

Better Bays and Waterways

A Water Quality Improvement Plan for Port Phillip Bay and Western Port



2008/9 AND 2009/10 IMPLEMENTATION REPORT

Background

Image supplied by Parks Victoria



Better Bays and Waterways Vision

Better Bays and Waterways will add significant value to our collective efforts to protect and enhance the quality of water in Port Phillip Bay, Western Port and the catchments' waterways. It is an investment plan and will provide government, business and community with the opportunity and confidence to invest in practical and measurable improvements to the health and environment of these assets.

Better Bays and Waterways defines our economic, social and environmental values, the threats to these values, and our commitments through an adaptive management approach to improve the water quality of our rivers, creeks, and marine environments for a more sustainable future.

Better Bays and Waterways is a five year plan from 2009 to 2014 and outlines actions for improving water quality in a number of different management programs. Each program consists of a range of management actions.

These programs are:

Catchment actions for managing water quality

- › Rural diffuse source management
- › Urban diffuse source management
- › Point source management
- › Management of 2009 Black Saturday bushfire effects on waterways

Environmental flows

- › Marine influences
- › Understanding our rivers and bays

In-stream monitoring

- › In-bay monitoring
- › Research and investigations

Effective management

- › Community engagement
- › Governance
- › Reporting, evaluation and review

This is a progress report on the implementation of the plan from 2008/09 and 2009/10 and progress towards meeting the targets which will be reported on annually.

Highlights from 2008/9 and 2009/10



100 tonne Nitrogen Reduction Target reached

Melbourne Water has achieved a 10 year KPI for annual Nitrogen loads reduction to Port Phillip Bay from stormwater. The project began in 1999 with the identification of the project potential through the "Filter" model. The ultimate target of 100 tonnes was set with yearly interim targets and has been achieved as of 11 May 2010 with the practical completion of the Dandenong Valley Wetland.

The total figure achieved within the program is 109 tonnes. Setting this target led to several additional significant achievements, including a start-up opportunity for the Melbourne wetland industry and companies like Australian Ecosystems being contracted to grow the plants. Development of new technologies and science around wetland construction has also evolved in the research and construction industries.



Dandenong Valley Wetland

Melbourne Water has completed the Dandenong Valley Wetland as a part of the corporate Nitrogen Reduction Program. At 48 hectares, it is the biggest wetland ever constructed in Victoria. The wetland, situated on the south side of Ferntree Gully Road, has been built to reduce pollutants in stormwater runoff from harming the health of our rivers and creeks and ultimately Port Phillip Bay. It will prevent a massive 28 tonnes of nitrogen a year from entering our waterways.

A total of 1.6 million plants in the wetland system will help to soak up pollutants. It will also provide new habitat, food and water for thousands of birds, fish and other animals. This is the last of 52 wetlands constructed over the past decade as part of the \$60 million Nitrogen Reduction Program.

Its construction marks the end of the 10-year program and enables Melbourne Water to successfully reach its goal of reducing nitrogen in stormwater runoff entering Port Phillip Bay by 100 tonnes a year. This wetland is so large that it is contributing to more than a quarter of this 100 tonne reduction.



Bushfire rehabilitation program

The one year anniversary of the Black Saturday fires fell on 7 February 2010. The recovery of our waterways and forested catchments over the past 18 months has been promising. Observations along our waterways indicate native plant growth continues to improve. The re-establishment of vegetation along the riparian zone is an important part of the recovery of the waterway, with riparian vegetation performing an important filtering function for water quality and providing habitat for animals that have survived, or returned, after the fires.

We continue to work with the fire affected communities to help the natural recovery of our waterways and supported private landholders through our Incentives Program. During 2009/10 year, the Incentives Program supported over 60 landholders investing \$385,901 in the on ground delivery of weed control, 33kms of riparian fencing and revegetation with 12,200 plants.



Six Star Standards for new residential buildings

On 30 April 2010 the Government announced the introduction of new Six Star minimum standards for new residential buildings from May 2011. As part of the roll-out of Six Star standards, the Victorian Government will consult with industry and the community through a Regulatory Impact Statement (RIS) on proposed further efficiency requirements for hot water systems as well as complementary Six Star water standards.

The proposed water component of the new standard includes water efficiency, water conservation and stormwater management standards. This initiative reflects a significant involvement from the Department of Sustainability and Environment, Department of Planning and Community Development, Melbourne Water and EPA Victoria over many years. It provides a fantastic opportunity to ensure that new housing is delivered with climate change and sustainable water management at its core. Its announcement helps progress the concept of a sustainable water future and potentially seeing Melbourne as a water sensitive city of the future.



Western Port research

There is agreement amongst stakeholders that a strategic knowledge review regarding environmental values and threats is required to inform future policy, planning, on-ground works and prioritisation of further research to protect and enhance the Western Port environment. This need has also been documented in various strategic and technical documents including the Port Phillip and Westernport Regional Catchment Strategy and Better Bays and Waterways.

The Western Port strategic knowledge review will be led by Melbourne Water and the Department of Sustainability and Environment, with close involvement from other natural resource management agencies, including the Port Phillip and Westernport Catchment Management Authority, the Central Coastal Board, EPA Victoria, Parks Victoria and the Department of Primary Industries.

Professor Mick Keogh has been appointed as head scientist and work is underway to identify what areas the knowledge review should focus on.



Little Stringybark Creek

The Little Stringybark Creek project in Mount Evelyn assesses the effectiveness of using WSUD techniques to 'disconnect' impervious areas and restore the ecological health of a creek. The approach is incentivised using innovative market-based tools to gain cost-effective community support and participation.

The project is progressing well on all fronts, rainwater tanks and raingardens are being constructed by the community on their properties and the Shire of Yarra Ranges Council have implemented their first streetscape project, Hereford Road infiltration system (pictured above) with funding from Melbourne Water.

The project team are trialling their second market based tool, 'Stormwater Fund', with high levels of interest from local residents and more than 92 expressions of interest. In addition, the council has adopted a novel referral system to ensure new developments can take advantage of the program.

The project team have also successfully secured over \$500,000 of additional funds through the 'Caring for Our Country' fund.

Catchment Actions for Managing Water Quality



Pollutants from the catchments make their way into waterways and the bays and effective catchment management is critical to protecting water quality in the bays.

