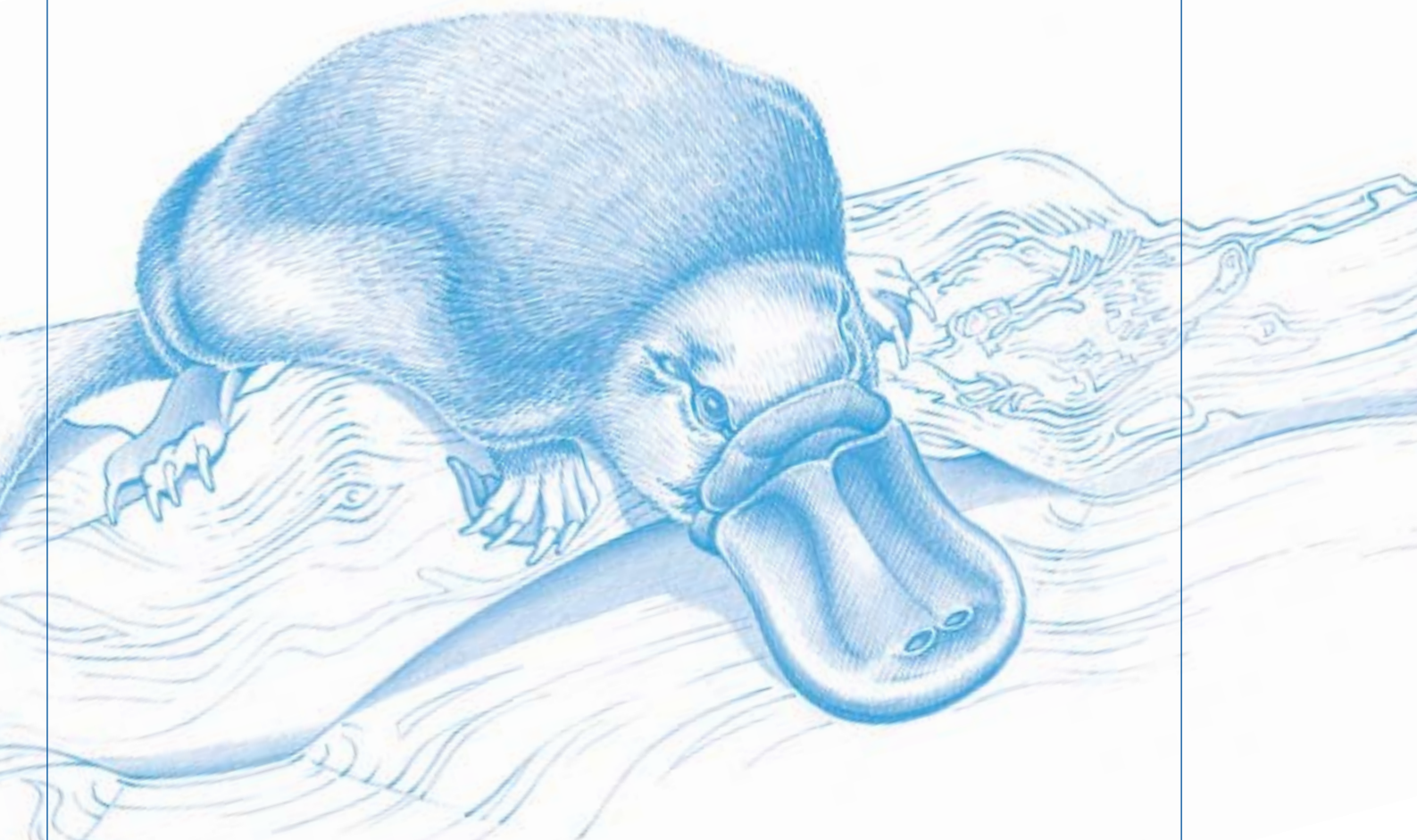


# Melbourne's Rivers and Creeks 2004



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*Melbourne Water is owned by the Victorian Government. Our operating area extends from Melbourne's water supply catchments high up in the Yarra Ranges, to the Mornington Peninsula and Western Port, north to Yan Yean and west to Werribee.*

*We manage Melbourne's water resources in a way that aims to ensure that future generations enjoy one of the best urban environments in the world. This involves a major role in the total water cycle.*

*We work closely with the Port Phillip and Westernport Catchment Management Authority (CMA) to protect and improve our rivers and creeks. The CMA is responsible for the overall strategic management of natural resources and regional planning for the Port Phillip and Westernport catchment through the development of a Regional Catchment Strategy.*

# Protecting our natural assets

Every year, Melburnians make about 100 million recreational visits to our rivers, creeks and streams, and about one in three Melburnians live within one kilometre of a waterway.

Rivers and creeks improve the quality of our urban and rural environments, often contain significant vegetation, provide important habitat for native animals and are valued as recreational assets.

We understand that the community regards the condition of our rivers and creeks as an important indicator of environmental health. The goal is to ensure that Melbourne's natural waterways are healthy, with increased numbers of native fish, platypus and plants.

This report has been developed to demonstrate how we are working to achieve our goal. It provides important information on the health of our rivers and creeks, their water quality, aquatic life and habitat, vegetation and level of flow. The report also provides important information on how you can become involved in your local 'Friends of' group or the Melbourne Waterwatch program to help us protect and improve our waterways.

This report supports the Victorian Government's River Health Strategy to ensure the long-term health of the State's waterways. Melbourne Water and the Port Phillip and Westernport Catchment Management Authority are working together to prepare a Regional River Health Strategy for the Port Phillip and Westernport catchment.



Merri Creek.



# Milestones

Yarra River near Melbourne.



Today, Melburnians value our rivers and creeks, and consider them to be major environmental and recreational assets. In the past, however, waste was discharged to our waterways and, when Melbourne was first established, the Yarra River was often used as a ‘drain’ to dispose of household and industrial waste. This led to three typhoid epidemics in the early 1840s that claimed up to 20 lives a week. Melbourne’s residents were forced to buy safe drinking water from commercial water carters.

Early attempts to control pollution were largely ignored and the establishment of a sewage treatment farm became essential. The development of the Western Treatment Plant in Werribee by the Melbourne Metropolitan Board of Works – Melbourne Water’s predecessor – in the 1890s ensured that raw sewage ceased to flow directly into the Yarra.

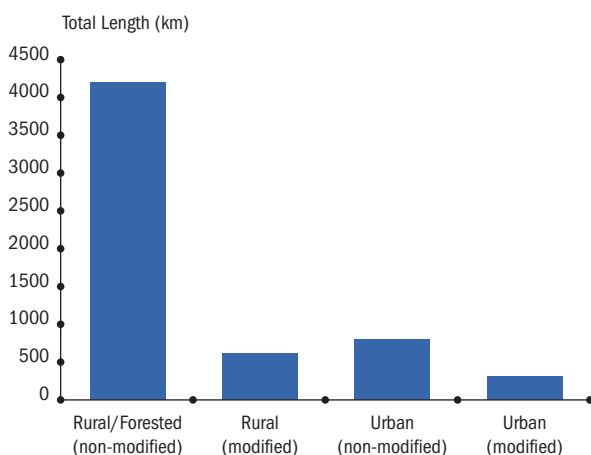
At about the same time, another major change was taking place about 100 kilometres upstream from Melbourne. More than 100,000 hectares of land around the source of the Yarra were permanently locked up to secure a pristine water source for the growing city, and a series of dams were constructed to contain this water. Because of these protected forested areas, Melburnians now enjoy one of the best water supply systems in the world.

Community standards and expectations have changed substantially in recent years and this has been reflected in more community involvement in caring for rivers and creeks, and stronger environmental regulation. The introduction of the *Environment Protection Act* in 1970 ensured a substantial improvement in waterway quality through the diversion of industrial waste and the large-scale sewerage of Melbourne’s outer suburbs and rural areas.

In the 1990s, major advances in waterway management occurred and native fish and platypus started to return to our waterways as a result of improvement projects. Local councils and the development industry also became more involved in assisting Melbourne Water to reduce stormwater pollution, and the community, farmers and other key stakeholders have also become more involved in protecting and improving waterway health.

Melbourne is home to almost four million people and is expected to grow by one million by 2030. Urban growth has led to a decline in waterway health in the past and it will be a challenge to

**Waterway types in greater Melbourne.**



protect rivers and creeks as the lands around them change significantly.

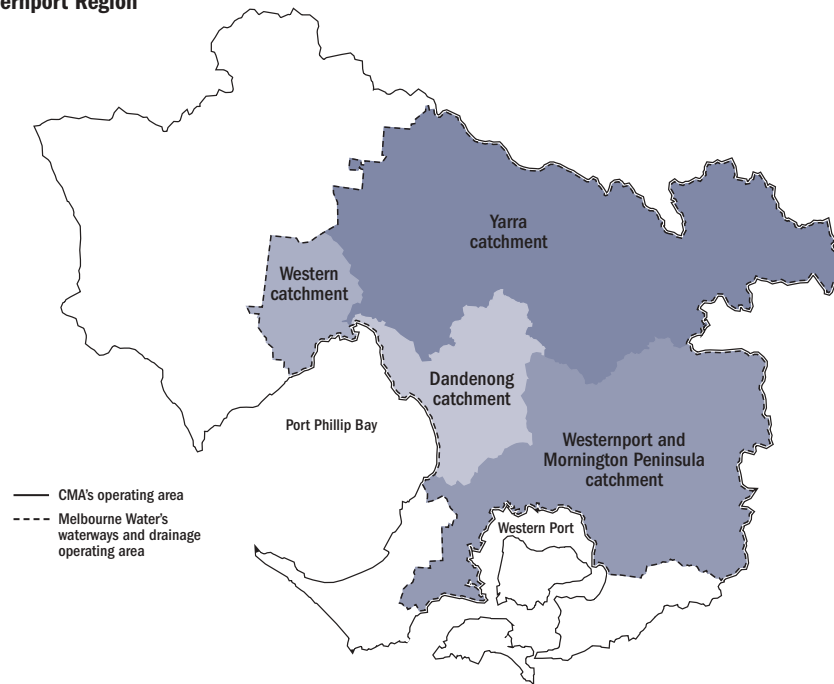
Major changes are being made in rural areas, with intensification of agriculture, changes in crop types and an increase in small allotment ‘hobby’ or ‘lifestyle’ farms on the urban fringe.

Today, urban development is more sustainable in its approach, and water-sensitive urban design is being introduced into suburbs to protect water quality and waterway health. Waterways are now also valued in the urban landscape and are generally incorporated into major open space corridors provided by new developments.

## Our rivers and creeks today

In the Port Phillip and Westernport region, Melbourne Water has responsibility for managing almost 4000 kilometres of rivers and creeks, and a further 1200 kilometres of waterways in forested areas and closed water supply catchments.

### Port Phillip and Westernport Region



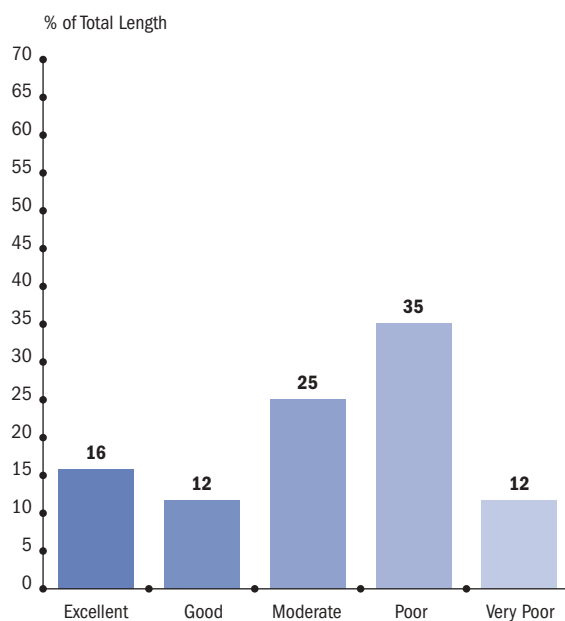
Recent analysis shows that in Melbourne Water's operating area, 28% of rivers and creeks are in good or excellent condition, and 25% are in moderate condition.

