

2. Development of the RRHS Addendum

2.3 Revision of 5-Year Implementation Targets

The overall 5-year Implementation Targets from the RRHS are similar for the RRHS Addendum period (i.e. Water Plan 2). The exceptions are the 5-year targets for 'kilometres of riparian land subject to weed management', that were doubled for the Addendum. Doubling of the weed management target reflects the relative increase in budget for weed management in the Water Plan 2 period compared to the Water Plan 1 period. A summary of assumptions for extending targets to cover the Water Plan 2 period on a program by program basis is given below. It is important to note that individual Management Unit targets are indicative only and that of greatest importance is the achievement of the overall 5-year Implementation Targets.

1. Channel Form Target – 'Number of sites subject to bed and bank stabilisation'

There is a total of 55 actions specifically relating to bed and bank stabilisation that are a 'very high' or 'high' priority for Channel Form works within the Addendum period. These actions comprise the 5-year Addendum period Channel Form target (see table below) and assume that at least one site will require Channel Form works for every investigation of bed and bank stability issues. Management Unit targets for Channel Form actions were determined based on the number of actions that refer to 'bed' and/or 'bank' stabilisation works.

Management Unit	Sub Management Unit	Action
1 Corhanwarrabul, Monbulk & Ferny Creeks	Dandenong Ranges	Identify extent of localised bed erosion issue and implement appropriate management solutions
2 Corhanwarrabul, Monbulk & Ferny Creeks	Monbulk	Implement priority actions to address bed and bank stability as identified in the Waterway Activity Plan (in prep) especially downstream of Monbulk Creek Retarding Basin
3 Lower Dandenong Creek	Mile Creek	Investigate extent of bed stability issue and identify appropriate management solutions
4 Middle Dandenong Creek	Dandenong Creek Middle	Continue to investigate extent of bed and bank erosion issues and implement appropriate management solutions
5 Deep Creek Lower	Konagaderra	Undertake bank stabilisation works recommended in Condina et al. (2002)
6 Deep Creek Upper	Deep Upper	Investigate bed and bank stability issues and implement priority actions recommended in Condina et al. (2000)
7 Deep Creek Upper	Boyd Lower	Investigate bank stability issues and implement priority actions recommended in Condina et al. (2000)
8 Deep Creek Upper	Boyd	Investigate and implement erosion and siltation controls
9 Jacksons Creek	Jacksons Middle	Investigate extent of bed and bank erosion problem and create appropriate management solutions
10 Jacksons Creek	Riddells Lower/Sandy	Investigate bed and bank stability issues and implement priority actions recommended in Condina et al. (2000)
11 Maribyrnong River	Maribyrnong Gorge	Investigate and monitor the extent of localised bank erosion and implement appropriate management solution
12 Maribyrnong River	Maribyrnong Lower	Investigate and monitor the extent of localised bank erosion and implement appropriate management solution
13 Steele	Steele	Undertake bank stabilisation works as outlined in the waterway activity plan
14 Lerderderg River	Goodman Lower	Investigate bank erosion issues and implement priority actions recommended in Condina et al. (2000)
15 Middle Werribee	Myrniong	Investigate bed and bank stability issues and implement priority actions recommended in Condina et al. (2000)
16 Middle Werribee	Toolern	Investigate bed and bank stability issues and implement priority actions recommended in Condina et al. (2000)
17 Middle Werribee	Korkuperimmul	Investigate bed and bank stability issues and implement priority actions recommended in Condina et al. (2000)
18 Middle Werribee	Djerriwarrh Forest	Investigate bed and bank erosion issue and implement priority actions recommended in Condina et al. (2000)
19 Parwan Creek	Upper Parwan & Spring	Investigate extent of bed and bank erosion issue and identify appropriate management solutions
20 Upper Werribee	Korweinguboora	Investigate bank erosion issues and implement priority actions recommended in Condina et al. (2000)

