

Contents



3.0 Corangamite Catchment Region section

Information sheet 1: Corangamite Catchment Region	2
Teacher sheet 1: Wathaurong ways	5
Information sheet 2: People who belong to the water	7
Student sheet 1A: Names and remains along the Barwon	8
Student sheet 1B: Names and remains along the Barwon	9
Teacher sheet 2: European settlement of the region	10
Student sheet 2: Water supply for Geelong and region	12
Information sheet 3: European settlement in the region	13
Teacher sheet 3: Your local catchment	16
Blackline master 1: Map 1 of Corangamite Region	17
Blackline master 2A: Map 2A of Corangamite Region	18
Blackline master 2B: Map 2B of Corangamite Region	19
Blackline master 2C: Map 2C of Corangamite Region	20
Blackline master 2D: Map 2D of Corangamite Region	21
Teacher information sheet 4: Corangamite Catchment Region	22-34
Blackline master 3: Map 3 of Corangamite Region	23
Blackline master 4: Map 4 of Corangamite Region	24
Blackline master 5: Map 5 of Corangamite Region	27
Blackline master 6: Map 6 of Corangamite Region	28
Teacher sheet 4: Monitoring Corangamite's waterways	35
Blackline master 7: Water quality ratings for Corangamite	37
Teacher sheet 5: Corangamite Region sample data	39
Student sheet 5: Corangamite Region sample data	41
Teacher sheet 6: Catchment condition report	43
Student sheet 6: Catchment condition report	44
Information sheet 5: Local issues	46





Corangamite Catchment Region

Regional information and activities

The information and activities in this section of the *Waterwatch Education Kit* supplement those in the Statewide section of this Kit. One approach is to conduct the Statewide activities first and apply the Statewide questions and activities to your local focus. The following specifically regional activities can then be conducted within an understanding of the broader Statewide issues related to water quality and use.

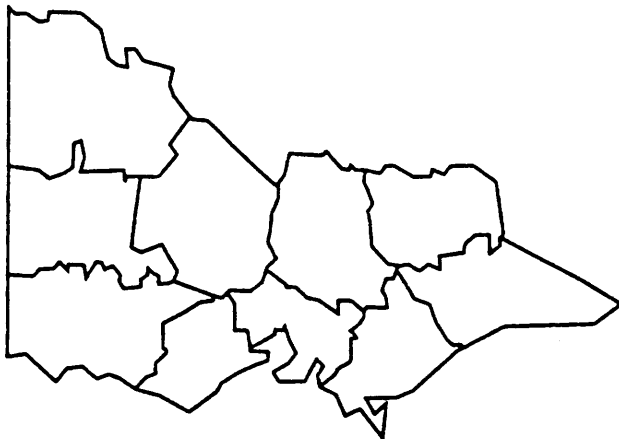
The information and activities in this Kit supplement those in *A Community Water Quality Monitoring Manual for Victoria*.

Corangamite Catchment Region

Corangamite Catchment Region is one of the ten Catchment Regions in Victoria.

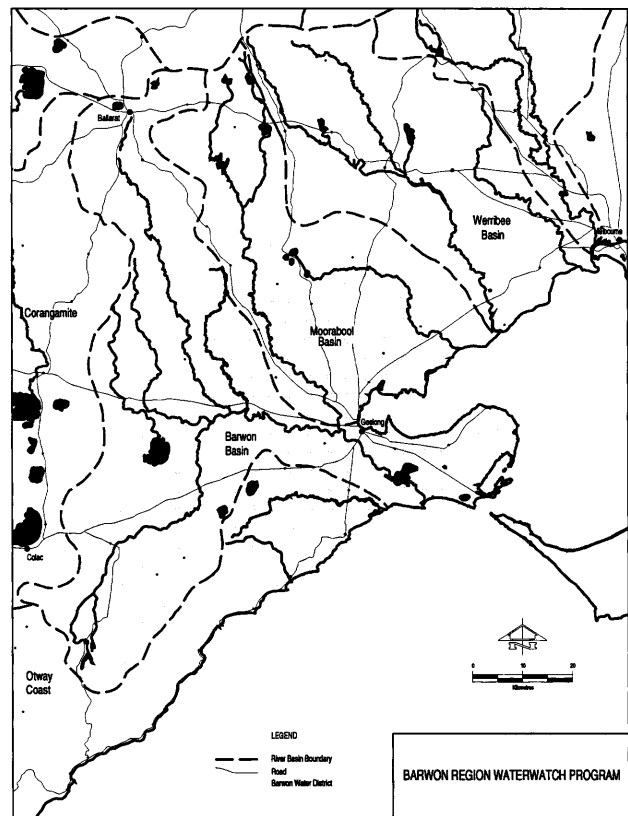
Four major drainage basins - Barwon Basin, Moorabool Basin, Otway Coast Basin and Corangamite Basin - are grouped together to make up the larger Corangamite Catchment Region. A Regional Catchment Strategy has been prepared for the Corangamite Catchment Region to assist with planning and management. Copies of this Strategy are available through your facilitator.