Rural water quality program

AIM				
To provide an integrated approach to improve the water quality of the bays and waterways by minimising the mobilisation and export of pollutants (including TN, TP, TSS and pesticides) from rural enterprises, stabilising waterways and managing flows and pollutants in-stream				
Water quality benefits: <i>quantified load impact</i>	2.5 t N and 345 t SS across the region over five years			
Water quality benefits: <i>additional</i>	Phosphorus, pesticides, E. coli, heavy metals, herbicides, fungicides			
Additional environmental benefits	Improvements in river health values associated with wetland and floodplain protection, revegetation and management			
Economic benefits	Resources for rural landholders in the Port Phillip and Western Port region for implementing sustainable production			
Social benefits	Social values associated with improved wetland and riparian condition, recreational benefits from improved water quality			
ACTIONS				
No.	Description	Lead (support) agency	Timeframe	Achievement
7.1	Implement <i>Regional River Health Strategy Addendum (5 year)</i> actions	Melbourne Water	2008/09-2012/13	Melbourne Water continues to actively deliver works and programs to improve the health of waterways across the Port Phillip and Westernport catchment and is on track to achieve the actions and targets set out in the RRHS. Key programs include incentives/grants provided to landowners to undertake works on private land, community groups and councils as well as capital works programs and maintenance activities'.
7.2	Implement PPWCMA flagship programs	CMA	Ongoing	All four Flagship Projects have achieved their financial goals in the 2009-10 year. Grow West has established nearly 2,000 ha of revegetation. In the Western Port catchment, the 'Spirit of the Bunyip' Woodlands Project will achieve its 2009-2010 vegetation corridor targets. 'Yarra4Life' is contracting landholders to create habitat corridors linking the Yellingbo Nature Conservation reserve to large forest areas to the north, east and west. Living Links has a consortium of 11 municipalities creating urban vegetation corridors on waterways in the Dandenong Creek catchment.
7.3	Deliver the Western Port Pilot EcoTender Demonstration	DSE (Melbourne Water, CMA, BCLN)	2008/09-2011/12	The Westernport EcoTender demonstration was developed by DSE during 2008/09 and run during 2009. Melbourne Water, PPW CMA and Bass Coast Landcare were represented on the Steering Committee during the development phase. Initially the pilot was to have run only in the Bass River and Lang Lang River catchments, however insufficient applications were received and the area was expanded to include part of the West Gippsland CMA region. DSE received 181 EOLs, 110 properties were visited and 51 landholders submitted bids for 105 sites. Of these landholders, 38 were successful (69 sites). Overall, the PPW EcoTender demonstration secured 190 hectares for approximately \$900,000.
7.4	Develop the Melbourne Water Rural Land Program and implement pilots in a minimum of two priority sub-catchments	Melbourne Water (DSE, DPI, CMA, LG)	2008/09-2013/14	The Melbourne Water Rural Land Program (RLP) Implementation Paper was researched and developed over 2008/09. The RLP aims to evaluate the cost-effectiveness of providing extension and grants assistance for agricultural best management practices (BMPs) as a way of addressing rural diffuse source water quality pollution (nutrients and sediments). The program comprises two pilots, one focusing on dryland grazing in the Upper Lang Lang and Upper Bass River catchments in Westernport, and the other on intensive horticulture and grazing in the Woori Yallock catchment, Upper Yarra. Melbourne Water's North East and South East Regional Delivery teams commenced delivery of the RLP in July 2009. The first year of delivery has focused primarily on recruiting suitably skilled staff, developing stakeholder relationships, developing service delivery relationships with DPI, and developing tools for prioritising projects and quantifying water quality outcomes with DPI and CQUniversity. The first call for applications to the Pilot programs is anticipated in early 2010/11.
7.5	Develop a consortium bid for Caring for our Country funding between CMA, government and community agencies to tackle water quality effects on Western Port	CMA (Melbourne Water, DPI, DSE, LG, LandCare)	2008/09-2012/13	This has not progressed as yet.

Understanding and guiding appropriate management of diffuse urban pollution

AIM		To continually improve the scientific understanding of urban effects on water quality and develop management tools and standards to manage these effects		
Water quality benefits: <i>quantified load impact</i>	Port Phillip Bay nitrogen contribution – 7 t over 5 years Western Port suspended solids contribution – 15 t over 5 years Western Port nitrogen contribution – 1 t over 5 years Note: Not all actions that contribute to these are fully funded.			
Water quality benefits: <i>additional</i>	Reduction of other pollutants to waterways and bays including phosphorus, toxicants and pathogens			
Additional environmental benefits	Improved river health through the reduction of urban flow effects in urban waterways Protection of ecological assets			
Economic benefits	Reduction in the need for stormwater capacity upgrades in established areas and allowing for the design of reduced systems in new areas Reduction in the need for stream remediation works Protection of waterway and bay beneficial uses including economic uses such as fishing, tourism and industrial water usage			
Social benefits	Improvement of aesthetics and amenity of waterways. Protection of recreational assets			
ACTION				
No	Description	Lead (support) agency	Timeframe	Achievement
7.6	Undertake research into stormwater pollutant sources and appropriate treatment systems	Melbourne Water (EPA Victoria, DSE, eWater CRC, Facility for Advancing Water Biofiltration II, National urban water governance program, Research Universities, LG)	2008/09-2012/13	Melbourne Water continued its participation in the eWater CRC. This research centre developed a new version (version 4) of MUSIC, the stormwater treatment modelling software. Estate-scale and lot-scale stormwater quantity and quality models are also being developed through this CRC. Melbourne Water has also signed up to a new research program anchored by Monash University. It is called Cities as Water Supply Catchments and is based on stormwater management for ecological, social and human health outcomes.
7.7	Evaluate the effectiveness of WSUD treatments in a targeted environment through a pilot project. Explore a variety of models including market mechanisms for their potential in the application of WSUD in retrofit situations.	Melbourne Water (Melbourne University, YVW, DSE)	Ongoing	The Little Stringybark Creek project in Mount Evelyn assesses the effectiveness of using WSUD techniques to 'disconnect' impervious areas and restore the ecological health of the creek. The project is progressing well with achievements to date including: The local community has been engaged to install rainwater tanks and raingardens on-lot; Yarra Ranges Council have implemented their first streetscape project, with funding from Melbourne Water; Round 2 of the 'Stormwater Fund' – an innovative market-based tool to gain cost-effective community participation – is in progress with more than 92 expressions of interest; Over \$500,000 of additional funds have been gained through 'Caring for Our Country'; A novel planning referral system has been implemented with Council. The Gum Scrub Creek new urban development project is exploring innovative integrated water management approaches, including 'Cities as Water Supply Catchments'. Several options have been developed and worked through with the broad project team. Monitoring has been established by Melbourne Water to assess the effectiveness of the Banyan stormwater treatment drain system.
7.8	Provide awareness, education and training to local government and the development industry to build institutional capacity to achieve improved stormwater management practices	Melbourne Water (DSE, LG, Clearwater, eWater CRC, MAV, DPCD, EPA Victoria)	2008/09-2011/12	With funding from Melbourne Water, DSE, MAV, EPA Victoria and DPCD, Clearwater delivered 38 capacity building initiatives to the water industry in the 2009/10 financial year.



7.9	Develop new standard for urban stormwater management and publish an updated best practice environmental management (BPEM) guideline for urban stormwater	EPA Victoria (Melbourne Water, DSE)	2008/09-2013/14	Following the recent Ombudsman and VAGO reports, EPA has committed to prioritise our focus on our core regulatory functions, including ensuring compliance and enforcement against existing standards. In this context, EPA will be working in 2010/11 to undertake important work to inform the priority allocation of resources to amending existing, or developing new, standards. The development of urban stormwater guidelines will be considered as part of this process. EPA is aware of the importance of this project in meeting targets within Better Bays and Waterways.
7.10	Work with the 38 councils in Melbourne Water's service area to enable 50% of them to have a commitment to WSUD implementation targets for pollutant loads, urban flow and effective imperviousness	Melbourne Water (LG)	2008/09-2012/13	An Action Plan was completed for this target in June 2010. Guidelines to assist councils to develop WSUD Implementation Targets are underway, with a brief developed and consultant appointed in June 2010. A Local Government Reference Group has been established and a draft outline of the Guidelines has been prepared. Discussions have also been had with ICLEI to identify links between the two programs. Work is currently underway with Port Phillip, Brimbank, Moonee Valley, Kingston and Knox City Councils on their WSUD Implementation Targets documents. Yarra, Melbourne and Manningham City Councils have already completed their WSUD Implementation Targets documents.
7.11	Implement the City of Melbourne's Total Watermark - City as a Catchment. This policy established municipality-wide and council targets for water efficiency, stormwater quality and alternative water use	City of Melbourne (Melbourne Water)	Ongoing over the 5 years (until 2020)	Implementation plans for streetscapes and parks completed. Updated the Total Watermark stormwater pollution load targets and removal-to-date loads to use only the last ten years of Bureau of Meteorology rainfall data in the MUSIC model. To June 2010, the City of Melbourne has achieved 79% of the 2020 target for TSS removal, 69% for TN and 103% for TP. Council is planning significant stormwater harvesting projects in the next few years.
7.12	Review legislative framework for on-site domestic wastewater	EPA Victoria (Melbourne Water, DSE, DHS, LG, water authorities)	To be completed in 2009	The project is progressing but at a slower rate than expected. We are currently working with DSE to understand further substantial additional work that has been requested to finalise the Discussion Paper.
7.13	Review and improve diffuse source pollution management and compliance arrangements	Melbourne Water (LG, water authorities, EPA Victoria)	2010/11	Work has been undertaken on 'Harmonising Local Laws', amongst other initiatives. This work is on track for 2010-11.