Management Unit	Sub Management Unit	Action
21 Upper Werribee	Pykes Reservoir	Investigate bank erosion issues and implement priority actions recommended in Condina et al. (2000)
22 Upper Werribee	Dale	Investigate bed and bank erosion issues and implement priority actions recommended in Condina et al. (2000)
23 Bass	Bass Upper	Implement bed erosion control as recommended in the SKM study in tributaries upstream of Poowong
24 Cardinia, Toomuc, Deep and Ararat	Upper Cardinia	Investigate the extent of localised bed erosion and excess sandy sediment supply and implement appropriate management solutions
25 Cardinia, Toomuc, Deep and Ararat	Toomuc Creek	Investigate the extent of bank erosion and implement appropriate management solutions
26 Cardinia, Toomuc, Deep and Ararat	Cardinia/Gum Scrub	Implement appropriate management solutions as outlined in the Cardinia Creek Geomorphology study (GHD 1998), particularly sedimentation control on Cardinia Creek
27 Cardinia, Toomuc, Deep and Ararat	Ararat Creek	Investigate the extent of localised bed (and bank) erosion in the lower Ararat (and Bessie) Creek and implement key actions proposed in Brizga et al, 2002
28 Cardinia, Toomuc, Deep and Ararat	Deep Creek S.E.	Investigate the extent of localised bank erosion from stormwater inputs and implement appropriate management solutions
29 French and Phillip Islands	Phillip Island	Investigate options for stabilisation of Whalehead Creek adjacent to Kitty Miller Wetlands
30 Lang Lang River	Minnieburn/O'Mahoney's	Identify priority actions in the Geomorphology Study, 1998 to address localised bank and bed erosion
31 Lang Lang River	Lang Lang	Implement priority actions from geomorphic study (in prep) to address bed and bank erosion to aid in the reduction of sediment loads to Western Port
32 Lang Lang River	Lang Lang Lower	Investigate actions from the Geomorphology study 1998, to assess feasibility of reducing peak flows through upstream measures and potential to re-engage floodplain
33 Lang Lang River	Lang Lang Lower	Implement priority actions from the Geomorphological study (in prep) to address bank and bed erosion to aid with the reduction in sediment loads to Westernport Bay
34 Lower Bunyip	Bunyip Lower	Implement recommendations from the Westernport Sediment Study 2003 and Bunyip Main Drain Improvement Works Plan to stabilise the Lower Bunyip River
35 Lower Bunyip	Yallock/King Parrot/Musk	Implement priority actions in the Bunyip River Geomorphological study, 1998, to address localised bed erosion
36 South Eastern Peninsula Rivers & Creeks	Main	Investigate extent of localised bed and bank erosion issues and implement priority actions identified in Condina and Craigie 1998
37 South Eastern Peninsula Rivers & Creeks	Manton	Investigate the extent of localised bed erosion and implement priority actions in Condina and Craigie, 1998
38 South Eastern Peninsula Rivers & Creeks	Merricks/Coolart/Stony	Investigate extent of localised bed and bank erosion issues and implement priority actions identified in Condina and Craigie 1998
39 Tarago	Tarago River	Implement key actions from the Westernport Sediment Study, 2003 to reduce the sediment source entering Westernport Bay including treating localised erosion
40 West Peninsula Rivers and Creeks	Tanti	Investigate extent of localised bank erosion issue and identify appropriate management solutions
41 West Peninsula Rivers and Creeks	Balcombe	Investigate the extent of localised bank and bed erosion and implement appropriate management solutions
42 Darebin Creek (Rural)	Darebin Creek Rural	Undertake Channel Form works in accordance with recommendations of Darebin Creek Waterway Management Activity Plan and as per Drainage Schemes
43 Darebin Creek (Urban)	Darebin Creek Lower	Undertake Channel form works in accordance with recommendations of Moonee Ponds, Atwood and Yuroke Creeks Waterway Management Activity Plan
44 Diamond Creek (Rural)	Arthurs/Running Creek	Implement priority actions in Waterway Activity Plan to address bed and bank stability issues at key reach sites
45 Diamond Creek (Rural)	Diamond Creek Lower	Implement priority actions in Waterway Activity Plan to address bed and bank stability issues at key reach sites

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Management Unit	Sub Management Unit	Action
46 Diamond Creek (Rural)	Diamond Creek Upper	Implement priority actions in Waterway Activity Plan to address bed and bank stability issues at key reach sites
47 Gardiners	Gardiners Creek	Identify extent of localised bank erosion and implement appropriate management solutions
48 Merri Creek (Urban)	Merri Creek Lower	Implement actions to address bed erosion as proposed in the Merri Creek Waterway Management Activity Plan (in prep)
49 Moonee Ponds	Moonee Ponds Lower	Undertake Channel form works in accordance with recommendations of Moonee Ponds, Atwood and Yuroke Creeks Waterway Management Activity Plan
50 Mullum Mullum	Mullum Mullum	Implement priority activities to address bed and bank erosion as identified in the Waterway Activity Plan
51 Olinda Creek	Olinda Creek	Continue to implement priority actions to address bed and bank erosion in the Olinda Creek Waterway Activity Plan
52 Plenty River (Rural and Lower)	Plenty River Upper	Implement bed and bank restoration actions identified in the geomorphological studies of Barbers Creek and Bruces Creek
53 Steels and Pauls Creek (rural)	Steels Creek	Continue to implement erosion control strategies to address bed and bank erosion as outlined in the geomorphologic study for this sub management unit
54 Steels and Pauls Creek (rural)	Pauls Creek	Investigate the extent of bed and bank erosion and implement appropriate management solutions
55 Lower Dandenong Creek	Patterson River	Investigate the extent of bank erosion and implement appropriate management solutions in Lower Paterson River downstream of Mornington Peninsula Freeway

2. Riparian Management Targets – ‘Area of streamside land under management agreements’, ‘Length of streamside land revegetated’, ‘Kilometres of riparian land subject to weed management’

The overall Riparian Management targets for the region for the Addendum period were based on the RRHS 5-year Implementation targets. The key difference was that the Addendum period targets for ‘kilometres of riparian land subject to weed management’ were doubled. Riparian Management targets for each Management Unit were determined based on budget allocations for each Management Unit and distributing the total Riparian Management targets based on percentage expenditure e.g. if a Management Unit had a budget allocation that comprised 5% of the total Riparian Management budget for the entire region, then the Riparian Management target for that Management Unit would be 5% of the target for the entire region. The exceptions were ‘Area of streamside land under management agreements’ and ‘Length of streamside land revegetated’, where it was assumed that these targets would not apply to forest catchments. Expenditure in these Management Units is expected to focus on weed management. In addition, due to the RRHS assumption that works would occur on no more than 40% of a waterway in the 5-year period, the ‘Length of streamside land revegetated’ targets were capped at 40% for individual Management Units.