This section provides specific information and activities for the Corangamite Catchment Region. More focus is given to the eastern half of the region, the area covered by Barwon Water's Community Waterwatch Program.

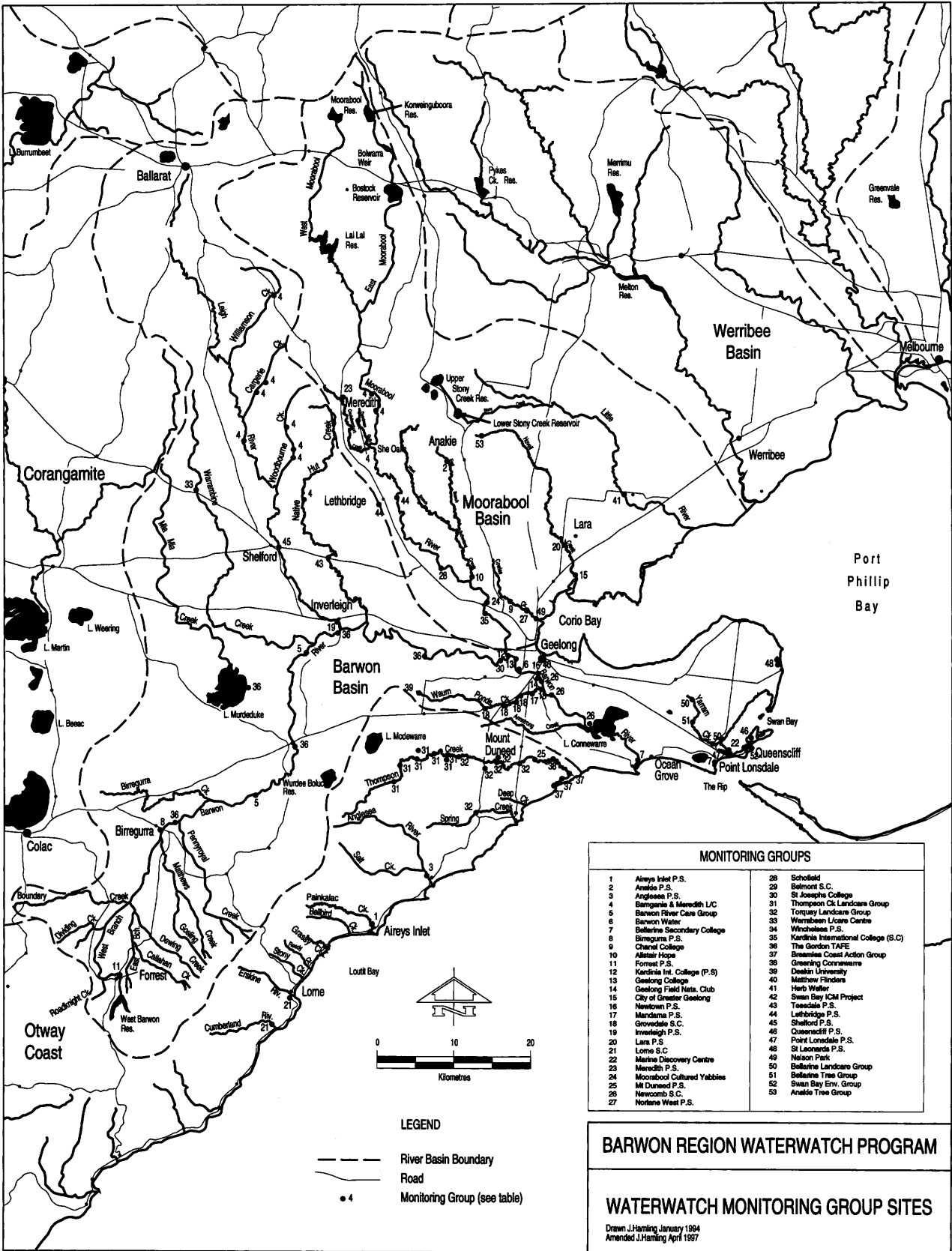


Catchment and Land Protection Act

The *Catchment and Land Protection Act 1994* laid down a framework for a co-ordinated and strategic approach to catchment management across Victoria. Catchment and Land Protection Boards (CALP) were established in 1994 in each region to advise on the management of land and water resources in their region. The Act required that the CALP Boards prepare a Regional Catchment Strategy for their region. The desired outcome of each region's strategy is that the community manages land and water based on an understanding of and a commitment to sustainable use, conservation and rehabilitation of those resources. In July 1997 nine new Catchment Management Authorities (CMAs) with expanded roles replaced the CALP Boards. Each CMA is made up of local representatives from land and water management agencies, local councils and representative community groups [check]. The CMAs will use the Regional Catchment Strategies as their blueprint for integrating and delivering land and water management programs into the next century.



Corangamite Catchment Region





Corangamite Catchment Region

Yollinko Wetlands

This wetland had all but vanished until recently. All that remained were the tough water plants that could survive the eating and trampling of cattle (Lignum and Water Couch).

The Yollinko Wetland has been restored as an initiative of Barwon Water. The project has been assisted by the State Government through employment training programs and many community groups have assisted with tree plantings. Boardwalks have been included to let visitors experience this fragile wetland environment without damaging it.

Yollinko Living Station

Yollinko Living Station has been a cooperative venture between the Wathaurong Aboriginal Co-op Barwon Water, the City of Greater Geelong, and Highton Rotary. The gardens surrounding the Aboriginal midden exhibit plants used by the local Koori population.

The wetlands