Managing Urban Development (impervious areas)

AIM		Protect receiving waterways from the effects of urbanisation		
Water quality benefits: <i>quantified load impact</i>	Port Phillip Bay nitrogen reduction – 39 t over 5 years Western Port suspended solids reduction – 547 t over 5 years Western Port nitrogen reduction – 5.5 t over 5 years Note: Not all actions that contribute to these benefits are funded			
Water quality benefits: <i>additional</i>	Reduction of other pollutants to waterways and bays including phosphorus, toxicants and pathogens			
Additional environmental benefits	Improvement of river health through the reduction of urban flow impacts in urban waterways; Protection of ecological assets; Increased area of greenspace			
Economic benefits	Increased alternative water supply, improved reliability of the urban water system; Reduction in the need for stormwater capacity upgrades in established areas and allowing for the design of reduced systems in new areas; Reduction in the need for stream remediation works; Protection of waterway and bay beneficial uses, including economic uses such as fishing, tourism and industrial water usage			
Social benefits	Improved capacity to maintain gardens; Potential to mitigate urban heat island effect; Protection of recreational assets			
ACTION				
No	Description	Lead (support) agency	Timeframe	Achievement
7.14	Develop a statewide stormwater strategy	DSE (Melbourne Water, LG, EPA Victoria)	Over the 5 years of the plan	Under consideration.
7.15	Establish Victorian stormwater standards for new allotment scale residential and non-residential developments to ensure consistent application of environmental standards for all forms of development	DSE – policy development DPCD – implementation (Melbourne Water, EPA Victoria)	Establish standard by 2011	A 6 Star water standard for new residential developments which includes stormwater management was announced by Minister Madden on 30 April 2010 for implementation on 1 May 2011. The proposed standard for residential allotments will be subject to a Regulatory Impact Statement (RIS) process in 2010.
7.16	Ensure all new non-residential subdivisions meet the Victorian stormwater standards thereby applying environmental standards across all forms of subdivision development	DSE – policy development DPCD – implementation	Implement standard by 2011	Under consideration.
7.17	Undertake the Melbourne Water stormwater management programs, working to improve capacity within local government. Activities include: · building institutional capacity within local government authorities · funding for the design and construction of stormwater treatment measures	Melbourne Water (LG)	2008-2013	38 local government councils were supported in strategic capacity building initiatives. 30 projects across 19 councils were funding for the design and construction of stormwater treatment measures. An associated work plan has been developed that includes activities to deliver this action.
7.18	Evaluate the benefits, constraints and regulatory changes needed to retain septic tanks and sand filters for stormwater retention and treatment as an alternative to decommissioning when properties connect to sewer	Manningham (Yarra Valley Water, Plumbing Industry Commission, Melbourne Water, EPA Victoria)	Over the 5 years of the plan	Meetings have been held between Manningham City Council and Melbourne Water. Manningham is undertaking an interstate case study review to assess replicability within the municipality. Early conversations with Yarra Valley Water have been had to investigate potential involvement through the backlog program. The viability of the approach could be trialled during Sewer Backlog works in Manningham. Sewer construction works for approximately 500 properties in Templestowe are scheduled to commence in July 2010 with new connections starting to become available by early 2011.

7.19	As part of the review of the Water Smart Gardens and Homes Rebate Scheme, recognise the environmental benefits of water saving products especially in regards to rainwater tanks	DSE	2010	As part of the review of the Water Smart Gardens and Homes Rebate Scheme, recognise the environmental benefits of water saving products especially in regards to rainwater tanks – To date almost 40,000 rainwater tank rebates have been provided under the rebate scheme, over 10,000 of these have included connections to the toilet and/or laundry thus increasing the environmental benefits from reduced stormwater runoff.
7.20	Work with the community to encourage the uptake of WSUD in established developments. Encourage community to install rain gardens and other infiltration and reuse options through education and incentive programs Investigate opportunities and considerations to implement household downpipe disconnection program. Including: · map land capability for land infiltration · review statutory and institutional considerations · establish a pilot program with local government	Melbourne Water Melbourne Water (LG, DSE, PIC, DPDC)	2008-2013 3 years	The 10,000 Raingardens program has developed a range of educational tools, including raingarden brochures, 'How to Build a Raingarden' instruction sheets (for planter box and in-ground), raingardens model and raingardens website (www.melbournewater.com.au/raingardens). The program has participated in eight different events this year, raising its profile and community awareness of raingardens and stormwater management. The Segmentation Social Research first stage has been completed, indicating incentives are not a driving factor for our target audience. With this in mind incentives will not be offered at this stage of the program. A soil report and permeability maps across four key councils are near completion to assist with further treatments. Discussions are underway with key councils. The Plumbing Industry Commission is to review statutory and institutional considerations of downpipe disconnection, in addition to ongoing discussions with DPCD and DSE regarding policy context and implications. A pilot program of 'live' raingarden demonstrations has been discussed with key councils, with a date set with the City of Knox.
7.21	Construct urban wetlands to reduce pollutant loads to waterways and the bays.	Melbourne Water	2008-2013	In May 2010, Melbourne Water achieved a 10 year KPI for annual nitrogen load reduction to Port Phillip Bay from stormwater. The total figure achieved within the program is 109.7 tonnes via the construction of 52 wetlands, completing the total Water Plan 2 target of 106 tonnes. See highlights for more details.
7.22	VicRoads to incorporate Water Sensitive Road Design and meet best practice standards for all new major roads and major road upgrades under their responsibility where practical and feasible	VicRoads (Melbourne Water)	Ongoing	VicRoads is currently incorporating Water Sensitive Road Design on all new major road and major road upgrade projects where practical and feasible and will continue to do so in the future. In addition, VicRoads requires its contractors to implement best practice standards for the control of erosion and sedimentation to protect the waters of Victoria.
7.23	Undertake capacity building and awareness programs with local government for best management of unsealed roads and road upgrades	Melbourne Water (LG)	2009-2013	A Shire of Yarra Ranges and Melbourne Water project group has been formed and terms of reference accepted. An initial Project Brief has been drafted targeting both unsealed roads and road upgrades and a consultant has been engaged.

