for Listing in DIWA	<p>It is a good example of a wetland type occurring within a biogeographic region in Australia (Criteria 1)</p> <p>It is a wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail (Criteria 3)</p> <p>The wetland supports native plant or animal taxa or communities which are considered endangered or vulnerable at the national level (Criteria 5)</p>		
Ramsar criteria for the WDL Ramsar site to which Lake Bookar contributes	<ol style="list-style-type: none"> 1. It contains a representative wetland type (permanent saline lake) within the south-east Coast Drainage Division 4. It supports waterbirds at critical stages in their life cycle (breeding and nesting) 5. It regularly supports over 20,000 waterbirds 6. It regularly supports 1% of the population of particular waterbird species 		

4.6.2 (CONTINUED)

Table 68. Lake Bookar (wetland 32240) work program – also refer to Section 2.7.1 and Western District Lakes Ramsar Site work program in Corangamite Regional Waterway Strategy

Basin: HOPKINS		Management Area: VOLCANIC PLAIN		
Waterway: LAKE BOOKAR		Identification No: 32240		
Values linked to regional goals				
Important Bird Habitats (5), Drought Refuges (5), Significant Birds (5)				
Long-term resource condition outcomes				
21 - To ensure that identified drought refuges within the Glenelg Hopkins region continue to meet the listing criteria				
22 - To ensure that listed important bird habitats within the Glenelg Hopkins region continue to meet the listing criteria				
23 - To ensure that the blue-billed duck can survive, flourish and retain its potential for evolutionary development in the wild				
38 - To protect high value wetlands known to be utilised by freckled duck				
Management outcome targets				
a - The wetland buffer vegetation has improved to good condition				
b - Maintain the ecological character of the Ramsar site				
Threats addressed by work program				
Degraded Buffer (5), Degraded Water Quality (3), Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
32240.1	Implement best management practice on dairy farms program	150 ha	DEPI / dairy industry / landholders	n/a
32240.2	Install riparian fence (on private land only)	3.75 km	landholders / CMA	a, b
32240.3	Grazing exclusion	15 ha	landholders / CMA	a, b
32240.4	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	15 ha	land managers	n/a
32240.5	Maintain grass buffer strip	15 ha	landholders / CMA	a, b


Below left: Lake Bookar.

Below right: Lake Bookar.



4.6.2 (CONTINUED)

Table 69. Nerrin Nerrin wetlands complex

Wetland Complex	Nerrin Nerrin wetlands	Wetland Type	Shallow Freshwater Marsh, Deep Freshwater Marsh, Permanent Freshwater
Land Tenure	Public and private	Area of Wetlands	526 ha
Land Manager	Parks Victoria and private	No. of Wetlands	Six including Nerrin Nerrin Swamp, Lake Oundell, Lake Jollicum, The Waterway and the Shallows
Location and Map			
RCS Regional Significance	<p>This system consists of a network of stream-fed freshwater to brackish wetlands. It consists of wetlands that provide a variety of habitats which support a diversity of vegetation types and waterbirds. Current uses include nature conservation, grazing, water extraction, commercial eel fishing and duck hunting. Grazing and cropping occur in the surrounding area. These wetlands are listed on the DIWA.</p>		
Criteria for Listing in DIWA	<p>Good example of a wetland type occurring within a biogeographic region in Australia (Criteria 1)</p> <p>It is a wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail (Criteria 3)</p> <p>The wetland supports 1% or more of the national populations of any native plant or animal taxa (Criteria 4)</p> <p>The wetland supports native plant or animal taxa or communities which are considered endangered or vulnerable at the national level (Criteria 5)</p>		

4.6.2 (CONTINUED)

Table 70. Nerrin Nerrin wetlands complex work program

Basin: HOPKINS		Management Area: VOLCANIC PLAIN		
Waterway: NERRIN NERRIN WETLANDS COMPLEX		Identification No: NERRIN NERRIN		
Values linked to regional goals				
Wetland Vegetation Condition (5), Significant EVCs (5), Significant Birds (5)				
Long-term resource condition outcomes				
27 - To maintain the wetland vegetation condition in excellent condition				
Management outcome targets				
a - The water regime of the wetland will be improved				
b - The wetland buffer vegetation value has improved to excellent condition				
c - The invasive wetland flora (weeds) threat will be reduced from very high to low				
d - Livestock have been excluded from over 75% of the wetland perimeter				
Threats addressed by work program				
Changed Water Regime (5), Degraded Buffer (4), Degraded Water Quality (3), Invasive Fauna (Terrestrial) (5), Invasive Flora (Wetland) (5), Livestock Access to Buffer (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
Nerrin Nerrin.1	Undertake water assessment	1 no.	CMA	a
Nerrin Nerrin.2	Install riparian fence (on private land only)	3.5 km	landholders / CMA	b, c, d
Nerrin Nerrin.3	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	7 ha	land managers	n/a

Table 71. Summary of works and outputs for the Volcanic Plains Waterway Management Area

OUTPUT	QUANTITY
Assessment of wetland water regime	3 no.
Install riparian fence	29.25 km
Establish controlled grazing regime	5 ha
Establish grazing exclusion	20 ha
Establish landholder agreements	5 ha
Establish terrestrial pest animal control	192 ha
Enhance native indigenous vegetation	33 ha
Modify wetland outlet structures	1 no.
Maintain grass buffer strips	15 ha
Establish non-woody weed control	59 ha
Total estimated budget for the Volcanic Plain Waterway Management Area	\$1,140,500

4.7 WANNON WATERWAY MANAGEMENT AREA

The Wannon Waterway Management Area consists of key rivers such as the Wannon River, Grange Burn, Dwyer Creek and Miakite Creek. Scattered red gums through this area are the key landscape feature. Rivers in this area eventually run into the Glenelg River near Casterton.

The condition of these rivers vary, with sections through treed landscapes in much better condition than waterways in cleared agricultural landscapes. Predominant land use in this area is grazing and timber production. Waterways are highly valued for stock and domestic water, sand extraction, tourism and recreational activities such as camping and fishing.

The main threats to the waterways are associated with unrestricted stock access, sedimentation, pest plants and animals, barriers to fish movement and inadequate flow.

The major river assets in this area are as follows:

Wannon River: The headwaters of this river begin in the Grampians National Park. River form is highly variable with large sections opening into wide floodplain wetlands, which

then become confined within gorge and waterfall sections. The Wannon and Nigretta falls are key tourist attractions to the region. The river supports threatened species such as the variegated pygmy perch, river blackfish, Yarra pygmy perch, growling grass frog and Glenelg spiny crayfish

Miakite Creek: This tributary of the lower Wannon River contains significant species such as the variegated pygmy perch.

Grange Burn: This waterway is a key feature of the township of Hamilton and is important for recreation and tourism. Although this section of the river contains a large amount of riparian weeds, its in-stream values are significant. Variegated pygmy perch and Glenelg spiny crayfish are both present in this waterway.

Dwyer Creek: This waterway runs through the centre of the Victoria Valley in the Grampians. It contains significant species such as the growling grass frog.

There are several priority wetlands including **Bryan Swamp**, **Gooseneck Swamp**, **Lake Linlithgow** and **Lake Kennedy**. These wetlands are important refuges for significant species such as the growling grass frog, brolga, blue-billed duck, freckled duck and salt-lake tussock grass. These are described in more detail in *Tables 77, 79 and 81*.



Figure 26. Wannon Waterway Management Area showing priority reaches.

4.7.1 RIVERS WITHIN THE WANNON WATERWAY MANAGEMENT AREA

Table 72. Wannon River work program (reaches 38-22, 38-23, 38-24, 38-25, 38-26 and 38-28)

Basin: GLENELG		Management Area: WANNON		
Waterway: WANNON RIVER		Identification No: 38-22		
Values linked to regional goals				
Significant Fish Non Migratory (4)				
Long-term resource condition outcomes				
08 - Protect all known populations of variegated pygmy perch and take immediate action to ensure that suitable habitat is appropriately managed in at least three locations				
25 - To guarantee that the river blackfish (upper Wannon form) can survive, flourish and retain its potential for evolutionary development in the Wannon River				
Management outcome targets				
a - Bank stability is maintained				
b - The large riparian trees value has improved to good condition				
c - The low flow magnitude threat score has reduced from very high to moderate				
d - There is a reduction in the length of waterway affected by livestock access				
e - There is no increase in the threat of loss of in-stream habitat through sedimentation				
Threats addressed by work program				
Bank Instability (4), Degraded Riparian Vegetation – Large Trees (5), Increase in Low Flow Magnitude (5), Invasive Fauna (Aquatic) (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (4), Livestock Access (3), Loss of In-stream Habitat (Large Wood) (4), Loss of In-stream Habitat (Sediment) (4), Reduced Vegetation Width (4)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-22.1	Ensure that best management practice for grazing is implemented in this catchment	1 ha	landholders / DEPI	e
38-22.2	Undertake invasive species assessment (carp)	32 ha	CMA	n/a
38-22.3	Licensed sand and gravel extraction	0.3 km	CMA	e
38-22.4	Install riparian fence	25 km	landholders / CMA	d
38-22.5	Establish inland aquatic pest control (carp)	36 ha	CMA	n/a
38-22.6	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	32 ha	land managers	n/a
38-22.7	Develop a waterway action plan including geomorphic investigation	1 no.	CMA	a, c, e
38-22.8	Establish native indigenous vegetation	20 ha	landholders / CMA	b, e