The wetland is a rich and diverse environment that complements the Barwon River. It is dependent on and urban stormwater runoff from Newtown which is directed into Balyang Sanctuary before discharging into the wetland site. Yollinko Wetland fills with the floods of winter and spring, then gradually dries out during summer and autumn. Its wetland plants have evolved in a cycle of flood and drought. There is a natural succession of plants as the water level changes. Green algae are a normal and important part of ephemeral wetlands as they provide food and cover for invertebrates such as water snails. In summer the algal mats dry out at the muddy margins.

Stan Lewis Walk

This 2.5 km walking track between Queens Park and Princess Bridge has been the site of one of Geelong's largest revegetation projects. From the early 1990s, woody weeds such as Boxthorn and Ash have been removed and replaced with indigenous trees, shrubs and grasses. This project has received several state and federal environmental awards.

Fyansford Information Centre

The centre has information displays about the Barwon River and its human and natural history.

Additional regional resources

The following publications contain useful additional information specific to the Corangamite Catchment Region.

Education materials

The Water Cycle. J. Dart & M. Galletly. Barwon Water. 1993. This education kit includes the following activities and information:

Geelong's Water Supply History information, pages 27-28; activities, pages 33-35.

Geelong's Water Supply Today information, pages 37-39, 57; activities, pages 45-56.

Water Treatment information, page 59; activity, page 61.

Wastewater information, pages 63-65, 73-76; activities, pages 67-72, 77-81

Barwon River information, pages 83-85; activities, pages 87-93

Barwon River History information, pages 95-96; activities, pages 97-101

Barwon River Today information, page 103; activity, page 104

Environment Issues information, pages 105-110, 121, 131-132; activities, pages 111-120, 123-129

Barwon River Environment Trail. A unit of work for upper Primary School students. Barwon Water. 1997.

Plant and animal lists

The Water Cycle, pages 88-89

Barwon River Flora. Barwon Water booklet.

Barwon River Fauna. Barwon Water booklet.

Brochures

Yollinko Park Aboriginal Garden. Barwon Water.

Barwon River Environment Trail. Barwon Water.