There was a small number of cases where the target exceeded the total length of waterways in the Management Unit. This mainly applied to urban waterways where, due to site constraints, a more intensive resource effort is typically required. To account for these situations where the budget allocation method for determining Management Unit targets is not practical or achievable, Management Unit targets for weed control were adjusted to ensure that they did not exceed more than 80% of the total length of waterways.

It is important to highlight that targets relating to ‘length of streamside land revegetated’ and the ‘kilometres of riparian land subject to weed management’ may overlap, and where multiple weed control efforts are required at a site, then the length of riparian land subject to weed management will be multiplied for each effort. It is also important to highlight that these targets require works on both sides of the stream. Accordingly, where works only occur on one side of the stream, the length will need to be halved for the purposes of determining progress against these targets e.g. 10 kilometres of work on one side of the stream will be the equivalent of meeting 5 kilometres of the Riparian Management target.

3. Aquatic Habitat Targets – ‘Number of fish barriers removed’, ‘Number of IRC reaches with instream habitat reinstated’

The Aquatic Habitat target, ‘number of fish barriers removed’, was determined by adding the number of catchment actions that refer to the removal or investigation of fish barriers. Management Unit targets for Aquatic Habitat actions were determined based on the number of actions that identify the removal or investigation of fish barriers. It was assumed that at least one barrier would be removed for each action (i.e. a total of 31). However, it is acknowledged that following an investigation it may be determined that the removal of a barrier is unwarranted from an environmental (e.g. threat of exotic fish to upstream native fish communities) or economic perspective. Under these circumstances, the undertaking of an investigation to determine the feasibility of removing a barrier will be considered sufficient for completion of an action. The table below identifies where the 31 actions fish barriers to be removed or investigated:

Management Unit	Sub Management Unit	Action
1 Lower Dandenong Creek	Dandenong Creek Lower	Implement recommendations from the functional design study to address the fish barriers which is the concrete channel through Dandenong
2 Lower Dandenong Creek	Mordialloc Main Drain	Design and construct fishway along Mordialloc Main Drain and Pillars Crossing
3 Maribyrnong River	Maribyrnong Gorge	Investigate any requirements to enhance performance of existing fishways
4 Jacksons Creek	Jacksons Lower	Investigate options and remove fish barriers through Sunbury
5 Jacksons Creek	Jacksons Middle	Investigate options to remove fish barrier on old diversion weir
6 Jacksons Creek	Jacksons Upper	Investigate options to remove fish barrier at stream flow gauge at Gisborne
7 Upper Werribee	Dale	Investigate fish barriers and identify opportunities for removal
8 Lerderderg River	Lerderderg Middle	Investigate feasibility of establishing fish passage past Melton Reservoir
9 Upper Werribee	Korweinguboorra	Investigate fish barriers and identify opportunities for removal
10 Lower Werribee	Werribee Outfall	Investigate extent of fish barriers associated with road crossings
11 Middle Werribee	Pyrites Upper	Identify fish barriers and investigate opportunities for removal
12 Middle Werribee	Pyrites Lower	Investigate fish barriers and identify opportunities for removal
13 Middle Werribee	Djerriwarrh Forest	Investigate fish barriers and identify opportunities for removal
14 Middle Werribee	Djerriwarrh	Investigate fish barriers and identify opportunities for removal
15 Upper Werribee	Werribee Headwaters	Investigate fish barriers and identify opportunities for removal
16 Upper Kororoit Creek	Kororoit Rural	Investigate extent of fish barriers in Kororoit Creek
17 Upper Kororoit Creek	Kororoit Creek West Branch	Investigate extent of fish barriers in Kororoit Creek
18 Upper Kororoit Creek	Kororoit Creek East Branch	Investigate extent of fish barriers in Kororoit Creek
19 Lower Werribee	Lower Werribee	Investigate the extent of fish barriers and identify opportunities for removal
20 Lower Kororoit Creek	Kororoit Creek	Investigate extent of fish barriers in Kororoit Creek
21 South Eastern Peninsula Rivers and Creeks	Main	Investigate barrier in lower reach of Main Creek and construct fishway
22 French and Phillip Islands	Phillip Island	Investigate the extent of fish barriers and identify opportunities for removal
23 Cardinia, Toomuc, Deep and Ararat	Cardinia/Gum Scrub	Investigate and undertake the construction of fishways at the retarding basin at Princes Freeway and stream flow gauging weir at Chadwick Road
24 Tarago	Tarago River Upper Forested	Identify extent of fish barriers and identify opportunities for removal in the longer term
25 Lang Lang River	Lang Lang Lower	Construct vertical slot fishway on the barrier at Heads Road
26 Cardinia, Toomuc, Deep and Ararat	Upper Cardinia	Investigate and undertake the construction of fishways at the retarding basin at Princes Freeway and stream flow gauging weir at Chadwick Road
27 South Eastern Peninsula Rivers and Creeks	Merricks/Coolart/Stony	Investigate barriers and construct fishways on Merricks, Coolart and Stony Creeks
28 Little Yarra And Hoddles Creek	Hoddles Creek	Investigate the extent of the fish barrier at the road culverts at Glenview Road and construct fish passage if required
29 Upper Yarra (Rural)	Yarra River Upper	Investigate fish barriers and identify opportunities for removal
30 Middle And Lower Yarra	Yarra River Lower	Implement Dights Falls fishway modifications proposed to improve overall effectiveness
31 Lower Dandenong Creek	Patterson River	Construct a fishway to enable fish passage through National Sports Centre