4.7.1 (CONTINUED)

Waterway: WANNON RIVER		Identification No: 38-23		
Values linked to regional goals				
Significant Fish Non Migratory (5), Significant Fish Migratory (4)				
Long-term resource condition outcomes				
08 - Protect all known populations of variegated pygmy perch and take immediate action to ensure that suitable habitat is appropriately managed in at least three locations				
25 - To guarantee that the river blackfish (upper Wannon form) can survive, flourish and retain its potential for evolutionary development in the Wannon River				
28 - To minimise the probability of extinction and ensure long-term survival of dwarf galaxias in the wild and to increase the probability of important populations becoming self-sustaining in the long-term				
29 - To minimise the probability of extinction and ensure long-term survival of Yarra Pygmy Perch in the wild and to increase the probability of important populations becoming self-sustaining in the long-term				
Management outcome targets				
a - The large riparian trees value has improved to good condition				
b - The low flow magnitude threat score has reduced from very high to moderate				
c - The invasive riparian flora (ground layer) threat will be reduced from high to moderate				
d - Livestock have been excluded from over 50% of the waterway frontage				
e - There is no increase in the threat of loss of in-stream habitat through sedimentation				
Threats addressed by work program				
Bed Instability (Degradation) (3), Degraded Riparian Vegetation – Large Trees (5), Increase in Low Flow Magnitude (5), Invasive Fauna (Aquatic) (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (4), Livestock Access (5), Loss of In-stream Habitat (Large Wood) (3), Loss of In-stream Habitat (Sediment) (3), Reduced Vegetation Width (4)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-23.1	Refer 38-22.1: Ensure that best management practice for grazing is implemented in this catchment			e
38-23.2	Refer 38-22.2: Undertake invasive species assessment (carp)			n/a
38-23.3	Refer 38-22.7: Develop a waterway action plan including geomorphic investigation			b, e
38-23.4	Install riparian fence	15 km	landholders / CMA	d
38-23.5	Establish inland aquatic pest animal control (carp)	25 ha	CMA	n/a
38-23.6	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	50 ha	land managers	n/a
38-23.7	Investigate opportunities to amend the bulk water entitlement for this catchment to improve environmental water outcomes and undertake FLOWs study to determine environmental water needs	1 no.	CMA/VEWH	b
38-23.8	Establish native indigenous vegetation	11 ha	landholders / CMA	a, e
38-23.9	Deliver environmental water to reach in line with Seasonal Watering Plan	25 ha	CMA	e
38-23.10	Establish non-woody weed control	30 ha	landholders / CMA	c

4.7.1 (CONTINUED)

Waterway: WANNON RIVER		Identification No: 38-24		
Values linked to regional goals				
Significant Fish Non Migratory (5), Significant Fish Migratory (4)				
Long-term resource condition outcomes				
08 - Protect all known populations of variegated pygmy perch and take immediate action to ensure that suitable habitat is appropriately managed in at least three locations				
25 - To guarantee that the river blackfish (upper Wannon form) can survive, flourish and retain its potential for evolutionary development in the Wannon River				
29 - To minimise the probability of extinction and ensure long-term survival of Yarra Pygmy Perch in the wild and to increase the probability of important populations becoming self-sustaining in the long-term.				
Management outcome targets				
a - Bank stability is maintained				
b - The large riparian trees value has improved to good condition				
c - The low flow magnitude threat score has reduced from very high to moderate				
d - The invasive riparian flora (ground layer) threat will be reduced from moderate to low				
e - The length of waterway affected by livestock access is maintained below 25%				
f - There is no increase in the threat of loss of in-stream habitat through sedimentation				
Threats addressed by work program				
Bank Instability (4), Bed Instability (Degradation) (3), Degraded Riparian Vegetation – Large Trees (5), Increase in Low Flow Magnitude (5), Invasive Fauna (Aquatic) (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (3), Livestock Access (1), Loss of In-stream Habitat (Large Wood) (3), Loss of In-stream Habitat (Sediment) (3), Reduced Vegetation Width (4)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-24.1	Refer 38-23.7: Investigate opportunities to amend the bulk water entitlement for this catchment to improve environmental water outcomes and undertake FLOWs study to determine environmental water needs			c
38-24.2	Refer 38-22.2: Undertake invasive species assessment (carp)			n/a
38-24.3	Refer 38-22.7: Develop a waterway action plan including geomorphic investigation			a, d, f
38-24.4	Install riparian fence	10 km	landholders / CMA	e
38-24.5	Undertake invasive species assessment (carp)	15 ha	CMA	n/a
38-24.6	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	15 ha	land managers	n/a
38-24.7	Establish native indigenous vegetation	6 ha	landholders / CMA	a, b, f
38-24.8	Deliver environmental water to reach in line with Seasonal Watering Plan	30 ha	CMA	f
38-24.9	Establish non-woody weed control	3 ha	land managers / CMA	d

4.7.1 (CONTINUED)

Waterway: WANNON RIVER		Identification No: 38-25		
Values linked to regional goals				
Significant Birds Waterway (5), Significant Birds Riparian (5), Significant Amphibians (5)				
Long-term resource condition outcomes				
11 - Secure extant populations of growling grass frogs, particularly those occurring in known breeding habitats, and improve their viability through increases in size and/or area of occurrence				
Management outcome targets				
a - The low flow magnitude threat score has reduced from very high to moderate b - The proportion of zero flow threat score has reduced from moderate to very low c - The invasive riparian flora (ground layer) threat will be reduced from moderate to low d - Livestock have been excluded from over 50% of the waterway frontage				
Threats addressed by work program				
Increase in Low Flow Magnitude (5), Increase in Proportion of Zero Flow (3), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (3), Livestock Access (5), Loss of In-stream Habitat (Large Wood) (4), Reduced Vegetation Width (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-25.1	Investigate need for reinstatement of large wood	5 ha	CMA	n/a
38-25.2	Install riparian fence	28 km	landholders / CMA	d
38-25.3	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	46 ha	land managers	n/a
38-25.4	Refer 38-22.7: Develop a waterway action plan including geomorphic investigation			d
38-25.5	Refer 38-23.7: Investigate opportunities to amend the bulk water entitlement for this catchment to improve environmental water outcomes and undertake FLOWs study to determine environmental water needs			n/a
38-25.6	Deliver environmental water to reach in line with Seasonal Watering Plan	57 ha	CMA	b
38-25.7	Establish non-woody weed control	2 ha	land managers / CMA	c

Below left: Nigretta Falls on the Wannon River.

Below right: Wannon Falls on the Wannon River.



4.7.1 (CONTINUED)

Waterway: WANNON RIVER		Identification No: 38-26		
Values linked to regional goals				
Significant Invertebrates Aquatic (5), Significant Fish Non Migratory (5)				
Long-term resource condition outcomes				
08 - Protect all known populations of variegated pygmy perch and take immediate action to ensure that suitable habitat is appropriately managed in at least three locations				
24 - To guarantee that the Glenelg spiny crayfish can survive, flourish and retain its potential for evolutionary development in the wild				
Management outcome targets				
a - The large riparian trees value has improved to good condition				
b - The low flow magnitude threat score has reduced from very high to moderate				
c - The proportion of zero flow threat score has reduced from moderate to very low				
d - Livestock have been excluded from over 50% of the waterway frontage				
e - There is no increase in the threat of loss of in-stream habitat through sedimentation				
Threats addressed by work program				
Bed Instability (Degradation) (3), Degraded Riparian Vegetation – Large Trees (5), Degraded Water Quality (5), Increase in Low Flow Magnitude (5), Increase in Proportion of Zero Flow (3), Invasive Fauna (Terrestrial) (5), Livestock Access (5), Loss of In-stream Habitat (Sediment) (3), Reduced Riparian Connectivity (5), Reduced Vegetation Width (4)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-26.1	Refer 38-22.7: Develop a waterway action plan including geomorphic investigation			b, c
38-26.2	Refer 38-23.7: Investigate opportunities to amend the bulk water entitlement for this catchment to improve environmental water outcomes and undertake FLOWs study to determine environmental water needs			b, c
38-26.3	Install riparian fence	0 km	landholders / CMA	d
38-26.4	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	0 ha	land managers / CMA	n/a
38-26.5	Establish native indigenous vegetation	0 ha	landholders / CMA	a, e

4.7.1 (CONTINUED)