Managing potentially polluting activities

AIM		Protect receiving waterways through the management of potentially polluting diffuse urban activities		
Water quality benefits: <i>quantified load impact</i>	Not modelled			
Water quality benefits: <i>additional</i>	Improvements in water quality by decreasing pollutants entering waterways			
Additional environmental benefits	Protection of ecological assets			
Economic benefits	Reduction in cost of managing pollution through prevention			
Social benefits	Improvements in public amenity around commercial and industrial precincts due to odour reduction and refuse management			
ACTION				
No	Description	Lead (support) agency	Timeframe	Achievement
7.24	Improve local government's capacity to prevent diffuse source pollution	Melbourne Water (EPA Victoria, LG)	2008-2013	Completed tools and guidelines to assist local government to prevent diffuse source pollution include Regional WSUD Guidelines (Round 1 - 5 councils), Melbourne Water Wetland Guidelines, Third Pipe Guidelines (Desktop Study) Report and IMAP WSUD Guidelines template. Tools/guidelines currently in development include Regional WSUD Guidelines (Round 2 - minimum 5 councils), MUSIC v4 Guidelines and Council WSUD Implementation Targets Guidelines.
7.25	Implement an education and enforcement program for small to medium industrial sites within targeted municipalities, based on the pilot project conducted in collaboration with Kingston Council	Melbourne Water (EPA Victoria, LG)	2008-2013	Development of education and enforcement program for small to medium industrial sites within City of Knox underway based on the pilot project with Kingston Council.
7.26	Completion of at least two sweep activities to reduce pollution from priority industrial and commercial areas	EPA Victoria (LG)	2009-2010	EPA completed sweeps in the areas of Nunawading (30 July - 2 August 2009, 145 sites visited) and Airport West (November 2009, 120 sites visited).
7.27	Develop a pilot project working with local government to trial an improved communications and enforcement framework in relation to commercial food enterprises – encompassing site management issues including waste management and washdown, trade waste and cross connections.	Melbourne Water (EPA Victoria, LG, DSE, Water authorities)	By 2011	A Project Steering Group comprising Melbourne Water, EPA, City of Melbourne and City of Yarra has been established and a consultant engaged. Preliminary communication materials have been developed and visits to food businesses are expected to commence around July 2010.
7.28	Water Authorities will redesign or alter their sewerage infrastructure programs to progress towards an elimination of dry weather spills, chronic leaks, and sewer overflows caused by storms not exceeding 1 in 5 year storm events.	Water authorities	By 2014	SEW - The current focus is on reducing the risk and lowering the consequence of rising main failures. This will be achieved through an improved condition assessment program, investigations into early warning leak detection systems and the development of site specific contingency plans. CWW - Works currently being undertaken will eliminate the last known '1 in 5' non compliant sewer catchments in CWW.



7.29	Implement the backlog upgrade of septic systems, through continued investment and creating capacity for innovation	Water authorities	Ongoing over the life of the plan	SEW - In 2008/09, SE Water invested a further \$21.7 million in the provision of backlog sewerage services. Most significantly, work on the Flinders/Shoreham Backlog program came close to completion, providing connection to over 700 residential and commercial properties. In addition, ongoing estuary monitoring already shows improved water quality in surrounding waterways as a result of the Flinders program. Working with 'us' – Utility Services, we developed innovative pressure sewer and construction techniques which allowed for rapid, low impact installation in hilly terrain. Works are currently underway in the townships of Nar Nar Goon and Tynong and we will start delivering sewerage services to 400 properties in the Upper Beaconsfield and Belgrave South areas in 2010. CWW – CWW manages its Sewer Backlog Program in accordance with its Compliance Management System. The driver is to reduce the number of unconnected properties with the potential to pose environmental risks. To manage this, CWW develops domestic wastewater management plans in cooperation with Councils. The unsewered properties will continue to be jointly monitored and future works programmed when deemed necessary.
7.30	Address failing septic tanks through education and investment in septic maintenance.	Melbourne Water (Yarra Ranges Shire, Baw Baw Shire)	2009-2013	Melbourne Water has met with the Shire of Yarra Ranges (SYR) and Baw Baw Shire to discuss. There is a high level of support at SYR and improvements have been made to the Green Wedge Management Plan. Currently in consultation to identify how to address failing septic tanks.
7.31	Identify and address 8 chronic faecal and/or toxicant pollution hotspots in priority catchments	Melbourne Water (EPA Victoria, water authorities, LG)	By 2013	A Polychlorinated Biphenyl (PCB) discharge to Scotchmans Creek has been identified, located and addressed in partnership with EPA Victoria. Two scoped projects are on hold due to prohibitive construction and operational costs. Preliminary sediment sampling due June 2010 is expected to identify further critical hot spots as potential projects.

Managing Litter

AIM To reduce the impact of litter on waterway and the bays				
Water quality benefits: <i>quantified load impact</i>		Not applicable		
Water quality benefits: <i>additional</i>		Fewer toxicants leaching from litter such as cigarette butts and affecting aquatic systems		
Additional environmental benefits		Reduction in impact on aquatic fauna		
Economic benefits		Reduction in clean up costs		
Social benefits		Improvements in health hazards and community perceptions with a reduction in litter. People are more likely to use and appreciate aquatic environments that are free from litter		
ACTION				
No	Description	Lead (support) agency	Timeframe	Achievement
7.32	Continue the Lower Yarra Litter Strategy partnership program until July 2010. The program will involve undertaking litter prevention projects in priority litter hotspots and facilitating institutional arrangements that enable a collaborative approach to litter prevention.	Melbourne Water (Sustainability Victoria, EPA Victoria, Parks Victoria, Metropolitan Waste Management Group, Victorian Litter Action Alliance, City of Melbourne, City of Stonnington, City of Boroondara, City of Yarra)	2009-2010	Lower Yarra Litter Strategy completed June 2010. Final report due August 2010.
7.33	Work with local government to collaboratively develop prevention strategies	MWMG (LG)	Ongoing	<p>Work with Government as follows:</p> <p>Facilitate Litter Advocates 12 month pilot program to empower and engage LG General Managers, Mayors, Managers and Councillors to Advocate Litter Prevention programs across councils.</p> <p>Disseminate information to LG councils on the VLAA Litter Prevention Roadside Kit.</p> <p>Disseminate information to LG council on the \$6 million Litter strategy and funding opportunities</p> <p>Working with metro coastal councils to roll-out MWMG / National Packaging Covenant (NPC) funded "Coastal Litter Prevention Campaign over summer 2010-2011.</p> <p>Continue to work with ButtFREE Australia and disseminate information to councils- new launch "Not a Good Look"</p> <p>Continue 'CLEAN' - Council litter environment action network quarterly to facilitate networking and engagement and explore litter issues and approaches.</p> <p>Assist councils in graphic design and dissemination of litter prevention case studies</p> <p>Assist council with general advice and support e.g. creation of own council litter strategy.</p> <p>Continue to be a member on committees, work with and support LYLs and VLAA.</p> <p>Work closely with VLAA Litter Champion to disseminate information and support each others projects and programs around litter prevention.</p> <p>Facilitation of events such as Clean Up Australia Day and World Environment Day.</p>

7.34	Install gross pollutant traps (GPTs) upstream of sediment basins when installing a constructed wetland or large bio-retention system in areas with high litter generation rates	Melbourne Water (Local government)	2008-2013	Where catchment needs dictate, a gross pollutant trap has been installed as part of newly constructed wetlands to protect the integrity of the system. This occurs as standard practice if a wetland's catchment includes industrial, commercial, school, or retail uses or is otherwise identified as generating high litter loads.
7.35	Develop a Roadside Litter and Resource Recovery Kit and trial and evaluate the program	Sustainability Victoria	By 2014	Not scheduled to commence yet.
7.36	Continue operation of Litter Report Line for public reporting of littering from cars	EPA Victoria	Ongoing	Litter report line continuing as per business as usual.