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There are 12 actions relating to the reintroduction of large wood for instream habitat within the Addendum period. These actions comprise the 5-year Addendum period target for 'number of IRC reaches with instream habitat reinstated' (see table below). Management Unit targets were based on the number of actions that refer to 'large woody debris' reintroduction and assume that for each action, one reach will be subject to habitat works. Similar to the fish barrier target, where an investigation of opportunities to reintroduce large woody debris has occurred and no feasible sites can be identified, then the undertaking of the investigation will be considered sufficient for completion of an action.

The table below identifies the 12 actions relating to reintroduction of large woody debris:

Management Unit	Sub Management Unit	Action
1 Lower Kororoit Creek	Kororoit Creek	Investigate opportunities for improving native fish habitat including investigation of the feasibility of reintroducing large woody debris and increasing diversity in channel habitats
2 Tarago	Tarago River	Retain large woody debris within the stream channel and investigate key sites for reintroduction
3 Middle and Upper Bunyip	Bunyip/Cannibal	Retain large woody debris within the stream channel. Identify key sites for large woody debris introduction and undertake works
4 South Eastern Peninsula Rivers and Creeks	Main	Ensure that large woody debris is retained within the stream channel, identify priority sites and undertake large woody debris introduction
5 Little Yarra And Hoddles Creek	Little Yarra Upper Forested	Ensure that large woody debris is retained and carry out further reintroduction in the stream channel
6 Little Yarra And Hoddles Creek	Little Yarra	Ensure that large woody debris is maintained and investigate and carry out further reintroduction within the stream channel
7 Diamond Creek (Source)	Arthurs/Running Creek Upper Forested	Investigate opportunities to reintroduce large woody debris
8 Upper Yarra (Rural)	Yarra River (Yering)	Investigate opportunities to improve habitat for significant fish species including reintroduction of large woody debris and pool riffles zones
9 Woori Yallock	Cockatoo Creek Upper Forested	Ensure that large woody debris is retained within the stream channel and identify key sites for reintroduction
10 Woori Yallock	Cockatoo Creek	Ensure that large woody debris is retained within the stream channel and identify key sites for reintroduction
11 Woori Yallock	Woori Yallock Creek	Ensure that large woody debris is retained within the stream channel and identify key sites for reintroduction
12 Watts River (Rural)	Grace Burn/Coranderrk	Ensure that woody debris is retained within the stream channel and investigate the reintroduction of woody debris where needed

4. Planning Targets – ‘Number of plans developed for rivers and creeks of high social value’, ‘Number of plans developed for rivers and creeks of high environmental value’

A Waterway Plan can take many forms as different types of plans will be applied to different contexts and waterway management needs within the region. Examples of plans include Waterway Management Activity Plans that analyse in detail a range of waterway and management issues interfacing with the stream corridor, geomorphology studies that investigate stream channel characteristics, behaviour and change over time, and Rural Opportunity plans that are designed to provide an overview of management issues along rural waterway frontages and plan for rehabilitation.

The table below identifies the plans that are included in the targets for rivers of high social value (15 plans) and rivers of high environmental value (11 plans). It has been assumed that if a Management Unit is assigned a plan for both high social and high environmental value, that only one plan is required.

