

# PART C

Regional Work Program: Implementation of Management Activities

Photo: Gooram Falls, Tony Kubeil

# **Chapter Seven:**

# The Action Plan

This Chapter:

Introduces priority waterways, identifies values and threats and identifies strategic directions for their maintenance and improvement;

Defines high-level (20 year) goals for waterways in the region; and

Commences the introduction of the proposed works and implementation plan.

#### 7.1 REGIONAL WORK PROGRAM (8 YEAR WORK PROGRAM)

The six major Social Ecological Systems (SESs) within the Goulburn Broken region are introduced in this Chapter. The values, threats and risks to the environmental, economic and social value of priority waterways are described for each SES or unit, together with Strategic Priorities, Management Objectives and Implementation Targets.

Social Ecological Systems (SESs) describe the linked social and ecological systems in which we all live. SESs can be described at a number of scales and embrace the social, ecological, economic, political, cultural and biophysical system components and acknowledge their inter-linkages and inter-dependencies. Understanding SESs and identifying their drivers, threats and thresholds helps managers to develop strategies to keep the system within limits, where appropriate.

The construct of the six Social Ecological Systems was established during consultation with the community as part of the *Regional Catchment Strategy* process. These have been adopted as the key management Units for the Strategy.

- 1. Agricultural Floodplains
- 2. Productive Plains
- 3. Upland Slopes
- 4. Commuting Hills
- 5. Southern Forests
- 6. Urban Centres
- 7. Catchment Wide SES (See Challenges and Opportunities Chapter 4)

#### 7.1.1 **RESOURCING THE STRATEGY**

The implementation of this Strategy will be influenced by available funding and resources, level of community support and the impacts of extreme events within the region. Investment proposals to support actions within the Strategy will be developed as investment opportunities arise. Where relevant, project investment proposals will be prepared in conjunction with delivery partners and the community.

The Agricultural Floodplains encompasses the low lying floodplains, with some sandhills, along the valleys of the River Murray and Goulburn River. The river floodplain systems are a dominant feature across the landscape.

Regulation, and the associated timing and volume of flow delivery in channels and across the floodplain is the greatest threat to waterways, which are typically highly modified from their original state. Most waterways are currently in poor condition and numerous wetlands are threatened by high saline watertables caused by irrigation.

Priority waterway assets in this SES are shown in Figure 7-1 and include:

**Goulburn River:** A Heritage River associated with wetlands of national significance supporting threatened species including Murray cod, Silver perch and Macquarie perch. It contains many cultural heritage sites and provides water for agriculture, urban and recreational use.

**Broken River**: Associated with wetlands of national significance and supports the threatened Murray cod, Macquarie perch and Silver perch.

**Broken Creek:** Supports the threatened Murray cod and is associated with wetlands; forms a critical part of the river ecosystems of the Agricultural Floodplains.

Current wetland condition is generally moderate to good. Wetlands on public land are in better condition than private land, where they are considered to be in a generally poor state. The biggest threats to this state are river regulation, inadequate drainage and landforming. Priority wetlands assets are:

**Barmah Forest** (Ramsar listed/The Living Murray (TLM) Icon Site): Along with the adjoining Millewa forest in NSW, it forms the largest River Red Gum forest in the world. It is one of Victoria's largest waterbird breeding areas and maintains 38 rare or threatened plant species.

**Kinnairds Wetland** (Regional): A Red Gum swamp that maintains the largest known population of the nationally threatened Rigid Water Milfoil in Victoria. It provides important breeding habitat for waterbirds including the threatened Royal Spoonbill.



Figure 7-1: Priority Waterways in the Agricultural Floodplains SES.

	Management Unit		Agricultural Flood	olains	
Basin	Goulburn	Waterway	Goulburn River		Identification No.
Values	Native Fish (2), Riparian Vo Significant Birds Riparian ( Migratory (1), Significant F Hunting (5), Motor Boatin Landscape (0)	egetation Con 2), Significant Sish Non Migra g (5), Non-Mo	dition (4), Significant Amphibians (1) Birds Waterway (4), Significant EVCs (5), atory (1), Significant Mammals (2), Campi tor Boating (3), Recreational Fishing (5),	Significant Fish ng (4), Game Fracks (5),	- 5-1, 5-2, 5-3, 5-4, 5-5
Threats	Bank Instability (3), Chang (5), Increase in Prop of Zer (Large Wood) (3), Red in H	e in Monthly S o Flow (5), Inv ligh Flow Mag	Streamflow Variable (3), Increase in Low I vasive Fauna (Terrestrial) (5), Loss of Instr nitude (4)	Flow Magnitude ream Habitat	<b>State:</b> Sustainable Working
	Improve flow regime by 20	021			
Long-ter	m Riparian and floodplain ve	getation cond	ition is maintained or improved by 2025		
Conditio	n Populations of native fish a	are maintaine	d or improved by 2025		
	Instream habitat is mainta	ined or impro	ved by 2030		
Ma	nagement Outcome Targets	N	Nanagement Activity/Output	Quantity	Lead agency/partner
AF.1	Environmental water program will improve altered hydrology threat score	AF 1.1	Deliver water to river reach	Based on seasonal watering plan (See Chapter 4.3)	Water Corporation GB CMA
			Control invasive pest plant species (Non-woody and Woody)	400 ha	Parks Victoria, YYNAC joint management
AF.2	Improved vegetation structure and diversity throughout reach	AF 2.2	Control invasive pest animal species (Terrestrial)	740 ha	Parks Victoria, YYNAC joint management
		AF 2.3	Modify agricultural practice change	480 ha	GB CMA, DEPI (region)
AF.3	Improve recreational opportunities within reach	AF 3.1	Develop and implement Recreational Strategy	1	GB CMA, Parks Victoria, Local Government
AF.4	Increase bank stability and reduce erosion and sediment input	AF 4.1	Establish earthworks (Armouring)	0.3 km	GB CMA / Parks Victoria /YYNAC Joint management
AF.5	Increase instream diversity, (Large Wood)	AF 5.1	Install waterway structure (Large wood)	5 sites	GB CMA
Estimate	d cost of activities for Goulburn R	iver (5-1, 5-2,	5-3, 5-4 and 5-5)		\$1,320,000
AF.6	Water Quality will be maintained or improved	AF 6.1	Deliver farm reuse/ recycle programs (No. Landowners)	240 (No.)	CMA, Landowners
Estimate	d cost of activities for Goulburn R	iver (Water Q	uality: 5-1, 5-2, 5-3, 5-4 and 5-5)		\$4,880,000
AF.7	Enhance floodplain to river linkages	AF 7.1	Implement Lower Goulburn Floodplain Management Plan	3 reaches	GB CMA, Local Government, Community
Estimate	d cost of activities for Goulburn R	iver (Floodpla	in reconnection: 5-1, 5-2, 5-3, 5-4 and 5	-5)	\$50,000,000
AF.8	Improve community awareness of urban rivers and wetlands and encourage participation in their maintenance	AF 8.1	Deliver RiverConnect – Shepparton/Mooroopna	1	GB CMA, Parks Victoria, GSCC, YYNAC, Education institutions
Estimate	d cost of activities for Goulburn R	iver (RiverCon	nect: 5-1, 5-2, 5-3, 5-4 and 5-5)		\$400,000

М	anagement Unit		Agricultural Flood	lplains			
Basin	Broken	Waterway	Tullah Creek		Identification No.		
Values	Significant Birds Riparian Significant Fish Non Migra	(5), Significant atory (5), withi	Birds Waterway (5), Significant Fish Mig n Ramsar Listed Wetland	gratory (5),	- 4 - 36		
Threats	Bank Instability, Degraded	Bank Instability, Degraded Riparian Vegetation – Large Trees Stat Ecological					
Long-term	Protect and promote nate	ural channel fo	rm and dynamics				
Condition Instream habitat is maintained or improved by 2030							
	Riparian and floodplain ve	egetation cond	ition is maintained or improved by 2025	5			
Manage	ment Outcome Targets	Ν	Nanagement Activity/Output	Quantity	Lead agency/partner		
AF.9 Inc wh rea	rease in bank stability ere less than 25% of the ch has active bank erosion	AF 9.1	Develop waterway stabilisation strategy/establish earthworks, (Armouring)	0.1 km	GB CMA / Parks Victoria		
AF.10 Im and rea	prove vegetation structure d diversity throughout the ch	AF 10.1	Establish native indigenous vegetation	10 ha	GB CMA / Parks Victoria		
Estimated cost of activities for Tullah Creek (4-36) (to be read in conjunction with Barmah Forest) \$90,000							

Management Unit			Agricultural Flood	dplains	
Basin	Broken	Waterway	Boosey Creek		Identification No.
Values	Significant Migratory Fish	(5)			- 4 - 32
Threats	Barriers to Fish Migration Quality (5), Invasive Fauna Wood) (3), Reduced Vege	(5), Degraded R a (Aquatic) (5), L tation Width (3)	tiparian Vegetation - Large Trees (4), D .ivestock Access (3), Loss of Instream F	egraded Water Habitat (Large	<b>State:</b> Sustainable Working
Long-ter	rm Protect and promote natu	iral channel forr	n and dynamics		
Resource	e Fish migration (open pass	age) is maintain	ed or improved by 2025.		
	Riparian and floodplain ve	getation condit	ion is maintained or improved by 202	5	
Ma	anagement Outcome Targets	Ma	anagement Activity/Output	Quantity	Lead agency/partner
AF 11	Manage livestock access in over 25% of waterway	AF 11.1	Establish native indigenous vegetation	5 ha	GB CMA, Landowners
	frontages	AF 11.2	Establish management agreement	5 ha	GB CMA / Landowners / Landcare
		AF 11.3	Construct riparian fence	5 km	GB CMA / Landowners / Landcare
		AF 11.4	Modify agricultural practice change	160 ha	GB CMA / Landowners / Landcare
AF.12	Improved vegetation structure and diversity throughout reach	AF 12.1	Control invasive pest plant species (Non-woody)	50 ha	GB CMA / Landowners / Landcare
		AF 12.2	Control invasive pest animal species (Terrestrial)	50 ha	GB CMA / Landowners / Landcare
AF.13	Increase the length of stream opened for fish passage	AF 13.1	Remove/modify barriers to fish migration	1 site	GB CMA
Estimate	ed cost of activities for Boosey Cre	ek ( 4-32)	-		\$237,500

	Mai	nagement Unit		Agricultural Flood	olains	
Basin		Broken	Waterway	Broken Creek		Identification No.
Values		Significant Birds Waterway Significant Reptiles Riparia Recreational Fishing (5)	/ (5), Signific n (4) Campi	ant Fish Migratory (5) Significant Birds Wa ng (4), Motor Boating (4), Picnics and Barb	terway (4), ecues (5),	- 4-21, 4-22, 4-23, 4-24
Threats		Degraded Riparian Vegeta (Terrestrial) (5), Loss of Ins	tion - Large stream Habit	Trees (4), Invasive Fauna (Aquatic) (5), Inva at (Large Wood) (3)	asive Fauna	<b>State:</b> Sustainable Working
Long-terr	m	Instream habitat is mainta	ined or impi	roved by 2030		
Conditior	e n	Water quality is maintaine	d or improv	ed by 2030		
		Riparian and floodplain ve	getation cor	dition is maintained or improved by 2025		
		Populations of native fish a	are maintain	ed or improved by 2025		
Ma	nagem	ent Outcome Targets		Management Activity/Output	Quantity	Lead agency/partner
AF 14	Redu (fish)	ice the impact of pest animals	AF 14.1	Install waterway structure (carp screen)	9 (No.)	GB CMA / Fisheries Victoria
AF.15	Man over	age livestock access in 80% of waterway	AF 15.1	Construct riparian fence	2 km	GB CMA / Parks Victoria
	front	ages	AF 15.2	Modify agricultural practice change	480 ha	GB CMA / Parks Victoria/ landowners
			AF 15.3	Establish management agreement	2 ha	GB CMA / Parks Victoria
AF 16	Main habit	ntain or improve instream tat diversity	AF 16.1	Install waterway structure (Large wood)	3 sites	GB CMA
AF 17	Redu plant	ice the impact of pest t and animal species	AF 17.1	Control invasive pest plant species (Woody)	200 ha	Parks Victoria / Landowners
			AF 17.2	Control invasive pest animal species (Terrestrial)	100 ha	Parks Victoria / Landowners
AF.18	Envir will i threa	ronmental water program mprove altered hydrology at score	AF 18.1	Deliver water to river reach (4- 21, 22, 23 and 24)	Based on seasonal watering plan (See Chapter 4.3)	Water Corporation / GB CMA
Estimate	d cost	of activities for Broken Cree	ek ( 4-21, 4-2	22, 4-23, 4-24)		\$495,000