Point source management program

AIM To manage existing licences (including mixing zones) to ensure that beneficial uses of the waters of the Western Port and Port Phillip region are protected				
Water quality benefits: <i>quantified load impact</i>		Not measurable at this stage		
Water quality benefits: <i>additional</i>		Phosphorus, E. coli and heavy metals		
Additional environmental benefits		Reduction in the impacts of licensed discharges will also reduce the stress on local aquatic environments		
Economic benefits		Protection of economic values of the affected aquatic environments by aiming to protect the beneficial uses of the region through managing licensed discharges.		
Social benefits		Reduction in impacts of licensed discharges, improving the safety of discharge output locations to recreational users.		
ACTION				
No	Description	Lead (support) agency	Timeframe	Achievement
7.37	Assess reports of monitored licensed discharges for compliance with requirements and take appropriate action to address any issues found	EPA Victoria	Ongoing	EPA continues to undertake compliance activities in catchments covered by Better Bays and Waterways. There has been a significant focus placed on detailed on-site compliance checks.
7.38	Review mixing zones for major licensed discharges (where it is a condition of the licence) to ensure that the impact of mixing zones is minimised	EPA Victoria	2012	Action for 2012. Work to be undertaken in the future.
7.39	Together with the Melbourne metropolitan retail water businesses, develop a sewerage strategy for Melbourne that specifies the actions required to build a robust sewerage system to cope with future sewage production and effluent discharge taking into consideration population and urban growth as well as climate change.	Melbourne Water (YVW, CWW, SEW)	2009	Melbourne Metropolitan Sewerage Review has resulted in the development of an implementation plan to ensure that the system can respond to future challenges.

Bushfire rehabilitation

AIM				
To minimise the effects of the 2009 Black Saturday Victorian bushfires on the health of waterways (and the bays) in the Port Phillip and Western Port region				
Water quality benefits: <i>quantified load impact</i>	Not quantified, though loads are likely to significantly increase in waterways following rainfall in fire-affected catchments Any works undertaken to reduce sediments, debris and ash entering waterways will reduce loads to waterways (and in some catchments, also the bays)			
Water quality benefits: <i>additional</i>	Reduction in sediments, phosphorus, nitrogen, debris			
Additional environmental benefits	Improved river health values associated with bank stabilisation, riparian zone protection, revegetation, riparian fencing reinstatement, provision of habitat, weed suppression			
Economic benefits	Reduced effects on water quality in water supply dams, assistance to private landholders to reinstate riparian fencing and plantings to exclude stock from waterways			
Social benefits	Social values associated with improved riparian condition, assistance to landholders affected by fire			
ACTION				
No	Description	Lead (support) agency	Timeframe	Achievement
7.40	Undertake damage assessments in fire affected catchments and prioritise areas for works to protect water quality in waterways and storages	Melbourne Water	2009	Throughout the fire affected water supply catchments, Melbourne Water has installed and maintained silt fences and sediment traps whilst continuously monitoring water quality. Additionally, repair or renewal of the following damaged infrastructure: bridges, roads, culverts, aqueducts, weirs, fences, gates and signage. Managing forest regrowth for protection of critical structures is ongoing.
7.41	Conduct weed suppression and control activities in fire affected catchments	Melbourne Water	2009-2011	Melbourne Water's River Health team have undertaken assessment of fire affected catchments and responded to weed management issues in priority areas.
7.42	Repair and replace Melbourne Water assets as well as assisting landowners to repair and replace their fire-damaged assets, such as riparian fencing, off stream stock watering and riparian plantings	Melbourne Water	2009-2010	Melbourne Water has assisted with individual's bush fire recovery efforts via financial contribution to the replacement of fencing, weed control and revegetation costs. Where necessary we have assisted with stock watering solutions and erosion control.
7.43	Where appropriate, undertake stream stabilisation works to maintain waterway stability in fire affected catchments with a focus on protecting built infrastructure	Melbourne Water	2009-2010	Melbourne Water's River Health team have undertaken assessment of fire affected catchments to assess geomorphic response of waterway systems. This has resulted in active monitoring and investigation activity as well as some intervention works in priority areas.
7.44	Undertake additional monitoring of waterways in fire affected catchments to gain an understanding of future effects on wildlife and river health, including monitoring for dissolved oxygen, nutrients and sediment loads	Melbourne Water	2009-2010	Water Quality surveys have been undertaken in all fire affected catchments. The data will be collated by SKM.
7.45	Conduct a longer term study into the effects of the fires on the system's biodiversity	Melbourne Water	2009-2011	Melbourne Water's River Health team have initiated a review of biodiversity investigations to date.
7.46	Conduct specific investigations for platypus, blackfish and other highly affected species in fire affected catchments	Melbourne Water	2009-2010	Dedicated post-bushfire surveys for fish, macro invertebrates and platypus were conducted in 2009.
7.47	Assess the impact of the 2009 bushfires on critical in-stream drought refuge sites and identify actions to protect or enhance these refuges.	Melbourne Water	2009	Bushfire impacts will be considered as part of the 2009-2010 Drought Action Plan review (due October 2010).

Environmental flows management

AIM				
To ensure environmental flow requirements of all waterways, estuaries and aquifers are regularly reviewed and environmental flows improved through appropriate management.				
Water quality benefits: <i>quantified load impact</i>	Not quantified			
Water quality benefits: <i>additional</i>	Prevention of stagnation, ensuring water is well mixed and oxygenated, and diluting toxic concentrations of pollutants. Improving flow condition links to nitrogen and sediment reduction targets and the implementation of the Central Region SWS			
Additional environmental benefits	Helps meet targets and objectives from the Regional River Health Strategy and Central Region Sustainable Water Strategy (SWS) that aim to reduce the risk of low/no flows and insufficient environmental allocation.			
Economic benefits	Ensuring the longer term sustainability of agricultural practices that rely on stream flows			
Social benefits	Providing recreational benefits to the community by providing water for recreational purposes such as fishing, swimming and boating.			
ACTION				
No	Description	Lead (support) agency	Timeframe	Achievement
7.48	Implement improved environmental flows for the Port Phillip and Western Port catchments as prescribed in the Central Region SWS	Refer to the Central Region SWS	Ongoing to 2055	Melbourne Water and DSE signed off on an environmental entitlement for the Bunyip and Tarago rivers in 2009. In 2006, the Yarra River was granted an Environmental Entitlement of 17,000 ML and minimum passing flows in order to meet the environmental flow recommendations. In 2007, the Environmental Entitlement was qualified by the Minister for Water, Tim Holding MP. However in 2010, it was announced that 7,000 ML of this entitlement would be returned to the Yarra River. Melbourne Water has commenced negotiations with Western Water in order to achieve the action of transferring part of Western Water's Rossllynne Reservoir entitlement to the environment, but acknowledges that this is likely to be a difficult process. 50% of currently unallocated inflows in Lake Merrimu have been allocated to an environmental entitlement for the Werribee River.
7.49	Review flow objectives and requirements for Little River by 2013	Melbourne Water	By 2013	An Environmental Flow study is 90% complete for the Little River. The study identifies key water dependent values in the waterway, sets ecological objectives for each value, and determines flow components to achieve the agreed objectives. The next steps for this action will be to identify which flow objectives are of highest priority and which are opportunities for implementation.
7.50'	Annually report on the progress of the actions within the Central Region SWS	DSE	Ongoing	DSE has completed its second annual review (covering the period 1 July 2007 – 30 June 2008) of water availability and demand compared to the predicted forecasts. The annual review includes an evaluation of progress in meeting targets. River flows and progress in meeting environmental targets has also been monitored. The review shows that the supply and demand trends in the 2007-08 year continue to support the Government's decision to bring forward the major augmentations in the Water Plan. For further information go to: http://www.ourwater.vic.gov.au/programs/sws/central/implementation .
7.51	Begin the review of the Port Phillip and Westernport Regional River Health Strategy by 2010.	Melbourne Water	2010	Review of the RRHS formally commenced in March 2010, with draft targets and costs for management actions for the next RRHS (Healthy Waterways Strategy) due to the ESC by June 2011. The targets and costs for the management actions will then be written into a draft strategy between July – December 2011. The completed Healthy Waterways Strategy will cover the period 2013/14 – 2017/18.