Management Unit	Plans developed for rivers and creeks of high social value	Plans developed for rivers and creeks of high environmental value	Action
Eumemmerring	1. Eumemmerring Creek*		Extend Eumemmerring Creek Waterway Plan to incorporate the upper catchment. Vegetation Management Plan in interim
Middle Dandenong Creek	2. Dandenong Creek Middle*		Vegetation Management Plans
Deep Creek Lower, Deep Creek Upper, Emu Creek	3. Deep Creek Upper	1. Deep Creek Upper & Lower, Emu	Develop the Deep Creek Tributaries Waterway Plan
Lerderderg River	4. Lerderderg	2. Lerderderg	Develop Goodman Creek Waterway Plan
Lerderderg River & Middle Werribee	5. Lerderderg & Middle Werribee	3. Lerderderg & Middle Werribee	Develop Lerderderg River Waterway Plan
Little River	6. Upper Little River*		Develop the Little River Waterway Plan
Middle Werribee	7. Middle Werribee	4. Middle Werribee	Develop the Upper Werribee Eastern Tributaries Waterway Plan
Parwan Creek	8. Parwan Creek Lower*		Develop the Parwan River Waterway Plan
Bass		5. Bass Upper*	Develop the Upper Bass Waterway Plan
Cardinia, Toomuc, Deep and Ararat		6. Ararat Creek*	Develop Ararat Creek Waterway Plan
French and Phillip Islands		7. French Island*	Develop a French or Phillip Island Waterway Plan
South Eastern Peninsula Rivers and Creeks	9. Main Creek*		Develop the Main Creek (Peninsula) Waterway Plan
South Eastern Peninsula Rivers and Creeks	10. Merricks/ Coolart/ Stony*	8. Merricks/ Coolart/ Stony*	Develop the Merricks/Coolart/Stony Creeks Waterway Plan
West Peninsula Rivers and Creeks	11. Balcolme & Dunns*		Develop a Waterway Plan in the West Peninsula Rivers and Creeks Management Unit
Little Yarra And Hoddles Creek		9. Hoddles Creek*	Develop the Hoddles Creek Waterway Plan
Middle And Lower Yarra & Upper Yarra (Rural)	12. Yarra River	10. Yarra River Upper*	Develop the Middle Yarra Waterway Plan
Olinda Creek	13. Olinda		Develop a weed management plan for the upper and middle reaches.
Watsons Creek		11. Watsons Creek*	Develop Watsons Creek Waterway Plan
Watts River (Rural)	14. Watts River*		Upgrade Watts River flood investigation Report (1997) to a Waterway Plan
Patterson River	15. Patterson River		Develop Lower Dandenong Creek Waterway Plan

* denotes an action that covers multiple Management Units and counted as a single plan in the overall targets.

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5. Investigations Targets – ‘Number of investigations to fill data gaps in rivers or creeks’

The Investigations program targets were developed based on the number of RRHS actions that refer to undertaking investigations to fill data gaps, fish, macroinvertebrate and platypus surveys, or other targeted data collection for waterway management. In total there are 55 actions for the RRHS Addendum period. Management Unit targets for Investigations were determined based on the number of actions that identify the need for stream health surveys.

Management Unit	Sub Management Unit	Action
1 Corhanwarrabul, Monbulk and Ferny Creeks	Monbulk	Undertake water quality and fish investigation
2 Corhanwarrabul, Monbulk and Ferny Creeks	Dandenong Ranges	Undertake stream health investigations to fill data gaps for waterway management
3 Deep Creek Lower	Deep (Bulla)	Undertake stream health investigations to fill data gaps for waterway management
4 Deep Creek Lower	Deep (Romsey)	Undertake stream health investigations to fill data gaps for waterway management
5 Deep Creek Lower	Deep Lower Middle	Undertake stream health investigations to fill data gaps for waterway management
6 Deep Creek Upper	Deep (Lancefield)	Undertake stream health investigations to fill data gaps for waterway management
7 Jacksons Creek	Jacksons Lower	Undertake stream health investigations to fill data gaps for waterway management
8 Jacksons Creek	Jacksons Middle	Undertake stream health investigations to fill data gaps for waterway management
9 Jacksons Creek	Jacksons Upper	Undertake stream health investigations to fill data gaps for waterway management
10 Jacksons Creek	Riddells Lower/Sandy	Undertake stream health investigations to fill data gaps for waterway management
11 Jacksons Creek	Riddells Upper/Baringo	Undertake stream health investigations to fill data gaps for waterway management
12 Maribyrnong River	Maribyrnong Gorge	Undertake stream health investigations to fill data gaps for waterway management
13 Lerderderg River	Lerderderg Middle	Undertake stream health investigations to fill data gaps for waterway management
14 Lerderderg River	Lerderderg Upper	Undertake stream health investigations to fill data gaps for waterway management
15 Lerderderg River	Goodman Upper	Undertake stream health investigations to fill data gaps for waterway management
16 Lower Werribee	Lower Werribee	Undertake stream health investigations to fill data gaps for waterway management
17 Upper Werribee	Werribee Headwaters	Undertake stream health investigations to fill data gaps for waterway management
18 Upper Werribee	Dale	Undertake stream health investigations to fill data gaps for waterway management
19 Upper Kororoit Creek	Kororoit Creek West Branch	Undertake stream health investigations to fill data gaps for waterway management
20 Upper Kororoit Creek	Kororoit Rural	Undertake stream health investigations to fill data gaps for waterway management
21 Middle Werribee	Werribee Gorge	Undertake stream health investigations to fill data gaps for waterway management
22 Middle Werribee	Djerriwarrh Forest	Undertake stream health investigations to fill data gaps for waterway management
23 Middle Werribee	Djerriwarrh	Undertake stream health investigations to fill data gaps for waterway management
24 Middle Werribee	Pyrites Lower	Undertake stream health investigations to fill data gaps for waterway management
25 Middle Werribee	Pyrites Upper	Undertake stream health investigations to fill data gaps for waterway management
26 Middle Werribee	Lerderderg Lower	Undertake stream health investigations to fill data gaps for waterway management
27 Middle Werribee	Korkuperimmul	Undertake stream health investigations to fill data gaps for waterway management
28 Middle Werribee	Myrniong	Undertake stream health investigations to fill data gaps for waterway management
29 Bass	Bass Upper	Undertake stream health investigations to fill data gaps for waterway management
30 Cardinia, Toomuc, Deep and Ararat	Cardinia/Gum Scrub	Undertake a fish investigation
31 Cardinia, Toomuc, Deep and Ararat	Toomuc Creek	Undertake platypus investigation
32 Lang Lang River	Lang Lang	Undertake stream health investigations to fill data gaps for waterway management