Management Unit				Agricultural Floc	odplains	
Basin		Broken	Waterway	Broken River		Identification No.
Values		Camping (4), Picnics and E	Barbecues (5), S	Sightseeing (5), Tracks (5)		- 4-01
Threats		Bank Instability (4), Degra Livestock Access (3)	ded Riparian V	egetation - Large Trees (3)		State: Highly Modified
Long-ter	m	Protect and promote natu	Iral channel for	m and dynamics		
Conditio	e ' n	Riparian and floodplain ve				
		Instream habitat is mainta	ained or improv	ved by 2030. (Link to 4.02).		
Ma	nagem	ent Outcome Targets	N	lanagement Activity/Output	Quantity	Lead agency/partner
AF.19	Mana over	age livestock access in 50% of waterway	AF 19.1	Construct riparian fence	5 km	GB CMA/Parks Victoria
	front	ages	AF 19.2	Modify grazing regime	5 ha	GB CMA/Parks
			AF 19.3	Establish management agreement	5 ha	<ul> <li>Victoria / landowners</li> </ul>
AF.20	Impro and c reach	ove vegetation structure liversity throughout 1.	AF 20.1	Establish native indigenous vegetation	10 ha	
AF.21	Incre with obstr reach	ase in habitat available no waterway structures ucting fish passage in this n	AF 21.1	Modify/remove waterway structure, (fish barrier)	1 (No.)	GB CMA GMW
Estimate	ed cost	of activities for Broken Rive	er (4-01)			\$1,692,000

Management Unit		Agricultural Fl	oodplains				
Basin		Goulburn	Wetland	Gaynors Swamp		Identification No.	
Values Significant EVCs (4), Signifi			cant Flora Wetla	nd (4), Significant Birds (5)		60118	
Threats		Invasive Flora (5), Degrade	d Buffer (5)				
Long-ter	rm	Wetland condition is main	tained or improv	ved by 2025			
Resource Conditio	e <sup>.</sup> on	Maintain or improve wetla					
		Maintain or improve habitat for significant birds by 2030.					
Manage	ement O	utcome Targets	Management	Activity/Output	Quantity	Lead agency/partner	
AF.22	Impro delive	ove environmental water er and wetting regimes	AF22.1	Investigate/plan water regime	Based on seasonal watering plan (See Chapter 4.3)	GB CMA/ Parks Victoria /GMW / VEWH	
			AF22.2	Install waterway structure (flow regulator)	2 (No.)	GB CMA/ Parks Victoria /GMW	
AF.23	Impro habit	ove condition of terrestrial at	AF23.1	Establish native indigenous vegetation	4 ha	Parks Victoria /GB	
AF.24	Impro and c flora	oved vegetation structure liversity, control invasive	AF24.1	Control invasive pest plant species (Non-woody)	40 ha	СМА	
AF.25	Impro estab	ove knowledge base / lish management plan	AF25.1 AF25.2	Establish Plan, Management Strategy Establish publication	1 (No.) 1 (No.)	GB CMA / Parks Victoria / GMW	
<b>-</b>				(online/printed)		<i>6 4 433 000</i>	
Estimate	ea cost o	of activities for Gaynors Swa	amp (60118)			\$ 1,122,000	

Manage	ment Unit	Agricultural	Floodplains		
Basin	Goulburn	Wetland	Kanyapella Basin		Identification No.
Values	Significant EVCs (4), Signifi	cant Flora We	tland (4)		60205
Threats	Invasive Fauna (Aquatic) (5 Degraded Buffer (5)	5), Invasive Fai	una (Terrestrial) (5), Changed Water Reg	;ime (5),	
Long-ter	m Reduce the threat of invas	ive species by	2030		
Conditio	e Improve flow regime by 20 n	)21			
Ma	nagement Outcome Targets	N	lanagement Activity/Output	Quantity	Lead agency/partner
AF.26	Improve environmental water delivery and wetting regimes	AF 26.1	Investigate / plan water regime	Based on seasonal watering plan (See Chapter 4.3)	GB CMA/ Parks Victoria /GMW/VEWH
		AF 26.1	Modify waterway structure(sill)	1 (No.)	-
AF.27	Improve condition of terrestrial habitat	AF 27.1	Establish native indigenous vegetation	10 ha	GMW/ Parks Victoria /GB CMA
		AF 27.2	Control invasive pest animal species (Terrestrial)	400 ha	/Landcare
AF.28	Maintain or improve water quality from adjacent lands	AF 28.1	Modify agricultural practice change	160 ha	GB CMA /DEPI (Ag Services)/GMW
AF.29	Improved vegetation structure and diversity, control invasive flora	AF 29.1	Control invasive pest plant species (Non-woody)	400 ha	GMW/ Parks
AF.30	Knowledge transfer	AF 30.1	Prepare publication, (online/printed)	1 (No.)	Victoria /GB CMA
Estimate	ed cost of activities for Kanyapella I	Basin (60205)			\$575,000

Management Unit			Agricultural Floodplains				
Basin		Goulburn	Wetland	Yambuna Bridge Rd (wetland)		Identification No.	
Values	Values Significant Birds (5)					- 60240	
Threats Invasive Fauna (Aquatic) (5), Invasive Fauna (Terrestrial) (5), Changed Water Regime (5)							
Long-term Establish Management Plan by 2030							
Resource Reduce the threat of invasive species by 2030							
Ma	nagem	ent Outcome Targets		Management Activity/Output	Quantity	Lead agency/partner	
AF.31	Deve	lopment of site	AF 31.1	Develop Plan (Site Management	1 (No.)	GB CMA/Parks	
	mana	agement plan		Strategy)		Victoria	
AF.32	Impro	oved vegetation structure	AF 32.1	Control invasive pest animal	(included in Go	oulburn Reach 2)	
	and c	liversity, control invasive		species (Terrestrial)			
	flora						
Estimate	Estimated cost of activities for Yambuna Bridge Rd wetland (60240) \$50,000						

	Management Unit		Agricultural Floodplains			
Basin	Goulburn	Wetland	Mansfield, Wallenjoe, One Tree a Swamps	nd Two Tree	Wetland Identification No	
Values	Significant EVCs (4), Signifi (5)	cant Flora We	etland (4), Significant Birds (5), Importani	t Bird Habitats	60265 60269 60101 60102	
Threats	Changed Water Regime (5	), Degraded B	Buffer (5)			
Long-term	n Improve flow regime by 20	)21				
Resource Condition	Maintain or improve wetla	nd buffer by	2030			
	Maintain or improve habit	at for signific	ant birds by 2030.			
Man	agement Outcome Targets	r	Management Activity/Output	Quantity	Lead agency/partner	
AF.33	Environmental water program will target altered hydrology threat score	AF 33.1	Management of flow releases - Deliver water to wetlands at required timing	Based on seasonal watering plan (See Chapter 4.3)	GB CMA / Parks Victoria / GMW / VEWH	
		AF 33.2	Modify waterway structure (sill)	1 (No.)	GB CMA / Parks Victoria / GMW	
AF.34	Improve condition of terrestrial habitat	AF 34.1	Establish native indigenous vegetation	10 ha	Parks Victoria / GB CMA	
AF.35	Maintain or improve water quality from adjacent lands	AF 35.1	Modify agricultural practice change	100 ha	GB CMA / GMW	
AF.36	Improved vegetation structure and diversity, control invasive flora	AF 36.1	Control invasive pest plant species (Non-woody)	250 ha	Parks Victoria /GB CMA	
AF.37	Knowledge transfer	AF 37.1	Establish publication (online/printed)	1 No	GB CMA/ Parks Victoria / GMW	
Estimated (60265, 60	l cost of activities for Mansfield, V 0269, 60101,60102)	Vallenjoe, Or	ne Tree and Two Tree Swamps		\$780,000	

	Management Unit		Agricultural Floodp	lains			
Basin	Broken	Broken Wetland Barmah Forest Identificat					
Values Important Bird Habitats (5), Significant EVCs (5), Camping (4), Motor Boating (4), Non-Motor Boating (4), Picnics and Barbecues (5), Recreational Fishing (5), Sightseeing (5), Tracks (5), Significant Birds (5)							
Threats	Altered Hydrology Invasiv	e Fauna, Inv	asive Fauna (Aquatic and Terrestrial)				
Long-terr	m Maintain or Improve the E	cological Ch	aracter of Barmah				
Resource Conditior	Improve flow regime by 2	021					
	Riparian and floodplain ve	getation cor	ndition is maintained or improved by 2025				
Ma	nagement Outcome Targets		Management Activity/Output	Quantity	Lead agency/partner		
AF.38	Improved vegetation structure and diversity throughout reach	AF 38.1	Monitoring the Ecological Character of Barmah (Ramsar Site) and fill knowledge gaps.	1	Parks Victoria / GB CMA / DEPI (Region)		
		AF 38.2	Control invasive pest plant species (Non-woody)	1,000 ha			
		AF 38.3	Control invasive pest animal species (Terrestrial)	500 ha			
		AF 38.4	Control invasive pest plant species (Non-woody and Woody)	1,000 ha	Victoria / YYNAC		
AF.39	Increase community knowledge of site and program of works (progress)	AF 39.1	Co-ordinate engagement event, (Conference / field day)	5 (No.)	-		
AF.40	Environmental water program will target altered hydrology threat score	AF 40.1	Management of flow releases - Deliver water to river reach at required timing	Based on seasonal watering plan (See Chapter 4.3)	DEPI / GB CMA / Fisheries NSW / VEWH (CEWH/MDBA)		
Estimate	d cost of activities for Barmah For	est (60706)			\$3,075,000		

	Management Unit		Agricultural Flo	oodplains	
Basin	Goulburn	Wetland	Doctors Swamp		Identification No.
Values	Important Bird I	Habitats (5), Significar	nt EVCs (5)		- 60210
Threats	Invasive Fauna (	Aquatic) (5), Invasive	Fauna (Terrestrial) (5), Degraded Buffer	r (4)	
Long-teri	m Maintain or imp	rove habitat for signi	ficant birds by 2030.		
Condition	Reduce the thre	at of invasive species	s by 2030		
Ma	nagement Outcome Tar	gets	Management Activity/Output	Quantity	Lead agency/partner
AF.41	Environmental water p will target altered hyd threat score	orogram AF 41.1 rology	Management of flow releases Deliver water to river reach at required timing	- Based on seasonal watering plan (See Chapter 4.3)	GB CMA/ Parks Victoria / GMW / VEWH
AF.42	Improved vegetation s and diversity througho	tructure AF 42.1 ut site	Control invasive pest animal species (Terrestrial)	250 ha	
		AF 42.2	Establish native indigenous vegetation	10 ha	Parks Victoria /
AF.43	Knowledge transfer	AF 43.1	Establish publication (online/printed)	1 (No.)	GB CMA
Estimate	d cost of activities for D	octors Swamp (6021)	0)		\$110,000

Management Unit		Agricultural Floodplains			
Basin	Goulburn	Wetland	Gemmills Swamp		Identification No.
Values	Important Bird Habitats (5	), Significant EV	/Cs (5),		- 63156
Threats Invasive Fauna (Aquatic) (5), Invasive Fauna (Terrestrial) (5), Changed Water Regime (5)					
Long-term Resource Condition	Reduce the threat of invas	ive species by 3	2030		
Mana	gement Outcome Targets	м	anagement Activity/Output	Quantity	Lead agency/partner
AF.44	Improved vegetation structure and diversity throughout reach	AF 44.1	Control invasive pest plant species (Non-woody)	150 ha	Parks Victoria /
		AF 44.2	Control invasive pest animal species (Terrestrial)	150 ha	GB CMA
Estimated	\$105,000				

	Management Unit		Agricultural Floodplains		
Basin	Goulburn	Wetland	Reedy Swamp Wildlife		Identification No.
Values	Important Bird Habitats (5	), Significant	Birds (5), Significant Amphibians (5)		63173
Threats	Invasive Fauna (Aquatic) (5	5), Invasive F	auna (Terrestrial) (5), Changed Water Regi	me (5),	
Long-ter	m Reduce the threat of invas	ive species b	y 2030		
Condition	Maintain or improve habit	at for signifi	cant birds by 2030		
Ma	Management Outcome Targets Management Activity/Output Quantity				Lead agency/partner
AF.45	Improved vegetation structure and diversity throughout reach	AF 45.1	Control invasive pest animal species (Terrestrial)	100 ha p.a.	Parks Victoria
AF.46	Environmental water program will target altered hydrology	AF 46.1	Construct waterway structure (flow regulator)	2 (No.)	GMW/ GB CMA
	threat score	AF 46.2	Management of flow releases - Deliver water to river reach at required timing	Based on seasonal watering plan (See Chapter 4.3)	GB CMA/GMW/ Parks Victoria / VBEWH
AF.47	Improve the management of surrounding catchment. Reduce nutrient impact on site	AF 47.1	Modify agricultural practice change	10 ha	GB CMA/Local Government/ Parks Victoria
AF.48	Control nutrient inputs, Reduce nutrients at source of discharge water	AF 48.1	Construct wetland/water storage (Nutrient management)	4 (no.)	GB CMA / COGS
Estimate	d cost of activities for Reedy Swan	np Wildlife F	Reserve (63173)		\$770,000

	Mar	nagement Unit		Agricultural Floodp	lains	
Basin		Broken	Wetland	Black Swamp		Identification No.
Values		Important Bird Habitats (5	), Significant	Birds (5)		63203
Threats		Invasive Fauna (Aquatic) (5	5), Invasive F	auna (Terrestrial) (5), Degraded Buffer (4)		
Long-terr	m	Reduce the threat of invas	ive species b	by 2030		
Resource Conditior	e n	Maintain or improve wetla	and buffer by	y 2030		
Management Outcome Targets				Management Activity/Output	Quantity	Lead agency/partner
AF.49	Envir will t threa	onmental water program arget altered hydrology at score	AF 49.1	Management of flow releases - deliver water to river reach at required timing	Based on seasonal watering plan (See Chapter 4.3)	GB CMA / GMW / Parks Victoria / VEWH
AF.50	Invas acces wate	ive species control (carp ss) in to site from adjacent rway	AF 50.1	Control invasive pest animal species (Aquatic). Modify waterway structure (carp screen)	1 (No.)	GB CMA / Parks Victoria
AF.51	Impr and c	oved vegetation structure diversity throughout the	AF.51.1	Establish native indigenous vegetation	5 ha	GB CMA / Parks Victoria
site		te	AF 51.2	Control invasive pest plant species (Non-woody)	10 ha	-
			AF 51.3	Control invasive pest animal species (Terrestrial)	10 ha	-
Estimate	d cost	of activities for Black Swam	p (63203)			\$100,000