Cultural heritage

The Cultural Heritage of the Barwon River. A study commissioned by Barwon Water. Bev Roberts. 1993.

Do you remember? Memories of the Barwon. Gordon College and Barwon Water.

These two publications are the sources of quotes in the Wathaurong and European information and activity pages of the Corangamite regional section of this Kit.

Regional catchment strategy

Corangamite Regional Catchment Strategy. Corangamite Catchment & Land Protection Board. June 1997.



Wathaurong ways



Key Learning Outcomes

Level 4

SOSE: Place and Space

Analyse how people's beliefs & practices influence the ways they interact with places.

Time, continuity & change

Describe ways of life of people in the past.

Portray an event or occasion from a particular perspective.

Resources

Explain factors that affect resource use & development.

Natural & social systems

Describe responses of different elements (including people) to change in natural systems.

Level 5

SOSE: Place and Space

Explain how peoples' use of natural environments changes over time.

Resources

Describe how resources are owned and accessed.

English

Aims

- to develop understandings about how the Wathaurong people used waterways and water related resources in the region

Materials

Information sheet 3: People who belong to the water

Student sheets 1A and 1B: Names and remains along the Barwon

Refer to the Aboriginal uses of waterways information and activity pages in the Statewide section of this Kit.

Additional resources

Barwon River History information pages 95 in *The Water Cycle*. J. Dart & M. Galletly. Barwon Water. 1993.

Barwon River Environment Trail. A unit of work designed for upper Primary School students. Barwon Water. 1997. Activity 8: Yollinko wetland; Activity 10: Useful plants.

Yollinko Park Aboriginal Garden brochure. Barwon Water.

Advanced preparation

- Duplicate the required number of the information and student sheet listed under Materials.
- Based on your students' reading levels decide whether the activity will be best done in small groups or individually, or whether you will read the information sheet out aloud to the class in sections, as related to each site to be mapped on Student sheet 1B.

Activities

- Distribute Information sheet 2 and Student sheet 1A and 1B.
- Read out, or have students read the information and map the named sites onto Student sheet 1B.
- Students write a story about a Wathaurong family group, describe their lifestyle, especially the ways in which they collected, used and managed water and water related resources.
- Summarise as a class some ways in which the Wathaurong people used rivers and wetlands, and how these resources influenced their lifestyle.

Extension

- Arrange for a local Aboriginal Cultural Officer to meet with your class.
- Visit the Yollinko Park Aboriginal Garden. The gardens surrounding the Aboriginal midden and mound displays plants used by the local Koori population.
- The Aboriginal names given to some areas of the river show their significance as sources of particular foods.
 - Boonea: Yallock (above Baum's Weir) - a place for trapping eels and fish.
 - Porrong: Goop (Boronggoop) - place of quails.
 - Liep: Liep (Lap Lap or Lib Lib, near Reedy Lake) - place of the waterbird Lewin's Rail.
 - Koo: N: Warre (Lake Connewarre) - mud oyster water.
 - Balliang - the place of bulrushes.

Wathaurong Aboriginal Co-operative

About 1200 descendants of Victorian Kooris live in the Geelong - Otway region. The Wathaurong Aboriginal Co-operative based in Geelong is a centre of education and cultural awareness regarding Koori heritage in the area.



People who belong to the water



The Wathaurong

Wathaurong means 'people who belong to the water'. The Wathaurong tribal area covered most of the present day Barwon and Moorabool River Basins and part of Otway Coast and Corangamite River Basins.

The Barwon River was an important part of the Wathaurong's territory. Their pattern for hundreds if not thousands of years was to move each year between their established camping sites along or near the river. Depending on the food supply they stayed briefly, or for 2-3 months.

The number of Aboriginal people in the Western District was perhaps 2000 to 3000 but, following white settlement, their numbers quickly fell. After only 50 years, the traditional system which had supported the Aborigines for centuries no longer existed. The last member of the Wathaurong tribe died in 1885.

Using the Barwon River

It is the lack of evidence of the Wathaurong's impact on the river which tells us most about their special relationship with it - it tells us they had little impact.

The Wathaurong lived and hunted along the Barwon using the river's natural resources. The river was a source of food, shelter and clothing. Moving from place to place according to the seasons and food sources, they used most sections of the river. The river's estuary, and the coastline and intertidal zone are very rich in food and were the focus of much of their everyday existence.