Waterway: WANNON RIVER		Identification No: 38-28		
Values linked to regional goals				
Significant Invertebrates Aquatic (5), Significant Flora Terrestrial (5)				
Long-term resource condition outcomes				
10 - Riparian vegetation condition is maintained in excellent condition				
24 - To guarantee that the Glenelg spiny crayfish can survive, flourish and retain its potential for evolutionary development in the wild				
Management outcome targets				
a - Bank stability is maintained				
b - No artificial barrier to fish migration exists				
c - The low flow magnitude threat score has improved from moderate to very low				
Threats addressed by work program				
Bank Instability (1), Barriers to Fish Migration (4), Increase in Low Flow Magnitude (3), Invasive Fauna (Terrestrial) (5), Loss of In-stream Habitat (Large Wood) (4), Reduction in High Flow Magnitude (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-28.1	Investigate options to remove fish barrier	1 no.	CMA	b
38-28.2	Refer 38-22.7: Develop a waterway action plan including geomorphic investigation			a
38-28.3	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	39 ha	land managers	n/a
38-28.4	Refer 38-23.7: Investigate opportunities to amend the bulk water entitlement for this catchment to improve environmental water outcomes and undertake FLOWS study to determine environmental water needs			c
38-28.5	Deliver environmental water to reach in line with Seasonal Watering Plan	39 ha	CMA / VEWH	c
38-28.6	Modify fishway	1 no.	waterway manager / CMA	b

Below left & right: Wannon River at Cavendish



4.7.1 (CONTINUED)

Table 73. Miakite Creek (reach 38-30) work program

Basin: GLENELG		Management Area: WANNON		
Waterway: MIAKITE CREEK		Identification No: 38-30		
Values linked to regional goals				
Significant Fish Non Migratory (5)				
Long-term resource condition outcomes				
08 - Protect all known populations of variegated pygmy perch and take immediate action to ensure that suitable habitat is appropriately managed in at least three locations				
Management outcome targets				
a - No artificial barrier to fish migration exists				
b - The large riparian trees value has improved to very good condition				
c - The low flow magnitude threat score has improved from moderate to low				
d - Livestock have been excluded from over 50% of the waterway frontage				
e - There is no increase in the threat of loss of in-stream habitat through sedimentation				
Threats addressed by work program				
Barriers to Fish Migration (4), Degraded Riparian Vegetation – Large Trees (5), Increase in Low Flow Magnitude (3), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (4), Livestock Access (5), Loss of In-stream Habitat (Large Wood) (5), Loss of In-stream Habitat (Sediment) (3), Reduced Riparian Connectivity (5), Reduced Vegetation Width (4)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-30.1	Implement forestry best management practice to manage sediment to the waterway	1 ha	forestry industry	e
38-30.2	Participate in bulk entitlement, licensing and management rule review process	1 no.	CMA	c
38-30.3	Install riparian fence	10 km	landholders / CMA	d
38-30.4	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	10 ha	land managers	n/a
38-30.5	Establish native indigenous vegetation	8 ha	landholders / CMA	b, e
38-30.6	Investigate fish barrier	1 no.	CMA	a

4.7.1 (CONTINUED)

Table 74. Grange Burn Creek (reaches 38-35 and 38-37) work program

Basin: GLENELG		Management Area: WANNON		
Waterway: GRANGE BURN CREEK		Identification No: 38-35		
Values linked to regional goals				
Significant Invertebrates Aquatic (5), Significant Fish Non Migratory (5)				
Long-term resource condition outcomes				
08 - Protect all known populations of variegated pygmy perch and take immediate action to ensure that suitable habitat is appropriately managed in at least three locations				
24 - To guarantee that the Glenelg spiny crayfish can survive, flourish and retain its potential for evolutionary development in the wild				
Management outcome targets				
a - No artificial barrier to fish migration exists				
b - The large riparian trees value has improved to very good condition				
c - The low flow magnitude threat score has reduced from very high to high				
d - The invasive riparian flora (ground layer) threat will be reduced from high to moderate				
e - Livestock have been excluded from over 50% of the waterway frontage				
f - There is no increase in the threat of loss of in-stream habitat through sedimentation				
Threats addressed by work program				
Barriers to Fish Migration (4), Degraded Riparian Vegetation – Large Trees (5), Increase in Low Flow Magnitude (5), Invasive Fauna (Aquatic) (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (4), Livestock Access (5), Loss of In-stream Habitat (Large Wood) (3), Loss of In-stream Habitat (Sediment) (3), Reduced Riparian Connectivity (3), Reduced Vegetation Width (4)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-35.1	Undertake invasive species assessment (carp)	18 ha	CMA	n/a
38-35.2	Install riparian fence	10 km	landholders / CMA	e
38-35.3	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	22 ha	land managers	n/a
38-35.4	Investigate opportunities to implement low flow bypass at Lake Hamilton	1 no.	CMA	c
38-35.5	Establish native indigenous vegetation	7 ha	landholders / CMA	b, f
38-35.6	Investigate fish barrier	1 no.	CMA	a
38-35.7	Establish non-woody weed control	22 ha	land managers / CMA	d

4.7.1 (CONTINUED)

Waterway: GRANGE BURN CREEK		Identification No: 38-37		
Values linked to regional goals				
Significant Fish Non Migratory (5)				
Long-term resource condition outcomes				
08 - Protect all known populations of variegated pygmy perch and take immediate action to ensure that suitable habitat is appropriately managed in at least three locations				
Management outcome targets				
a - The large riparian tree value has improved to excellent condition				
Threats addressed by work program				
Degraded Riparian Vegetation - Large Trees (5), Degraded Water Quality (5), Reduced Vegetation Width (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-37.1	Install riparian fence	5 km	landholders / CMA	a
38-37.2	Establish native indigenous vegetation	5 ha	landholders / CMA	a

Below: Grange Burn Creek.



4.7.1 (CONTINUED)

Table 75. Dwyer Creek (reach 38-40) work program

Basin: GLENELG		Management Area: WANNON		
Waterway: DWYER CREEK		Identification No: 38-40		
Values linked to regional goals				
Significant Birds Waterway (5), Significant Amphibians (5)				
Long-term resource condition outcomes				
11 - Secure extant populations of growling grass frogs, particularly those occurring in known breeding habitats, and improve their viability through increases in size and/or area of occurrence				
Management outcome targets				
a - Bank stability is maintained				
b - No artificial barrier to fish migration exists				
c - The large riparian trees value has improved to very good condition				
d - The invasive riparian flora (ground layer) threat will be reduced from moderate to low				
e - There is no increase in the threat of loss of in-stream habitat through sedimentation				
Threats addressed by work program				
Bank Instability (4), Barriers to Fish Migration (5), Change in Monthly Streamflow Variation (1), Degraded Riparian Vegetation – Large Trees (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) – Ground Layer (3), Livestock Access (3), Loss of In-stream Habitat (Large Wood) (4), Loss of In-stream Habitat (Sediment) (3), Reduced Vegetation Width (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
38-40.1	Investigate fish barriers	1 no.	CMA	b
38-40.2	Develop a waterway action plan including geomorphic investigation	1 no.	CMA	a
38-40.3	Install riparian fence	8 km	landholders / CMA	c
38-40.4	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	36 ha	land managers	n/a
38-40.5	Establish native indigenous vegetation	5 ha	landholders / CMA	a, c, e
38-40.6	Remove fish barrier	1 no.	waterway manager / CMA	b
38-40.7	Establish non-woody weed control	15 ha	land managers / CMA	d

4.7.2 WETLANDS WITHIN THE WANNON WATERWAY MANAGEMENT AREA



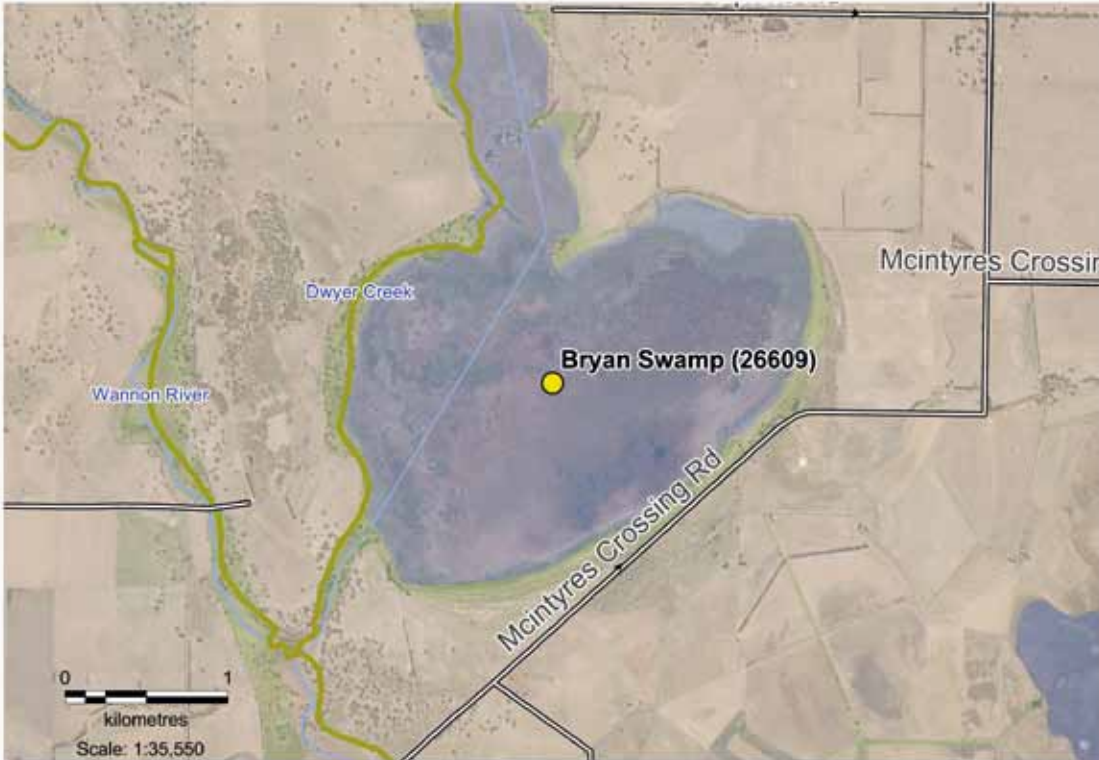
Figure 27. Wetlands in the Wannon Waterway Management Area

Below left: Gooseneck Swamp reflooding trial (Nature Glenelg Trust).
 Below right: Bryan Swamp.