Forty-seven per cent are in poor or very poor condition, mostly due to changes in flow, poor water quality and changes in land use.

Generally, the condition of rivers and creeks closer to the city worsen due to run-off from buildings and roads, loss of vegetation and litter.

This report provides an overview of waterway condition based on the best available information, and draws on a wide range of data and findings from various investigations into waterway activity and health.

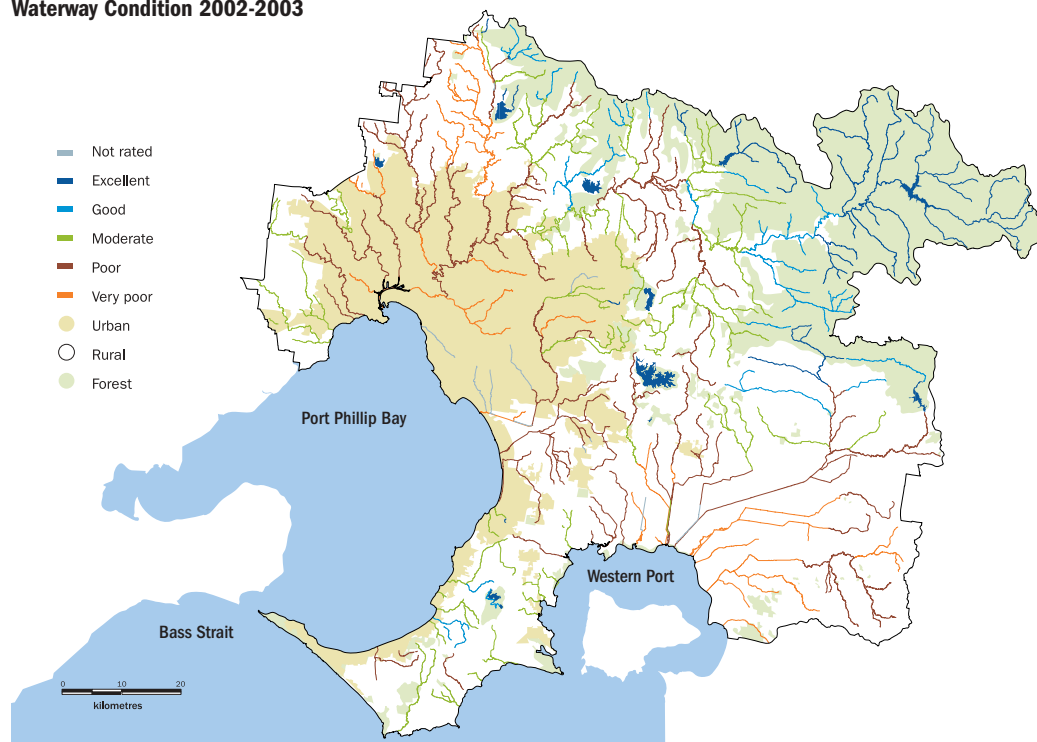
### Condition ratings for rivers and creeks in Melbourne Water's operating area.





The ratings provided in this report are based on the Index of Stream Condition (ISC), developed by the Department of Sustainability and Environment for rural waterways. They have been modified, however, to account for the urban rivers and creeks in Melbourne Water's operating area. The overall rating combines information on five aspects of waterway health identified by the ISC and is supplemented with data from Melbourne Water's extensive water quality and biological monitoring programs, which examine 72 sites around the region (see Appendix page 38). In this report, Melbourne Water has sought to provide information on each waterway as a whole, not specific sections identified by the ISC.

### Waterway Condition 2002-2003



# Reviving our rivers and creeks

In protecting and improving Melbourne's rivers and creeks, the main objectives are to:

- Achieve significant improvements in waterway health by managing environmental flows and undertaking improvement works
- Reduce nitrogen inputs to Port Phillip Bay from the stormwater system by 100 tonnes a year by 2010 through the construction of wetlands
- Work with the community and key stakeholders to protect and improve our waterways.

The rivers and creeks in the Port Phillip and Westernport catchment have experienced significant changes as their catchments have been modified for agricultural and urban use. Despite this, some 87 per cent of the region's waterways are natural.



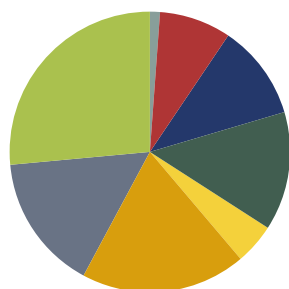
Tree planting, part of Melbourne Water's Healthy Rivers Program.

The most significant threats to waterway health in greater Melbourne include changes in land use, loss of vegetation, flow changes, poor water quality, bed and bank erosion, fish barriers, and invasion by weeds and introduced fish. Our challenge for the future is to re-establish healthy rivers and creeks, vegetated with indigenous plants and with more abundant wildlife.

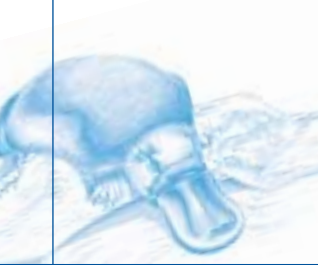
Melbourne Water invests over \$23 million a year to protect and improve the health of our rivers and creeks. This is a long-term program of improvement works that includes:

- Improving waterway beds and banks
- Preventing pollution and excessive erosion
- Creating and improving habitat
- Improving water quality by constructing litter traps, wetlands and other stormwater projects
- Removing weeds and cleaning up pollution spills and litter
- Replanting stream edges in partnership with landowners and local councils
- Research and monitoring
- Educating and involving the community.

## Expenditure allocation under the Healthy Rivers Program 1998-2003.



● Fishways - \$1.1 million
● Monitoring and Research - \$8.3 million
● Planning and Stakeholder Involvement - \$10.8 million
● Weed Management and Revegetation - \$13.6 million
● Stream Frontage Management Program - \$5 million
● Wetlands and Water Quality Management - \$18.8 million
● Waterway Maintenance - \$15.7 million
● Major Rehabilitation - \$26.4 million



# Our major priorities

## Improving waterway beds and banks

Land clearing and development in local catchments have affected our rivers and creeks by increasing urban run-off, reducing water quality and changing natural flow regimes. Native vegetation has been replaced or is being invaded by introduced plants (such as willow trees). Improving waterway beds and banks mainly involves removing introduced plants, replanting with indigenous vegetation and controlling excessive erosion.

A number of Melbourne's urban rivers and creeks are considered to have a high stability rating for beds and banks. This is mostly due to channel modifications such as concrete lining, which was largely used as a flood protection measure in the past. Despite the high stability rating, these waterways may not necessarily provide good habitat for aquatic plants and animals.

## Managing environmental flows

An environmental flow refers to the amount of water flowing along a waterway to ensure its health. The use of water from rivers and creeks for domestic and agricultural use, land clearing and urbanisation impacts on flows and stream health.

For waterways such as the Yarra River, flows are allocated through government permits. Under the State Environment Protection Policy, Melbourne Water is required to ensure, to the extent that it is practicable, that the Yarra River flows at a rate of 245 million litres a day, measured at Warrandyte.

On other waterways, Stream Flow Management Plans that involve sustainable water allocations are being prepared. To do this, we bring together working groups of water users, including licensed diverters (irrigators) to develop plans that balance the needs of all water users with those of the environment.

Our intention is to ensure adequate flows to protect or allow the recovery of waterway health.

## Constructing fishways

Barriers to fish passage in rivers and creeks can be created by structures such as dams, weirs and road crossings. These structures hamper access to habitat and limit migration of some species, especially native fish, hindering breeding cycles. We aim to provide a continuous passage for fish and other aquatic animals by building fishways, which are structures that allow fish to swim over impediments.

Since 1998, Melbourne Water has invested more than \$1 million to reconnect more than 230 kilometres of rivers and creeks through the construction of some 20 fishways. We have targeted a further 1200 kilometres of waterways to be reconnected by building more fishways.

Grayling have been found in the Maribyrnong River above Keilor for the first time since 1982. Fishways built as part of the Healthy Rivers Program helped the fish to migrate upstream.





Hampton Park  
Wetlands (far left).  
Water quality testing  
(left).

## Improving stormwater quality

Melbourne Water builds wetlands to treat pollution in stormwater run-off before it reaches our waterways and bays. This helps to improve water quality and reduce the amount of nitrogen in the marine environment. We have built over 50 wetlands, and more are being built which will contribute to reducing 100 tonnes of nitrogen a year from rivers and creeks that discharge to Port Phillip Bay by 2010.

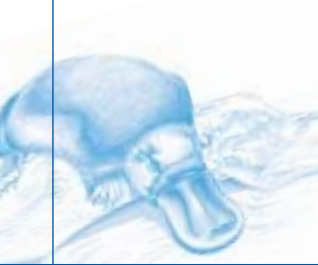
Melbourne Water has assisted all local councils in Melbourne to develop and implement stormwater management plans to reduce pollution and protect waterway quality from new urban developments. These plans include regulation, enforcement, construction of infrastructure (such as litter traps) and education. We also routinely remove litter, obstructions and pollution in our rivers and creeks.

## Community partners and education

Melburnians have a great sense of ownership of their waterways, and many actively participate directly in their management through local “Friends of” and Landcare groups. Melbourne Water offers grants and works closely with community groups, school groups and landholders to assist their contribution to waterway improvement. Key programs include:

### Working with landholders

Since 1996, Melbourne Water has been providing grants to help rural landholders improve and protect the waterways that run through or adjacent to their properties under the Stream Frontage Management Program. The most common works required are weed and vermin control, fencing to exclude stock, and revegetation of banks with indigenous plants. Almost \$5 million has been provided to more than 1100 recipients to protect about 350 kilometres of waterways, and more than 480,000 trees and shrubs have been planted as part of the program.



## Our major priorities

### Assisting volunteer groups

Most weekends across Melbourne, volunteer groups get together to improve and protect their local rivers and creeks. Melbourne Water provides annual funding to assist these groups. More than 150 grants totalling \$220,000 have been provided to volunteer groups for waterway improvement projects, many of which involve revegetation. A further 72 grants have helped groups produce community newsletters. Supported projects are diverse, ranging from weed control to protecting the habitat of the endangered Helmeted Honeyeater.

### Green corridors

Since 1999, Melbourne Water has worked in partnership with private companies, Landcare Australia and "Friends of" groups in the Corridors of Green program, contributing \$780,000 in grants to local councils. More than 33 kilometres of rivers and creeks have been improved through the planting of about 240,000 indigenous plants.

### Monitoring our rivers and creeks

Melbourne Waterwatch is an education program for schools and community groups to assess the condition of their local rivers and creeks through surveys of water quality and aquatic life (including macroinvertebrates and frogs) and habitat.

Melbourne Waterwatch aims to increase community awareness, understanding and ownership of waterways in the Port Phillip and Westernport catchments, with the advice and support of Melbourne Water and other sponsors.

### Melbourne Water Frog Census

The presence of frogs is a strong indicator of the health of Melbourne rivers and creeks. The Melbourne Water Frog Census, a partnership with the Amphibian Research Centre and community volunteers, was launched in December 2001. Volunteers visit local waterways and record frog calls. The Amphibian Research Centre then analyses the results and uses them to map Melbourne's frog populations.

Students participate in Melbourne Waterwatch activities in the Carlton Gardens (right).

Amphibian Research Centre's Gerry Marantelli displays a Growling Grass Frog (far right).



## Community research

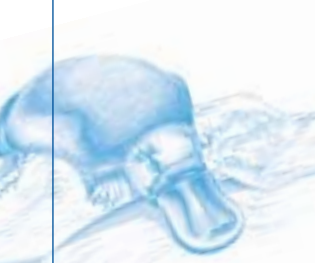
Nearly 30% of Melburnians live within one kilometre of a waterway, which tends to increase both their use and awareness of our rivers and creeks.