While the men might trap or spear fish in the river, the women would collect the new young rhizomes of reeds at the water's edge, or fruits, gum and nectar from the riverside trees.

Animal foods

The river itself provided fish, shellfish, eels and water birds. Kangaroos were caught coming to drink. Possums were caught in riverbank trees.

Plant foods

Plant foods were easily collected. The sweet, starchy tubers of Water Ribbons were cooked in earth ovens. The tough starchy roots of Small-leafed Clematis and Blushing Bindweed were cooked in baskets and kneaded into dough on a small sheet of bark. The underground stems (rhizomes) of Bracken were roasted in hot ashes and then beaten to break up its hard fibres. Mistletoe flowers and fruits were used for sweetness, as were Lerps (the surgery covering of a tiny insect that lives on eucalypt leaves).

Tools

To carry water from the river the Wathaurong people made water containers from a sheet of fresh acacia bark about 30 x 50 cm, bent double and sewn up each side with sinews. The seams were caulked up with cement made of wattle gum and wood ash made in hot water. For a small water bag the pouch of a kangaroo was used. A larger water bag was made from the skin of a male Brush Wallaby, cut at the neck and sewn water tight with ligatures.

The plentiful Tea-tree and Reeds were made into spear shafts. Wattle and Red Gum trees were ideal for boomerangs (wanguim). Marine shells and fresh-water mussel shells were used for knives

Bark from the riverside trees provided ready-made cover for shelters. Wood was used to make handles for weapons and tools. Wattle gum was made into glue by chewing balls of the gum or dissolving it in water. Some of the local stone was used for tools. Barrabool sandstone was used for sharpening axe heads or grinding wattle or grass seeds into flour.

Trading

The Wathaurong traded products and resources from their local area. The Barwon River region was known for its trading in stone for axes, special wattle gum for adhesives, and shells for knives.

Bunyips

The Barwon River was also the home of a local mythological creature, the Bunyip. According to members of the Wathaurong, the local Bunyip was a fearsome creature responsible for a number of deaths. Its breast was said to be covered with different coloured feathers, and its usual method of killing its prey was by hugging it to death.

... it did not come on land except on extremely hot days. (its) head resembled an emu with a long bill at the extremity of which was a transverse projection on each side with serrated edges like the bone of a stingray. Its legs were long and resembled a crocodile's with sharp claws, and stood 12 or 13 feet [about 4 metres] in height. When in water it swam like a frog, and when on land it walked on its hind legs with its head erect.

1845 quote from a Wathaurong tribe member who believed his mother was killed by the Bunyip.



Names and remains along the Barwon

Names and sites along the Barwon River

1. **Barwon River -BARRE : WARRE : N: YALLOCK** - means the great river (Yallock) that ran from the mountains (Barre) to the ocean (WARRE).
Aboriginal people don't often name a river because how can you name a river when the water is flowing away from you? Instead they had names all along the river where they camped. In the case of the Barwon they did have a name for it.
2. **Moorabool - MOORA** means ghost.
There was a very large lagoon on the Moorabool river and the Aboriginal people believed ghosts lived there. The Moorabool also means Cooloo and this is a night bird, so they only heard it, never saw it, so they thought it was the voice of a ghost.
3. **Buckley Falls - YARRAM MORDONG, YARRAM** means a waterfall or rapid and **MORDONG** means eels.
The eels don't breed here, they go down to the sea and swim away. When they come back, they are only little tiny things . . . about eight centimetres long, they wriggle up where the water is running over the rocks.
4. **Fyansford - BUKAR BULAC** means a place between two rivers; Fyansford lies at the junction of the Moorabool and the Barwon rivers.
Bukar:Buloc was a significant area to the Wathaurong tribe as one of the locations on their seasonal food-gathering route which was followed each year. This site was a major source of eels and fish.
5. **Queens Park - WOORONGA** means trees which had protruding gnarls. It is also thought the name represented the shape of the river at this site which curves in a 'gnarly' manner.
Gnarls were useful when making coolamons (containers). There were lots of trees where they cut these gnarl's off and they would make vats to hold water. The vats were kept with fresh water in them and they used to make nice drinks for the little children by soaking flowers to get honey out of them. They also put gum in it and stirred it up. When the children came back from the morning's foraging they would offer them a honey drink - that was why they needed these great vats to keep water in.