4.7.2 (CONTINUED)

Table 76. Bryan Swamp

Wetland Complex	Bryan Swamp	Wetland Type	Deep Freshwater Marsh
Land Tenure	Public and private	Area of Wetlands	727 ha
Land Manager	Parks Victoria and private	No. of Wetlands	One
Location and Map			
RCS Regional Significance	Bryan Swamp has good public access and is good for bird watching.		


4.7.2 (CONTINUED)

Table 77. Bryan Swamp (wetland 26609) work program

Basin: GLENELG		Management Area: WANNON		
Waterway: BRYAN SWAMP		Identification No: 26609		
Values linked to regional goals				
Significant Amphibians (5), Significant Birds (5)				
Long-term resource condition outcomes				
09 - Protect the Victorian brolga populations by ensuring that they can breed successfully to maintain and increase population sizes, and flock at consistently used sites without disturbance				
11 - Secure extant populations of growling grass frogs, particularly those occurring in known breeding habitats, and improve their viability through increases in size and/or area of occurrence				
23 - To ensure that the blue-billed duck can survive, flourish and retain its potential for evolutionary development in the wild				
26 - To maintain the existing population and to rehabilitate former breeding sites of Australasian bittern				
41 - By 2033, improve the condition of wetlands and maintain the diversity of wetland types				
Management outcome targets				
a - The water regime of the wetland will be improved				
b - The wetland buffer vegetation value has improved to excellent condition				
c - The invasive wetland flora (weeds) threat will be reduced from moderate to low				
Threats addressed by work program				
Changed Water Regime (1), Degraded Buffer (4), Degraded Water Quality (3), Invasive Fauna (Terrestrial) (5), Invasive Flora (Wetland) (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
26609.1	Undertake assessment of water regime and drainage structures	1 no.	Parks Victoria / CMA	a
26609.2	Install riparian fence (on private land only)	5 km	landholders / CMA	b, c
26609.3	Establish controlled grazing regime (private land only)	5 ha	landholders / CMA	b, c
26609.4	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	21 ha	land managers	n/a
26609.5	Establish non-woody weed control	10 ha	land managers	c

4.7.2 (CONTINUED)

Table 78. Gooseneck Swamp

Wetland Complex	Gooseneck Swamp	Wetland Type	Shallow Freshwater Marsh
Land Tenure	Public	Area of Wetlands	62 ha
Land Manager	Parks Victoria	No. of Wetlands	One
Location and Map			
RCS Regional Significance	<p>A 60 ha ephemeral wetland that is public land and classified as National Park. The swamp provides habitat and refuge for a number of threatened fauna and flora species. In recent years it has supported breeding events for ibis and feeding grounds for brolga.</p>		

4.7.2 (CONTINUED)

Table 79. Gooseneck Swamp wetland complex (wetland 26718) work program

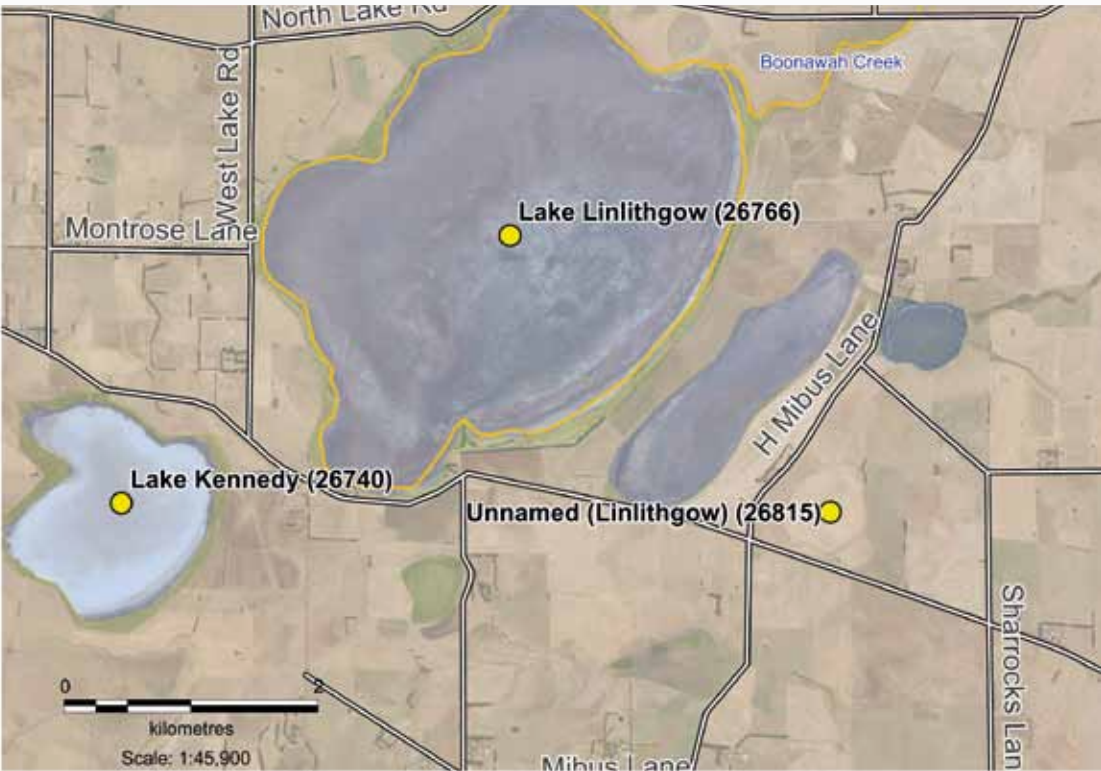
Basin: GLENELG		Management Area: WANNON		
Waterway: GOOSENECK SWAMP		Identification No: 26718		
Values linked to regional goals				
Wetland Vegetation Condition (5), Significant EVCs (5), Significant Birds (5)				
Long-term resource condition outcomes				
27 - To maintain the wetland vegetation condition in excellent condition				
Management outcome targets				
a - The water regime of the wetland will be improved				
b - The wetland buffer vegetation value has improved to excellent condition				
c - The natural wetland area has been reduced by less than 25%				
Threats addressed by work program				
Changed Water Regime (5), Degraded Buffer (3), Reduced Wetland Area (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
26718.1	Undertake water regime assessment	1 no.	CMA	a
26718.2	Establish woody weed control	4 ha	land managers / CMA	b
26718.3	Remove outlet	1 no.	waterway manager / CMA	c

Below left: Gooseneck Swamp.



4.7.2 (CONTINUED)

Table 80. Lake Linlithgow wetland complex

Wetland Complex	Lake Linlithgow	Wetland Type	Permanent Open Freshwater, Freshwater Meadow and Semi-permanent Saline
Land Tenure	Public and private	Area of Wetlands	1432 ha
Land Manager	Parks Victoria, DEPI and private	No. of Wetlands	Eight wetlands including Lake Kennedy, Salt Lake, Krause Swamp, Lake Bullrush and Lake Linlithgow
Location and Map			
RCS Regional Significance	<p>The Lake Linlithgow wetlands are of high conservation value for their flora and fauna. They cover a large area and have the capacity to hold very large numbers of waterbirds in a part of the Victorian Volcanic Plain which has few large permanent wetlands. This system acts as a drought refuge and includes several wetland types that vary in salinity and depth. Socially the wetland system is important for recreational activities such as boating and fishing. The wetlands are DIWA listed.</p>		
Criteria for Listing in DIWA	<p>It is a good example of a wetland type occurring within a biogeographic region in Australia (Criteria 1)</p> <p>It is a wetland which is important as the habitat for animal taxa at a vulnerable stage in their life cycles, or provides a refuge when adverse conditions such as drought prevail (Criteria 3)</p> <p>The wetland supports 1% or more of the national populations of any native plant or animal taxa (Criteria 4)</p> <p>The wetland supports native plant or animal taxa or communities which are considered endangered or vulnerable at the national level (Criteria 5)</p>		

4.7.2 (CONTINUED)

Table 81. Lake Linlithgow wetland complex (inc. wetlands 26740, 26766 and 26815) work program

Basin: GLENELG		Management Area: WANNON		
Waterway: LAKE LINLITHGOW WETLAND COMPLEX: LAKE KENNEDY		Identification No: 26740		
Values linked to regional goals				
Significant Birds (5)				
Long-term resource condition outcomes				
09 - Protect the Victorian brolga populations of by ensuring that they can breed successfully to maintain and increase population sizes, and flock at consistently used sites without disturbance				
23 - To ensure that the blue-billed duck can survive, flourish and retain its potential for evolutionary development in the wild				
33 - To protect high value wetlands known to be utilised by freckled duck				
Management outcome targets				
a - The wetland buffer vegetation value has improved to excellent condition				
Threats addressed by work program				
Degraded Buffer (5), Invasive Fauna (Terrestrial) (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
26740.1	Install riparian fence (on private land only)	1.5 km	landholders / CMA	a
26740.2	Establish controlled grazing regime	146 ha	landholders / CMA	a
26740.3	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	191 ha	land managers	n/a
26740.4	Establish native indigenous vegetation	146 ha	landholders / CMA	a

Below left: Lake Linlithgow.