Melbourne Water has undertaken research over the past 10 years to seek community views on our waterways. Since the first surveys were undertaken, the community has become more aware of our rivers and creeks and, as a result, their expectations have increased, particularly with regard to environmental condition. In recent surveys, most people (72%) were satisfied with the condition of their local waterway. Seventy-eight per cent also thought that their local waterway was in better or the same condition as five years ago, and that protecting the environment should be the first priority for waterway management.

By asking the community about its preferences and views, Melbourne Water can develop priorities and standards for protecting and improving the health of our rivers and creeks.

## Useful links and other sources

- **Melbourne Water**  
[www.melbournewater.com.au](http://www.melbournewater.com.au)  
Provides information on waterway quality, community grants, Melbourne Waterwatch and the Frog Census.
- **Port Phillip and Westernport Catchment Management Authority**  
[www.ppwcm.vic.gov.au](http://www.ppwcm.vic.gov.au)
- **Victorian Government Department of Sustainability and Environment (Victorian River Health Strategy)**  
[www.dse.vic.gov.au](http://www.dse.vic.gov.au)  
[www.vicwaterdata.net](http://www.vicwaterdata.net)
- **EPA Victoria**  
[www.epa.vic.gov.au](http://www.epa.vic.gov.au)



# Yarra catchment



Yarra catchment.

The Yarra River begins on the southern slopes of the Great Dividing Range, in the forested water supply catchments of the Yarra Ranges National Park. The river's catchment area covers 4078 square kilometres. Average annual rainfall in the catchment ranges from 615mm at Burnley, near Melbourne, to 1080mm at Upper Yarra Reservoir near Warburton, contributing to higher flows during Winter and Spring. Although the Yarra River is not large by Australian standards, it is a very productive catchment as it generates the fourth highest yield of water per hectare of catchment in Victoria.

The upper reaches of the Yarra River and its major tributaries flow through forested, mountainous areas, which have been reserved for water supply purposes for more than 100 years. The rivers and creeks are relatively undisturbed and in excellent condition. The lower slopes and floodplains have been extensively cleared for agricultural use, which impacted on waterway health. Development of urban areas in the lower catchment has also contributed to poor health.

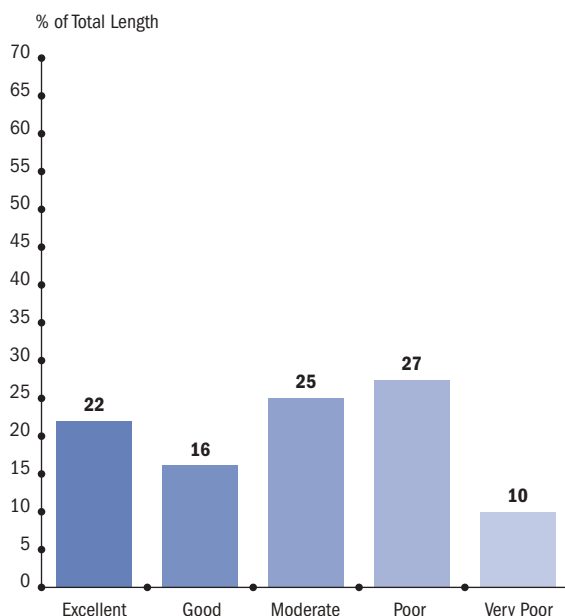
Water quality is generally good in the upper catchment, but deteriorates downstream because of changes in land use. Over the past few decades, there has been a general improvement in many of the water quality parameters we test, such as nutrients, bacteria and suspended solids, especially in urban rivers and creeks. A good deal of this can be attributed to improvements in sewerage infrastructure, regulation against industrial discharges to waterways, and works to prevent erosion.

While the forested upper catchment offers excellent habitat, both the quality and amount of habitat in a number of rural and urban waterways is poor as a result of erosion, weeds, farming techniques and changes to river flows. Despite this, native plants and endangered or threatened species can still be found in many rural and urban waterways. In recent years, we have managed to slow the loss of habitat and, in some cases, have extended the range of certain species with a range of works including replanting indigenous plants, enhancing habitat and removing fish barriers.

Urbanisation and land clearing or extraction for urban and agricultural uses have led to modified flows in most waterways in the Yarra catchment. As a result, many creeks in the catchment are considered to be flow stressed and we are now focusing on ensuring environmental flow requirements in these waterways are met.

The rivers and creeks in the Yarra catchment are described and rated on the following pages. The highlighted red section of the map indicates the catchment area for the individual waterway. Information on improvement works that have been undertaken or are planned is included.

Waterway condition in the Yarra catchment.



## Upper Yarra River

Source: Excellent

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent	●	●	●	●	●
Good					
Moderate					
Poor					
Very poor					

## Rural Sections: Moderate

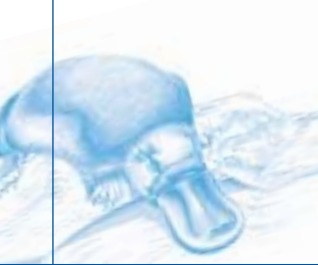
	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good	●	●	●		●
Moderate					
Poor				●	
Very poor					

The Upper Yarra River and its tributaries are located upstream from Warrandyte. The catchment here is dominated by native forests contained within protected water supply areas and is essentially in pristine condition. Environmentally, the area is of high quality and home to a wide range of aquatic species, including the Mt Donna Buang Wingless Stonefly, which is only found in the small area of alpine catchment around the source of the river.

From Warburton to Warrandyte, the river passes through several gorges broken up by wider floodplains dotted with wetlands and billabongs, through which a slower river meanders. Land use in the surrounding area is mainly rural, with some native forest in tributary headwaters. The Yarra Valley forms a green wedge protected from the more closely settled urban areas that dominate the valley below Warrandyte. There are number of townships throughout the upper river valley, including Coldstream, Healesville, Lilydale and Yarra Glen.

Over recent years, much traditional grazing has given way to more intensive cultivation such as horticulture and vines, and this has raised demands for water from the river and its tributaries. The expansion of urban Melbourne has also contributed to increased water demands on the Yarra system. Flow-related stresses have become a significant issue for the Yarra, together with other long standing impacts caused by changes to the waterway, clearing of trees and other plants, stock access and intensive farming. The condition of the river varies from moderate to poor in this section despite the presence of indigenous vegetation and reasonably healthy stream communities including fish.

**Improvement works:** Waterways are being fenced and replanted in this region through the Stream Improvement Program, and gradually weeds and willows are being removed and replaced with indigenous plants. The beds and banks of the river are being stabilised, and material, for example logs that provide suitable habitat, are being put back into key streams. Environmental management systems are being developed for farms and businesses in the area that will help to reduce the run-off of nutrients and other chemicals into waterways.



## Yarra catchment

### Little Yarra River

Good

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent			●		●
Good	●	●			
Moderate				●	
Poor					
Very poor					

The Little Yarra River flows from native forests in the Yarra Ranges above Warburton, passing through rural areas to join the Yarra River below Yarra Junction. Its upper sections are in excellent condition, but deteriorate downstream due to the loss of habitat and plants, build up of sand deposits, willows and other weeds and general deterioration of water quality. The prospects for improving this waterway are good.

**Improvement works:** Recent works have included reinstating old tree trunks (which provide habitat for species living in the waterway), willow removal and replanting programs.

### Woori Yallock Creek

Moderate

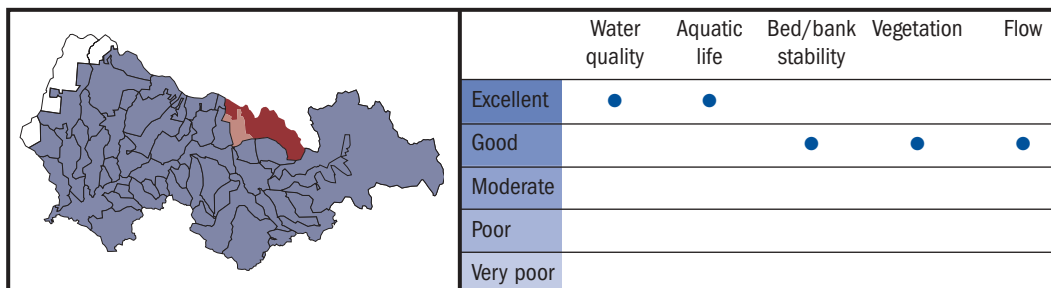
	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good		●	●		
Moderate	●				●
Poor				●	
Very poor					

This creek is mostly rural with minor urban centres and some forested headwaters. Key management issues for this waterway include loss of native vegetation, bed and bank erosion, water quality deterioration, weeds, fish barriers and maintaining stream flows. The Yellingbo State Nature Reserve, which extends along several kilometres of the creek and its tributaries, supports the largest remaining population of the critically endangered Helmeted Honeyeater.

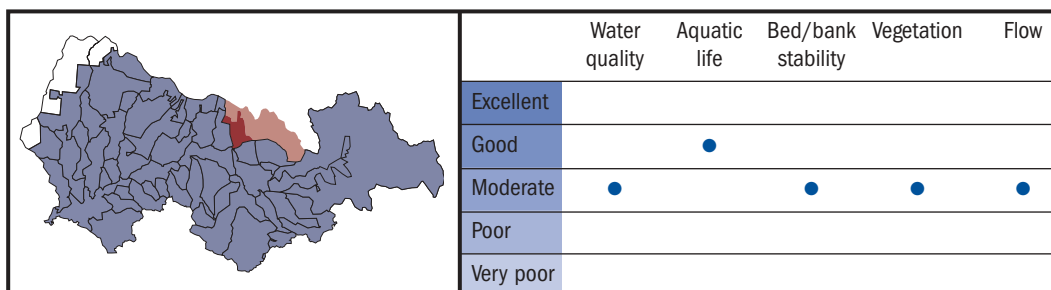
**Improvement works:** Recent works have included willow removal and replanting, fencing and weed control.

## Watts River

Source: Excellent



Rural Sections: Moderate



This river is largely contained within the forested Maroondah Reservoir water supply catchment area. Below the reservoir, the river runs mostly through rural areas, with the town of Healesville in its floodplain.

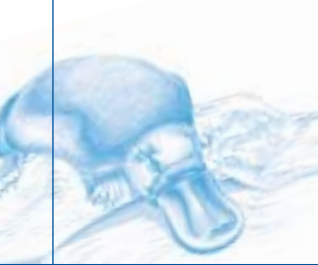
The river has been affected by loss of vegetation, reduced flows, erosion, pollution from rural and urban run-off, willow and weeds and barriers to fish and fauna moving through the river.

**Improvement works:** Recent works have focused on weeds, including willows, and stabilising the bed and bank of the river. Further works will improve a 1.3 kilometre section of the river downstream of Walkers Lane, Healesville. The project includes weed and willow control and replanting on both sides of the river.

Works on the smaller nearby Badgers Creek will be carried out in a section that runs through Healesville Sanctuary. This will include flood protection for the Platypus House, works to stabilise the bed and banks of the river, enhancing habitat and improvements to fish movement.



The uninhabited Mountain Ash forest in the Maroondah Reservoir catchment.



# Yarra catchment

## Steels and Pauls Creeks

Source: Good

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good	●		●		
Moderate		●		●	●
Poor					
Very poor					

## Rural Sections: Poor

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good					
Moderate		●	●	●	●
Poor	●				
Very poor					

Small areas of the headwaters of Steels Creek lie in the forested ranges of Kinglake National Park. The majority of the creek flows through cleared, rural areas until it meets the Yarra River at Yarra Glen. Outside of the forested areas, waterway condition deteriorates rapidly because of bed and bank erosion, stock access, willows, poor native vegetation and water quality. Nearby Pauls Creek also flows from forested areas although for most of its length it flows through cleared rural areas.

**Improvement works:** There has been considerable work on both creeks in recent years, made up mostly of works to stabilise beds and banks including replanting programs, and fencing to prevent stock from accessing the creeks.