Management Unit	Sub Management Unit	Action
33 Lang Lang River	Lang Lang Lower	Undertake stream health investigations to fill data gaps for waterway management
34 Lang Lang River	Minnieburn/O'Mahoney's	Undertake stream health investigations to fill data gaps for waterway management
35 French and Phillip Islands	French Island	Undertake stream health investigations to fill data gaps for waterway management
36 Tarago	Tarago River Upper Forested	Undertake stream health investigations to fill data gaps for waterway management
37 South Eastern Peninsula Rivers and Creeks	Main	Undertake stream health investigations to fill data gaps for waterway management
38 Merri Creek (Urban)	Edgars Creek	Undertake stream health investigations to fill data gaps for waterway management
39 Diamond Creek (Source)	Arthurs/Running Creek Upper Forested	Undertake stream health investigations to fill data gaps for waterway management
40 Diamond Creek (Source)	Diamond Creek Upper Forested	Undertake stream health investigations to fill data gaps for waterway management
41 Upper Yarra (Rural)	Yarra River (Healesville)	Undertake water quality and fish investigation
42 Upper Yarra (Rural)	Yarra River Upper	Undertake platypus investigation
43 Upper Yarra (Rural)	Yarra River (Yering)	Undertake water quality, fish and platypus investigation
44 Upper Yarra (Source)	Yarra River Upper Forested	Undertake platypus investigation
45 Mullum Mullum	Mullum Mullum	Undertake a fish investigation
46 Watsons Creek	Watsons Creek Upper Forested	Undertake macroinvertebrate investigation
47 Watsons Creek	Watsons Creek	Undertake macroinvertebrate investigation
48 Watts River (Rural)	Grace Burn/Coranderrk	Undertake water quality, fish and platypus investigation
49 Watts River (Rural)	Watts River	Undertake water quality, fish and platypus investigation
50 Watts River (Rural)	Watts River	Undertake a fish investigation
51 Watts River (Source)	Grace Burn/Coranderrk Upper Forested	Undertake water quality, fish and platypus investigation
52 Watts River (Source)	Watts River Upper Forested	Undertake water quality, fish and platypus investigation
53 Middle And Lower Yarra	Andersons Creek	Undertake stream health investigations to fill data gaps for waterway management
54 Middle And Lower Yarra	Yarra River Lower	Undertake a fish investigation
55 Middle And Lower Yarra	Yarra River (Warrandyte)	Undertake water quality, fish and platypus investigation

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6. Flow Management Targets – Number of rivers with negotiated environmental flow regimes, Number of rivers with improvements made to environmental flow regimes

The table below identifies the 12 rivers that are included in the target relating to the ‘number of rivers with negotiated environmental flow regimes’. Environmental flow regimes will be negotiated through the development of flow management plans e.g. Streamflow Management Plans, Bulk Entitlements, Environmental Entitlements Local Management Rules. Where Melbourne Water is not the lead agency, a study identifying options to recover water for the environment will be considered sufficient towards achieving the target for that river system.

River system	Lead agency Responsibility
1. Dandenong Creek (upper)	Southern Rural Water
2. Upper Maribyrnong River	Southern Rural Water
3. Maribyrnong River	Melbourne Water
4. Werribee River	Southern Rural Water
5. Bunyip/ Tarago Rivers	Southern Rural Water
6. Diamond Creek	Melbourne Water
7. Hoddles Creek	Melbourne Water
8. Olinda Creek	Melbourne Water
9. Steels, Pauls and Dixons Creeks	Melbourne Water
10. Stringybark Creek	Melbourne Water
11. Yarra River	Melbourne Water
12. Bass River	Southern Rural Water

The list below identifies the 17 rivers that are included in the target relating to the ‘number of rivers with improvements made to environmental flow regimes’. Improvements are expected to occur within those systems where environmental flow regimes have already been negotiated or are soon to be negotiated through the development of flow management plans.

- Environmental flow regimes still to be negotiated:
 1. Dandenong Creek (upper)
 2. Upper Maribyrnong River
 3. Maribyrnong River – Central Region Sustainable Water Strategy
 4. Werribee River – Central Region Sustainable Water Strategy
 5. Bunyip/Tarago Rivers
 6. Diamond Creek
 7. Hoddles Creek
 8. Olinda Creek
 9. Steels, Pauls and Dixons Creeks
 10. Stringybark Creek
 11. Yarra River
 12. Bass River
- Flow management plans already negotiated:
 1. Kororoit Creek
 2. Little Yarra and Don Rivers
 3. Plenty River
 4. South East Peninsula
 5. Woori Yallock Creek



Olinda Creek.