	Management Unit		Agricultural Floo	dplains	
Basin	Broken	Wetland	Sampys Swamp		Identification No.
Values	Significant Birds (4)				66906
Threats	Invasive Fauna (Aquatic) (	5), Invasive Fau	una (Terrestrial) (5), Degraded Buffer (5	5)	
Long-terr	m Maintain or improve habit	at for significa	nt birds by 2030		
Resource					
Conditior	1				
Mai	nagement Outcome Targets	Μ	lanagement Activity/Output	Quantity	Lead agency/partner
AF. 52	Improved vegetation structure	AF 52.1	Establish native indigenous	5 ha	GB CMA / Land
	and diversity throughout site		vegetation		managers
		AF 52.2	Control invasive pest animal	10 ha	
			species (Terrestrial)		
Estimated cost of activities for Sampys Swamp (66906)					

	Management Unit		Agricultural Floo	dplains	
Basin	Broken	Wetland	Taylors Swamp		Identification No.
Values	Significant Birds (4)				- 66911
Threats	Invasive Fauna (Aquatic) (	5), Invasive Fau	una (Terrestrial) (5), Degraded Buffer (5	5)	
Long-tern	n Maintain or improve habit	at for significa	nt birds by 2030		
Resource					
Condition	1				
Mar	nagement Outcome Targets	N	lanagement Activity/Output	Quantity	Lead agency/partner
AF. 53	Improved vegetation structure and diversity throughout site	AF 53.1	Establish native indigenous vegetation	3 ha	Parks Victoria / GB CMA
		AF 53.2	Control invasive pest animal species (Terrestrial)	10 ha	_
Estimated	d cost of activities for Taylors Swa	mp (66911)			\$34,000

	Management Unit		Agricultural Floo	dplains		
Basin	Broken	Wetland	Mulquiney Rd (Wetland)		Identification No.	
Values	Significant Birds (4)				- 67091	
Threats	Invasive Fauna (Aquatic) (	5), Invasive Fau	na (Terrestrial) (5), Invasive Flora (We	tland) (5),		
	Changed Water Regime (3	), Degraded Bu	ffer (5), Soil Disturbance (5)			
Long-ter	m Maintain or improve habit	at for significa	nt birds by 2030			
Resource	2					
Conditio	n					
Management Outcome Targets		м	anagement Activity/Output	Quantity	Lead agency/partner	
AF.54	Protect site from influence of stock	AF 54.1	Maintain stock proof fence	1 km	GB CMA / Landowners	
AF.55	Improved vegetation structure and diversity throughout site	AF 55.1	Establish native indigenous vegetation	3 ha	_	
		AF 55.2	Control invasive pest plant species (Non-woody)	10 ha	_	
AF.56	Site Management Plan	AF 56.1	Develop plan / management	1 (No.)	GB CMA	
	(threats)		strategy			
Estimate	Estimated cost of activities for Mulquiney Rd wetland (67091)					

Management Unit				Agricultural Flood	olains		
Basin	Goulburn Wetland Kinnairds Wetland					Wetland	
Values	Drought	Refuge (5), Impoi	rtant Bird Habi	itat (5) Significant Birds (5) Significant Flo	ra Wetland (5)	63206	
Threats	Invasive	Flora (5), Invasive	Fauna (5) Deg	graded Buffer (5)			
Long-terr	m Wetland	condition is mair	tained or imp	roved by 2025			
Resource Conditior	Maintain	Aaintain or improve wetland buffer by 2030					
	Maintain	or improve habit	at for significa	ant birds by 2030			
Mai	nagement Outcor	ne Targets	Ν	Nanagement Activity/Output	Quantity	Lead agency/partner	
AF.57	Improve enviro deliver and wet	nmental water ting regimes	AF57.1	Investigate / Plan Water regime, River reach	Based on seasonal watering plan (See Chapter 4.3)	GB CMA/ Parks Victoria / GMW / VEWH	
AF.58	Improve condit habitat	ion of buffer	AF58.1	Establish native indigenous vegetation	10 ha	Parks Victoria / Shire of Moira /	
AF.59	Improved veget and diversity, co flora	ation structure ontrol invasive	AF59.1	Control invasive pest plant species (Non-woody)	40 ha	GB CMA	
AF. 60	Seeking compline management of wetland habitat	mentary f adjacent 	AF60.1	Investigate options for maintenance and improvement of adjacent wetland habitats	20 ha	Shire of Moira / GMW / GB CMA / Landowners	
Estimate	Estimated cost of activities for Kinnairds Wetland (63206) \$100,000						

#### 7.3 **PRODUCTIVE PLAINS**

Waterways in this region occur on the open plains and are the outfall from the Strathbogie Ranges and other surrounding hills. These waterways are largely unregulated, except for the Goulburn River and are mostly in moderate condition. Major threats to waterways include European carp, degraded riparian vegetation through grazing pressure, poor instream habitat and water harvesting in the upper catchments. Wetlands within the Productive Plains are generally in a moderate to good state.

Priority waterway assets include:

**Goulburn River:** A Heritage River associated with wetlands of national significance that supports threatened species including Murray cod, Silver perch and Macquarie perch. The Goulburn River floodplain contains cultural heritage sites and provides water for agriculture, urban centres and recreational use.

Hughes Creek and Seven Creeks: Supports the threatened Macquarie perch and Murray cod.

**Broken River:** Associated with wetlands of national significance and supports the threatened Murray cod, Macquarie perch and Silver perch.

**Doctors Swamp** (Bioregional): One of the most intact River Red Gum swamps in Victoria. It supports a diverse number of species including 73 wetland flora species and 44 wetland fauna species.

**Tahbilk Lagoon** (Bioregional): A large billabong connected to the Goulburn River. The wetland is a biological hot spot that maintains a number of threatened species including the Broad-shelled Turtle, the most southerly remnant freshwater Catfish population and the largest known Watershield (native waterlily) population in Victoria.





	Management Unit		Productive Plai	ns				
Basin	Broken	Waterway	Holland Creek		Identification No.			
Values	Significant Fish Migratory	Significant Fish Migratory (5)						
Threats	ThreatsBank Instability (5), Barriers to Fish Migration (4), Degraded Riparian Vegetation - Large Trees (3), Degraded Water Quality (5), Livestock Access (3), Reduced Vegetation Width (3)							
Long-tern	n Riparian and floodplain ve	getation condit	ion is maintained or improved by 2025					
Resource Condition	Instream habitat is mainta	ined or improve	ed by 2030					
Man	agement Outcome Targets	Ma	anagement Activity/Output	Quantity	Lead agency/partner			
PP.1	Manage livestock access in over 50% of waterway frontages	PP 1.1	Construct riparian fence	2 km	GB CMA / Landcare / landowners			
		PP 1.2	Modify grazing regime	4 ha	GB CMA /			
		PP 1.3	Establish management agreement	4 ha	<ul> <li>Landcare / landowners</li> </ul>			
		PP 1.4	Modify agricultural practice change	160 ha	_			
PP.2	Increase in habitat availability within instream zone	PP 2.1	Install waterway structure (Large wood)	1 site	GB CMA			
PP.3	Improved vegetation structure and diversity throughout reach	PP 3.1	Undertake native indigenous vegetation supplementary planting	4 ha	GB CMA / Landcare			
PP.4	Increase in habitat available with no waterway structures obstructing fish passage in this reach	PP 4.1	Install waterway structure (Fishway)	1	GB CMA			
Estimated	l cost of activities for Holland Cre	ek (4-13)			\$212,000			

	Management Unit		Productive Plair	15		
Basin	Goulburn	Waterway	Goulburn River		Identification No.	
Values	Values         Native Fish (2), Riparian Vegetation Condition (4), Significant Birds Waterway (4), Significant           EVCs (5), Significant Fish Migratory (5), Significant Fish Non Migratory (5), Camping (4), Game           Hunting (5), Motor Boating (5), Non-Motor Boating (3), Recreational Fishing (5), Significant (5),					
Threats	Altered Streamflow Seasc Increase in Prop of Zero F Wood) (4), Red in High Flo	onality (3), Bank I low (5), Invasive ow Magnitude (4	nstability (5), Increase in Low Flow Mag Fauna (Terrestrial) (5), Loss of Instream )	gnitude (5), 1 Habitat (Large	<b>State:</b> Sustainable Working	
Long-terr	m Riparian and floodplain ve	egetation conditi	on is maintained or improved by 2025			
Conditior	Instream habitat is mainta	ained or improve	ed by 2030			
	Improve flow regime by 2	021				
Mai	nagement Outcome Targets	Ma	nagement Activity/Output	Quantity	Lead agency/partner	
PP.5	Environmental water program will target altered hydrology threat score	PP 5.1	Management of flow releases - deliver water to river reach at required timing	Based on seasonal watering plan (See Chapter 4.3)	DEPI/GB CMA	
PP.6	Manage livestock access in	PP 6.1	Modify grazing regime	10 km	GB CMA /	
	over 50% of waterway frontages	PP 6.2	Establish management agreement	10 ha	Landcare/ landowners	
PP.7	Increase in habitat availability within instream zone	PP 7.1	Install waterway structure (Large wood)	3 sites	GB CMA	
PP.8	Improved vegetation structure and diversity throughout reach	PP 8.1	Control invasive pest plant species (Non-woody and Woody)	200 ha	Parks Victoria	
		PP 8.2	Control invasive pest animal species (Terrestrial)	30 ha		
PP.9	Increase bank stability within zones of active bank erosion	PP 9.1	Establish earthworks (Armouring)	0.1 km	GB CMA	
Estimated cost of activities for Goulburn River (5-6, 5-7, and 5-8) \$525,0						

	Management Unit		Productive Plain	าร				
Basin	sin Goulburn Waterway Goulburn River							
Values	Native Fish (2), Riparian V EVCs (5), Significant Fish M Hunting (5), Motor Boatin Swimming (5)	egetation Cond Iigratory (5), Si g (5), Non-Mote	getation Condition (4), Significant Birds Waterway (4), Significant igratory (5), Significant Fish Non Migratory (5), Camping (4), Game (5), Non-Motor Boating (3), Recreational Fishing (5), Sightseeing (5),					
Threats	Threats Altered Stream flow Seasonality (3), Bank Instability (5), Increase in Low Flow Magnitude (5), Increase in Prop of Zero Flow (5), Invasive Fauna (Terrestrial) (5), Loss of Instream Habitat (Large Wood) (4), Red in High Flow Magnitude (4), Recreational and commercial vessel usage (unknown)							
Long-terr	m Riparian and floodplain ve	getation condit	tion is maintained or improved by 2025					
Conditior	Instream habitat is mainta	ined or improv	ed by 2030					
	Improve flow regime by 20	)21						
Ma	nagement Outcome Targets	М	anagement Activity/Output	Quantity	Lead agency/partner			
PP.10	Environmental water program will target altered hydrology threat score	PP 10.1	Management of flow releases - Deliver water to river reach at required timing	Based on seasonal watering plan (See Chapter 4.3)	DEPI / GB CMA			
PP.11	Manage livestock access in over 50% of waterway frontages	PP 11.1	Construct riparian fence	5 km	GB CMA / Landcare / landowners			
		PP 11.2	Modify grazing regime	15 ha	GB CMA /			
		PP 11.3	Establish management agreement	15 ha	- Landcare / landowners			
		PP 11.4	Modify agricultural practice change	160 ha				
PP.12	Increase in habitat availability within instream zone	PP 12.1	Install Waterway structure (Large wood)	1 site	GB CMA			
PP.13	Improved vegetation structure and diversity throughout reach	PP 13.1	Control invasive pest plant species (Non-woody and Woody)	100 ha	GB CMA / Landcare			
		PP 13.2	Control invasive pest animal species (Terrestrial)	20 ha	Landcare / landowners			
PP.14	Increase bank stability within zones of active bank erosion	PP 14.1	Establish earthworks (Armouring)	0.1 km	GB CMA			
Estimate	Estimated cost of activities for Goulburn River (5-9 and 5-10) \$415,000							

Management Unit Productive Plains							
Basin	Goulburn	Waterway	Hughes Creek		Identification No.		
Values	Values Significant Fish Non Migratory (5)						
Threats	ThreatsLivestock Access (5), Loss of Instream Habitat (Large Wood) (3), Loss of Instream Habitat (Sedimentation) (3), Reduced Vegetation Width (3)						
Long-teri	m Riparian and floodplain ve	getation condit	ion is maintained or improved by 2025				
Resource Conditio	Resource Protect and promote natural channel form and dynamics						
Ma	Management Outcome Targets		anagement Activity/Output	Quantity	Lead agency/partner		
PP.15	Manage livestock access in	PP 15.1	Construct riparian fence	5 km	GB CMA /		
	over 25% of waterway frontages	PP 15.2	Modify grazing regime	10 ha	<ul> <li>Landcare / landowners</li> </ul>		
		PP 15.3	Establish management agreement	10 ha	_		
PP.16	Increase in habitat availability within instream zone	PP 16.1	Install waterway structure (Large wood)	2 sites	GB CMA		
PP.17	Facilitate fish movement within and to adjacent reaches	PP 17.1	Modify waterway structure (Fishway)	1 (No.)	GB CMA		
Estimate	Estimated cost of activities for Hughes Creek (5-37) \$230,000						