Marine Influences

Image supplied by Parks Victoria

Although the catchments are the source of most of the pollutants in the marine environment, action is also required in the marine environment to complement actions in the catchments.

Marine Influences

AIM		To ensure integrated management and research of marine environments and processes in Port Phillip Bay and Western Port		
Water quality benefits: <i>quantified load impact</i>	Total load reductions of nitrogen to Port Phillip Bay and sediment and nutrient loads to Western Port			
Water quality benefits: <i>additional</i>	Other benefits such as phosphorus, E. coli, heavy metals, litter			
Additional environmental benefits	A single framework for monitoring, reporting and managing actions within the individual bays will minimise duplication and provide for efficient reporting of management action implementation and effectiveness.			
Economic benefits	Good water quality in the marine environments helps sustain many commercial industries including aquaculture, commercial fishing and tourism (e.g. diving, seal rocks)			
Social benefits	Recreational activities – good water quality contributes to the continued use of the bays for fishing, diving and boating.			
ACTION				
No	Description	Lead (support) agency	Timeframe	Achievement
8.1	Implement the actions relating to the marine environment in Port Phillip Bay and Western Port in the Victorian Coastal Strategy 2008	VCC (DSE, CMA)	Ongoing beyond 2013 (5 year strategy)	A mid-term report will be prepared by June 2011.
8.2	Review the Port Phillip Bay EMP and ensure that the relevant Better Bays and Waterways actions clearly link to the statutory EMP framework to provide a policy vehicle for implementation and attainment of nutrient reduction actions	DSE (EPA Victoria)	2009-13	Have met with the Shire of Yarra Ranges and Baw Baw Shire to discuss. There is a high level of support at SYR and we have made improvements to the Green Wedge Management Plan. Currently in consultation to work out how we can address failing septic tanks.
8.3	Undertake an analysis of current key knowledge and management gaps to improve strategic understanding of Western Port, with a clear focus on informing improved future environmental management as the basis for future investment and action. Commence implementation of key priorities.	DSE (Melbourne Water, EPA Victoria, PPWCMA)	By 2013	DSE is working with Melbourne Water on a "Scientific Review of Western Port environmental values and threats project. The project will be managed by Melbourne Water, with support in the marine policy technical area from DSE - and co-funded by Melbourne Water and DSE. After initial meetings with stakeholders, work has commenced on an agreed project brief.
8.4	Implement targeted re-establishment of shoreline vegetation, especially mangroves on Western Port shorelines identified as at risk of erosion, and monitor its effectiveness using water quality indicators and seagrass condition assessment to guide future investment	PPWCMA Seagrass partnership	2009-2010 ongoing	The PPW CMA understand that the Western Port Seagrass Partnership is conducting some activities with school programs and community groups. The focus is on the Lang Lang cliffs but the area treated will be insufficient to achieve any water quality change.

Understanding Our Rivers and Bays

Image supplied by Parks Victoria

Regular research and monitoring of water quality occurs within the region's catchments and bays. The data is used to inform, report on and improve current management.



In-stream monitoring

AIM				
To maintain a regional monitoring program that fully assesses and reports on the freshwater and estuarine water quality of the Port Phillip and Western Port catchments and is relied upon to guide management decisions				
Water quality benefits: <i>unquantified load impact</i>	Measurements of load reductions for nitrogen and sediments			
Water quality benefits: <i>other</i>	Measurements of load reductions for other pollutants of concern, such as phosphorus, heavy metals, E. coli.			
Additional environmental benefits	The suite of parameters monitored allows managers to identify when any indicators threaten the environmental values of the system			
Economic benefits	Information on the current condition of waterways to feed into the development of cost effective management programs			
Social benefits	Community engagement for a better understanding of local water quality			
ACTION				
No	Description	Lead (support) agency	Timeframe	Achievement
9.1	Regularly monitor, review and report on water quality monitoring programs across the region	Melbourne Water	Ongoing	The water quality data collected from January to December 2009 has been compiled in a summary fact sheet available on the Melbourne Water website. In addition, the data has been assessed against SEPP and reported in the Environmental Report.
9.2	Enhance and develop community water quality monitoring programs (such as Waterwatch) and develop accessible datasets to educate community members on water quality issues	Melbourne Water (Waterwatch Melbourne)	2009	Melbourne Water's Healthy Waterways Waterwatch program engaged with 519 community monitors and 123 active monitoring groups over the past 12 months. Monthly data records from monitoring groups are entered on the Melbourne Water Waterwatch database to report results to key stakeholders. Seventy-two community information sessions were also conducted to inform and engage the community on water quality issues.
9.3	Establish monitoring of contaminants in fish from freshwater and estuarine waters to understand human health risks associated with fish consumption	Melbourne Water/ EPA Victoria (DHS)	By 2013	The most recent study was based on fish collected from the Yarra between Dights Falls and Wonga Park. Fish were collected in mid 2008 and fish tissue was analysed for organic and metal toxicants. Results have been written into a draft report that will be circulated to EPA and DHS for comment.
9.4	Undertake faecal contamination monitoring in the Yarra River, Maribyrnong River, Mordialloc Creek and Patterson River and expand the monitoring network to other rivers and creeks of recreational importance across the region	Melbourne Water (DHS, EPA Victoria)	2008-2014	All water quality monitoring sites on the stream network have E. coli included in the suite of analyses. Faecal contamination 'surveillance' continued during 2009-10 at the end of drains discharging to the lower Yarra River. Yarra Watch continued at 13 sites, along with two weekly sites in the Maribyrnong. Monitoring has expanded to cover additional recreational sites during the summer only during 2009-10. No further expansion is envisaged.
9.5	Investigate sources of faecal pollution in waterways and impacts on recreational activities	Melbourne Water (DHS, EPA Victoria)	2008-2014	A number of source tracking investigations were commissioned out by Melbourne Water. A broad research program determining bacterial sources and sinks has been agreed with Monash University and research commenced towards the end of 2009-10.
9.6	Implement recommendations from the loads monitoring program reviews and continue to review monitoring programs and measure loads across the region	Melbourne Water	2009	The recommendations of both reviews were implemented. The program is ongoing, however, it is being reviewed internally by a Steering Committee. It is anticipated that the whole program will be modified to ensure that it continues to be appropriate and cost effective.

ACTION				
No	Description	Lead (support) agency	Timeframe	Achievement
9.7	Develop an estuarine monitoring program and integrate it with the waterway water quality monitoring program	Melbourne Water	Ongoing	Eleven estuaries have been sampled intensively through the Index of Estuary Condition project run in collaboration with DSE and Deakin University. In addition to the core parameters sampled (physico-chem – vegetation etc) bird and fish surveys have been undertaken on these systems as well as a sediment quality survey undertaken by the CAPIM research team.
9.8	Monitor and analyse macro invertebrate data to complement water quality and waterway health data	Melbourne Water	Ongoing	A data analysis has commenced, and further data collection has been undertaken to inform the Index of Stream Condition. The report is due at the end of June 2010.
9.9	Establish and report on pesticide and toxicant monitoring and research programs to determine their concentrations in the environment, their environmental effect and major sources of contaminants	Melbourne Water	2008-2014	The pesticide program has commenced and results from the first surveys of the upper Yarra catchment have been completed. A DPI report is due in August 2010.
9.10	Regularly review monitoring programs for freshwater and estuarine environments to ensure they are strategically designed to inform current and future management decisions and measure progress towards water quality targets	Melbourne Water	Ongoing	Melbourne Water has set up a Water Quality Improvement Project and Steering Committee. Reviewing the monitoring network has been identified as a priority project; along with developing conceptual models for estuaries. These models will inform design of a monitoring network. Completion of the Adaptive Management Framework in early 2010-11 will also assist with building in increased relevance into monitoring programs.