## Watsons Creek

Good

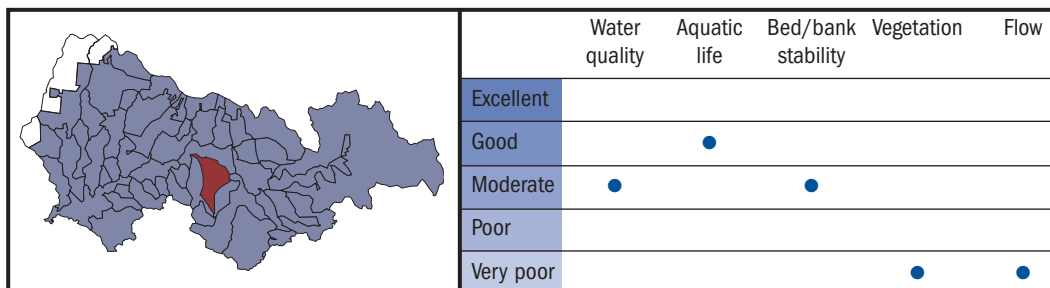
	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent			●		●
Good	●	●			
Moderate				●	
Poor					
Very poor					

This creek originates in the forested Kinglake National Park, but quickly passes into cleared rural land at Christmas Hills and Kangaroo Ground, where the impacts of bed and bank erosion, poor water quality, lack of native vegetation and weeds can be clearly seen.

**Improvement works:** Recent works have included weed control and ongoing maintenance programs.

## Stringybark Creek

Poor

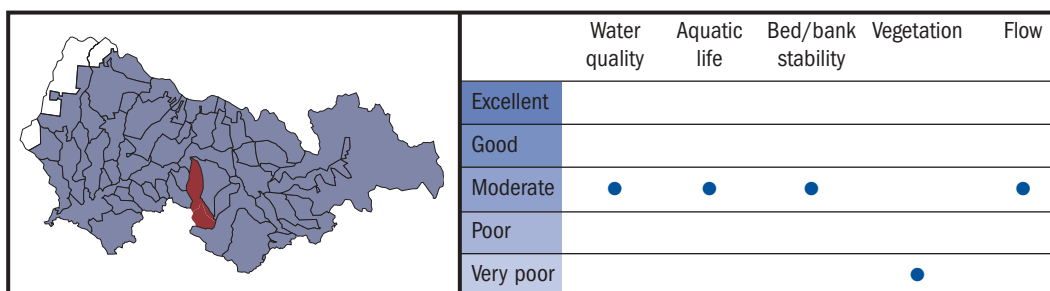


A largely rural catchment, with headwaters in the semi-urban area of Mount Evelyn, this creek joins the lower part of Olinda Creek on the Yarra River floodplain below Lilydale. Both Stringybark Creek and Olinda Creek have been diverted to drain through wetlands that were once there. The creek is affected by willows, loss of native plants and habitat, water diversions and rural run-off. The flow of water is poor due to a number of small dams along the banks used for irrigation.

**Improvement works:** Recent works include stabilising the bed and banks, and willow removal.

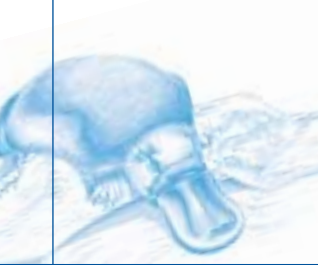
## Olinda Creek

Moderate



Olinda Creek rises up in the forested south-eastern slopes of the Dandenong Ranges. It is a major tributary of the Yarra River, with a largely rural catchment interspersed with several towns including Lilydale, Montrose, Olinda and Mount Evelyn. The Dandenong Fresh Water Amphipod, a rare crustacean, lives in its upper tributaries.

**Improvement works:** In recent years, the bed and banks of the creek have been stabilised, willows and other weeds removed, and wetlands built nearby. Through Melbourne Water's Healthy Rivers Program, we have supported studies on the endangered Powerful Owl to identify how we can minimise potential impacts to this species from our works in the area. Weed removal and stabilisation works will be undertaken on the banks of the creek where it runs through the Melba Park area in Lilydale, followed by a major replanting program.



## Yarra catchment

### Brushy Creek

### Poor

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good			●		
Moderate					
Poor	●			●	
Very poor		●			●

Brushy Creek is a small tributary that rises in urban Mooroolbark and passes mostly through an urban catchment. A number of issues have had a negative impact on the creek, including urban stormwater run-off, bed and bank erosion, loss of native vegetation and aquatic habitat, barriers to fish and fauna passage and weed infestations.

**Improvement works:** Recent works have included stabilisation of the bed and banks of the creek, weed control and replanting. Extensive works have been carried out on the creek through Barnegeong Reserve in Croydon to control erosion and reinstate habitat, including a replanting program.

### Middle and Lower Yarra River Poor

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good					
Moderate	●		●		
Poor		●		●	●
Very poor					

The Middle Yarra River stretches from Warrandyte to the head of the estuarine section at Dights Falls, Alphington. Having passed through the rocky constrictions around Warrandyte, the river expands again into a wide floodplain downstream of Templestowe, with meandering river loops and associated floodplain wetlands. The wide green areas of open space, and the extensive parkland that protects the floodplain, are particularly valued by the community.

The river and its tributaries, already damaged by clearing and farming, have been urbanised and as a result, are in a poorer condition. In this section of the Yarra River, stormwater flows more quickly to the river, water quality is poor, there are more weeds, and native plants have been taken over by introduced plants.

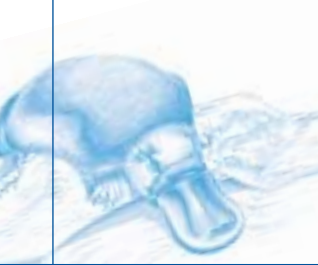
The health of the Yarra declines from good to poor as you move downstream, largely due to the inputs of urban tributaries. However, a number of native plants and wildlife can still be found here in the extensive parkland along the river. The water quality is reasonable despite a long history of mining, industry, farming and urbanisation. A number of important species continue to live here, such as the Australian Grayling, Murray Cod and Macquarie Perch, and platypus are regularly found as far down as Rosanna.

**Improvement works:** Works to control erosion of the bed and banks of the river have been carried out in past years, along with willow and weed control. We have also enhanced habitat for platypus and endangered fish species. Willows have been removed from the Greenacres Golf Club frontage in Kew, and the area will be replanted. In Pridmore Park, Hawthorn, replanting of river banks is being undertaken following the removal of non-indigenous trees and bank reshaping.

The Lower Yarra (downstream of Dights Falls) flows through older established suburbs and the major commercial centre of Melbourne. Being at the bottom of the entire Yarra catchment, the Lower Yarra is subject to the combined impacts of all of its upstream tributaries. Willow, ash and other non-indigenous trees exist along the river banks above Richmond, with formal parkland vegetation the main features through the city centre and port sections of the river. Continuing water quality and litter problems have been linked back to sources further upstream and drains flowing into the river. A fishway built in the early 1990s has helped fish move over Dights Falls and some migratory native fish species have been recorded above the falls for the first time in many years. This fishway requires some modifications to improve fish passage.



Yarra River near Ivanhoe.



## Yarra catchment

Information on some of the significant tributaries meeting the Yarra River is provided below.

### Mullum Mullum Creek

Poor

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good			●		
Moderate				●	
Poor	●	●			
Very poor					●

This is a small tributary of the Yarra River flowing from North Croydon, which has been affected by impacts such as changed flows, poor water quality, weeds and loss of habitat. There are some native plants still remaining along its banks in open space reserves close to the Yarra River, and several native fish species still live in the creek. Works to improve habitat in the area have seen platypus return to the lower part of Mullum Mullum Creek.

**Improvement works:** The creek's banks and bed have recently been stabilised, and weed control and replanting programs completed. A major replanting of the banks downstream of Ringwood Street, Ringwood, will be undertaken following recent stabilisation works. Willow control, stabilisation and revegetation is being undertaken at Kalinda Road, Ringwood, over a number of years.

### Diamond Creek

Source: Good

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent	●				●
Good		●	●	●	
Moderate					
Poor					
Very poor					

Rural Sections: Moderate

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good					●
Moderate	●	●	●		
Poor				●	
Very poor					

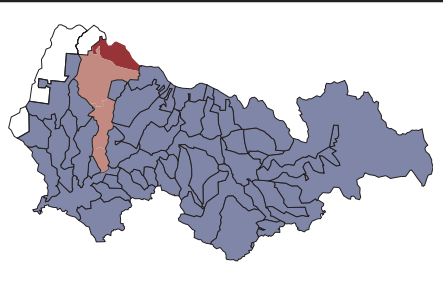
Rising in the forested Kinglake Plateau north of Melbourne, this major tributary flows through a rural landscape for most of its length. It passes through semi-rural developments at St Andrews and Arthurs Creek before flowing into the urban area of Eltham where it meets the Yarra River. A number of native fish species such as Mountain Galaxias, Broad-finned Galaxias and Freshwater Blackfish are found here, and platypus have re-established a breeding population in the lower creek after works were undertaken to improve habitat. Recently, as vineyards have become established in this area, competition for water has started to increase.

**Improvement works:**

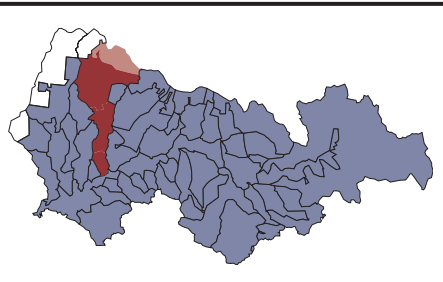
Melbourne Water has recently been working in stages to remove willows, stabilise the bed and banks of the creek, control weeds and replant the area. Willow removal, fencing and replanting has also been undertaken for one of the upper tributaries, Running Creek, near the town of Arthurs Creek.

**Plenty River**

**Source: Good**

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow	
	Excellent	●	●			
	Good			●		
	Moderate				●	●
	Poor					
Very poor						

**Lower Sections: Poor**

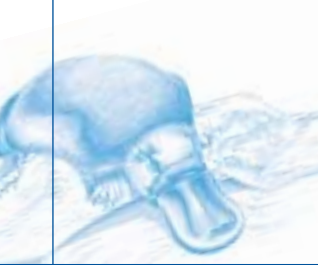
	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
	Excellent				
	Good			●	
	Moderate		●		
	Poor	●			●
Very poor					●

Originating in the forested slopes of Mount Disappointment, the Plenty River is the source of Melbourne’s first major water supply. Below the forests, where the river is in good condition and has an excellent rating for aquatic life and water quality, the river has a largely rural catchment with two major towns at Mernda and Whittlesea. Downstream of South Morang, the catchment becomes fully urbanised. Flows are a serious issue in terms of waterway health.

**Improvement works:** During the last five years, there has been a major program to remove willows and replant the river banks. Works have also been carried out to stabilise the river’s bed and banks, including strategically placing old logs and branches in the waterway that will naturally break down and help maintain the shape of the bank.

Recent surveys have found the migratory fish species Spotted Galaxias and Short-headed Lamprey in the waterway, probably as a result of works to improve fish movement at Dights Falls in Alphington.

Willows have been removed and the banks of the river have been stabilised at the Heidelberg Golf Course, and major replanting is being carried out. Upstream on Barbers Creek, nearly 2.5 kilometres of the river’s east branch will be stabilised and replanted.



# Yarra catchment

## Koonung Creek

### Very Poor

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
	Excellent				
	Good		●		
	Moderate			●	
	Poor	●	●		
Very poor					●

This creek is almost entirely urban and has been heavily modified by realignment works. It contains major parklands in some of its reaches, which have a strong appeal to the community.

**Improvement works:** Major works have been undertaken in recent years to control erosion and protect the banks, the creek and nearby buildings from increased and sometimes torrential flows. These works have been done alongside willow removal and weed control, followed by replanting with native plants. Further improvement works will be carried out in Doncaster East to stabilise the creek, improve habitat and replant trees and shrubs.