4.7.2 (CONTINUED)

Waterway: LAKE LINLITHGOW WETLAND COMPLEX: LAKE LINLITHGOW		Identification No: 26766		
Values linked to regional goals				
Drought Refuges (5), Significant Birds (5), Significant Flora (5)				
Long-term resource condition outcomes				
09 - Protect the Victorian brolga populations by ensuring that they can breed successfully to maintain and increase population sizes, and flock at consistently used sites without disturbance				
15 - To ensure that salt-lake tussock grass can survive, flourish and retain its potential for evolutionary development in the wild. To secure populations or habitat from potentially incompatible land use or catastrophic loss				
21 - To ensure that identified drought refuges within the Glenelg Hopkins region continue to meet the listing criteria				
23 - To ensure that the blue-billed duck can survive, flourish and retain its potential for evolutionary development in the wild				
34 - To protect high value wetlands known to be utilised by freckled duck				
Management outcome targets				
a - The wetland buffer vegetation value has improved to excellent condition				
b - The invasive wetland flora (weeds) threat will be reduced from moderate to low				
Threats addressed by work program				
Degraded Buffer (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Wetland) (3)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
26766.1	Install riparian fence (on private land only)	3.4 km	landholders / CMA	a
26766.2	Establish controlled grazing regime	3.4 ha	landholders / CMA	a
26766.3	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	13.5 ha	land managers	n/a
26766.4	Establish non-woody weed control	13.5 ha	land managers / CMA	b

4.7.2 (CONTINUED)

Waterway: LAKE LINLITHGOW WETLAND COMPLEX: UNNAMED (26815)		Identification No: 26815		
Values linked to regional goals				
Drought Refuges (5)				
Long-term resource condition outcomes				
21 - To ensure that identified drought refuges within the Glenelg Hopkins region continue to meet the listing criteria				
Management outcome targets				
a - The wetland buffer vegetation value has improved to excellent condition				
b - The water regime of the wetland will be improved				
Threats addressed by work program				
Degraded Buffer (5), Invasive Fauna (Terrestrial) (5), Changed Water Regime (5)				
Work program				
Activity ID	Management Activity	Quantity	Lead agency / Partners	MOT link
26815.1	Undertake assessment of the water regime and water quality issues within the wetland	1 no.	CMA	b
26815.2	Establish terrestrial pest animal control at waterway as part of a cooperative regional partnership program	46 ha	land managers	n/a
26815.3	Install riparian fence (on private land only)	1.8 km	landholders / CMA	a

Table 82. Summary of key outputs and works in the Wannon Waterway Management Area

OUTPUT	Quantity
Assessment of wetland water regime	3 no.
Install riparian fence	122.7 km
Establish controlled grazing regime	149.5 ha
Establish grazing exclusion	5 ha
Carp and predator fish management	76 ha
Establish terrestrial pest animal control	521.5 ha
Establish native indigenous vegetation	208 ha
Modify fish barrier	2 no.
Deliver environmental water to reach in line with Seasonal Watering Plan	151 ha
Modify wetland outlet structure	1 no.
Establish non-woody weed control	95.5 ha
Establish woody weed control	4 ha
Develop waterway management plans	2 no
Total estimated budget for the Wannon Waterway Management Area	\$4,491,800

4.8 ESTIMATED EIGHT-YEAR WORK PROGRAM BUDGET

The total estimated budget for the eight-year work program is just over \$29 million. This is an estimated budget only and it does not include costings for all the work program activities or actions identified elsewhere in the Strategy. Assumptions have been made in estimating the budget and these include items such as cost share, project management costs, operational costs, materials and labour.

The budgets for recommended activities in each Waterway Management Area are indicative only. There is no commitment to funding of activities and funding will be sought through usual investment opportunities.

The work programs provided for individual wetlands within a complex is an example only and do not cover every wetland within the complex. Significant additional actions may be required to manage other wetlands in the complex.

As information about other wetlands is gathered and opportunities arise to manage priority seasonal herbaceous wetlands, detailed work programs for other wetlands may be developed and funding sought for these sites.

Table 83. Overall budget by waterway management area for the eight-year regional work program

WATERWAY MANAGEMENT AREA	ESTIMATED BUDGET
Coastal	\$7,955,700
Lower Glenelg	\$4,086,250
Upper Glenelg	\$8,311,000
Upper Hopkins	\$3,342,500
Volcanic Plain	\$1,140,500
Wannon	\$4,491,800
Total	\$29,327,750

In addition to the budget for implementing the eight-year works program, additional funds will be required to support the maintenance program (see 4.9.2) and undertake the monitoring, evaluation and reporting program (see 4.10.).

The maintenance program is estimated to be \$362,000 per annum or \$2.9 million over the eight-year strategy period. Similarly, an additional \$2.9 million will be required over the eight-year period to support the Monitoring, Evaluation and Reporting program.

Below left: Frasers Swamp on Glenelg River near Balmoral.
Below right: Fiery Creek near Streatham.



4.9 DELIVERING THE STRATEGY

The regional work program is based on a ‘typical year’. Should events such as extreme flood, drought or fire occur during the life of the GHWS, delivery of specific actions in the work plan may need to adapt to the changed conditions and/or risks to priority waterways.

More specific activities and tasks will be addressed through action planning or development of annual work programs and funding proposals.

The regional work program considers the full range of tools and approaches available for waterway management, including:

- Market-based instruments
- Government investment in on-ground works or environmental water management
- Research
- Community awareness raising or information provision
- Regulation
- Land acquisition

Land acquisition is not costed in the work program; however, opportunities will be sought to purchase land parcels if it is deemed the most cost-effective approach to reducing the threat to a high priority waterway asset.

ACTION 4-1:

Develop an Implementation Plan to guide delivery of the works program using appropriate tools and approaches. The plan will prioritise activities, refine outputs identify potential funding opportunities and provide a basis for identifying delivery partners

Lead: CMA, partner organisations and community groups

4.9.1 ROLES IN DELIVERING THE STRATEGY

The strategy will be delivered by the CMA in close collaboration with various partners including individual landowners, community groups, Indigenous groups, government agencies, industry groups, education and research bodies and local government. The CMA and its partners undertake a range of functions required for implementing different aspects of the GHWS, which are summarised in *Table 84*.

ACTION 4-2:

Encourage community involvement and support partnerships with activities consistent with the CMA Partnership and Engagement Strategy

ACTION 4-3:

Promote implementation of the GHWS consistent with the CMA Communication Strategy

Lead: CMA, partner organisations and community groups

4.9.1 (CONTINUED)

Table 84. Agencies and partners and their roles and responsibilities with delivering the strategy

AGENCY/PARTNER	ROLES AND RESPONSIBILITIES/LINKS WITH WATERWAYS
State Government agencies and statutory bodies	
Glenelg Hopkins CMA	<p>Under Part 10 of the <i>Water Act 1989</i>, CMAs are designated with specific responsibility for the management of waterways, drainage and floodplains in the Glenelg Hopkins Waterway Management District. The CMA's roles and responsibilities include:</p> <ul style="list-style-type: none"> • developing a regional waterway strategy and associated action plans • developing and implementing work programs • authorising works on waterways, acting as a referral body for planning applications and licences to take and use water • identifying regional priorities for environmental watering and facilitating water delivery • authorising artificial river mouth openings • providing input into water allocation processes • developing and co-ordinating regional floodplain management plans • responding to natural disasters and incidents affecting waterways such as floods • undertaking community participation and awareness programs.
Department of Environment and Primary Industries	<p>The Department of Environment and Primary Industries (DEPI) is the lead agency for waterway management. It is responsible for the development of waterway policy, co-ordination of regional delivery and prioritisation of government investment in waterways. DEPI is also responsible for other aspects of natural resource management that are of relevance to waterways, including:</p> <ul style="list-style-type: none"> • sustainable management of Victoria's water resources • overseeing the catchment planning framework to promote integrated catchment management throughout Victoria • management of biodiversity • management of public land, including Crown frontages. DEPI is responsible for their administration, including their licensing for riparian management and for grazing and ensuring compliance with licence conditions. DEPI also has a direct on-ground responsibility for unlicensed Crown frontages and is responsible for some aspects of waterways on public land • bushfire management on public land • delivery of sustainability and environment services at the regional level, including some services that relate to waterway management • management of fisheries and recreational fishing in waterways to optimise economic and social value while ensuring the sustainability of resources • investing in and delivering farming programs on private land where waterways occur • overseeing the management of biosecurity, including aquatic invasive species.