	Management Unit		Productive Plair	ıs		
Basin	Goulburn	Goulburn Waterway Seven Creeks				
Values	Significant Fish Migratory	(5), Significant I	Fish Non Migratory (5)		- 5-17 / 5-18	
Threats	Bank Instability (4), Barrier (3), Livestock Access (3), Lo (3)	rs to Fish Migra oss of Instream	tion (4), Degraded Riparian Vegetation - Habitat (Large Wood) (3), Reduced Veg	Large Trees etation Width	<b>State:</b> Sustainable Working	
Long-terr	m Riparian and floodplain ve	getation condit	ion is maintained or improved by 2025			
Conditior	Improve flow regime by 20	)21				
Mai	Management Outcome Targets Management Activity/Output Quantity					
PP.18	Manage livestock access in	PP 18.1	Construct riparian fence	7 km	GB CMA /	
	over 25% of waterway frontages	PP 18.2	Modify grazing regime	14 ha	<ul> <li>Landcare / landowners</li> </ul>	
	-	PP 18.3	Establish management agreement	14 ha	_	
PP.19	Increase in habitat availability within instream zone	PP 19.1	Install waterway structure (Large wood)	2 sites	GB CMA	
PP.20	Improved vegetation structure and diversity throughout reach	PP 20.1	Establish native indigenous vegetation	10 ha	GB CMA / Landcare	
PP.21	Maintain channel stability	PP 21.1	Establish earthworks (Armouring)	0.2 km	GB CMA	
PP.22	Increase in habitat available with no waterway structures obstructing fish passage in this reach	PP 22.1	Modify waterway structures (Fishway)	5 (No.)	GB CMA	
Estimate	d cost of activities for Seven Creek	(s (5-17, 5-18)			\$540,000	

	Mai	nagement Unit		Productive Plain	ns			
Basin		Goulburn	Waterway	Seven Creeks		Identification No.		
Values		Significant Fish Migratory	(5), Significant I	Fish Non Migratory (5)		- 5-19 / 5 -20		
Threats		Bank Instability (4), Barrie (3), Livestock Access (3), L (3)	rs to Fish Migra oss of Instream	tion (4), Degraded Riparian Vegetation · Habitat (Large Wood) (3), Reduced Veg	- Large Trees etation Width	<b>State:</b> Sustainable Working		
Long-ter	m	Populations of native fish	are maintained	or improved by 2025				
Conditio	e n	Riparian and floodplain ve	Riparian and floodplain vegetation condition is maintained or improved by 2025					
		Improve flow regime by 2	021					
Management Outcome Targets Man			anagement Activity/Output	Quantity	Lead agency/partner			
PP.23	Mana over front	age livestock access in 25% of waterway rages	PP 23.1	Construct riparian fence	10 km	GB CMA/ Landcare/ landowners		
			PP 23.2	Modify grazing regime	20 ha	GB CMA/		
			PP 23.3	Establish management agreement	20 ha	<ul> <li>Landcare/ landowners</li> </ul>		
PP.24	Incre withi	ase in habitat availability in instream zone	PP 24.1	Install waterway structure (Large wood)	1 site	GB CMA		
PP.25	Mon distri Maco	itor population and ibution of Trout cod and quarie perch	PP 25.1	Develop and Implement Monitoring Plan (Aquatic: Macquarie perch, Trout cod)	1 (No.)	GB CMA		
PP.26	Impr strea inter	oving our knowledge on m flow / groundwater actions.	PP 26.1	Investigate links between groundwater and channel hydrology	1 (No.)	GMW		
Estimate	Estimated cost of activities for Seven Creeks (5-19, 5-20) \$550,000							

Management Unit Productive Plains					
Basin	Broken	Waterway	Identification No.		
Values	Significant Amphibians (5),	Significant R	eptiles Riparian (5)		- 4 - 34
Threats	Degraded Riparian Vegeta (3), Loss of Instream Habit	tion - Large T at (Large Wo	rees (4), Invasive Fauna (Terrestrial) (5) od) (3), Reduced Vegetation Width (3)	, Livestock Access	State: Highly Modified
Long-term	Riparian and floodplain ve	getation cond	dition is maintained or improved by 202	.5	
Condition	Instream habitat is mainta	ined or impro	oved by 2030		
Manage	ement Outcome Targets	I	Management Activity/Output	Quantity	Lead agency/partner
PP.27 M	lanage livestock access in	PP 27.1	Construct riparian fence	2 km	GB CMA /
ov fro	er 25% of waterway Intages	PP 27.2	Modify grazing regime	4 ha	<ul> <li>Landcare / landowners</li> </ul>
		PP 27.3	Establish management agreement	4 ha	-
PP.28 Im an	nproved vegetation structure nd diversity throughout reach	PP 28.1	Establish native indigenous vegetation	4 ha	-
		PP 28.2	Control invasive pest animal species (Terrestrial)	10 ha	-
Estimated co	\$97,000				

Management Unit Productive Plains									
Basin	Broken	Waterway	Broken River		Identification No.				
Values	Significant Birds Riparian ( Significant Mammals (4)	Significant Birds Riparian (5), Significant Birds Waterway (4), Significant Fish Migratory (5), Significant Mammals (4)							
Threats Long-ter Resource	Threats     Barriers to Fish Migration (4), Degraded Riparian Vegetation - Large Trees (3), Degraded Water Quality (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Aquatic) (3), Livestock Access (3), Loss of Instream Habitat (Large Wood) (3), Reduced Vegetation Width (3)       Long-term     Improve flow regime by 2021       Resource     Resource								
Condition	n nagement Outcome Targets	Ma	nagement Activity/Output	Quantity	Lead agency/partner				
PP.29	Manage livestock access in	PP 29.1	Construct riparian fence	5 km	GB CMA /				
	over 25% of waterway frontages	PP 29.2	Modify grazing regime	10 ha	<ul> <li>Landcare / landowners</li> </ul>				
	U	PP 29.3	Establish management agreement	10 ha	-				
		PP 29.4	Modify agricultural practice change	160 ha	-				
PP.30	Increase in habitat availability within instream zone	PP 30.1	Install waterway structure (Large wood)	1 site	GB CMA				
PP.31	Increase in habitat available with no waterway structures obstructing fish passage in this reach	PP 31.1	Install waterway structure / modify structure (Fishway)	1 (No.)	GB CMA				
PP.32	Improved vegetation structure and diversity throughout reach	PP 32.1	Establish native indigenous vegetation	10 ha	GB CMA / Landcare				
		PP 32.2	Control invasive pest animal species (Terrestrial)	20 ha	Landcare / landowners				
		PP 32.3	Control invasive pest plant species (Non-woody and Woody)	15 ha	GB CMA / GMW / Landcare / Landowners				
Estimate	Estimated cost of activities for Broken River (4-03) \$2,805,000								

	Management Unit		Productive Plair	15					
Basin	Broken	Wetland	Winton Wetland Complex		Identification No.				
Values	Important Bird Habitats (-) (5), Significant Birds (-)	Important Bird Habitats (-), Significant EVCs (-), Recreational Fishing (-), Sightseeing (5), Tracks (5), Significant Birds (-)							
Threats	Invasive Fauna, Invasive Fa	auna (Aquatic a	nd Terrestrial), Water Quality						
Long-ter	m Support the Winton Wetla	ınd Rehabilitati	on						
Resource Conditio	e Maintain or improve wetla	and buffer by 2	030						
	Wetland condition is main	tained or impro	oved by 2025						
Ma	nagement Outcome Targets	м	anagement Activity/Output	Quantity	Lead agency/partner				
PP.33	33 Support Return to Winton Support the Winton Wetland recovery initiative Winton Wet Wetland project Management				and Committee of t (WWCOM) / GB CMA				
Estimated cost of activities for Winton Wetland Complex (67909) \$0					\$0				
PP.34	Improved vegetation structure and diversity throughout reach	PP 34.1	Control invasive pest plant species (Non-woody and Woody)	400 ha	WWCOM, Landcare, GB CMA				
		PP 34.2	Control invasive pest animal species (Terrestrial)	400 ha	WWCOM, Landcare, GB CMA				
		PP 34.3	Modify agricultural practice change	480 ha	GB CMA, DEPI (region)				
PP.35	Manage livestock access in over 25% of waterway	PP 35.1	Establish native indigenous vegetation	15 ha	GB CMA, landowners				
	frontages	PP 35.2	Establish management agreement	15 ha	GB CMA / Landowners / Landcare				
		PP 35.3	Modify grazing regime	50 ha	GB CMA / Landowners / Landcare				
Estimate	Estimated cost of activities for Winton Wetland Complex (67909) – Catchment Program \$4,637,500								

Management Unit Productive Plains						
Basin	Broken	Wetland	Dowdle Swamp		Identification No.	
Values	Significant Birds (5)				67905	
Threats	ats Invasive Fauna (Aquatic) (5), Invasive Fauna (Terrestrial) (5), Changed Water Regime (5),					
Long-terr	n Maintain or improve habit	at for significan	t birds by 2030			
Resource Condition	Wetland condition is main	tained or impro	oved by 2025			
Maintain or improve wetland buffer by 2030						
Mar	nagement Outcome Targets	Ma	anagement Activity/Output	Quantity	Lead agency/partner	
PP.36	Improved vegetation structure and diversity throughout	PP 36.1	Control invasive pest animal species (Terrestrial)	10 ha	Parks Victoria / GB CMA /	
		PP 36.2	Control invasive pest plant species	10 ha	Landcare	
PP.37	Improve the quality of water produced from within catchment	PP 37.1	Establish native indigenous vegetation	10 ha	_	
PP.38	Maintain flow regulation (as designed) at outfall	PP 38.2	Maintain waterway structure (Flow regulator)	1 (No.)	Parks Victoria / GB CMA / GMW	
Estimate	Estimated cost of activities for Dowdle Swamp (67905) \$ 115,000					

Basin	Goulburn	Wetland			
Values	Significant Flora Wetland (	5), Significant Fish	n Migratory (5), Significant Fish Non N	Aigratory (4)	- Identification No. 61918
Threats	Degraded Buffer (4), Invasi	ve Fauna (Aquatio	c) (5), Invasive Flora (Aquatic) (5)		
Long-ter	m Reduce the threat of invasi	ve species by 203	0		
Conditio	Maintain or improve wetla	nd buffer by 2030	)		
	Populations of native fish a	re maintained or	improved by 2025		
	Management Outcome Targe	ets	Management Activity/Output	Quantity	Lead agency/partner
PP.39	Improve condition of terrestrial habitat	PP 39.1	Establish native indigenous vegetation	10 ha	GB CMA / GMW/ Landowners
PP.40	Maintain or improve water quality from adjacent lands	PP 40.1	Modify agricultural practice change	100 ha	GB CMA / GMW/ Landowners
PP.41	2.41 Improved vegetation structure PP 41.1 and diversity, control invasive flora		Control invasive pest plant species (Non-woody)	10 ha	GB CMA / GMW/ Landowners
PP.42	2 Knowledge transfer PP 42.1		Establish publication (online/printed)	1 (No.)	GB CMA / GMW/ Landowners
PP.43	Improve condition of aquatic habitat	PP 43.1	Control invasive pest animal species (Aquatic)	150 ha	GB CMA / GMW
Estimate	d cost of activities for Tahbilk Lage	oon (61918)			\$300,000

Management Unit Productive Plains					
Basin	Goulburn	Wetland	Stockyard Plain		Wetland
Values	Significant Flora Wetland (	5), Important	t Bird Habitats (5)		- Identification No. 62900
Threats	Changed Water Regime (4)	, Degraded B	Buffer (4)		
Long-terr	n Improve flow regime by 20	21			
Conditior	Maintain or improve wetla	nd buffer by	2030		
Mai	nagement Outcome Targets	I	Management Activity/Output	Quantity	Lead agency/partner
PP.44	Improve condition of terrestrial	PP 44.1	Establish native indigenous	5 ha	GB CMA / DEPI /
	habitat		vegetation		Landowners
PP.45	Maintain or improve water	PP 45.1	Modify agricultural practice	50 ha	GB CMA / DEPI /
	quality from adjacent lands		change		Landowners
PP.46	Improved vegetation structure	PP 46.1	Control invasive pest plant	5 ha	GB CMA / DEPI /
	and diversity, control invasive		species (Non-woody)		Landowners
	flora				
PP.47	Environmental water program	PP 47.1	Management of flow releases -	Based on	GB CMA / DEPI /
	will target altered hydrology		deliver water to wetland at	seasonal	GMW /
	threat score		required timing	watering	Landowners
				plan (See	
				Chapter 4.3)	
Estimate	d cost of activities for Stockyard Pl	ain (62900)			\$150,000