In-bay monitoring

AIM	To implement marine monitoring programs for Port Phillip Bay and Western Port that assess and report on water quality and the protection of beneficial uses and is relied upon to guide management decisions			
Water quality benefits: <i>quantified load impact</i>	Total load reductions of nitrogen and sediments to marine waters			
Water quality benefits: <i>additional</i>	Assists in linking water quality to protection of beneficial uses (e.g. phosphorus, E. coli, heavy metals, litter)			
Additional environmental benefits	Linkages to SEPP and national water quality strategy implementation and demonstrated progress on protection of Ramsar wetlands			
Economic benefits	The beaches of Port Phillip Bay and Western Port are major recreational resources attracting significant numbers of tourists to the beaches and subsequently the quality of the water has an impact on the local economy			
Social benefits	Healthy ecosystems and beach water quality are factors in social and economic benefits for both Port Phillip Bay and Western Port			
ACTION				
No	Description	Lead (support) agency	Timeframe	Achievement
9.11	Undertake regular monitoring of water quality in Port Phillip Bay with appropriate QA/QC (including EPA's monitoring of beach water quality for swimming at Port Phillip Bay beaches) to inform future management	EPA Victoria (DSE, DPI, OEM, Mornington Peninsula Shire)	ongoing	Regular monitoring and reporting is undertaken as part of the beach monitoring report. Fixed sites network water quality monitoring in Port Phillip Bay and Western Port continues. Additional rigour to improve quality assurance has been undertaken.
9.12	Undertake monitoring of beach water quality in Western Port at specific beaches within the Mornington Peninsula Shire region to inform future management	Mornington Peninsula Shire	2009	An important part of monitoring local beaches and waterways is to measure the impact of domestic wastewater and septic tank systems. Samples were taken from Somers, Balnarring, Merricks, Point Leo, Shoreham and Flinders fortnightly. Very Good beach results were achieved during 2009/10 at all Westernport swimming beaches, however, precautions should be taken at any beach with a stormwater outfall following storms or rainfall events.
9.13	Interpret results and monitoring data for the marine environment and publicly report on findings. Where relevant use results to inform management.	EPA Victoria/DSE	ongoing	Annual beach report in preparation and due for release in July 2010. Reporting on fixed site water quality monitoring is undertaken on a periodic basis.
9.14	Develop and implement a marine environmental condition assessment framework (ECAAF) and reporting approach that will inform monitoring approaches, supported by a scientific assessment of existing programs and future needs. e.g. Use the ECAF to undertake an environmental condition assessment for Port Phillip Bay and Western Port to inform future monitoring approaches.	DSE (EPA Victoria, DPI, Parks Victoria, PPWCMA)	ongoing	Victoria (through DSE) is actively contributing to development of a National Condition Assessment and Reporting Framework – which will be the successor to the ECAF – through a National MER taskforce under the National Marine and Coastal Committee. This framework has recently been endorsed by the NRM Ministerial Council and is now being piloted across Australia (including the South Eastern States) to inform its refinement. DSE is currently pursuing pilots of key elements of this approach within Victoria, for the marine flagship areas identified in the Land and Biodiversity White Paper.
9.15	Promote, enhance and develop community based monitoring programs that build community engagement and understanding of water quality and environmental values in Port Phillip Bay and Western Port	PPWCMA	ongoing	The Two Bays 2010 program provided an opportunity to build community awareness of bay values and the importance of water quality management. The project brings together government agencies, local governments, key stakeholders and community groups in a three week sailing program, which included community monitoring programs, habitat mapping, marine pest surveys, seabird monitoring, multicultural events, and building partnerships with indigenous groups. An automated underway monitoring system was piloted to provide participants with a picture of bay water quality. Information collected is made available through the project website.

Research and Investigations

AIM				
To conduct research and investigations programs that will stay abreast of emerging issues that present a threat to water quality. The program will also focus on improving water quality in a changing environment				
Water quality benefits: <i>quantified load impact</i>	No measurable load reductions applicable			
Water quality benefits: <i>additional</i>	Research programs link to improving our knowledge base and enable management to be refined and improved to allow targets to be met			
Additional environmental benefits	Environmental benefits are associated with an improved understanding and knowledge base. Understanding issues links to the ability to achieve targets and improve methods and tools			
Economic benefits	Economic benefits are gained through an improved understanding and knowledge base, driving more cost-effective			
Social benefits	Social benefits are associated with an improved understanding and knowledge base. Understanding issues links to the ability to achieve targets and improve methods and tools			
ACTION				
No	Description	Lead (support) agency	Timeframe	Achievement
9.16	Continue to use and validate the PortsE2 and receiving water quality models with up-to-date monitoring and climate data to inform management	Melbourne Water/ EPA Victoria	2009-2013	PortsE2 findings are continuing to be used to inform Melbourne Water programs including the Rural Land Program. Funding has been allocated for future years to ensure the model is kept up to date.
9.17	Investigate and report on the relative rates of denitrification and assimilation of nitrogen in waterways of varying size and condition across the region	Melbourne Water (Monash University)	2013	There is some evidence in the literature about the relationship between denitrification capacity and stream size. This concept needs to be revisited and the first step will be to undertake a desktop study recapping on the latest in the field.
9.18	As required, undertake targeted studies to identify the sources of specific contaminants in waterways	Melbourne Water	As needed	Melbourne Water has joined a new research partnership – the Centre for Aquatic Pollution Identification and Management (CAPIM). This research centre is developing techniques in our jurisdiction that will not only enable the identification of toxic sources, but also the nature of the toxicant causing the damage. This will provide a great basis for managing illicit sources of toxic pollution.
9.19	Develop a bacteria budget program to understand the movement of bacteria in and out of the waterway network to reduce their presence in waterways and other receiving water bodies	Melbourne Water, EPA Victoria (PPWCMA)	2009	The bacterial budget program has been developed, agreed, and funding commitment given. Research has commenced.
9.20	Support and collaborate with eWater in researching the in-stream dynamics of nutrients to enhance and inform management activities	Melbourne Water	2008-2013	This area of research is continuing with eWater, although there was an unavoidable tragic setback in 2009 when the principal researcher died unexpectedly. We are relying on the CRC to continue this line of research.
9.21	Research and report on the effectiveness of natural and constructed stormwater treatment systems on treating urban and rural stormwater	Melbourne Water	By 2013	The Rural Water Quality (WQ) Treatment Scoping Project was run in 2008/09 to identify opportunities for constructing WQ treatment wetlands in rural areas in the Port Phillip and Westernport region. Overall the project found that regional wetlands were difficult to translate from an urban to a rural context due to issues such as lack of flows, high natural values and lack of water quality data for rural streams. Two sites were identified, one on Olinda Creek, Yering and the other on Wallan Creek, Wallan. Wallan Creek has progressed to the development of a project concept plan for community consultation. Additional treatment modelling was required for the Olinda Creek site to consider the potential impact on wetland treatment capacity of variations in flows and pollutant loads from the Lilydale Sewage Treatment Plant. This modelling has been completed and the project is now being considered as part of 2010/11 planning. External consultation will commence in 2010/11.