4.9.1 (CONTINUED)

AGENCY/PARTNER	ROLES AND RESPONSIBILITIES/LINKS WITH WATERWAYS
Environment Protection Authority Victoria	<p>EPA Victoria is an independent body responsible for the protection and improvement of Victoria's environment by establishing environmental standards, and regulating and working with organisations to meet these standards. Their roles and responsibilities include:</p> <ul style="list-style-type: none"> • identifying the beneficial uses of water environments and the level of environmental quality needed to protect them through the State Environmental Protection Policy (Waters of Victoria) • setting statutory standards for acceptable water quality and indicators of water quality • investigating water quality incidents classified as 'pollution' • using mandatory and regulatory mechanisms, such as licensing and other discretionary tools to assist in the achievement of water quality objectives • acting in partnership with DEPI and regional bodies to monitor water quality and waterway health, and enables problem solving approaches and independent audits of impacts on the environment and the protection of beneficial uses.
Parks Victoria	<p>Parks Victoria manages parks and conservation reserves in which many waterways are located, including national, state, wilderness, metropolitan and regional parks, marine national parks and sanctuaries and conservation and natural features reserves. They create, manage and maintain visitor sites and manage a range of assets, including visitor facilities and access points, piers and jetties, sporting facilities and navigation aids, many of which are associated with waterways.</p>
Western Coastal Board	<p>The Western Coastal Board is one of three regional coastal boards formed under the <i>Coastal Management Act 1995 (Vic)</i> reporting to the Minister for Environment and Climate Change. The Western Coastal Board's principal role is to implement the Victorian Coastal Strategy, provide advice to the Minister and the Victorian Coastal Council, and prepare and implement regional coastal plans. Another key activity is facilitating improved coastal management through liaison with industry, government and the community.</p>
Victorian Environmental Water Holder	<p>The Victorian Environmental Water Holder is appointed under the <i>Water Act</i> to manage Victoria's environmental water entitlements. The Victorian Environmental Water Holder works with the waterway managers, Commonwealth Environmental Water Holder, Murray–Darling Basin Authority, storage operators and land managers to ensure environmental water entitlements are used to achieve the best environmental outcomes.</p>
Water Corporations	
Southern Rural Water, Grampians Wimmera Mallee Water, Wannon Water	<p>Water corporations in Victoria are established under the <i>Water Act</i> and provide a range of water services to customers within their service areas. Southern Rural Water, Wannon Water and Grampians Wimmera Mallee Water provide a combination of irrigation services, domestic and stock services, bulk water supply services and urban water and wastewater services in the Glenelg Hopkins region. Their link with the RWS includes:</p> <ul style="list-style-type: none"> • broader catchment health and improved water quality links to water supply • water reform, operational role in environmental water management.

4.9.1 (CONTINUED)

AGENCY/PARTNER	ROLES AND RESPONSIBILITIES/LINKS WITH WATERWAYS
Local Government	
Moyne Shire, Glenelg Shire, Warrnambool City Council, Pyrenees Shire, Southern Grampians Shire, Ararat Rural City, West Wimmera Shire, Corangamite Shire, Horsham Rural City, Northern Grampians Shire, City Of Ballarat	<p>Councils are involved in the management of waterways in Victoria through their role as responsible planning authorities, managers of stormwater drainage and onsite domestic wastewater systems, users of integrated water systems, land managers, emergency management bodies, and supporters of community groups.</p> <p>Specifically with regard to waterways, local government has the following roles and responsibilities:</p> <ul style="list-style-type: none"> • incorporate waterway and catchment management objectives, priorities and actions into strategic and statutory planning processes • undertake elements of floodplain management in accordance with the renewed Victorian Floodplain Management Strategy • develop and implement urban stormwater plans • manage on-site domestic wastewater systems • manage sections of waterways where formal agreements are in place • manage rural drainage where appropriate
Traditional Owners	
Traditional Owner boards/councils	Traditional Owners have an important role in land and water management. Joint co-operative management agreements can involve establishment of majority Traditional Owner boards or councils that prepare management plans and/or provide advice about the management of specific areas.
Community	
Landholders	<p>Landholders are vital to successful implementation of this strategy, as most works are on privately owned land or affect areas that require private co-operation, and their land management practices have a vital role in catchment health. Under the <i>Catchment and Land Protection Act</i> landholders are required to:</p> <ul style="list-style-type: none"> • protect water resources • avoid causing or contributing to land degradation which causes or may cause damage to land of another owner • conserve soil • eradicate regionally prohibited weeds and prevent the growth and spread of regionally controlled weeds • prevent the spread of, and as far as possible eradicate, established pest animals.
Individuals	Community members have an important role in protecting waterway health by avoiding and reporting pollution, reducing resource consumption and contributing to environmental management processes.
Community groups	Community groups (such as Landcare, Waterwatch, EstuaryWatch, 'friends of' groups) participate in regional planning, priority setting and the implementation of regional work programs, participate in monitoring waterway condition and undertake projects in priority areas.
Industry	Industry can assist in the protection and improvement of waterways by managing activities in accordance with the principles of ecologically sustainable development, minimising impact on the environment by the implementation of best practices in accordance with 'duty of care' responsibilities and good corporate citizenship.

4.9.2 MAINTENANCE

A maintenance program would also involve an extension program to determine the condition of past works and the level of investment required for maintenance. Maintenance will be funded only when the activities are beyond the agency's or landholder's duty of care or legal obligations.

The significant work already undertaken by the community to maintain or improve the condition of waterways was highlighted in Section 1.6.1. Maintenance of this previous investment is essential to ensure on-going effectiveness of the works and provide support for landholders and community groups. Maintenance of investment includes, but is not limited to:

- Pest plant and animal control
- Fencing
- Supplementary plantings
- Structural works (erosion control structures, fish passage).

4.9.3 REGULATION

Regulatory controls apply across all waterways in Victoria. Works on waterways are required to comply with any legal or statutory requirements regardless of the priority assigned to a waterway.

A key responsibility for agencies is to ensure that relevant standards are followed to ensure the protection of rivers, estuaries and wetlands. Agency roles and responsibilities for waterway management are summarised in Table 84.

Most waterways in the region are within the Glenelg Hopkins Waterway Management District; however, some also occur within the Strathdownie Drainage District and the Yatchaw Drainage District (see Figure 28). Within these two areas the CMA has no regulatory functions. Works that occur on waterways outside these two areas require Works on Waterways authorisation from the CMA.

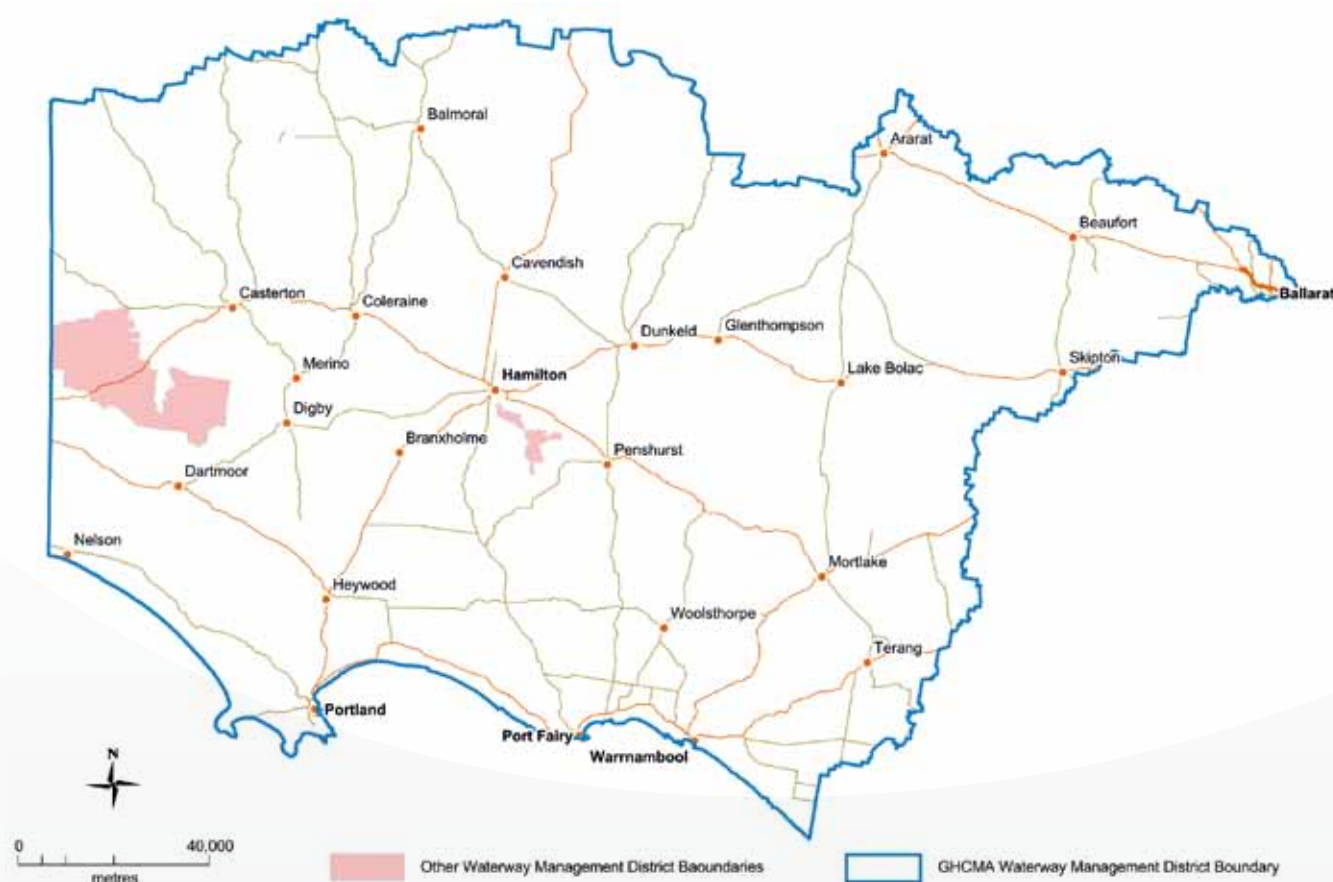


Figure 28. Waterway Management District boundaries in the Glenelg Hopkins region

4.9.3 (CONTINUED)