The stump of a River Red Gum 'canoe tree' can be seen today at Queens Park. The tree's bark has been stripped to make a simple canoe.
... a huge dish-shaped sheet or bark was stripped from a mature gum tree. It could be used only on calm water. The flat craft was punted along by a long pole which also served as a fish harpoon ... As well as fishing for eels by torchlight, the canoe was ideal for pursuing aquatic birds in moult or for harvesting their eggs.
6. **Kardinia Creek - KA: DIN :IU** means the hissing of a snake and perhaps refers to the rippling of the tide as it moved upstream. This was a Wathaurong camping place.
There is a mound at Yollinko Park . . . There were 800 artefacts on one mound.
7. **Yollinko. YOLLINKO** means yesterday.
The Wathaurong people camped here in winter for 5000 years. It was an ideal place, sheltered from all winds, and up to 2 degrees warmer than up on the ridge. Fresh water was available from the creek and there were plenty of waterfowl, fish and freshwater mussels to eat. Across the river are the wetlands which provided good hunting. There is also a mound or fishing stage (located where Princes Bridge now is) which provided a flat space from which fish could be caught when the river was flooding.
8. **Porrong:Goop (Boronggoop)** - place of quails.
9. **Belmont Common-** was called **JERRINGOT** means water all around or a place of billabongs.
10. **Waurn Ponds Creek - WUURRN YALLOCK** means homes along the river.
11. **Reedy Lake- BANGI: BALLA** means inert or placid water.
12. **Barwon Estuary - KOOURIN** means neck.
13. **Barwon Heads - KOLO: ET KOLO** means fresh water. Salt water meets fresh water here.



European settlement of the region



Key Learning Outcomes

Level 4

SOSE: Place and Space

Analyse how people's beliefs & practices influence the ways they interact with places.

Time, continuity & change

Describe ways of life of people in the past.

Portray an event or occasion from a particular perspective.

Resources

Explain factors that affect resource use & development.

Natural & social systems

Describe responses of different elements (including people) to change in natural systems.

Level 5

SOSE: Place and Space

Explain how peoples' use of natural environments changes over time.

Resources

Describe how resources are owned and accessed.

English

Advanced preparation

1. Look through *The Water Cycle* education kit and decide which activities and information pages from that publication you want to include as part of this topic.
2. Based on your students' reading levels decide whether the reading activities will be best done in small groups or individually, or whether you will read the information sheet out aloud to the class in sections, as related to each site to be mapped on Student sheet 1B.
3. Duplicate the required number of information and student sheets listed under Materials, and required pages from *The Water Cycle*.
4. Prepare an overhead of Blackline master 1: Map 1 of Corangamite Region.

Activities

1. On an overhead of Blackline master 1, locate your town. Can students identify nearby rivers and reservoirs? Show the location of these on the overhead map. Identify the reservoir(s) that now supply your town with water. [Refer to Information sheet 3.]
2. Make the point that the water that comes out of your taps today comes from nearby rivers [*name them*] and that water from these rivers is stored in reservoirs. Early settlers did not have water on tap and had to obtain it directly from rivers and this affected settlement patterns. It was often quite a task for people in the 1800s to get clean water every day.
3. Distribute copies of page 28 of *The Water Cycle*, Student sheet 2: Water supply for Geelong, and Blackline master 2: Map 2 of Corangamite Region. Students read the information page, complete the timeline and label the mentioned sites onto the regional map. Discuss the results as a class to summarise the major events and significance of these to the region.
4. Distribute Information sheet 3: European settlement in the region and Student sheet 1B: Names and remains along the Barwon.

Aims

- to develop understandings about early European uses of waterways and water related resources in the region

Materials

Student sheet 2: Water supply for Geelong and region

Water Supply information on page 28 *The Water Cycle*

Blackline master 1: Map 1 of Corangamite Region

Blackline master 2: Map 2 of Corangamite Region

Information sheet 3: European settlement in the region

Student sheet 1B: Names and remains along the Barwon

Refer to the European history information and activity pages in the Statewide section of this Kit.