## Darebin Creek

### Rural Sections: Very Poor

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
	Excellent				
	Good		●		
	Moderate		●		●
	Poor	●			
Very poor				●	

### Urban Sections: Poor

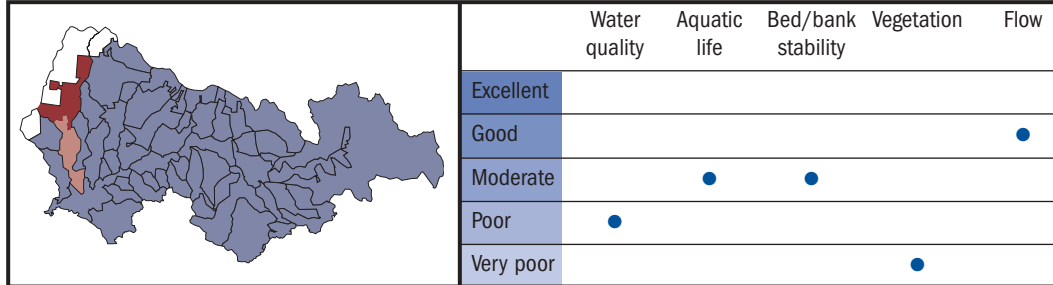
	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
	Excellent				
	Good				
	Moderate	●		●	
	Poor		●		
Very poor				●	

Darebin Creek is a major tributary that rises in rolling grazing lands on Melbourne's northern outskirts. The landscape changes to urban and industrial as the creek flows towards Melbourne at Thomastown and Lalor. In the urban section, the waterway has been heavily modified. However, it features as a major open space in the suburbs that it flows through.

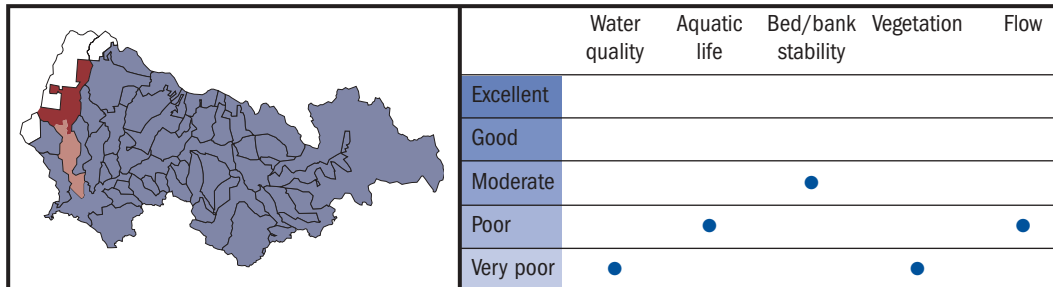
**Improvement works:** Recently, the focus has been on works to stabilise the banks, remove willows and replant the area. We have also improved the ability of fish to move through the creek by building fishways on several barriers along its length. Stabilisation works and revegetation near Alphington Grammar have also been undertaken. We also successfully controlled an outbreak of the noxious weed Water Hyacinth. Further works are planned downstream of Childs Road in Mill Park to improve habitat, control weeds and replant native vegetation.

## Merri Creek

### Rural Sections: Poor



### Urban Sections: Very Poor

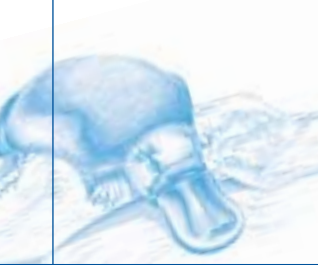


Merri Creek flows from the foothills of the Great Dividing Range north of Wallan on the Hume Highway. A major tributary, it crosses more than 50 kilometres of basalt plain to meet the Yarra River at Fairfield. The upper and middle sections are mostly rural, and dotted with small townships like Wallan, Beveridge and Kalkallo. The creek's middle sections are surrounded by the growing suburb of Craigieburn and other northern suburbs. Blackfish are still found in the upper sections and, although there are no platypus found there at present, they could return in the future. There are major native grasslands alongside the creek that will soon be included in an extended waterway park.

**Improvement works:** Work is ongoing to control weeds, remove willows, replant areas and stabilise the banks of the creek. We have also reinstated the fish passage around the wall at Coburg Lake. Replanting and minor stabilisation works will continue between the Northcote Golf Course frontage and the Preston Main Drain, and at Phillips Reserve in Brunswick. Other creek bank works, removal of willow and ash trees, weed control and replanting is planned downstream of the Sumner Park footbridge.



Merri Creek at Galada Tamboore, Campbellfield, a site of significance for indigenous plants, animals, geology and archaeological features.



## Yarra catchment

### Moonee Ponds Creek

### Very Poor

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good			●		
Moderate					
Poor	●	●			●
Very poor				●	

The Moonee Ponds Creek is rural in its upper sections near Greenvale, passing across basalt plains towards the urban lower sections. Much of the lower creek has been heavily modified as part of extensive development of the lower floodplain.

**Improvement works:** Works in recent years have focused on enhancing habitat and stabilising, reshaping and replanting the banks of the creek.

A major stormwater improvement program is also underway in the creek's catchment area, and wetlands at Jacana and litter traps have been built.

### Gardiners Creek

### Very Poor

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good			●		
Moderate					
Poor	●	●			
Very poor				●	●

Most of Gardiners Creek flows through an urban landscape, but is bordered for much of its length by well-used open space. The poor condition of the creek is due mainly to changes to its channel form and loss of vegetation, together with urban impacts of weeds and poor stormwater quality. A recent find of Common Galaxias and Climbing Galaxias, small native fish, shows that water quality and habitat are still good enough to support some stream life.

**Improvement works:** Recent works on the creek have included stabilising its bed and banks, along with replanting vegetation.

Further works in the Yarra catchment include a major improvement project for Blackburn Creek, which includes bank protection, flood management and habitat improvement, protection of a significant aged tree and some replanting works. In addition to these works, a management plan for Gardiners and Scotchmans creeks will be developed to determine works over the next 15 years.

# Western catchment

Melbourne Water manages a relatively small area of rivers and creeks to the west of Melbourne, including the lower sections of the Maribyrnong River and several small coastal waterways west of the river.

There has been much urban and industrial development in the Western catchment, and the impacts of this are evident through stormwater pollution, changed stream flows, loss of river bank and waterway habitat, and changes to the shape of the waterways.

The lower sections of the Maribyrnong River extend through a number of inner Melbourne suburbs, and the river has suffered several periods of serious degradation during settlement of the region and the development of Melbourne.

During the late 19th century, a range of industries used the river for waste disposal, which caused a decline in water quality. During the 1960s and 1970s, expanding industrial premises and unsewered urban development again polluted the river. Today, the Maribyrnong River has largely recovered from these impacts and now has good water quality, particularly for an urban river.

The Maribyrnong's catchment covers an area of 1433 square kilometres, and yields an average annual flow of 120,000 million litres. In recent years, below average rainfall in the catchment has contributed to its flow being markedly lower than long-term averages.

Water quality in the river is generally good in the upper catchment, but decreases progressively downstream, mainly as a result of nutrients running into the river from agricultural activities. Given the expected growth in urban and rural subdivisions in the future, sustainable development is a priority to protect waterways from further decline.

The health of the waterways in the upper catchment is good, but many tributaries and the middle and lower reaches of the river have declined as a result of rural and urban impacts.

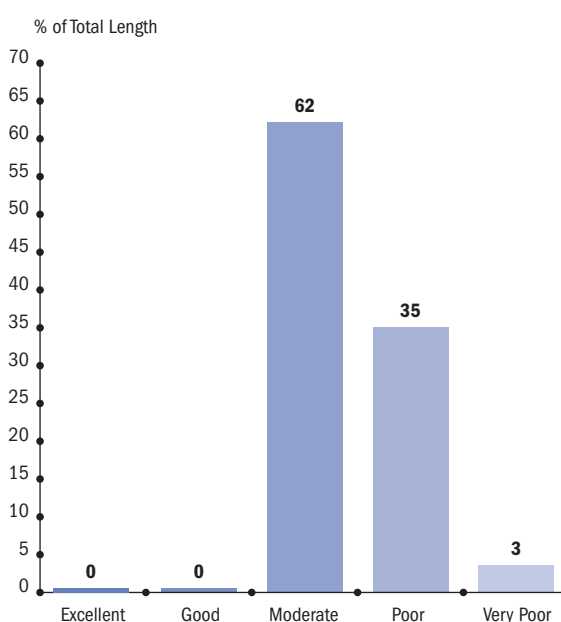
Although the range of species living in the upper catchment continues to be excellent, damage and loss of habitat in the rural and urban waterways means there has been a reduction in populations of aquatic species.

Many indigenous plants have disappeared and introduced plants such as willows and blackberries now dominate streams. Drawing water for domestic and agricultural use has noticeably altered the pattern of flows in a number of the waterways. In areas that are being urbanised, changes are also expected as increased run-off generates more flows into rivers and creeks. Such changes in flow patterns can impact on the fish, frogs and other species living in our waterways. Recent studies in the catchment have focused on the importance of ensuring there is enough flow through the catchment to protect the animals and plants that live there.



Western catchment.

Waterway condition in the Western catchment.





## Western catchment

Despite the declining condition of the catchment's waterways, platypus are still widespread and a number of significant fish species can be found, such as the endangered Yarra Pigmy Perch and Australian Grayling. Recent and ongoing works to improve fish passage in the lower Maribyrnong River aim to increase the numbers and types of fish found there.

The rivers and creeks in the Western catchment are described and rated on the following pages. The highlighted red section of the map indicates the catchment area for the individual waterway. Information on improvement works that have been undertaken or are planned is included.

### Maribyrnong River

### Moderate

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good	●		●		
Moderate		●			
Poor				●	●
Very poor					

The Deep and Jacksons creeks join to form the Maribyrnong River upstream of Keilor. The river forms a long estuary that winds through Essendon and Flemington before meeting the Yarra River at Footscray. The Maribyrnong is bordered by extensive parkland, however, the surrounding lands are entirely urban and industrial in nature. Waterway health is relatively good and populations of native species, such as the Australian Grayling, can still be found, and Australian Fur Seals and Bottle-Nosed Dolphins have occasionally been spotted in the lower part of the river. Key management issues include loss of habitat and native plants, weeds, deteriorating water quality and maintaining levels of water flow.

**Improvement works:** Fish have been able to move through the river more easily in recent years due to fishways built over four barriers, increasing numbers of the Australian Grayling and other native fish species.

Significant works to stabilise and replant a number of sites affected by erosion through the market gardens above Keilor have also been completed over the last 10 years.

## Taylor's Creek

Poor

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good					
Moderate			●		
Poor	●	●		●	
Very poor					●

Taylor's Creek is a small tributary that has Red Gums and interesting geological features, downstream of Taylor's Lakes. The site of early aboriginal occupation, it lies north of Keilor, flowing through rapidly expanding urban areas near Taylor's Lakes. Much of the lower reaches retain natural features, but many plants have been lost and urban pressures will have an increasing impact.

**Improvement works:** Works have recently been completed on a wetland system at Taylor's Lakes. Works are planned to reinstate the natural features of the creek and replant its bank in the Sydenham area.

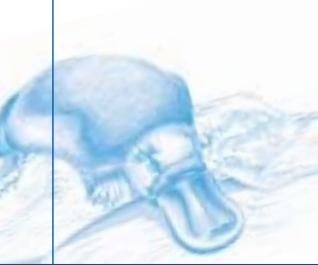
## Steele Creek

Poor

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good					
Moderate	●		●	●	
Poor		●			
Very poor					●

The creek originates near Tullamarine Airport, then flows south through urban areas to meet the Maribyrnong estuary at Avondale Heights. There have been a number of pollution spills and discharges over the years that have contributed to degraded water quality. Key management issues include erosion of the bed and banks, loss of habitat, weeds and flooding.

**Improvement works:** Sites affected by erosion have been stabilised and replanted in recent years. Erosion control and replanting works are planned downstream of Buckley Street, Essendon, including re-establishing a connection to the floodplain. The part of the creek adjacent to the old Niddrie Quarry, East Keilor, has been stabilised and an extensive revegetation program will be undertaken.