Works on Waterways regulation is a tool for managing threats to the waterway as it establishes minimum standards for particular works, thereby providing a level of protection for the health of waterways. Works regularly involve vehicle and utility crossings. Unauthorised works sometimes occur on waterways either through a lack of awareness of the need for a licence/permit or because the waterway is not well defined. The works can have an impact on the flow regime, connectivity (fish passage), channel stability, water quality and habitat values.

Some works are very minor and occur on waterways where the risk to waterway health is very low. It is expected that efficiencies can be made by refining the application and approval process to focus more on the risk to a waterway, and its value. The CMA will review its approach to both the authorisation and compliance process resulting in improved outcomes for waterways and landholders.

ACTION 4-4:

Clarify the roles and responsibilities of waterway management functions within the Strathdownie and Yatchaw drainage districts

Who: DEPI, CMA, local government, drainage trusts

ACTION 4-5:

Review and reform the current approach to authorisation and compliance of works on waterways

Who: CMA, DEPI, local government

ACTION 4-6:

Investigate opportunities to incorporate high value and priority waterways from this strategy in local government planning schemes through the application of Environmental Significance Overlays (ESOs)

Who: CMA, DEPI, local government

The CMA region has many rural drainage areas, two of which are not within the Waterway Management District (Strathdownie and Yatchaw drainage schemes) (*Figure 29*). Some drainage areas operate a rated scheme, while many other areas are smaller, informal drainage networks. While all rural drainage systems ultimately have some connection to a natural waterway, they are purpose-built infrastructure that provides private benefit to landholders. The CMA does not support the further loss of natural wetlands by construction of new drains; however, it recognises the role of rural drainage areas in supporting agriculture and also the aquatic or terrestrial biodiversity value of some drains.

Reform of policy and strategies guiding rural drainage in Victoria is currently underway. The Victorian Government's response to a recent inquiry indicated that CMAs will be responsible for regulating the effects of drainage schemes on waterways and wetlands. The CMA will adopt a risk-based approach to drainage regulation, similar to that described for works on waterway regulation earlier.

ACTION 4-7:

Having regard to any future Victorian rural drainage strategy, the CMA will use a risk-based approach to regulate the effects of drainage schemes on waterways and wetlands. The emphasis will be on supporting landholders and responsible authorities to develop rural drainage management plans rather than on an authorisation process

Who: CMA, DEPI, local government, drainage schemes committees

4.9.3 (CONTINUED)

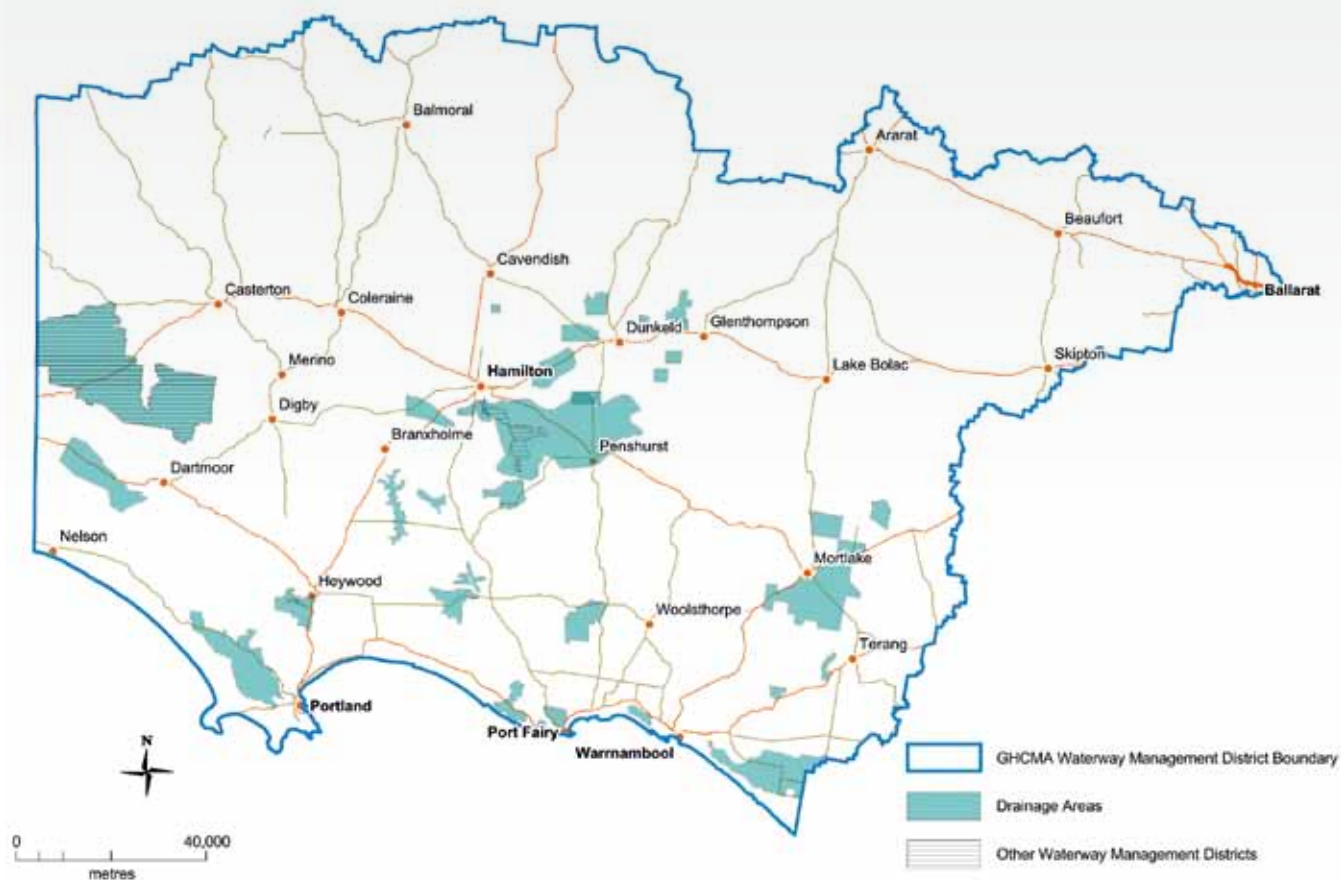


Figure 29. Designated drainage schemes within the Glenelg Hopkins region

4.9.4 UNDERTAKING MANAGEMENT ACTIVITIES ON NON-PRIORITY WATERWAYS

The majority of Victorian Government investment in regional waterway management is directed to works on priority waterways. However, there are also circumstances when investment can occur on non-priority waterways (see *criteria in 3.5*); for example, it may be necessary to undertake work in upstream non-priority areas to reduce threats to downstream priority waterways.

Investment may also be required to protect public infrastructure or to support dedicated community groups who are actively working to improve the environmental condition of their local waterway. Finally, existing regulatory controls apply across all waterways in Victoria and work that is required to comply with any legal or statutory requirements must be undertaken.

4.10 MONITORING REPORTING AND EVALUATION

The management of rivers, estuaries and wetlands in the region is conducted within an adaptive management framework.

At the core of adaptive management is the ability to learn from previous experience and update management approaches to reflect the knowledge gained during implementation. *Figure 30 (below)* presents the eight-year adaptive management cycle of the Victorian Waterway Management Program and regional waterway strategies. The cycle includes:³⁸

- **Strategy and Planning** – State policy framework and targets, planning for waterway management through regional waterway strategies with priorities and regional targets
- **Implementation and Monitoring** – Government and other investment in regional priorities, implementation of priority management activities, intervention monitoring and long-term resource condition assessment
- **Evaluation and reporting** – Management reporting, intervention monitoring reporting, resource condition reporting, program evaluation and improvement

Community participation and research and innovation occur across all parts of the program. This knowledge and information is crucial for ensuring effective adaptive management and informing associated monitoring, evaluation and reporting processes.³⁹

A detailed monitoring, evaluation and reporting plan will be developed to support adaptive management from planning through to strategy completion.