9.22	Improve estate-scale urban stormwater modelling through review, validation and calibration	Melbourne Water	By 2013	Modelling work has commenced on evaluating estate, street scale and allotment scale solutions to determine optimal outcomes. Work is being undertaken by Chris Walsh, Rhys Eddy and Tim Fletcher.
9.23	Develop an estuary strategy for the estuaries of Port Phillip Bay and Western Port	Melbourne Water	2009	A draft strategy has been prepared. This strategy is being reviewed in light of the new responsibilities Melbourne Water will have as part of the merger with the Port Phillip and Westernport CMA and the Central Coastal Board. The draft strategy is informing the review of the Regional River Health Strategy.
9.24	Collaborate between agencies and universities to better understand the presence and effect of EDCs and other bio-indicators on fish across the region	Melbourne Water (DPI, Melbourne University)	2008-2013	A research centre, CAPIM, has been established at the University of Melbourne that includes undertaking biochemical and biological investigations and research into impacts of EDCs in freshwaters and estuaries.
9.25	Continue the nutrient flux monitoring program and review at regular intervals to inform management	DSE (EPA Victoria, DPI, Melbourne Water)	By 2013	Monitoring is continuing. The program has been augmented to the end of 2011 with additional locations, bimonthly reporting on water quality measurements and quarterly reporting on nutrient fluxes, as part of the Baywide monitoring for Channel Deepening.
9.26	Implement a program(s) to better understand how groundwater and surface water management can be integrated to enhance overall water resource protection in priority areas.	DSE Office of Water	2011	DSE has prepared guidance on the application of Managed Aquifer Recharge to facilitate use in overall water management (eg. storage and reuse of stormwater). DSE has also funded Southern Rural Water to undertake a groundwater resource appraisal (including interactions with surface water) for the sandbelt of the south east suburbs of Melbourne (Moorabbin to Nepean). DSE has also released the Melbourne Groundwater Directory to provide a general understanding of groundwater in the Port Phillip Basin.
9.27	Expand groundwater monitoring network and water quality monitoring in priority areas	DSE	2012	KooWeeRup management plan area has ongoing salinity monitoring. Nepean groundwater management area included analysis of nutrients and ecoli to evaluate impacts of septic tanks (2008). A broad range of water quality parameters were also analysed in the Wandin Yallock Groundwater Management Area. Ongoing water quality monitoring is scheduled for Nepean, Deutgam, Wandin Yallock, KooWeeRup and Moorabbin Groundwater Management Areas.

Effective Management



Combining the resources of government and the community will result in better management of water quality.

Community engagement

AIM		For the community to recognise the value of good water quality and participate in maintaining and improving it through understanding the issues		
Water quality benefits: <i>quantified load impact</i>	Not quantifiable			
Water quality benefits: <i>additional</i>	Although not quantifiable, effective community engagement will contribute to reductions in pollutants including nutrients, toxicants, and pathogens such as E.coli			
Additional environmental benefits	Improved community awareness of environmental issues			
Economic benefits	Effective community engagement and consultation ensures actions align with the values and needs of the entire community. Engagement and consultation throughout action implementation ensures budgets and spending are cost-effective			
Social benefits	Community understanding and ownership of waterways improvements can lead to changed behaviours to improve water quality. Good water quality benefits the community by making waterways and bays safe and available for recreational purposes and aesthetic enjoyment			
ACTION				
No	Description	Lead (support) agency	Timeframe	Achievement
10.1	Regularly survey community members through Melbourne Water's waterways market research program to measure their ownership and understanding of local waterways	Melbourne Water	Ongoing	Melbourne Water conducted a major social research project between January and June 2010 on waterways values, perceptions, actions taken at home and awareness of 84 Hundred campaign.
10.2	Continue educational programs run by Melbourne Water at schools and festivals to promote understanding of water quality	Melbourne Water (Waterwatch Melbourne)	Ongoing	Melbourne Water's Healthy Waterways Waterwatch program was delivered to over 23,000 students (178 schools) across the Port Phillip and Westernport region over the past 12 months. The Program was also present at 54 community festivals and events during this time. In 2009/10, more than 35,000 people participated in a Waterwatch activity or program.
10.3	Identify the type of community engagement that is needed to successfully implement the management programs within Better Bays and Waterways	Refer to lead in each Part 2 management action	2009-2013	Undertaken by each lead agency as part of program development and/or implementation.

Governance

AIM				
To provide a coordinated approach to reporting on and steering water quality outcomes				
Water quality benefits: <i>quantified load impact</i>		N/A		
Water quality benefits: <i>additional</i>		The coordinating committee will monitor the progress of actions to ensure water quality targets and outcomes are achieved.		
Additional environmental benefits		N/A		
Economic benefits		N/A		
Social benefits		N/A		
ACTION				
No	Description	Lead (support) agency	Timeframe	Achievement
10.4	Initiate a coordinating committee to oversee the implementation of Better Bays and Waterways	Melbourne Water (DSE, EPA Victoria, DPI, PPWCMA, Parks Victoria, LG and others)	Inception by 2010	Initiation of coordinating committee has been deferred until governance arrangements around the merger of Melbourne Water, the Port Phillip and Western Port CMA and the Central Coastal Board are finalised. It may be possible to set the committee up towards the end of 2010 if governance structures are finalised in the next few months otherwise it will be undertaken in 2011. It is important to prevent duplication of governance arrangements.
10.5	Establish and engage a resource to support the administrative needs of the coordinating committee	Melbourne Water	2009-2014	Deferred until governance arrangements are sorted out (see comments on Action 10.4).

Reporting, evaluation and review

AIM				
To track and report on the implementation of the management actions and programs in Better Bays and Waterways and report on progress towards the targets				
Water quality benefits: <i>quantified load impact</i>		N/A		
Water quality benefits: <i>additional</i>		N/A		
Additional environmental benefits		N/A		
Economic benefits		N/A		
Social benefits		Education, engagement		
ACTION				
No	Description	Lead (support) agency	Timeframe	Achievement
10.6	Develop an annual water quality and loads update, possibly in the form of a report card	Better Bays and Waterways coordinating committee	2010-2014	Melbourne Water is engaging in a project to explore simple on-line maps as a vehicle for explaining stream health in a report-card report to the community. At the end of 2009-10, tenders from vendors were being assessed prior to interview.
10.7	Develop an annual Better Bays and Waterways implementation report	Better Bays and Waterways coordinating committee	2010-2014	This report is the implementation report for 2008/9 and 2009/10. As the plan was still under development in 2008/9, this is the first implementation report.
10.8	Annually report on the implementation of Better Bays and Waterways actions	All lead agencies	2010-2014	Undertaken as part of this implementation report.
10.9	Coordinate the Port Phillip Bay EMP review and reporting with Better Bays and Waterways reporting	DSE (Melbourne Water, EPA Victoria)	2010-2014	DSE has started discussions with Melbourne Water on this coordination.
10.10	Review the SEPP (WoV) water quality objectives	EPA Victoria (Melbourne Water, DSE)	2013/14	Not scheduled to commence until 2013.
10.11	Incorporate the actions from Better Bays and Waterways into the reviews of the Regional Strategy for Healthy Rivers, Estuaries and Wetlands (currently Regional River Health Strategy) and Regional Catchment Strategy	Melbourne Water/CMA	RCS - 2009/10 RRHS - 2012	Reviews of the River Health Strategy and Regional Catchment Strategy are underway and the directions outlined in BBW are being considered in developing both strategies. The second edition of the Regional River Health Strategy and the third edition of the Regional Catchment Strategy are being developed for completion in mid-2011. Both will set environmental condition targets from information provided by BBW.

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