## Western catchment

### Kororoit Creek

### Moderate

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good			●		
Moderate	●	●			●
Poor					
Very poor				●	

One of the major creeks in the western suburbs, Kororoit Creek flows from a mostly rural catchment around Gisborne, Bulla and Melton into an urban region at Caroline Springs and Deer Park, before passing through industrial areas near its mouth at Altona. Pollution has been a problem in this creek in the past. The substantial open space along its banks may eventually be developed into a major regional park.

**Improvement works:** Recent works have included weed control and ongoing maintenance programs.

### Cherry Creek

### Poor

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good			●		
Moderate					●
Poor	●	●		●	
Very poor					

The majority of the Cherry Creek flows through industrial and urban areas. It was once an ill-defined drainage line with a series of shallow wetlands and ponds on basalt plains grasslands, and has been modified to improve drainage and reduce flooding on nearby, mostly industrial land. The popular Cherry Lake is found in its lower section.

**Improvement works:** Recent works have included revegetation, weed control and ongoing maintenance programs.

## Laverton Creek

## Moderate

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good			●		●
Moderate	●				
Poor		●		●	
Very poor					

Laverton Creek originates in a semi-rural area, but is quickly surrounded by urban and industrial development. It discharges to Port Phillip Bay at Altona through a coastal wetland, Truganina Swamp, which has been modified for flood protection. Truganina Swamp is a site of State significance for the threatened Altona Skipper butterfly, and is a regionally significant bird habitat.

**Improvement works:** Recent works have included weed control and ongoing maintenance programs.

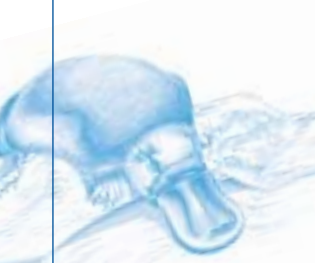
## Skeleton Creek

## Moderate

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent			●		
Good					●
Moderate	●	●			
Poor					
Very poor				●	

The upper reaches of Skeleton Creek lie in dry grazing lands near Mount Cottrell. Its lower sections are becoming increasingly urbanised as new developments extend from Hoppers Crossing. Cheetham Wetlands, a site of significance for migratory birds, straddles the mouth of the creek. Key management issues include the impact of urban development, changes to water flow, barriers to fish movement and poor habitat.

**Improvement works:** Works are planned on the creek between Sayers Road and the Old Geelong Road at Hoppers Crossing. Habitat will be improved, weeds controlled and indigenous plants will be planted.



# Dandenong catchment



Dandenong catchment.

South-east of Melbourne lies the Dandenong Valley. This catchment has an area of 855 square kilometres, with some 485 kilometres of rivers and creeks that originally drained to a large coastal wetland, the Carrum Carrum Swamp. The swamp, however, has been extensively modified with the building of new waterways such as the Patterson River. Average annual rainfall in the catchment ranges from 560mm at Keysborough to 1123mm at Mt Dandenong.



Growling Grass Frog – a threatened species found in Melbourne’s rivers and creeks.

The catchment has also been modified with urban land use increasing. There is a notable amount of industrial activity, although some forest and open space pockets remain, particularly in the Dandenong Ranges and the floodplain. Waterway health in this area tends to closely match changes in land use. In general, health is moderate to poor throughout, although some areas are still in relatively good condition, especially the forested source of Dandenong Creek and parts of the Corhanwarrabul-Monbulk Creek system.

Vegetation along these waterways is mostly poor to very poor, but there are still some fair to excellent sections. The condition of the beds and banks is largely good to moderate, with some sections in a poorer state. Poor ratings are largely due to lack of habitat and barriers that hamper fish migration. A large number of species live in the area, including the nationally significant Dwarf Galaxias fish, platypus, the Growling Grass Frog and threatened plant species.

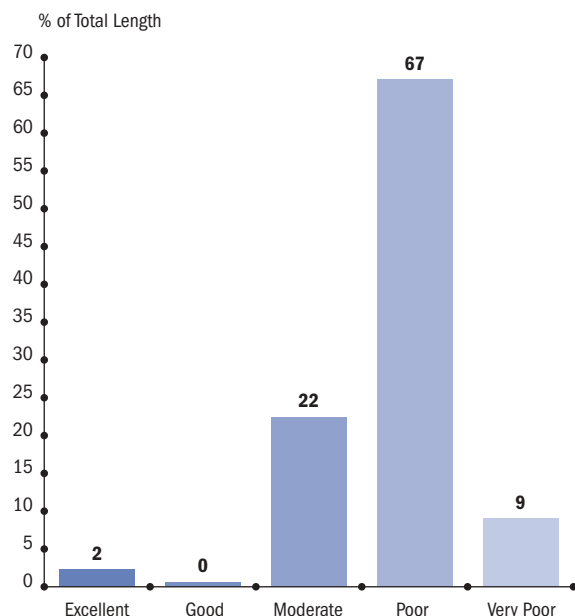
Although flow diversions may stress waterways, increased stormwater run-off in urban areas also impacts on the environment. While the level of run-off and quality of stormwater is degrading parts of the catchment, there has been a significant improvement in water quality in the last 30 years as the sewerage system has been extended to areas under development, and industrial discharges to rivers and creeks have been phased out.

Rapid residential growth along with major road construction in the region is probably the most significant threat to the health of rivers and creeks in the Dandenong catchment. It is therefore essential that development adopts a more sustainable approach, and that water-sensitive urban design is utilised to protect water quality and waterway health.

Melbourne Water has initiated a number of activities to improve the health of rivers and creeks in the Dandenong catchment, including reintroducing habitat, building wetlands and litter traps to improve water quality, removing willows, and relocating threatened species to more suitable habitats.

The rivers and creeks in the Dandenong catchment are described and rated on the following pages. The highlighted red section of the map indicates the catchment area for the individual waterway. Information on improvement works that have been undertaken or are planned is included.

Waterway condition in the Dandenong catchment.



## Dandenong Creek

Source: Excellent

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent	●			●	●
Good		●	●		
Moderate					
Poor					
Very poor					

## Middle and Lower Sections: Poor

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good					
Moderate			●	●	
Poor		●			
Very poor	●				●

Dandenong Creek is the major waterway in the catchment and its source lies in the forested Dandenong Ranges National Park, where waterway health is excellent. Once out of the forest, the creek flows into the urban areas of Boronia and The Basin and its health declines significantly. The upper part of the creek discharges to the Liverpool Road Retarding Basin, where native plants and the rare Swamp Skink can be found. In its middle section, the creek is urbanised and in places has been straightened to reduce flooding. Although quite urbanised, significant corridors of parkland still remain and support environmental values, including native plants and the threatened Dwarf Galaxias.

The creek has been modified as it runs through urban areas for the remainder of its length to Mordialloc Creek, Patterson River and Port Phillip Bay. Key issues for the waterway are protecting threatened flora and fauna, reducing the impact of stormwater, weeds, loss of habitat and barriers to fish and fauna movement.

**Improvement works:** The focus of recent works has been erosion control, reinstating the creek's natural channel form, replanting native plants and establishing major wetlands to treat stormwater run-off and improve water quality. Replanting works are planned and the section from Heatherton Road to Clow Street, Doveton, has been examined in terms of stability and the potential to restore habitat in this area.



Innovative drainage systems at developments such as Lynbrook Estate treat stormwater to improve the quality of rivers and creeks.



## Dandenong catchment

### Blind Creek

### Very Poor

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good			●		
Moderate	●				
Poor		●			
Very poor				●	●

Blind Creek originates in the Dandenong Ranges National Park. Outside the park, the creek runs through urbanised areas and meets Dandenong Creek at Wheelers Hill. The creek is an important area of open space that stretches in a continuous park from Ferntree Gully to Jells Park.

**Improvement works:** Recent works have included weed control and ongoing maintenance programs.

### Corhanwarrabul, Monbulk and Ferny Creeks

### Moderate

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good			●		
Moderate	●	●		●	
Poor					●
Very poor					

The Monbulk and Ferny creeks join below the Dandenong Ranges near Rowville to form the Corhanwarrabul Creek. These creeks have some forested and rural areas above the urban lowlands, and are among the best waterway sections in the Dandenong catchment. Monbulk Creek has one of the largest and most healthy platypus populations in Melbourne. In the urbanised section of the creeks, the condition drops to moderate, due mainly to the loss of plants and habitat, weeds, stormwater run-off, and barriers stopping fish and other animals from migrating.

**Improvement works:** In the last five years, works to stabilise the bed and banks of these creeks have been undertaken, and willows and weeds have been removed. These areas have been replanted. Further work will continue to improve habitat and native vegetation.

## Mile Creek

Poor

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good					
Moderate			●		
Poor	●	●			
Very poor				●	●

Mile Creek is an industrial and urban waterway that originates in Springvale. Key issues include poor water quality due to urban and industrial pollution, lack of habitat and poor vegetation.

**Improvement works:** Recent works include ongoing maintenance and repairs to the channel.

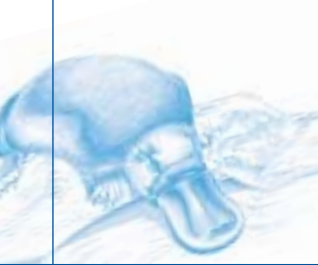
## Eumemmerring Creek

Poor

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good					
Moderate	●	●	●		●
Poor				●	
Very poor					

This is a rural-urban catchment where rapid development is taking place. The creek has been heavily modified in its middle sections to provide flood protection in once extensive wetland areas, as have its upstream tributaries the Hallam Main Drain and Narre Warren and Troups creeks.

**Improvement works:** Major wetlands have been built, and channel reshaping and replanting works carried out. Replanting will take place in the creek after curves have been put back into the creek from South Gippsland Highway to Abbots Road in Hampton Park.



## Dandenong catchment

### Mordialloc Creek

### Very Poor

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good			●		
Moderate					
Poor		●		●	●
Very poor	●				

Once the natural northern outlet of the Carrum Carrum Swamp, Mordialloc Creek is now fed by a diversion on lower Dandenong Creek and underground drains entering from the north. A mostly urban and industrial catchment, it suffered from heavy metal pollution and other contaminants during the 1970s, but has now improved significantly. The internationally recognised Edithvale-Seaford Wetlands are in this catchment and, to the north, there are wetlands in Braeside Park and the Woodlands Estate.

**Improvement works:** Recent works include replanting and stabilisation of the creek's bed and banks along with ongoing works to maintain the environmental values at Edithvale-Seaford Wetlands.

### Patterson River

### Poor

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good					
Moderate	●				
Poor		●	●	●	●
Very poor					

The lower section of Dandenong Creek is known as Patterson River and discharges to Port Phillip Bay at Carrum.

Levee banks and pump stations protect nearby areas from high flows in the river, which has become a significant recreation area for boating, both through its entrance to the bay and the National Water Sports Centre in Bangholme.

**Improvement works:** Melbourne Water has recently contributed to improvement works on the river in partnership with Parks Victoria and the Department of Sustainability and Environment.

## Kananook Creek

Poor

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good			●		
Moderate	●	●			
Poor					
Very poor				●	●

Kananook Creek was once the southern outlet of the Carrum Carrum Swamp. The creek and coastal dune system are relatively intact, and the Seaford Swamp lies a short distance inland. Many native plants survive along both the creek and the Seaford foreshore. The creek's catchment has been substantially altered to drain inland areas and is mostly urbanised. Waterway health is moderate to poor, although there has been improvement since properties in the catchment were connected to the sewerage system. Saltwater is pumped through the creek from nearby Patterson Lakes to create artificial flows that will help to keep the creek healthy.

**Improvement works:** Recent works have included repairing a litter trap and ongoing maintenance programs.

## Elster Creek and Elwood Canal Very Poor

This is a highly modified creek with an urban catchment and a constructed outlet to Port Phillip Bay at Elwood. The canal drains a previously extensive wetland area adjacent to the bay. Extreme urban stormwater pressure, development of the floodplain and modifications for flood protection all have, or have had, a major impact on waterway health.