7. Heritage – ‘Rivers where heritage values are protected or improved’

The Heritage target, ‘Rivers where heritage values are protected or improved’, was determined by adding the number of catchment actions that refer to the protection or improvement of heritage values (i.e. 34). This target highlights those waterways that were identified as having particular heritage value. It is assumed that when waterway improvement activities are carried out through other programs (i.e. Riparian Management, Channel Form, Aquatic Habitat and Flow Management), each of these activities will count towards the Heritage target. It is also assumed that during these activities, sites of archaeological significance are given sufficient protection.

2.4 Revision of Budgets

Although the overall costs for RRHS implementation are similar for both the RRHS 5-year period and the RRHS Addendum 5-year period (Tables 1 & 2), budget allocations for several catchment and regional actions were modified. This was based on expenditure and further planning over the first two years of RRHS implementation. For example, a large number of Investigation and Flow Management costs were reduced (reflecting the planning focus in the initial years of RRHS implementation), as were several Channel Form actions, while many of the Riparian Management action allocations were increased. Most of the Aquatic Habitat action allocations were unchanged. Similar to the RRHS 5-year budgets, those actions where Melbourne Water was a secondary partner, 20% of the total action cost was included in Melbourne Water's Addendum budgets.

Table 1: Comparison of RRHS 5-year Program Costs and RRHS Addendum Costs for Catchment Specific Actions Program

Program	RRHS 5-Year Total	RRHS Addendum 5-Year Total	Variance	% Variance
AH	\$2,728,000	\$4,450,000	\$1,720,000	63%
CF	\$54,365,000	\$30,955,000	-\$23,410,000	-43%
FM	\$3,210,000	\$3,115,000	-\$95,000	-3%
INV	\$3,770,000	\$1,630,000	-\$2,140,000	-57%
P	\$883,000	\$1,760,000	\$879,000	99%
RM	\$41,385,000	\$78,110,000	\$36,725,000	89%

Table 2: Percentage of Catchment Actions where Allocations were Revised from the RRHS 5-year Program for the RRHS Addendum

Program	% actions where allocations decreased	% actions where allocations increased	% actions where funds did not change
AH	1	21	79
CF	41	58	2
FM	55	34	11
INV	77	4	19
P	10	45	45
RM	13	72	16

The Regional River Health Strategy does not specify how the allocations for actions should be delivered in terms of Operational Expenditure (OPEX) and Capital Expenditure (CAPEX). In order to develop Melbourne Water's second Water Plan, it was important to make this distinction. To determine the CAPEX/OPEX split, key assumptions were made. Some activities were automatically categorised as CAPEX activities, namely Channel Form, Aquatic Habitat and Planning actions, while other activities were automatically categorised as OPEX activities, namely Flow Management and Investigations. On the other hand, Riparian Management actions splits were more complex.

Firstly, for those Riparian Management actions where waterway condition is already in 'good' or better, OPEX will be high as activities will mostly be of a maintenance nature. For these waterways the OPEX/CAPEX split was set to 90% to 10%, respectively, for the life of the RRHS between 2005 to 2025 (Figure 1).

For waterways in less than 'good' condition the proportion of CAPEX works will be much greater as works (at least initially) will be of an asset improvement nature rather than maintenance to hold current condition. As the proportion of waterways in 'good' or better condition increases between 2005 and 2025, it is assumed that asset improvement (CAPEX) works will progressively decrease (Figure 2). Using Figure 2, the CAPEX/OPEX split for Riparian Management actions in the RRHS Addendum period was derived by calculating the average annual CAPEX/OPEX split between 2008/9 and 2012/13 i.e. around 75% CAPEX to 25% OPEX.

2. Development of the RRHS Addendum



Figure 1
Riparian Management Operational and Capital Expenditure Split
for Areas in Good or Better Condition

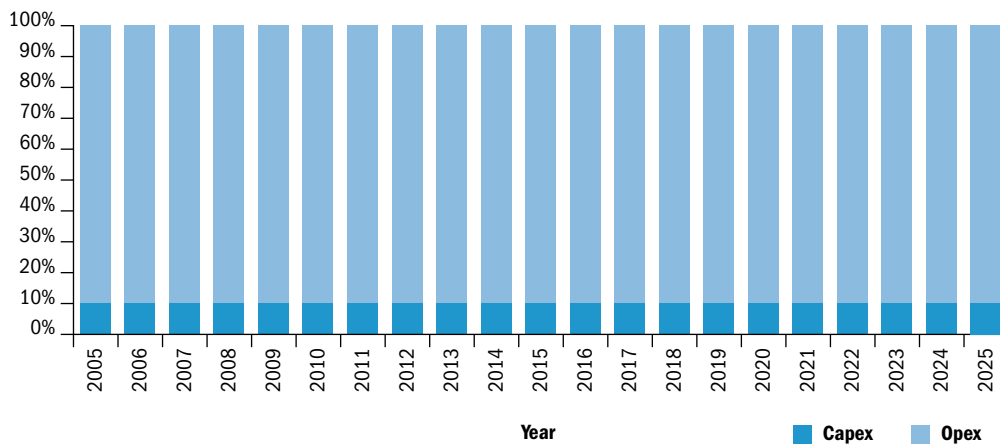
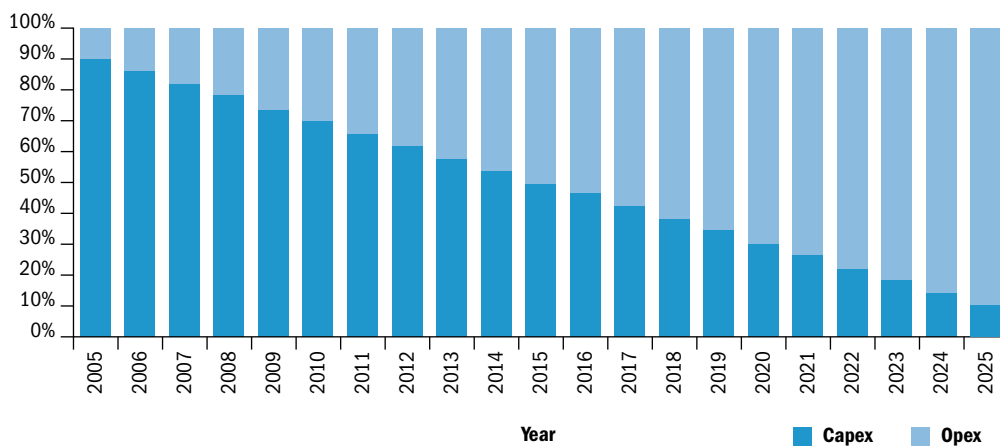