Management Unit Productive Plains					
Basin	Broken	Broken Wetland Moodie Swamp			
Values	Significant Flora Wetland	(5), Important B	ird Habitats (5), Significant Birds (5)		67053
Threats	Degraded Buffer (3), Invas	ive Fauna (Terre	estrial) (3), Changed Water Regime (4)		
Long-tern	n Maintain or improve habi	at for significan	t birds by 2030.		
Condition	Maintain or improve wetl	and buffer by 20	30		
	Improve flow regime by 2	021			
Management Outcome Targets		Ma	nagement Activity/Output	Quantity	Lead agency/partner
PP.48	Improve condition of terrestrial habitat	PP 48.1	Establish native indigenous vegetation	10 ha	GB CMA / Parks Victoria / Landowners
PP.49	Maintain or improve water quality from adjacent lands	PP 49.1	Modify agricultural practice change	100 ha	GB CMA / GMW / Landowners
PP.50	Improved vegetation structure and diversity, control invasive flora	PP 50.1	Control invasive pest plant species (Non-woody)	10 ha	GB CMA / GMW / Landowners
PP.51 Environmental water program will target altered hydrology threat score		PP 51.1	Management of flow releases - deliver water to wetland at required timing	Based on seasonal watering plan (See Chapter 4.3)	GB CMA / GMW / Parks Victoria / Landowners
Estimate	d cost of activities for Moodie Sw	amp (67053)			\$300,000

Management Unit Productive Plains							
Basin	Goulburn	Waterway	Honeysuckle Creek (Stony Creek)		Identification No.		
Values	Aquatic invertebrate Com Vegetation Condition (3), Terrestrial (3) Flagship Spe	Aquatic invertebrate Community Condition (3), Community Groups (3), Native Fish (2), Riparian Vegetation Condition (3), Significant EVCs (5), Significant Fish Migratory (4), Significant Flora Terrestrial (3) Flagship Species (5)					
Threats	Bank Instability (5), Barrie	rs to fish migration	on (4), Degraded Riparian Vegetation (4	4), Increase in	State:		
	low flow magnitude (3), Ir	ivasive fauna aqu	iatic (5), Invasive fauna terrestrial (5), I	ivestock access	Sustainable		
	(3), Reduced Vegetation v	vidth (3)			Working		
Long-tern	n Riparian and floodplain ve	getation condition	on is maintained or improved by 2025				
Resource Condition	Populations of native fish	are maintained o	r improved by 2025				
Management Outcome Targets		Ma	nagement Activity/Output	Quantity	Lead agency/partner		
PP.52	Increase bank stability and reduce erosion and sediment input	PP 52.1	Establish earthworks (Armouring)	0.2 km	GB CMA		
PP.53	Improve vegetation structure and diversity throughout the reach	PP 53.1	Establish native indigenous vegetation	10 ha	GB CMA/ landowners/Land care		
PP.54	Manage livestock access in	PP 54.1	Construct riparian fence	5 km	GB CMA /		
	over 25% of waterway		Modify grazing regime	10 ha	Landcare / landowners		
	nontageo	PP 54.3	Establish management agreement	10 ha			
Estimated cost of activities for Honeysuckle Creek (5-22, 5-23, 5-76) \$237,000							

#### 7.4 UPLAND SLOPES

The Upland Slopes generate the largest proportion of the catchment's total water yield. Lake Eildon, which regulates the Goulburn River, is an important feature and contributes to agriculture and enhancing lifestyles in this area. The Goulburn River delivers a regulated supply of high quality water down the catchment. Waterways vary in their condition, with the Goulburn River considered to be in a poor state, largely due to regulation. Streams in the upland slopes are highly valued for recreation and tourism opportunities.

Recent bushfires threatened water quality in this area through erosion, sedimentation and residue processes. There are also a number of point sources of pollution (including township and lifestyle development).

Changes to flow and flood regimes that regulate rivers threaten native fish populations and floodplain dependent plant species. However this regulation also provides many values to the community, in terms of visitation, recreation and productive intensive farming.

Priority waterway assets include:

**Goulburn River:** a Heritage River that supports threatened species. It contains important cultural heritage sites, provides water for agriculture and urban townships, and supports recreational activities such as fishing and boating.

Hughes Creek and Holland Creek: support the threatened Macquarie perch.

Seven Creek: support the Trout cod.

**Broken River:** supports Macquarie perch population, recreational fishing and provides water for stock and domestic use.



#### Figure 7-3: Priority Waterways in the Upland Slopes SES

Management Unit		Upland Slope	s		
Basin	Broken	Waterway	Holland Creek		Identification No.
Values	Significant Fish Migratory	(5)			- 4-14
Threats	Threats         Bank Instability (4), Barriers to Fish Migration (4), Livestock Access (3), Reduced Vegetation           Width (3)				<b>State:</b> Sustainable Working
Long-ter	m Populations of native fish a	are maintained	or improved by 2025		U
Resource Conditio	e Riparian and floodplain ve	getation conditi	on is maintained or improved by 2025		
	Fish migration (open passa	age) is maintaine	ed or improved by 2025		
Management Outcome Targets		Ma	nagement Activity/Output	Quantity	Lead agency/partner
US.1	Manage livestock access in	US 1.1	Construct riparian fence	5 km	GB CMA /
	over 25% of waterway frontages	US 1.2	Modify grazing regime	5 ha	<ul> <li>Landcare / landowners</li> </ul>
	-	US 1.3	Establish management agreement	5 ha	_
US.2	Increase bed and bank stability at sites of active bank erosion	US 2.1	Establish earthworks (Armouring)	0.1 km	GB CMA
US.3	Increase in habitat availability – modify waterway structures obstructing fish passage	US 3.1	Modify waterway structure (Fishway)	2 (No.)	GB CMA
US.4	Assessment of fish populations	US 4.1	Undertake assessment of Macquarie perch (population and distribution)	1 (No.)	GB CMA / DEPI (ARI)
Estimated cost of activities for Holland Creek (4-14)					

	Management Unit Upland Slopes					
Basin	Goulbu	Goulburn Waterway Acheron River				Identification No.
Values	Aqua In	vert Community C	ondition (5), Ripa	arian Vegetation Condition (4)		- 5-62
Threats	Threats         Livestock Access (5), Loss of Instream Habitat (Large Wood) (4)					<b>State:</b> Ecologically Healthy
Long-ter	rm Maintai	n "Ecological Heal	thy Status"			
Conditio	ne Instream	n habitat is mainta	ained or improve	d by 2030		
Management Outcome Targets		Ma	nagement Activity/Output	Quantity	Lead agency/partner	
US.5	Increase in ha within instrea	bitat availability m zone	US 5.1	Install waterway structure (Large wood)	1 site	GB CMA
US.6	Manage livest	ock access in	US 6.1	Construct riparian fence	4 km	GB CMA /
over front	over 25% of w frontages	er 25% of waterway ontages	US 6.2	Modify grazing regime	8 ha	<ul> <li>Landcare / landowners</li> </ul>
			US 6.3	Establish management agreement	8 ha	_
			US 6.4	Modify agricultural practice change	50 ha	_
Estimated cost of activities for Acheron River (5-62)						\$160,000

Basin	Broken	Waterway	Broken River		Identification No.		
Values	Urban or Rural Township	Water Source	s (4), Water Storages (4), Significant Fish I	Migratory (5)	- 4-05 / 4-06		
Threats	Invasive Flora (Riparian) - Wood) (5), Reduced Ripar	Invasive Flora (Riparian) - Tree Layer (3), Livestock Access (3), Loss of Instream Habitat (Large Wood) (5), Reduced Riparian Connectivity (5), Reduced Vegetation Width (5)					
Long-terr Resource Conditior	m Riparian and floodplain ve : า	getation cond	lition is maintained or improved by 2025				
Mai	Management Outcome Targets Management Activity/Output Quantity				Lead agency/partner		
US.7	Manage livestock access in	US 7.1	Construct riparian fence	5 km	GB CMA /		
	over 25% of waterway frontages	US 7.2	Modify grazing regime	10 ha	<ul> <li>Landcare / landowners</li> </ul>		
		US 7.3	Establish management agreement	management 10 ha nt	_		
		US 7.4	Modify agricultural practice change	50 ha	_		
US.8	Improved vegetation structure and diversity throughout reach	US 8.1	Control invasive pest plant species (Woody)	10 ha			
US.9	Increase in habitat availability within instream zone	US 9.1	Install waterway structure (Large wood)	1 site	GB CMA		
Estimate	Estimated cost of activities for Broken River (4-05 / 4-06) \$240,000						

Management Unit Upland Slopes							
Basin		Goulburn	Waterway	Goulburn River		Identification No.	
Values		Native Fish (2), Riparian Ve Riparian (4), Significant Bir Recreational Fishing (5), La	egetation Condition ds Waterway (4), Indscape (3)	on (3), Significant Amphibians (1), Sigr , Significant EVCs (5), Non-Motor Boat	iificant Birds ing (3),	- 5-13 / 5-14	
Threats		Bank Instability (3), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian), Tree Layer (3), Livestock Access (5), Loss of Instream Habitat (Large Wood) (5), Loss of Instream Habitat (Sedimentation) (4), Reduced Vegetation Width (3)					
Long-terr	m	Heritage River values are n	naintained or imp	proved by 2025			
Resource Conditior	e – n	Riparian and floodplain ve	getation conditio	n is maintained or improved by 2025			
		Recreational values are ma	aintained or impr	oved by 2030			
Management Outcome Targets			Man	agement Activity/Output	Quantity	Lead agency/partner	
US.10	Manag	ge livestock access in	US 10.1	Construct riparian fence	5 km	GB CMA /	
	over 2 fronta	er 25% of waterway	US 10.2	Modify grazing regime	10 ha	<ul> <li>Landcare / landowners</li> </ul>	
			US 10.3	Establish management agreement	10 ha	_	
US.11	Improv and div	ved vegetation structure versity throughout reach	US 11.1	Control invasive pest plant species (Woody)	10 ha	GB CMA	
US.12	Improvindex (	ve the instream sub- (Large Woody Debris)	US 12.1	Install waterway structure (Large wood)	1 site		
US.13	Increa	se bank stability at zones	US 13.1	Establish earthworks (Armouring)	0.2 km	GB CMA	
	with active bank erosion (mainstream and tributary)		US 13.2	Establish native indigenous vegetation	5 ha	GB CMA / Landcare / landowners	
			US 13.3	Install waterway structure (Chute)	2 km	GB CMA	
			US 13.4	Control invasive pest animal	50 ha	Landcare /	
Estimated cost of activities for Goulburn River (5-13 / 5-14) \$705,000							

	Management Unit		Upland Slopes	Upland Slopes		
Basin	Goulburn	Waterway	Ford Creek / Brankeet Creek / Me	/ Brankeet Creek / Merton Creek Id		
Values	Urban or Rural Township V	Water Sources	(4)		— 5-73 / 5-74 / 5-75	
Threats	Threats Livestock Access (3)					
	Bank Instability (3), Livesto	ock Access (3),	Reduced Vegetation Width (3)		Sustainable Working	
Long-term Riparian and floodplain vegetation condition is maintained or improved by 2025 Resource Condition						
Management Outcome Targets		М	anagement Activity/Output	Quantity	Lead agency/partner	
US.14	Manage livestock access in	US 14.1	Construct riparian fence	4 km	GB CMA /	
	over 25% of waterway frontages	US 14.2	Modify grazing regime	8 ha	<ul> <li>Landcare / landowners</li> </ul>	
		US 14.3	Establish management agreement	8 ha	-	
		US 14.4	Modify agricultural practice change	50 ha	_	
US.15	Increase bank stability at zones	US 15.1	Establish earthworks (Armouring)	0.1 km	GB CMA	
	with active bank erosion (mainstream and tributary)	US 15.2	Establish native indigenous vegetation	8 ha	GB CMA / Landcare / landowners	
Estimated cost of activities for Brankeet / Merton system (5-73 / 5-74 / 5-75) \$19						

	Management Unit Upland Slopes							
Basin		Broken	Waterway	Broken River		Identification No.		
Values	Values Significant Fish Migratory (5), Significant Fish Non Migratory (5)							
Threats	Threats Barriers to Fish Migration (4), Increase in Low Flow Magnitude (3), Loss of Instream Habitat (Large Wood) (3)					<b>State:</b> Sustainable Working		
Long-tern	n	Improve flow regime by 20	)21					
Condition	י – ו	Instream habitat is mainta	ined or improved	by 2030				
	Populations of native fish are maintained or improved by 2025							
Mar	nageme	nt Outcome Targets	Man	agement Activity/Output	Quantity	Lead agency/partner		
US.16	Enviro impro threat	onmental water ving the flow magnitude t score	US 16.1	Deliver water regime, River reach	Based on seasonal watering plan (See Chapter 4.3)	GB CMA / GMW		
US.17	Increa addre obstru reach	ise in habitat available - ss waterway structures ucting fish passage in this	US 17.1	Investigate waterway structure (Fishway)	1 (No.)	GB CMA		
US.18	Impro index	ve the instream sub- (Large Woody Debris)	US 18.1	Install waterway structure (Large wood)	2 sites	GB CMA		
Estimate	Estimated cost of activities for Broken River (4-04) \$180.000							