Additional resources

The Water Cycle. Barwon Water. 1993. Geelong's Water Supply History information, pages 27-28; activities, pages 33-3; Barwon River History information, pages 95-96; activities, pages 97-101.

European settlement of the region cont.



5. Read out, or have students read the information sheet and map the named sites onto Student sheet 1B. Emphasize the important role of the Barwon River in the development of the region.

Use an overhead of the Student sheet 1B to show the historical sites along the Barwon and summarise their impacts on the river and the town, beneficial and detrimental.

6. As a class, list the ways in which the Barwon River was used from the 1830s to 1940s by people and industry.

[E.g. for people's drinking water, water for household uses such as washing and gardens, water for livestock; for generating steam power; water for industrial processing in wool, paper and tanning factories; a drain for discharging wastes from these factories; a drain for household sewerage; water for orchards and market gardens.]

Discuss why all these uses could not continue.

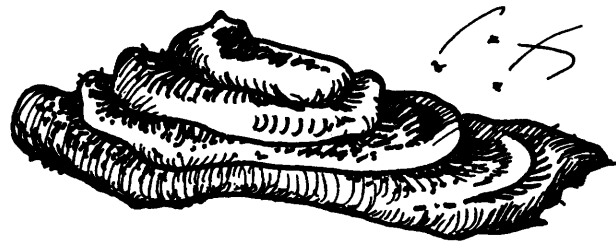
[Some activities polluted the water which meant it became a health hazard and could not be used for purposes that required high quality water.]

7. Students write a story describing the life of a family of early settlers in the region in the mid 1800s. This could cover a period of drought or flood as well as a time of typical river levels. The essay should explain the ways in which the family collected, used and managed water, what they needed water for (e.g. domestic use, stock, crops), and what the quality of water was like.
8. Summarise as a class some ways in which early European settlers used rivers, and how these resources influenced where they settled and their lifestyle. *[e.g. needing to travel to the river every day, or buy water in barrels].*

Extension

Maths

Students use the map to estimate the distance water flows from the relevant reservoir(s) to their town.



Water supply for Geelong and region



1. Read the information on page 28 of *The Water Cycle*.

Complete this timeline.

- 1866 Geelong's first reservoir is made by building a dam across _____ Creek in the Brisbane Ranges.
- 1898 After a drought that year, it was decided to divert water from the _____ River to Stony Creek Reservoir.
- 19__ The Geelong Waterworks and Sewerage Trust began sewerage the city.
- 1914 K _____ Reservoir near Ballan was built.
- 1954 Geelong was in danger of running out of water in times of drought, even though the _____ near Winchelsea and the Bostock Reservoir on the _____ had been built.
- 19__ The West Barwon Reservoir was built to overcome drought water shortage.
- 1970s Geelong Waterworks and Sewerage Trust began testing for _____
- 1972 The _____ Dam is built on the West Moorabool River. This water is shared with _____.
- 1984 A number of smaller water authorities in the region merged with Geelong Waterworks and Sewerage Trust to become the Geelong and District Water Board.
- 1994 Barwon Water is the new name for the region's water authority.
- 1997 Barwon Water merges with Otway Water but retains the name 'Barwon Water'.

2. Label the rivers, waterways, water storages and other mentioned sites onto your map of the region.



European settlement in the region



The region

European Settlement

The vast open grasslands of the Western Volcanic Plains attracted early European settlers with their flocks of sheep. By the end of the 1830s much of the northern Corangamite area had been taken up by large pastoral runs held under the leasehold from Crown - at an annual fee of ten pounds.

The severe drought in 1839-40 led to a number of pastoral runs changing hands as settlers struggled with the lack of water, loss of livestock and the fluctuating markets.

In 1847 those graziers that remained won the right to tenure their Crown leases. This new found security led many of them to replace their old timber slab and iron huts with more established dwellings, often made out of the local bluestone. Family life was well established by 1850 and supported growing local centres like Colac, Geelong and Ballarat with produce.

The Gold Rush

The discovery of gold around Ballarat in 1851 led to population explosions in goldfield areas. Pastoralists and farmers in rural areas soon lost many of their workers to the 'gold rush'. Some people did not join the 'rush' itself but set up shops and services to supply the miners with food and goods. Until 1854 all of the extracted gold was alluvial, that is, removed from the beds of existing or ancient streams.