As this creek system is highly modified, it has not been formally rated and the condition rating is only an estimate.

**Improvement works:** Last year, a major catchment litter reduction program was launched to protect the beaches near the outlet at Elwood Canal.



The Elwood Canal where it meets Port Phillip Bay.



# Westernport and Mornington Peninsula



Westernport and Mornington Peninsula.

The Westernport catchment has an area of 3433 square kilometres and some 2232 kilometres of rivers and creeks. Average annual rainfall ranges from 750mm along the coast to 1200mm in the northern highlands. Approximately 70% of the catchment is rural land, 20% is Crown land and five per cent is urban. The waterways in the area are diverse in both their form and health. Lowlands in the Westernport hinterland were once largely covered by the Koo Wee Rup Swamp, which extended for some 400 square kilometres. With settlement, the swamp was drained for agricultural use and, as a result, many of the waterways in the lower catchment are mostly made up of channelised drains.

On the Mornington Peninsula, waterways are relatively small and discharge to Western Port, Port Phillip Bay or Bass Strait. Most of the waterways that discharge to Port Phillip Bay and Western Port on the western and southern parts of the peninsula are not within Melbourne Water's management area.

Waterway health within the catchment varies considerably, from good or very good in the northern highlands, to poor or very poor in the rural and urban sections in the central lowlands. These waterways are extremely important, as they are home to 14 species of native fish (including the Dwarf Galaxias and Australian Grayling), 11 species of native frogs (including the Growling Grass Frog), platypus and several species of native plants.

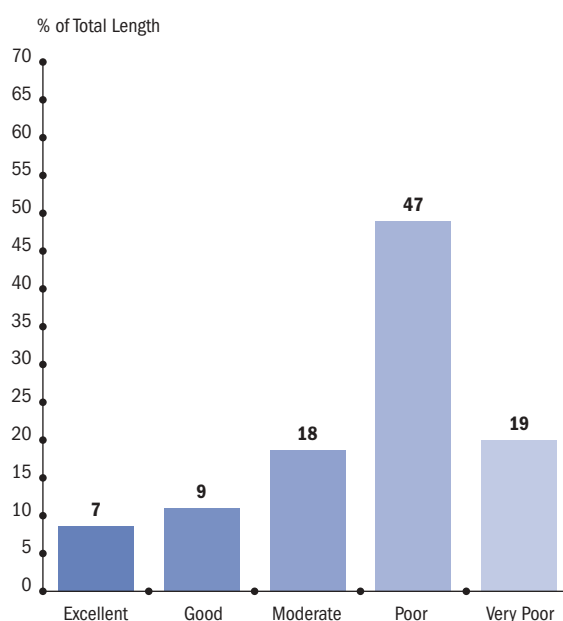
Water quality is generally good in the upper catchments, but tends to decline downstream of Princes Highway. Clearing and draining of the catchment for agricultural use has resulted in significant erosion of the waterways, particularly in the smaller, upper sections. Sediment run-off to the bays caused by the erosion has become a major issue, and Melbourne Water is working to control this.

Although waterways on the Mornington Peninsula generally have a good level of water flow, there is some stress to the Lang Lang and Tarago rivers and the Clyde and Cardinia creek systems. The condition of vegetation is mostly good, but there are some issues throughout the lower sections of the peninsula.

The most significant threats to the health of rivers and creeks in the Westernport catchment are rapid residential growth and major road building. Additional issues to be addressed include reducing the impact of agriculture, industry and septic tanks on water quality reducing sediments, ensuring that planting continues along the banks of the waterways, improving habitat, removing barriers that hinder native fish migration and protecting threatened flora and fauna.

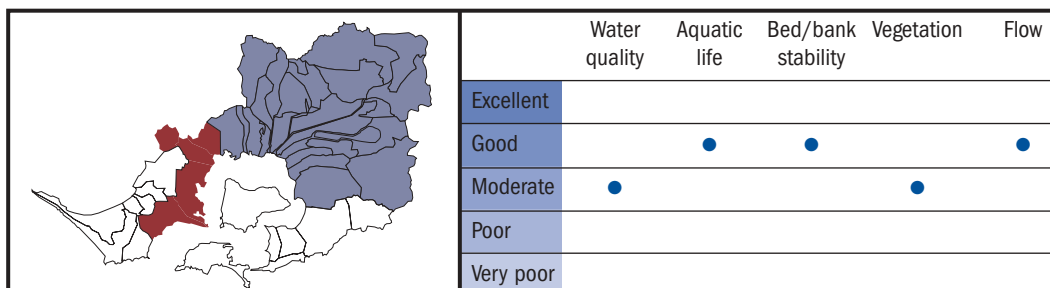
The rivers and creeks in the Westernport catchment are described and rated on the following pages. The highlighted red section of the map indicates the catchment area for the individual waterway. Information on improvement works that have been undertaken or are planned is included.

Waterway condition in the Westernport catchment and western Mornington Peninsula.



## South East Mornington Peninsula Waterways

Moderate

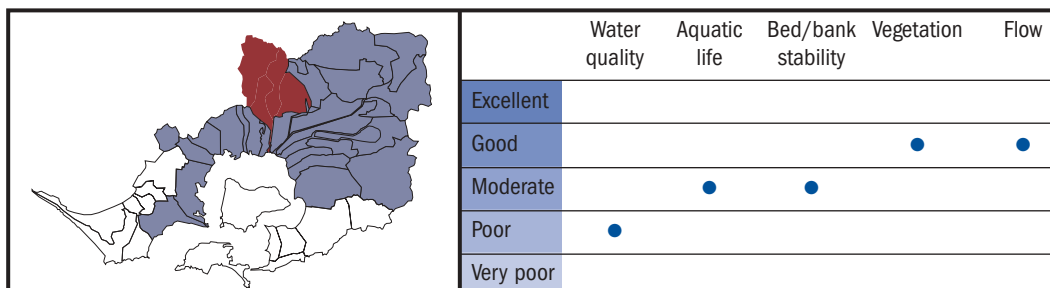


There are several small waterways on the Mornington Peninsula, including Watsons (Somerville), Merricks (Balnarring) and Stony (Shoreham) creeks. The region is a combination of rural and urban areas, with some industry. Urban areas are growing, and the amount of intensive agriculture (particularly viticulture) has increased in recent years. Key issues in the region are the protection of threatened flora and fauna, damage to water quality in intensive agricultural regions, stormwater run-off, the continued extension of the sewerage system, lack of habitat and loss of vegetation along the edge of the waterways.

**Improvement works:** Works are being undertaken to stabilise the bed and banks of the waterways, control willow and weeds, and replant some areas.

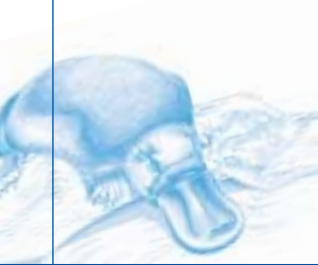
## Cardinia, Toomuc, Deep and Ararat Creeks

Moderate



These are largely agricultural waterways that are generally in good condition near the source, and moderate to poor condition downstream of Princes Highway. Key issues in the region are protecting threatened flora and fauna (eg. Dwarf Galaxias, Australian Grayling and Growling Grass Frog), damage to water quality from agriculture, stormwater run-off, septic tanks, loss of vegetation and barriers to fish movement.

**Improvement works:** The fishways already in place have recently been upgraded and others are being proposed. Other works have included erosion control, removing willows, building sediment traps and replanting vegetation. A new sediment trap will be built on the Northern Boundary Drain, downstream of the junction with Ararat Creek in Nar Nar Goon.



## Westernport and Mornington Peninsula

### Bunyip River

Source: Good

Source: Tarago River

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent		●			●
Good			●		
Moderate	●			●	
Poor					
Very poor					

Source: Upper Bunyip River

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent		●	●		●
Good	●				
Moderate				●	
Poor					
Very poor					

Lower Sections: Moderate

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good					
Moderate		●	●		●
Poor	●			●	
Very poor					

The Bunyip River is the largest waterway in the Westernport catchment, and includes the Tarago River. Its lower sections have formed into a major drainage outlet to Port Phillip Bay and the Bunyip Main Drain, where Melbourne Water is carrying out extensive stabilisation works. Waterway health tends to be very good near the source, but as agricultural practices intensify and the natural form of the channel is changed, there is a damaging impact on health. A key challenge is to reduce the amount of sediment entering the river by controlling erosion sites in gullies higher in the catchment, as well as along the river itself.

**Improvement works:** Major works to control erosion in the river have been undertaken in recent years, together with weed control and replanting programs. A series of weirs (small dams) that in the past have prevented fish from moving through the river have recently been improved to help fish movement.

Further work will be undertaken to stabilise and replant the banks of the river in its lower sections, and works to control erosion will include improving existing rock formations.

## Lang Lang River

### Upper Sections: Poor

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent		●			
Good			●		●
Moderate	●				
Poor					
Very poor				●	

### Lower Sections: Poor

	Water quality	Aquatic life	Bed/bank stability	Vegetation	Flow
Excellent					
Good					
Moderate		●	●		●
Poor	●				
Very poor				●	

The Lang Lang River is an agricultural area where there has been significant clearing of trees and other plants. Waterway health is generally moderate to poor, and key management issues include protecting vegetation and habitat for platypus and fish, improving the quality of run-off from agriculture, environmental flows, removing barriers to fish movement and stabilising the gullies that are a major source of sediment flowing into Western Port.

**Improvement works:** In recent years, works carried out have included erosion control, removing willows and replanting.

## Further information

For information on Melbourne Water's work to protect and improve the health of our rivers and creeks, visit [www.melbournewater.com.au](http://www.melbournewater.com.au) or call 131 722.

For information on regional catchment management, visit [www.ppwcm.vic.gov.au](http://www.ppwcm.vic.gov.au) or call 9785 0183.