N	lanagement Unit		Upland Slope	s			
Basin	Broken	Waterway	Lima East Creek		Identification No.		
Values	Aqua Invert Community Co	Aqua Invert Community Condition (5), Riparian Vegetation Condition (5)					
Threats	Invasive Fauna (Terrestrial	) (5)			State:		
					Ecologically		
					Healthy		
Long-term	Maintain "Ecological Healt	hy Status"					
Resource							
Condition							
Manage	ment Outcome Targets	Ma	inagement Activity/Output	Quantity	Lead		
interioge	inent outcome rargets		inagement Activity output	Quantity	agency/partner		
<b>US.19</b> Im	proved vegetation structure	US 19.1	Control invasive pest animal	50 ha	GB CMA /		
an	d diversity throughout reach		species (Terrestrial)		Landholder		
		US 19.2	Undertake regular assessments	50 ha	GB CMA /		
			of condition and presence of		Landholder		
			invasive pest plant species				
Estimated cost of activities for Lima East Creek (4-10)							

Management Unit Upland Slopes								
Basin	Broken	Waterway	Ryans Creek		Identification No.			
Values	Urban or Rural Township Wa Significant Birds Riparian (4), Significant Fish Non Migrato	Urban or Rural Township Water Sources (4), Water Storages (3), Significant Amphibians (5), Significant Birds Riparian (4), Significant Birds Waterway (4) Significant Fish Non Migratory (5)						
Threats	Invasive Fauna (Terrestrial) ( Invasive Fauna (Terrestrial) (	Invasive Fauna (Terrestrial) (5), Loss of Instream Habitat (Large Wood) (4) Invasive Fauna (Terrestrial) (5), Livestock Access (3), Reduced Vegetation Width (3)						
Long-terr	m Maintain "Ecological Healthy	' Status"						
Conditior	Riparian and floodplain vege	Riparian and floodplain vegetation condition is maintained or improved by 2025						
Mai	nagement Outcome Targets	Ma	nagement Activity/Output	Quantity	Lead agency/partner			
US.20	Improved vegetation structure and diversity throughout reach	US 20.1	Control invasive pest animal species (Terrestrial)	1 ha	Forest managers/ landowners / GB CMA			
US.21	Manage livestock access in over 25% of waterway frontages	US 21.1	Construct riparian fence	4 km	GB CMA / Landcare / landowners			
		US 21.2	Modify grazing regime	8 ha				
		US 21.3	Establish management agreement	8 ha				
Estimate	\$155,000							

	Management Unit		Upland Slop	es				
Basin	Broken	Waterway	Sawpit Gully and Bridge Creek		Identification No.			
Values	Urban or Rural Township V	Urban or Rural Township Water Sources (4)						
Threats	Bed Instability (Degradatio	Bed Instability (Degradation) (3), Livestock Access (3)						
Long-teri	m Riparian and floodplain veg	getation conditio	n is maintained or improved by 2025					
Condition	Water quality is maintained	Water quality is maintained or improved by 2030.						
	Protect and promote natur	al channel form	and dynamics					
Ma	nagement Outcome Targets	м	anagement Activity/Output	Quantity	Lead agency/partner			
US.22	Manage livestock access in	US 22.1	Construct riparian fence	10 km	GB CMA /			
	over 25% of waterway frontages	US 22.2	Modify grazing regime	20 ha	<ul> <li>Landcare / landowners</li> </ul>			
	Ū	US 22.3	Establish management agreement	20 ha	_			
		US 22.4	Modify agricultural practice change	160 ha	_			
US.23	Increase in bed and bank stability within the reaches with active bank erosion	US 23.1	Modify and install waterway structure (Pile fields / Chutes /Armouring)	2 km				
Estimated cost of activities for Sawpit Gully Bridge Creek system (4-11) \$290,000								

	Management Unit		Upland Slopes		
Basin	Goulburn	Waterway	Hughes Creek		Identification No.
Values	Significant Fish Non Migrator	ry (5)			- 5-38 / 5-39
Threats	Livestock Access (5), Loss of (Sedimentation) (3), Reduce	Instream Habitat d Vegetation Wic	(Large Wood) (3), Loss of Instream Ha dth (3)	abitat	<b>State:</b> Sustainable Working
Long-terr	n Populations of native fish are	e maintained or ir	mproved by 2025		
Resource Conditior	Riparian and floodplain vege	tation condition i	is maintained or improved by 2025		
	Protect and promote natural	l channel form an	id dynamics		
Management Outcome Targets Management Activity/Output Quantity					
US.24	Manage livestock access in	US 24.1	Construct riparian fence	20 km	GB CMA /
	frontages	US 24.2	Modify grazing regime	40 ha	<ul> <li>Landcare / landowners</li> </ul>
	J. J	US 24.3	Establish management agreement	40 ha	-
US.25	Increase in habitat availability within instream zone	US 25.1	Install waterway structure (Large wood)	3 sites	GB CMA
US.26	Identify sediment sources from key tributary streams and their fate.	US 26.1	Investigate the sources and fates of sediments	1 (No.)	GB CMA
US.27	Maintenance and management of sediment input from key tributary streams	US 27.1	Install waterway structure (Stabilisation of tributary streams)	2 km	GB CMA
US.28	Improved vegetation structure and diversity throughout reach	US 28.1	Establish native indigenous vegetation	20 ha	GB CMA / Landcare
US.29	Monitor population and distribution of Macquarie perch	US 29.1	Monitoring Plan Aquatic: Macquarie perch, Trout cod)	1 (No.)	GB CMA
Estimate	d cost of activities for Hughes Cree	ek (5-38 / 5-39)			\$1,190,000

	Management Unit		Upland Slo	pes			
Basin	Broken	Waterway	Five Mile Creek		Identification No.		
Values	Values Aquatic Invertebrate Community Condition (3), Community Groups (3), Game Hunting (5), Riparian vegetation Condition (5), Significant EVC's (5), Swimming (3), Flagship species (3)						
Threats	Invasive Fauna Aquatic ( Habitat Large Wood (2)	5), Invasive Faun	a Terrestrial (5), Livestock Access (3	), Loss of Instream	<b>State:</b> Ecologically Healthy		
Long-term	Maintain "Ecological Hea	althy Status"					
Resource Condition	Riparian and floodplain v	iparian and floodplain vegetation condition is maintained or improved by 2025					
	Instream habitat is main	tained or improv	ed by 2030				
Mana	agement Outcome Targets	Ma	anagement Activity/Output	Quantity	Lead agency/partner		
US.30	Manage livestock access in	US 30.1	Construct riparian fence	2 km	GB CMA /		
	over 25% of waterway frontages	US 30.2	Modify grazing regime	4 ha	<ul> <li>Landcare / landowners</li> </ul>		
		US 30.3	Establish management agreement	4 ha	_		
		US 30.4	Establish native indigenous vegetation	2 ha			
Estimated	Estimated cost of activities for Five Mile Creek (4-08) \$70,000						

#### 7.5 COMMUTING HILLS

The remaining extent of forest in the Commuting Hills SES contributes to healthy river ecosystems, which ideally provide constant yields of filtered high quality water down the catchment.

Threats to waterways in this SES largely relate to runoff and water quality.

Waterways are classified as being in good condition, however, water yield and quality has been influenced by recent bushfires. Invasive species, including European carp, also threaten water quality in this SES.

Priority waterways include:

**Goulburn River:** a Heritage River that supports high community values (including tourism, recreation and aesthetics.

King Parrot Creek and Yea River: supports populations of the threatened Macquarie perch.

Acheron River: environmental Site of Significance.

**Taggerty River:** contains ecologically healthy and representative reaches and supports the threatened Barred galaxias.

Mollisons Creek and Sunday Creek: supply of water for urban, stock and domestic uses.

#### Figure 7-4: Priority Waterways in the Commuting Hills SES



Management Unit				Commuting I	Hills	
Basin	sin Goulburn Waterway Mollisons Creek					Identification No.
Values		Urban or Rural Township \	Water Sources (4	l), Water Storages (3)		- 5-42 / 5-43
Threats	Threats         Degraded Water Quality (5), Livestock Access (5), Reduced Vegetation Width (3)					
Long-ter	m	Riparian and floodplain ve	getation condition	on is maintained or improved by 202	.5	
Resource Water quality is maintained or improved by 2030.						
Ma	inagem	ent Outcome Targets	Ma	nagement Activity/Output	Quantity	Lead agency/partner
CH.1	Mana	age livestock access in	CH 1.1	Construct riparian fence	15 km	GB CMA /
	over front	ver 50% of waterway rontages	CH 1.2	Modify grazing regime	30 ha	<ul> <li>Landcare / landowners</li> </ul>
		-	CH 1.3	Establish management agreement	30 ha	_
			CH 1.4	Modify agricultural practice change	160 ha	
СН.2	Impro and c	ove vegetation structure liversity throughout reach	CH 2.1	Establish native indigenous vegetation	5 ha	
Estimate	Estimated cost of activities for Mollisons Creek (5-42 / 5-43)					

	Management Unit		Commuting Hil	ls				
Basin	Goulburn	Waterway	King Parrot Creek		Identification No.			
Values	Significant Fish Migratory	(5)			- 5-51			
Threats	Livestock Access (5), Loss o	Livestock Access (5), Loss of Instream Habitat (Large Wood) (3), Reduced Vegetation Width (3)						
Long-tern	n Populations of native fish a	are maintained	or improved by 2025					
Resource Condition	Riparian and floodplain ve	getation condit	ion is maintained or improved by 2025					
	Instream habitat is mainta	ined or improve	ed by 2030					
Mar	nagement Outcome Targets	Ma	anagement Activity/Output	Quantity	Lead agency/partner			
CH.3	Manage livestock access in	CH 3.1	Construct riparian fence	5 km	GB CMA /			
	over 50% of waterway frontages	CH 3.2	Modify grazing regime	10 ha	<ul> <li>Landcare / landowners</li> </ul>			
	-	CH 3.3	Establish management agreement	10 ha	_			
CH.4	Increase in habitat availability within instream zone	CH 4.1	Install waterway structure (Large wood)	1 site	GB CMA			
CH.5	Improved vegetation structure and diversity throughout reach	CH 5.1	Control invasive pest plant species (Woody)	40 ha	GB CMA / Landcare / landowners			
CH.6	Monitor population and	CH 6.1	Develop and implement	1 (No.)	GB CMA, DEPI			
	distribution of Macquarie perch		Macquarie perch)		(AKI)			
Estimated	Estimated cost of activities for King Parrot Creek (5-51) \$650,000							

Management Unit		Commuting H	tills					
Basin		Goulburn	Waterway	Yea River		Identification No.		
Values		Significant Fish Migratory	(5)			— 5-55 and 5 - 56		
Threats		Barriers to Fish Migration Reduced Vegetation Width	(3), Livestock Ad n (3)	ccess (5), Loss of Instream Habitat (Larg	e Wood) (5)	<b>State:</b> Sustainable Working		
Long-ter	m	Populations of native fish a	are maintained	or improved by 2025				
Resource	e - n	Riparian and floodplain ve						
Contaition		Instream habitat is maintained or improved by 2030						
Ma	inageme	ent Outcome Targets	Ma	magement Activity/Output	Quantity	Lead agency/partner		
СН.7	Mana	ge livestock access in	CH 7.1	Construct riparian fence	10 km	GB CMA /		
	over 5 fronta	over 50% of waterway frontages	CH 7.2	Modify grazing regime	20 ha	<ul> <li>Landcare / landowners</li> </ul>		
			CH 7.3	Establish management agreement	20 ha			
CH.8	Increa withir	ase in habitat availability n instream zone	CH 8.1	Install waterway structure (Large wood)	1 site	GB CMA		
			CH 8.2	Investigate the management of high sediment sources and fates	1 (No.)	GB CMA		
СН.9	Impro and d	oved vegetation structure iversity throughout reach	CH 9.1	Establish native indigenous vegetation	15 ha	GB CMA / Landcare		
			CH 9.2	Control invasive pest plant species (Woody)	40 ha	GB CMA, DEPI		
CH.10	Monit distrik perch	tor population and oution of Macquarie	CH 10.1	Develop and implement Monitoring Plan (Aquatic: Macquarie perch)	1 (No.)	GB CMA, DEPI (ARI)		
Estimate	ed cost o	of activities for Yea River (5	-55 / 5-56)			\$1,070,000		

	Management Unit		Commuting Hil	ls			
Basin	Goulburn	Goulburn Waterway Goulburn River					
Values	Native Fish (2), Riparian Vegetation Condition (3), Significant Amphibians (1), Significant Birds Riparian (4), Significant Birds Waterway (4), Significant EVCs (5), Significant Fish Migratory (1), Significant Mammals (1), Non-Motor Boating (3), Landscape (3)						
Threats	Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) - Tree Layer (3), Livestock Access (5), St. Loss of Instream Habitat (Large Wood) (4), Loss of Instream Habitat (Sedimentation) (4), Highly I Reduction in High Flow Magnitude (3), Reduced Vegetation Width (4)						
Long-ter	m Improve flow regime by 20	021					
Conditio	Riparian and floodplain ve	getation conditi	on is maintained or improved by 2025				
	Heritage River values are r	maintained or in	nproved by 2025				
Management Outcome Targets Management Activity/Output Quan				Quantity	Lead agency/partner		
CH.11	Manage livestock access in	CH 11.1	Construct riparian fence	10 km	GB CMA /		
	over 40% of waterway	CH 11.2	Modify grazing regime	20 ha	- Landcare / landowners		
		CH 11.3	Establish management agreement	20 ha			
		CH 11.4	Modify agricultural practice change	320 ha	-		
CH.12	Increase in habitat availability within instream zone	CH 12.1	Install waterway structure (Large wood)	2 sites	GB CMA		
		CH 12.2	Investigate the management of high sediment sources and fates	1 (No.)	GB CMA		
CH.13	Improved vegetation structure and diversity throughout reach	CH 13.1	Establish native indigenous vegetation	5 ha	GB CMA / DEPI/ landowners		
		CH 13.2	Control invasive pest plant species (Woody)	20 ha	-		
		CH 13.3	Control invasive pest animal species (Terrestrial)	100 ha	-		
CH.14	Environmental water program will target altered hydrology threat score	CH 14.1	Deliver Water regime, River reach: Management of flow releases - Deliver water to river reach at required timing	Based on seasonal watering plan (See Chapter 4.3)	DEPI / GB CMA/ Parks NSW		
Estimate	Estimated cost of activities for Goulburn River (5-11 / 5-12) \$1,250,000						

	Management Unit		Commuting I	Hills				
Basin	Goulburn	Waterway	Sunday Creek		Identification No.			
Values	Urban or Rural Township	Urban or Rural Township Water Sources (4), Significant Fish Non Migratory (5)						
Threats	<b>State:</b> Sustainable Working							
Long-term	Long-term Riparian and floodplain vegetation condition is maintained or improved by 2025							
Condition	Water quality is maintain	ed or improved b	by 2030					
Man	agement Outcome Targets	Ma	nagement Activity/Output	Quantity	Lead agency/partner			
CH.15	Manage livestock access in over 40% of waterway	CH 15.1	Modify agricultural practice change	50 ha	GB CMA / local government /			
	frontages	CH 15.2	Establish management agreement	50 ha	landowners			
Estimated	cost of activities for Sunday Cre	ek (5-47)			\$50,000			

#### 7.6 SOUTHERN FORESTS

The Southern Forests contribute to healthy river ecosystems and provide constant yields of filtered high quality water. Waterways in this SES are considered to be in a good to excellent state.