The monitoring, evaluation and reporting plan will:

- present the program logic underpinning the strategy
- clarify the assumptions associated with the program logic and identifies strategies to manage potential risks
- identify the key questions for evaluation and establishes processes to monitor progress within the framework of the state-wide monitoring program
- clarify the communication and reporting needs and identifies the processes required to support these needs
- enable lessons learned from monitoring and evaluation to be gathered and inform improvement.

The MER plan will be reviewed, at minimum, on an annual basis to ensure it remains current and relevant to informing adaptive management.

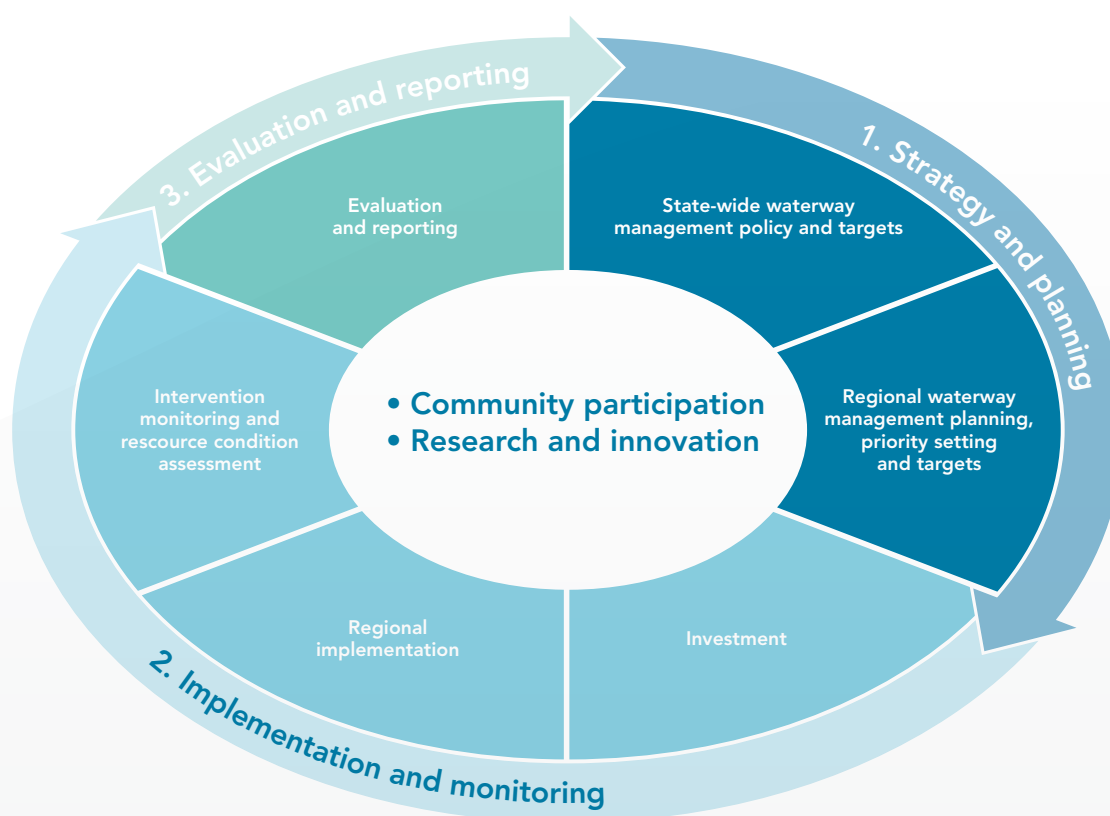


Figure 30. The eight-year adaptive management cycle of the Victorian Waterway Management Program and regional waterway strategies⁴⁰

4.10.1 MONITORING

Monitoring activities are targeted to inform evaluation and reporting on strategy implementation. Monitoring activities also include the collection of information about factors likely to impact on strategy implementation. These include climatic and environmental factors such as climatic variability, drought, flood, bushfire and potential impacts of climate change; and other factors such as land use change, population growth, government investment, economic conditions, community expectations and landholder attitudes.

Monitoring activities will be consistent with the state-wide monitoring processes co-ordinated through the Victorian Waterway Management Program. This program includes targeted resource condition and intervention monitoring to inform both state and regional evaluation and reporting processes.

In addition, the Department of Sustainability, Environment, Water, Population and Communities is developing a three-year Ramsar Rolling Review program for reporting the status of the ecological character of Australia's Ramsar sites including Lake Bookar in the Western District Lakes Ramsar site. Monitoring of the site is required to assess various parameters against limits of acceptable change and fill data gaps (see 2.7.1).

4.10.2 EVALUATION

The strategy and planning phase of the adaptive management cycle (Figure 30) includes the development of predetermined key evaluation questions by which to assess the strategy and gain new information and understanding. Evaluation questions provide the basis for evaluation design and associated monitoring processes.

Evaluation of the strategy will include an assessment of the extent to which the outcomes have been achieved at each level of the program logic underpinning the strategy. It will also address the assumptions in the program logic and provide direction and improved knowledge for subsequent planning cycles.

The evaluation questions developed for the strategy address the following five categories:⁴¹

- **Impact** – changes to resource condition, management activities or institutions
- **Appropriateness** – addressing the needs of beneficiaries and against best practice
- **Effectiveness** – achievement of desired management outputs and resource condition objectives
- **Efficiency** – value or return from investment
- **Legacy** – return from investment after the activity/program ends.

The scale and frequency of evaluation processes will vary throughout the life of the strategy, and will include an annual review cycle and more detailed interim and final reviews.

The annual reviews will assess progress towards the planned management activities and outputs, and associated financials. These reviews will consider any new knowledge and information that may necessitate changes to planned management activities and outputs. The annual review will be undertaken by the CMA and will align with regional investment processes.

The interim review will also assess progress towards management activities and outputs, and where possible, review progress towards management outcomes. This review may also provide new knowledge and information that may lead to an update of the strategy to support an adaptive approach.

The final review of the strategy will focus on capturing the knowledge gained during its implementation, and an assessment of achievements and progress against strategy targets. This will ensure there is a clear record of achievements and lessons learned, and an evidence base for updating or changing regional programs and management approaches in the future. This final review will be undertaken through an independent process.

ACTION 4-8:

Review implementation progress of management activities in the GHWS annually, at an interim review and at a final review in eight years

Who: CMA, partners identified in specific actions

4.10.3 REPORTING

Reporting is an important tool to ensure accountability for the investment of government funds into waterway management activities. Over the long-term, consistent and effective reporting provides evidence to evaluate and communicate the effectiveness of this strategy.

Annual management reporting is a component of the annual review cycle, and includes reporting on the activities and outputs achieved for the year and associated financials. This reporting is delivered through the CMA's annual report, and annual investment reports for existing funding arrangements with the Victorian Government. This reporting generally includes spatial information. Financial audits are required to ensure that reported expenditure is accurate and accountable. These audits will be led by DEPI and provides assurance that investment in delivering outputs has been strategic, cost effective and consistent.⁴²

Public reporting against strategy management outcome targets will occur, at a minimum, following the final review of the strategy. The CMA will also support reporting of management outcome targets for the Victorian Waterway Management Strategy in 2016 and 2020. These reporting processes will be informed through the reviews undertaken in the third and final year of the strategy.

Resource condition reporting is led through the Victorian Waterway Management Program. This involves the collection, analysis and reporting of information on the condition of Victoria's waterways every eight years, subject to available funding.⁴³ This reporting, combined with regional knowledge, provides the collective data to assess the condition of waterways over the long-term.

The monitoring, evaluation and reporting plan for the strategy identifies key stakeholders at organisational, community, regional, state and Commonwealth levels who should be kept informed of the progress of the strategy or would benefit from strategy information. It also identifies what they need to know and how it will be communicated.

ACTION 4-9:

Report on outputs and financials each year through the following reports:

- Annual investor reports
- CMA annual reports
- CMA corporate plans
- Victorian Environmental Water Holders Annual Report

Who: CMA

ACTION 4-10:

Develop tools and processes to facilitate spatial data reporting

Who: CMA, DEPI

4.10.4 KNOWLEDGE GAPS AND RESEARCH

The process of developing the program logic and evaluation questions demonstrates the areas where critical knowledge gaps exist. The monitoring, evaluation and reporting plan for the strategy identifies the key knowledge gaps identified through this process, and also identifies the strategies for addressing them. These strategies may involve collating existing information or proposing areas for further research programs. To align with the Victorian Waterway Management Program the strategy will support research that addresses the following:

- provides essential knowledge to address critical short-term and/or strategic long-term knowledge gaps. The resulting research findings will be incorporated into policy and management
- targets knowledge gaps or low confidence in the relationships between outputs, management outcomes and long-term resource condition outcomes (if significant for waterway management and investment).⁴⁴

Research will be directed to investigating those relationships where there is little scientific evidence, or the confidence in the evidence is low. This targeted approach to research also provides an increased focus on prediction and testing of these predictions, rather than more general, descriptive research. It is also vital that research is targeted to better understanding the effectiveness of management activities in which there is significant Victorian Government investment.⁴⁵

ACTION 4-11:

Support regular forums to identify and progress research that addresses key knowledge gaps in waterway management

Who: DEPI, CMA, research institutes, universities