# Appendix

## Water quality data 2002/03

Description	Dissolved oxygen		Electrical conductivity		pH		Turbidity (median)		Suspended solids (median)		Total nitrogen		Total phosphorous		Lead		Zinc	
	Median	% SEPP	Median	% SEPP	Median	% SEPP	Median	% SEPP	Median	% SEPP	Median	% SEPP	Median	% SEPP	Median	% SEPP	Median	% SEPP
<b>Yarra catchment</b>																		
Andersons Creek at Everard Drive Bridge	7.1	58	615	100	7.5	100	10.0	83	7.0	92	2.46	11	0.32	0	0.004	75	0.019	83
Arthurs Creek at Burkes Bridge, Hurstbridge	6.1	67	360	83	7.4	100	12.0	67	4.0	83	0.72	50	0.06	67	0.003	83	0.008	100
Brushy Creek at Lower Homestead Road Bridge, Wonga Park	7.3	92	665	100	7.4	100	13.0	83	6.5	83	6.14	0	0.54	0	0.002	100	0.032	83
Corduoy Road, upstream of Bridge, Yarra Junction	9.3	100	79	100	7.0	75	13.5	75	17.0	83	0.76	22	0.04	100	0.001	100	0.006	100
Darebin Creek at Clark Road Footbridge	9.3	100	765	100	7.8	100	6.0	100	4.0	83	1.20	11	0.08	50	0.004	75	0.058	17
Diamond Creek at Main Road, Eltham	6.5	50	560	100	7.4	100	14.0	75	10.0	92	1.15	33	0.09	67	0.004	58	0.041	92
Diamond Creek at Strathaven Road, Cottles Bridge	3.8	20	520	100	7.1	100	15.0	80	6.0	100	1.29	0	0.07	40	0.004	100	0.008	100
Gardiners Creek downstream of junction with South Eastern Freeway & Glenferrie Road	10.3	100	500	100	8.0	100	8.5	67	4.0	75	1.73	0	0.09	42	0.005	67	0.082	17
Jumping Creek at Jumping Creek Road Bridge	8.7	92	960	100	7.6	100	7.0	92	9.0	100	1.32	33	0.06	83	0.001	100	0.011	100
Koonung Creek at Bulleen Road	6.6	67	755	100	7.2	100	10.0	83	9.0	83	1.57	22	0.11	58	0.005	58	0.081	33
Macclesfield at Woori Yallock Road	8.5	100	145	100	7.4	100	14.5	75	11.5	92	1.28	0	0.04	92	0.001	100	0.006	100
Merri Creek at Roseneath Street	10.5	100	835	100	8.2	100	5.0	92	2.0	83	1.26	33	0.11	25	0.004	83	0.046	42
Merri Creek at Summerhill Road	5.1	33	3875	8	7.9	100	6.5	100	6.5	75	0.95	44	0.05	58	0.003	100	0.006	100
Moonee Ponds Creek at Mt Alexander Road	6.9	75	1970	42	8.0	100	9.0	92	8.0	92	2.86	0	0.09	50	0.006	50	0.051	42
Mullum Mullum Creek at Deep Creek Reserve	6.9	67	360	100	7.4	100	13.5	83	7.0	83	2.29	0	0.34	0	0.004	67	0.034	83
Olinda Creek at Macintyre Lane, Coldstream	6.8	67	545	100	7.5	100	19.5	83	13.5	83	4.01	0	0.28	0	0.002	100	0.015	100
Plenty Gorge at South Morang	7.1	42	1215	100	7.6	100	6.0	91	4.5	100	0.95	11	0.05	83	0.003	92	0.006	100
Plenty River at Henty Road Bridge, Lower Plenty	6.1	67	650	100	7.3	100	13.0	83	14.5	92	1.28	56	0.08	75	0.005	67	0.024	92
Ruffey Creek at Parker Street, Templestowe	8.4	100	755	100	7.5	100	7.0	83	4.0	92	1.81	0	0.19	0	0.005	67	0.060	50
Steels Creek at Healesville Road, Yarra Glen	6.7	86	780	71	7.0	100	12.0	57	8.0	100	0.74	20	0.03	71	0.001	100	0.009	100
Stony Creek at Bena Street, Yarraville	6.5	100	410	-	7.9	100	6.5	-	6.0	92	3.03	-	0.65	-	0.006	100	0.165	0
Stringybark Creek at Melba Highway, Yering	7.0	83	735	75	7.2	100	8.0	75	5.0	92	0.77	22	0.03	75	0.001	100	0.004	100
Watts River at Healesville-Kinglake Road	7.4	75	110	100	7.1	83	6.5	83	5.5	83	0.75	44	0.04	75	0.001	100	0.009	100
Woori Yallock Creek at Warburton Highway	8.7	92	145	100	7.1	75	18.5	50	14.5	83	1.19	0	0.04	92	0.001	100	0.006	100
Yarra River at Chandler Highway	7.5	80	240	90	7.5	100	17.0	90	16.5	100	1.30	14	0.08	40	0.005	70	0.022	70
Yarra River at Don Road, Launching Place	8.9	100	62	100	7.0	83	8.0	92	8.0	92	0.56	67	0.03	92	0.001	100	0.006	100
Yarra River at Everard Park Maroondah Highway, Healesville	7.8	92	98	100	7.4	92	12.5	83	10.5	92	0.74	22	0.03	92	0.001	100	0.005	100
Yarra River at Princes Bridge	6.3	73	7180	-	7.1	100	8.0	91	13.5	91	1.14	25	0.10	18	0.005	64	0.028	82
Yarra River at Spadonis Reserve downstream of Olinda Ck, Coldstream	8.3	82	130	100	7.5	91	15.0	67	13.0	73	1.15	0	0.05	55	0.001	100	0.005	100
Yarra River at Warrandyte Road Bridge	8.0	92	180	100	7.6	100	9.5	92	5.5	92	1.17	33	0.05	92	0.002	92	0.007	100
Yarra River at McKenzie-King Drive, Millgrove	8.9	100	54	100	7.1	83	4.0	100	4.0	100	0.52	78	0.02	100	0.001	100	0.004	100
Elster Creek at Cochrane Street	8.1	100	790	-	7.8	92	6.0	-	5.0	92	1.87	-	0.10	-	0.004	92	0.210	0
Killara Road at Sunnyside Road	8.3	75	615	100	7.3	100	8.5	83	10.0	92	1.50	11	0.04	83	0.001	100	0.006	100
Cockatoo Creek at Tschampions Road, Macclesfield	8.8	100	160	100	7.2	100	12.0	75	8.0	83	1.30	0	0.03	100	0.001	100	0.005	100
<b>Dandenong catchment</b>																		
Corhanwarrabul Creek at Wellington Road	7.5	92	400	-	7.3	100	18.0	75	8.0	92	1.42	-	0.07	-	0.003	100	0.031	100
Dandenong Creek at Boronia Road	7.2	83	610	-	7.2	100	14.0	83	17.0	83	1.66	-	0.10	-	0.004	100	0.140	83
Dandenong Creek at Stud Road	6.5	92	430	-	7.4	100	21.0	67	16.0	83	1.36	-	0.10	-	0.006	100	0.054	100
Dandenong Creek upstream of Pillars Crossing	7.6	100	470	-	7.6	100	21.0	58	18.0	58	1.49	-	0.09	-	0.007	100	0.085	92
Dandenong Creek upstream of Sheffield Road	9.0	75	130	-	7.4	67	15.0	75	15.0	75	1.59	-	0.04	-	0.001	100	0.007	100
Eumemmerring Creek at Worsley Road	7.3	100	820	-	7.6	92	11.0	75	10.0	92	1.66	-	0.19	-	0.003	100	0.041	100
Hallam Valley Contour Drain at South Gippsland Highway	5.5	92	860	-	7.4	100	11.0	83	8.0	100	1.13	-	0.04	-	0.002	100	0.017	100
Mile Creek downstream of Cheltenham Road	5.9	83	1300	-	7.3	100	7.0	100	5.0	100	1.57	-	0.10	-	0.003	100	0.190	67
Mordialloc Creek at end of Wells Road	6.2	92	2580	-	7.3	92	21.0	25	26.0	17	1.79	-	0.16	-	0.005	100	0.067	42
Patterson River at National Water Sports Centre	7.8	100	1160	-	7.6	92	24.0	33	27.0	17	1.57	-	0.12	-	0.006	100	0.051	92
Kananook Creek at Wells Street	5.6	67	42300	-	7.6	100	4.0	100	24.0	33	0.78	-	0.18	-	0.006	100	0.047	33

\* Melbourne Water undertakes water quality monitoring at 72 sites around Melbourne.

Description	Dissolved oxygen		Electrical conductivity		pH		Turbidity (median)		Suspended solids (median)		Total nitrogen		Total phosphorous		Lead		Zinc	
	Median	% SEPP	Median	% SEPP	Median	% SEPP	Median	% SEPP	Median	% SEPP	Median	% SEPP	Median	% SEPP	Median	% SEPP	Median	% SEPP
<b>Westernport catchment</b>																		
Balcombe Creek at footbridge off Uralla Drive	6.3	75	2210	-	7.4	100	8.0	-	8.0	75	1.14	-	0.04	-	0.002	100	0.025	33
Bunyip Main Drain at Iona Gauging Station	8.2	-	210	100	7.1	100	10.5	83	9.0	92	0.71	33	0.04	92	0.002	100	0.006	100
Bunyip River at Healesville-Koo Wee Rup Road, Koo Wee Rup	8.9	-	255	100	7.6	100	15.5	58	14.0	73	0.89	33	0.04	75	0.003	100	0.005	100
Bunyip River at North Labertouch Road, Labertouche	9.4	-	110	100	7.3	100	10.0	58	12.5	83	0.75	0	0.02	92	0.002	100	0.005	100
Bunyip River downstream of Cannibal Creek at Farm Bridge, Longwarry North	9.0	-	150	92	7.3	100	11.5	83	11.0	83	0.73	44	0.04	92	0.002	100	0.006	100
Cardinia Creek at Ballarto Road	9.1	-	370	-	7.3	92	10.5	75	4.5	83	0.74	44	0.04	67	0.002	100	0.007	100
Cardinia Creek upstream of Chadwick Road Ford, Upper Beaconsfield	8.4	-	160	83	7.5	67	6.5	83	4.0	91	0.54	67	0.03	92	0.001	100	0.004	100
Chinamans Creek at Eastborne Road	3.5	17	1260	-	7.4	100	5.0	-	4.0	83	1.24	-	0.06	-	0.002	100	0.013	58
Deep Creek at Ballarto Road	5.1	-	765	-	7.1	100	46.5	0	38.0	0	1.91	0	0.41	0	0.005	100	0.016	75
Lang Lang River at South Gippsland Highway	8.3	-	625	75	7.4	100	24.5	25	14.5	58	2.33	0	0.17	0	0.003	100	0.008	100
Lang Lang River upstream of Drouin-Poowong Road, Athlone	7.4	-	460	100	7.4	100	12.0	8	11.5	17	2.12	11	0.15	8	0.002	100	0.007	100
Main Creek at Boneo Road	9.1	100	1800	-	7.8	100	5.0	-	3.0	92	0.64	-	0.02	-	0.001	100	0.004	100
Merricks Creek at Bridge Street (Beach Road)	5.2	-	3000	-	7.4	92	6.0	92	6.0	83	0.84	33	0.04	75	0.003	100	0.021	92
Tarago River at Morrisons Road, Labertouche	8.5	-	315	58	7.3	100	8.5	83	8.0	83	0.66	56	0.04	83	0.002	100	0.005	100
Toomuc Creek at Ballarto Road	5.2	-	510	-	6.9	92	15.0	50	7.0	42	0.84	0	0.05	42	0.003	100	0.008	100
Toomuc Creek at Princes Highway	8.0	-	520	17	7.4	83	14.0	58	5.0	92	0.87	22	0.05	33	0.002	100	0.009	83
Warrangine Creek downstream of Frankston-Flinders Road	6.3	-	2880	-	7.2	92	10.0	92	7.0	92	1.23	33	0.05	83	0.003	100	0.035	50
Watsons Creek at Dandenong-Hastings Road, Somerville	8.1	-	3500	-	7.2	92	8.0	100	9.0	83	-	0	0.30	25	0.003	92	0.030	42
Watsons Creek at Henley Road, Kangaroo Road	8.1	83	865	25	7.5	100	4.5	83	2.5	92	0.43	67	0.03	92	0.003	92	0.005	100
Yallock Outfall at South Gippsland Highway	6.9	-	1850	0	7.0	100	52.0	0	53.0	0	4.21	0	0.17	0	0.003	100	0.008	100
Dunns Creek at Marine Drive	7.2	100	3300	-	7.4	100	5.0	-	4.0	92	0.74	-	0.04	-	0.002	100	0.010	92
<b>Maribyrnong catchment</b>																		
Maribyrnong River at Canning Street Ford, Avondale Heights	6.8	83	1900	-	7.8	100	9.5	-	8.5	100	1.16	-	0.04	-	0.002	100	0.007	100
Maribyrnong River at Brimbank Park Ford upstream of Taylors Creek & Keilor	6.4	83	1780	-	7.8	100	7.5	-	6.0	100	1.19	-	0.05	-	0.002	100	0.009	92
Steele Creek at Rose Avenue, Niddrie	8.1	92	1010	-	8.0	100	4.0	-	4.0	67	0.66	-	0.05	-	0.004	83	0.050	0
<b>Werribee catchment</b>																		
Kororoit Creek at Millbank Drive, Deer Park	6.3	75	1605	-	7.6	100	5.5	-	6.0	92	0.67	-	0.05	-	0.003	100	0.012	75
Kororoit Creek upstream of Racecourse Road Ford, Altona	6.5	75	5365	-	7.9	100	17.5	-	34.0	8	1.56	-	0.19	-	0.007	75	0.030	25
Skeleton Creek at Ayr Street, Laverton	5.5	58	4100	-	7.5	100	9.5	-	15.0	100	0.80	-	0.15	-	0.003	100	0.018	58





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*For information on Melbourne's water resources  
in languages other than English, call 131 722  
or visit [www.melbournewater.com.au](http://www.melbournewater.com.au) and click on  
the Community Languages link.*