This area supports several significant native fish species.

Increasing numbers of tracks for timber extraction and recreational activities intensifies erosion, resulting in reduced water quality. This results in increased sedimentation of waterways, destruction of fish habitat and changes to stream condition.

The current condition of wetlands is considered to be good. The major threats to wetlands are pest plant and animal invasion and soil erosion.

Priority waterways assets include:

**Goulburn River:** a Heritage River that is an ecologically healthy reach. Its tributaries support threatened species (Spotted Tree Frog and Alpine Bent).

**Rubicon River:** a priority river with near "Ecologically Healthy" status, supports Barred galaxias in tributary streams – Keppel Hut Creek, Pheasant Creek, Perkins Creek, Taggerty River, Torbreck River and Stanleys Creek.

Big River: a Heritage River and representative reaches that supports the threatened Spotted Tree Frog.

Howqua River: a Heritage River that has high economic values through tourism and recreation values.

**Alpine bogs** (National significance): areas that support the nationally threatened Alpine Sphagnum Bogs and associated fens ecological community.

**Central Highlands Peatlands** (DIWA listed): five separate sphagnum moss dominated bogs located along rivers and gullies in the Central Highlands.



#### Figure 7-5: Priority Waterways in the Southern Forests SES

	Management Unit		Southern Fore	sts	
Basin	Goulburn	Wetland	Big River		Identification No.
Values	Urban or Rural Townshi Significant Amphibians Landscape (3), Aqua Inv	p Water Sources (5), Non-Motor B rert Community C	(4), Riparian Vegetation Condition (5) oating (5), Recreational Fishing (5) condition (5)		- 5-67 / 5-68
Threats	Invasive Fauna (Terresti	rial) (5)			<b>State:</b> Ecologically Healthy
Long-ter Resourc Conditic	rm Maintain "Ecological He ce on	althy Status"			
Ma	anagement Outcome Targets	N	lanagement Activity/Output	Quantity	Lead agency/partner
SF.1	Improve protection of threatened native species (Amphibian)	SF 1.1	Control invasive pest animal species (Aquatic)	100 ha	Forest Managers / GB CMA
SF.2	Monitor the condition (Ecological Healthy)	SF 2.1	Develop and implement Monitoring Plan (Assessment of Invasive species)	1 (No.)	_
Estimate	ed cost of activities for Big River	(5-67 / 5-68)			\$70,000

	Management Unit		Southern Fores	sts	
Basin	Goulburn	Waterway	Howqua River		Identification No.
Values	Values Urban or Rural Township Water Sources (4), Aqua Invertebrate Community Condition (5), Riparian Vegetation Condition (4), Significant Amphibians (4), Non-Motor Boating (4), Becreational Fishing (5)				
Threats	Invasive Fauna (Terrestrial) (5), Livestock Access (3)				
Long-ter	m Riparian and floodplain ve	getation condit	ion is maintained or improved by 2025		
Resource Conditio	Recreational Values are m	aintained or im	proved by 2030.		
Ma	nagement Outcome Targets	м	anagement Activity/Output	Quantity	Lead agency/partner
SF.3	Manage livestock access in	SF 3.1	Construct riparian fence	2 km	GB CMA /
	over 25% of waterway frontages	SF 3.2	Modify grazing regime	4 ha	<ul> <li>Landcare / landowners</li> </ul>
	-	SF 3.3	Establish management agreement	4 ha	_
SF.4	Improved riparian vegetation structure and diversity throughout reach	SF 4.1	Establish native indigenous vegetation	10 ha	GB CMA / Landcare
SF.5	Improved instream vegetation structure and diversity	SF 5.1	Control invasive pest animal species (Aquatic)	100 ha	GB CMA / landowners
	throughout reach	SF 5.2	Control invasive pest plant species (Woody)	10 ha	GB CMA / landowners
		SF 5.3	Establish assessment of invasive species	1 (No.)	GB CMA
Estimated cost of activities for Howqua River (5-69 / 5-70)					\$140,000

Ma	anagement Unit		Southern Fores	sts			
Basin	Goulburn	Waterway	Goulburn River		Identification No.		
Values	Urban or Rural Township V Condition (5), Riparian Veg Game Hunting (5), Non-Me	Urban or Rural Township Water Sources (4), Water Storages (5), Aqua Invert Community Condition (5), Riparian Vegetation Condition (4), Significant Fish Migratory (5), Camping (4), Game Hunting (5), Non-Motor Boating (4), Recreational Fishing (5), Sightseeing (5)					
Threats	Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) - Shrub Layer (4)				<b>State:</b> Ecologically Healthy		
Long-term Improve flow regime by 2021							
Condition	Riparian and floodplain vegetation condition is maintained or improved by 2025						
	Heritage River values are r	naintained or imp	proved by 2025				
Management	Outcome Targets	Management A	Activity/Output	Quantity	Lead agency/partner		
SF.6 Imp and	proved vegetation structure diversity throughout reach	SF 6.1	Control invasive pest plant species (Woody)	5 ha	GB CMA/ Parks Victoria /DEPI /		
		SF 6.2	Control invasive pest animal species (Terrestrial)	200 ha	Forests/Local Government		
		SF 6.3	Establish assessment of invasive species	1 (No.)			
Estimated cos	Estimated cost of activities for Goulburn River (5-15 / 5-16) \$325,000						

Management Unit Southern Forests							
Basin	Goulburn	Waterway	Delatite River		Identification No.		
Values	Urban or Rural Township V Riparian Vegetation Condi	ban or Rural Township Water Sources (4), Significant Fish Migratory (5), parian Vegetation Condition (4)					
Threats	Threats Barriers to Fish Migration (3), Invasive Flora (Riparian), Tree Layer (3), Livestock Access (3), Loss of Instream Habitat (Large Wood) (5), Reduced Vegetation Width (3) Invasive Fauna (Terrestrial) (5)						
Long-teri	m Water quality is maintaine	d or improved b	y 2030				
Condition	Riparian and floodplain ve	getation condition	on is maintained or improved by 2025				
	Recreational values are m	aintained or imp	roved by 2030				
Ma	nagement Outcome Targets	Mai	nagement Activity/Output	Quantity	Lead agency/partner		
SF.7	Manage livestock access in	SF 7.1	Construct riparian fence	5 km	GB CMA /		
	over 25% of waterway frontages	SF 7.2	Modify grazing regime	10 ha	<ul> <li>Landcare / landowners</li> </ul>		
		SF 7.3	Establish management agreement	10 ha	_		
SF.8	Improved riparian vegetation structure and diversity	SF 8.1	Establish native indigenous vegetation	5 ha	GB CMA / Landcare /		
	throughout reach	SF 8.2	Establish assessment of invasive species	1 (No.)	landowners		
SF.9	Improved instream vegetation structure and diversity throughout reach	SF 9.1	Control invasive pest plant species (Woody)	10 ha	GB CMA		
SF.10	Increase habitat available with no waterway structures obstructing fish passage in this reach	SF 10.1	Install waterway structure (Fishway)	1 (No.)	GB CMA		
SF.11	Increase in habitat availability within instream zone	SF 11.1	Install waterway structure (Large wood)	2 sites	GB CMA		
Estimate	d cost of activities for Delatite Riv	er (5-71 /5-72)			\$ 640,000		

Ma	nagement Unit		Southerr	n Forests		
Basin	Goulburn	Waterway	Taggerty River		Identification No.	
Values	Aqua Invert Comm	unity Condition (5), Ripa	rian Vegetation Condition (4)		- 5-64	
Threats	Loss of Instream Ha	bitat (Large Wood) (3)			<b>State:</b> Ecologically Healthy	
Long-term	Maintain "Ecologica	al Healthy Status"			,	
Resource Instream habitat is maintained or improved by 2030						
Managem	nent Outcome Targets	s Mar	agement Activity/Output	Quantity	Lead agency/partner	
SF.12 Mor	SF.12 Monitor status and condition					
Estimated cost of activities for Taggerty River (5-64) \$ (see maintenance)						

Ma	anagement Unit		Souther	n Forests	
Basin	Goulburn	Waterway	Acheron River		Identification No.
Values	Aqua Invert Comm	unity Condition (5), Ripa	arian Vegetation Condition (5)		- 5-63
Threats	Loss of Instream H	abitat (Large Wood) (3)			<b>State:</b> Ecologically Healthy
Long-term	Maintain "Ecologic	al Healthy Status"			
Resource Condition	.e Instream habitat is maintained or improved by 2030				
Manager	nent Outcome Target	s Mai	nagement Activity/Output	Quantity	Lead agency/partner
SF.13 Mo	nitor status and condi	tion			
Estimated cost of activities for Acheron River (5-63) \$ (see mainter					(see maintenance)

Management Unit		Southern Forests				
Basin	Goulburn	Wetland	Central Highland Peatlands and	Alpine Bogs	Identification No.	
Values	Significant EVCs (5)				– СНР / АВ	
Threats	Degraded buffer (5), Invas	Degraded buffer (5), Invasive Fauna (Terrestrial) (5), Invasive Flora (Riparian) (5)				
Long-term Wetland Condition is maintained or improved by 2025 Resource Condition						
Management Outcome Targets Management Activity/Output Quantity			Quantity	Lead agency/partner		
SF.14	Improved vegetation structure and diversity throughout reach	SF 14.1	Control invasive pest plant species (Woody)	500 ha	DEPI (Region) / Forest Managers /	
		SF 14.2	Implement the Victorian Alpine Peatlands Spatial Action Plan	100 ha	GB CMA/TCAC/ Parks Victoria /	
SF.15	Monitor the condition (Ecological Healthy)	SF 15.1	Refine and implement Monitoring Plan: Assessment of Invasive Species	1 (No.)	Alpine Resort Management Boards	
Estimate	Estimated cost of activities for Central Highland Peatlands and Alpine Bogs (CHP/AB) \$1,000,000					

	Management Unit Southern Forests					
Basin	Goulburn	Waterway	Rubicon River		Identification No.	
Values	Aqua Invertebrate Con Pre-European Indigenc Significant Birds (Wate	nmunity Conditio ous Heritage (5) R rway) (4), Flagsh	n (5), Beside Water Activities (5) Hydro E epresentative River (5), Significant Birds ip Species (5)	lectricity (5), (Riparian) (4),	- 5-65	
Threats	ThreatsInvasive Fauna (Aquatic) (5), Invasive Flora (Riparian) (3), Livestock Access (5), Loss of InstreamHabitat (4) , Reduced Vegetation Width (3),					
Long-ter	rm Maintain "Ecological H	ealthy Status"				
Conditio	Instream habitat is ma	ntained or impro	ved by 2030			
	Riparian and floodplain vegetation condition is maintained or improved by 2025					
Management Outcome Targets		Π	/anagement Activity/Output	Quantity	Lead agency/partner	
SF.16	Monitor the condition (Ecological Healthy)	SF 16.1	Develop and implement Monitoring Plan (Assessment of Invasive species)	1 (No.)	GB CMA / DEPI	
		SF 16.2	Develop and implement Monitoring Plan (Assessment of Stream Condition)	1 (No.)	GB CMA / DEPI	
SF.17	Improved vegetation structur and diversity throughout read	e SF 17.1 :h	Construct riparian fence	2 km	GB CMA / landowners	
		SF 17.2	Control invasive pest plant species (Woody)	2 ha	GB CMA / landowners	
		SF 17.3	Establish native indigenous vegetation	4 ha	GB CMA / riparian landowners	
SF.18	Increase habitat availability within the stream zone	SF 18.1	Install waterway structure (Large wood)	1 site	GB CMA / Fisheries (DEPI)	
Estimate	Estimated cost of activities for Rubicon River (5-65) \$152,000					

#### 7.7 URBAN CENTRES

Historically our urban areas and satellite townships were built near or in close proximity to waterways. Waterways were a focal point for development because they provided water, food and recreation resources.