Figure 2
Riparian Management Operational and Capital Expenditure Split
for Areas in Less than Good Condition



2. Development of the RRHS Addendum

The primary purpose of the RRHS Addendum was to align existing RRHS actions and targets for which Melbourne Water has responsibility with the Water Plan 2 period. The Addendum development process did not seek to undertake a process of re-prioritising actions or identifying an extensive list of new actions. The process essentially involved:

1. removal of completed regional and catchment specific actions
2. addition of the next highest priority RRHS actions from the 6 to 20-year program into the 5-year program
3. review of action wording to clarify intent
4. extension of existing targets out to 2013
5. review of budget allocations for specific actions

Broad external stakeholder consultation was not necessary for the development of the Addendum, as it is based on existing RRHS priorities and targets that arose from extensive consultation with stakeholders. In addition, the Addendum only incorporates actions and targets for which Melbourne Water has responsibility. The initial scoping of Addendum development occurred between Melbourne Water and the Department of Sustainability and Environment. Review and further refinement of the Addendum was through the Waterways Advisory Committee prior to submission as part of Water Plan 2 to the Essential Services Commission.

This section of the RRHS Addendum details the development process, including major assumptions behind revised budgets and targets.

2.1 Revision of Catchment Specific Actions

The process to review catchment actions commenced with a series of workshops for each major catchment involving key internal Melbourne Water stakeholders, including planning, works delivery and maintenance teams representatives. With a focus on actions where Melbourne Water has responsibility, the workshops essentially reviewed actions within Aquatic Habitat, Channel Form, Planning and Riparian Management programs. The status of Flow Management and Investigations actions were reviewed independently by the Environmental Flows and Waterway Planning teams, respectively.

During the workshops the status of high priority actions was reviewed so that completed actions could be removed from the Addendum. The upgrading of the next priority actions (i.e. high or moderate priority actions) to the 5-year Water Plan 2 program also occurred. Based on experience from that first 18 months of RRHS implementation and local knowledge, budget allocations for each action were also reviewed and modified. To ensure consistency across the region, Waterway Planning undertook further review of the budget allocations after the workshops.

To complete the catchment actions review, only those outstanding actions with a revised status of 'Very High' or 'High' priority were captured in the RRHS addendum and ultimately, Water Plan 2. The exception was for Riparian Management and Aquatic Habitat programs. For Riparian management all actions were carried through to the Addendum regardless of priority. This was to ensure some expenditure across the region to hold the current condition of lower priority waterways and provide gradual improvement to facilitate future rehabilitation. The outcome was to allocate 50% of the action budgets to the 5-year program for all actions that were a 'Moderate' or 'Low' priority. 'Guiding' actions (i.e. no funds allocated) for the Aquatic Habitat program were also carried across to the Addendum.

Where Melbourne Water is the lead agency for an action, 100% of the budget was included in the Addendum. Where Melbourne Water is a financial partner, only 20% of the action budget was included in the Addendum. The exception was the Flow Management (FM) program, where agreed action budgets between the lead and secondary parties were allocated at full cost.

Water Quality program actions are not included in the Addendum as these actions will be reviewed through a parallel process of developing Melbourne Water's Waterway Water Quality Strategy. There were no budget implications for Melbourne Water for Recreation and Heritage Programs actions, therefore, they are also excluded from the Addendum.

2.2 Revision of Regional Actions

The process to review regional actions also involved a workshop involving key internal Melbourne Water stakeholders, including planning, works delivery, maintenance and research teams representatives. Once again, when reviewing the status of regional actions only those where Melbourne Water has responsibility were considered for inclusion in the Addendum. In addition to action status, budget allocations and the clarity of wording was also reviewed. As with the catchment actions, Water Quality program regional actions are not included in the Addendum as they will be reviewed through Melbourne Water's Waterway Water Quality Strategy, and Recreation and Heritage Programs actions without budget implications for Melbourne Water were also removed.