Waterways in urban areas provide a range of environmental, social and economic values (Table 7-1). Urban areas also present a threat to some of the values we associate with waterways.

Table 7-1: Values and Threats within Urban Waterways

Values		Threats (direct)
Social		
	Recreational fishing	Channel modification
	Non-Motor boating	Removal of Large woody debris
	Motor boating	Development
	Camping	Water discharge
	Swimming	Waste discharge
	Walking, hiking, cycling	Removal/modification of native vegetation
	Sightseeing	Litter
	Picnics/barbecues	Weeds
	Pre-European (Indigenous)	
	Post-European landscape	
	Community groups	
Econom	ic	
	Urban/Rural township water sources	
	Wastewater discharges	

#### 7.7.1 MANAGEMENT ARRANGEMENTS

The GB CMA and in some areas, local councils, are the managers of urban sections of waterways within the Goulburn Broken region (DSE 2012). Strategic planning documents that influence the management of waterways in regional urban areas include:

- **GB CMA Waterway Strategy**: Management activities to improve the condition of priority waterways in urban areas are identified in this Strategy (see Chapter 4).
- **GB CMA Regional Floodplain Management Strategies**: CMAs are also responsible for floodplain management and have previously developed Regional Floodplain Management Strategies.
- Local Stormwater Plans: Local councils are responsible for managing stormwater and drainage infrastructure in urban areas. In undertaking waterway management actions in regional urban areas, CMAs have previously relied on strong partnerships, cost-sharing arrangements and goodwill from local government and other partners.
- Urban Waterway plans: In partnership with the community some local governments together with the local Catchment Management Authority, have developed a management plan for urban waterways (see section 7.7.2).

#### 7.7.2 URBAN WATERWAYS IN THE REGION

A number of townships surround or run parallel to key waterway systems throughout the Goulburn Broken region.

The township and waterway interface creates a separate set of circumstances with respect to waterway management; social and economic values are heightened and direct threats to waterway values are increased.

Urban waterways within priority waterways are shown in Table 7-2.

#### 7.7.3 ISSUES

A number of key threats are evident within Urban Waterways, these are grouped under the following key issues:

- Stormwater management;
- Recreation and open space planning;
- Water reuse planning and implementation; and
- Urban encroachment.

Waterways in urban centres have been highly modified to accommodate development and built infrastructure. Water is extracted from the rivers for consumptive use and waste and storm water is discharged. Waste water is treated prior to discharge, but often stormwater is not.

Waterways are a major feature of urban centres but are under stress from numerous threats associated with high density living, such as gross and diffuse pollutants, flood mitigation works that change flows, water weeds and European carp, all of which reduce the quality of water.

Pollutants change the chemistry of water which in turn affects fish populations and the food resources they rely on.

# 7.7.4 STRATEGIC SUPPORT AND RECOMMENDED STRATEGIES

The Municipal Association of Victoria (MAV) strongly supports consultation with local government to investigate incentives for local government and household interventions to retain, use and infiltrate urban stormwater runoff through capital works programs. The MAV understands current issues around the regulatory uncertainty of stormwater ownership will be considered through the review of the *Water Act 1989*. Therefore, this

#### RiverConnect

More and more Shepparton and Mooroopna residents are enjoying their stunning riverine environment because of the RiverConnect project.

RiverConnect links the goodwill and energy of many and varied groups and individuals, enhancing existing activities and creating the opportunity to develop bigger, whole of community projects.

People from vastly different backgrounds are interacting through educational, recreational, artistic, cultural heritage and environmental activities.

RiverConnect resulted from a ground swell in understanding that the time had come to embrace the Goulburn and Broken Rivers and the opportunities they present. The RiverConnect vision is for the riverine environment to be the heart and soul of Shepparton and Mooroopna.

RiverConnect working groups on Education, Aboriginal Participation, Land Management and Communication involve more people in implementing detailed actions listed in the RiverConnect Strategic Plan, which was prepared in 2011 after extensive community consultation.

Eighteen of the nineteen schools in the RiverConnect area have adopted a reach and thousands of students participate in activities on the banks of the Goulburn and Broken Rivers each year.

should be considered as part of the implementation of this action, as well as greater information about the economic rationalisation of various stormwater reuse projects, including maintenance costs.

The MAV supports the extension of water performance standards to other types of development in Victoria. However, Clause 56.07 of the Victorian Planning Provisions, which currently applies to residential subdivisions, is not without its challenges and requires review before being transposed to other types of development. This Strategy does not address the management of domestic onsite waste systems, which is largely the responsibility of local government. Domestic wastewater management has been a significant recent issue for councils; in particular the role of councils in onsite domestic wastewater management in open potable water supply catchments. New potable guidelines are expected to be released shortly by the Victorian Government. These guidelines will increase the requirements of councils in domestic wastewater management planning.

The MAV strongly believes that this Strategy is an opportunity to improve the integration of agencies involved in domestic wastewater management for improved water quality outcomes, to avoid repetition in legislated roles.

Waterway corridors in the catchment of the Goulburn and Broken Rivers are important assets that are threatened by urbanisation. In particular, Plan Melbourne (2014) identifies areas around Kilmore and Broadford as new growth areas for Melbourne. Melbourne Water has developed guidelines to protect waterway corridors in greenfield development areas. The Goulburn Broken CMA will adopt Melbourne Water's guidelines for waterway corridors and incorporate them into the CMA best practice guidelines for land use and planning.

Township	Social Ecological System	Waterway	Existing Management Plans
Shepparton	Agricultural Floodplains	Goulburn River	Urban Land Use Study
Mooroopna Shepparton	Agricultural Floodplains	Broken River	<ul> <li>Shepparton-Mooroopna Stormwater Quality</li> <li>Strategy prepared for City of Greater</li> <li>Shepparton - February 1999</li> </ul>
Nathalia	Agricultural Floodplains	Broken Creek	_
Numurkah	Agricultural Floodplains	Broken Creek	_ Stormwater Strategy for Moira Shire Council
Katamatite	Agricultural Floodplains	Broken Creek	
Murchison	Productive Plains	Goulburn River	
Benalla	Productive Plains	Broken River	Lake Benalla Riverine Trail and Waterway Management Plan
			Stormwater Strategy for Benalla Rural City
Nagambie	Productive Plains	Lake Nagambie	Land and On-Water Management Plan 2012
Tungamah	Productive Plains	Boosey Creek	Boosey Creek Management Plan
Avenel	Productive Plains	Hughes Creek	
Seymour	Commuting Hills	Goulburn River	Stormwater Strategy for Mitchell Shire
Molesworth /Thornton	Commuting Hills	Goulburn River	
Broadford	Commuting Hills	Sunday Creek	
Broadford	Commuting Hills	Dry Creek	
Kilmore	Commuting Hills	Kilmore Creek	
Yea	Commuting Hills	Yea River	

#### Table 7-2: Existing Management Plans for waterways in urban centres

#### 7.7.5 PRIORITY ACTIONS FOR URBAN CENTRES

The following table details priority actions; the timeframe for implementation and the responsible agency, authority or group.

Action	Timeframe	Responsibility
Encourage and support local government in the development and implementation of urban waterway plans	2014-2022	GB CMA, Local Government, Community Interest Groups
Provide protection to urban waterways in planning schemes	2014-2022	Local Government
Support urban waterway community actions and activities	2014-2022	Local Government, GB CMA, Community
Incorporate Melbourne Water Corporation (MWC) waterway corridor guidelines in the CMA best practice guidelines for land use and planning	2014-2022	Local Government, GB CMA

#### 7.8 ASSUMPTIONS

The assumptions underpinning the link between Implementation Targets and Management Outcomes is derived from:

- conceptual models (from GHD, 2011) that will provide consistent assumptions about the relationships between values and threats and the management activities required to reduce threats to values;
- evidence used to determine the confidence rating for association values (from Doeg, 2009) between values and threats; and
- assumptions developed by the GB CMA over the life of the previous River Health Strategy (see Table 7-3).

Implementation Strategy	Assumption	Outcomes	Link to KPIs		
Environmental Water					
Waterways with negotiated environmental flow regimes	Increase the Hydrology ISC rating. Influence instream habitat and aquatic life.	Number of river reaches with improved environmental flow regimes.	Number of river reaches and wetlands with water managed to meet environmental objectives. Number of reaches with water improved floodplain connectivity.		
Management of Riparian Land					
Kilometres of riparian land subject to weed management	Improve riparian flora and fauna diversity. Promote the regeneration of native species.	Additional area and length of habitat improved – riparian.	Hectares managed for pest plant and animals.		
	Protect significant riparian flora and fauna species.				
	Promote aquatic biodiversity and habitat.				

Implementation Strategy	Assumption	Outcomes	Link to KPIs
	Improve water quality, particularly dissolved oxygen and temperature.		
Management of riparian land	Improve Streamside Zone ISC rating over 50% of the length of reach under management. Improve water quality, particularly nutrients, by providing a buffer to filter nutrient input to streams and wetlands. Specifically: reduce total phosphorous inputs by 2.5-6.5 kg/km/yr.	Additional area and length of habitat improved – riparian. Estimated reduction in phosphorous. Estimated reduction in sediment.	Kilometres of riparian fencing / ha of fenced wetlands. Hectares covered by management agreements (Number of management agreements).
Replanting of indigenous vegetation (ha)	Maintain Streamside Zone ISC rating in 50% of reaches under management over the period of the Strategy.		Hectares of indigenous revegetation.
Weed suppression and control (aquatic)	Improve riparian flora and fauna diversity, promote the regeneration of native species.	Improve riparian flora and fauna diversity, promote the regeneration of native species.	Kilometres managed for pest plant and animals.
Management of the Chann	el		
Modify barriers	Improve native fish community values within all stream reaches upstream of the barrier to the next barrier in the system.	Additional length of fish passage provided.	Kilometres opened for native fish passage.
Sites subject to bed and bank stabilisation	Maintain Physical Form ISC rating.	Estimated reduction in phosphorous.	Kilometres treated for soil erosion.
	Reduce sediment mobilisation from the banks. Specifically: reduce fine and coarse sediment mobilisation from bank profile by 60-612 t/km/yr and reduce total phosphorous inputs by 15-153 kg/km/yr.	Estimated reduction in sediment.	
No of sites with improved instream habitat		Length of instream habitat improved.	Kilometres of instream habitat established.
Works on waterways			Number of permits processed and planning referrals received

Implementation Strategy	Assumption	Outcomes	Link to KPIs	
Water quality/savings				
No. of reaches with water quality improvements		Estimated reduction in phosphorous, sediments etc.	Number of reaches with water quality improvements.	
Other				
No. of plans developed for rivers and creeks of high social value		Additional area and number of NRM group action plans developed and being implemented.		
No. reaches with community programs/ engagement initiatives	Increase regional community understanding and knowledge about river health issues.		Number of waterways with local Action Plans.	
	Encourage greater community involvement in river management and restoration.		Number of community groups supported.	
Monitoring			Number of sites monitored for asset condition.	

### 7.9 OUTCOMES BY SES/LANDSCAPE

High-level (20 year) goals for waterways in the region for each priority waterway, together with Management Targets and Management Activity are described in the previous Chapter. High-level outcomes by Social Ecological System/Landscape are presented in Table 7-4.

#### Table 7-4: Outputs (by Social Ecological System) 2014-2022

High level outcomes		Agricultural Floodplains	Productive Plains	Upland Slopes	Commuting Hills	Southern Forests
no. sites with instream habitat established	KPI 1	8	11	8	4	3
no. of fish barriers addressed	KPI 2	2	8	2	0	1
km of riparian fencing	KPI 3	13	41	59	40	9
ha of fenced wetlands	KPI 4	0	0	0	0	0
ha of indigenous vegetation	KPI 5	90	93	35	25	19
ha managed for pest plants		3550	750	20	100	527
ha managed for pest animals	KPI 6	2620	640	101	100	400
km treated for soil erosion	KPI 7	0.4	0.6	6.4	0	0
no. reaches with water managed to meet environmental objectives	KPI 8	9	5	1	2	0
no. wetlands with water managed to meet environmental objectives	iu ro	11	2	0	0	0
no. sites monitored for asset condition	KPI 9	0	0	0	0	2
no. of community groups supported	KPI 10	6	0	0	0	0
ha covered by management agreements	KPI 11	12	112	113	130	14
no. permits processed and planning referrals received (pa)	KPI 12			850		
ha modified grazing regime		5	147	113	80	14
no. ecological monitoring projects		1	1	2	2	7
no. strategies / management or recovery plans		4	0	0	0	0
no reaches with improved floodplain connectivity		3	0	0	0	0
ha of agricultural practice change		1390	1210	310	530	0

Outcomes in Table 7.4 (above) were established based on current forward funding estimates. One-off and maintenance activities are not included.



Boosey Creek Tungamah (GB CMA); Broken River upstream of Lake Nillahcootie (GB CMA); Catchment resilience Buxton (GB CMA); Dry wetland Broken River floodplain (GB CMA); Field Monitoring (GB CMA); Lake Benalla pest plant encroachment (GB CMA); Hughes Creek Rock Pool (J and L Dalziel)