Sutherland Creek which flows from the Brisbane Ranges has silted up mainly because of goldmining activities at Steiglitz in the 1890s.

Changing Landscape

The gold rush changed the landscape and waterways dramatically. Rivers were dredged and surrounding forests felled for timber and fuel. A whole range of exotic European fauna was introduced including foxes, hares, European Carp and European Perch (fish), skylarks, sparrows and deer. The release of rabbits into the Australian wild occurred in the Corangamite region. The Austin family who owned Barwon Park near Winchelsea, released rabbits for sport and recreation in 1859.

Most of the Western Volcanic Plain was originally covered with native grasslands and so naturally had few trees. Pastoralists quickly settled on these native grasslands with their introduced sheep and cattle. Grazing by stock, and the use of fertilisers such as superphosphate in the 1900s, has led to the loss of most of these native grasslands as they became invaded or replaced by introduced pasture plants and weeds.

The Railway

Railway lines were laid during the 1870s and provided people with quicker and easier travel. Most importantly they provided a cheap way to transport goods to larger cities and towns. Railways had a significant impact in the Otway region. Before railways, Otway farmers were isolated; afterwards they had good access to markets from which to sell their goods. By 1900 timber was a big industry in the Otway area. This resulted in forest clearing and led to dairying, grazing and cropping in the Ranges.

The Barwon River

The Barwon River has been very important to the development of Geelong. The land surrounding the river was gradually occupied by European settlers looking for pastures for their flocks of sheep. In 1836 sheep owned by Dr Alexander Thomson were landed at Point Henry. He set up his run on the south bank of the Barwon, his sheep ranging over most of the area which is now the suburbs of Belmont and Highton. By the end of 1836, there were 30,000 sheep in the Geelong area and land within 25 miles of Geelong was taken up by squatters.

One of the essentials of a newly established colony is an adequate and reliable water source. Some people questioned the suitability of the Barwon as a fresh water source.

The river is generally salty or brackish, and is subject to the influence of the tides. It is joined about three miles from the western extremity of the Port by another river. The scarcity of fresh water makes it in some parts ineligible for sheep farming.

(An 1836 report quoted in B. Roberts 1996).

The Breakwater

The water in the river was affected by ocean tides and was salty up to Buckley's Falls. This was especially so in the summer months when the river was not flowing as steadily and the water was getting low. To overcome the problem of fresh water supply, a breakwater (or dam) was built to stop the flow upstream of salty water at high tide. Fyans Breakwater was built by convict labour from 1839-1841. This meant that water upstream of the breakwater was of drinking quality (i.e. not salty) but it also permanently changed the condition of the river and its aquatic inhabitants.





European settlement in the region cont.

A local resident speaking about the improved water quality said:

The tide formerly flowed above the town, rendering the river water undrinkable, this is now completely remedied by Fyan's Breakwater, which is a solid mass of rough masonry (stonework) in the bed of the river, broad enough on the top to let two or three drays pass each other, and having a covered channel above high water mark for the 'flow' of the 'excellent' fresh water. The success of this great work has been triumphant; at the present moment the water on one side is quite salty, on the other pure and fresh.

(Quoted from B. Roberts 1996)

For those living downstream from the Breakwater, the need for fresh water continued to be a problem. Anne Drysdale (after whom the town of Drysdale is named) wrote in her diary of 1842 that they had to go to the breakwater every day to collect their fresh water, a journey of two miles. Their stock-keeper also had to take the cattle to the breakwater every day to drink.

Distributing water

After removing the salt, the next difficulty for the growing town was the need to distribute the water. The first efforts were made by Josef Griffin and William Gray. They installed pumps on the river bank to obtain water without polluting it with mud. They sold this water by the bucket at the river bank or loaded into barrels to sell in town. There were problems with this system when it was found the water was not clean. Gray's second scheme (in 1850) was to lay pipes to carry the water from the river to a large tank in Market Square. Here carriers purchased water from the tank for four pence a load.

In the years to come the need for clean, safe and cheap water was a major issue in Geelong. A number of proposals were put forward by the then Town Council. These proposals included the construction of dam above Buckley Falls and a pumping system, and the removal of the Breakwater which:

... could be dispensed with and the river thrown open to manufacturing and industrial pursuits and be, what it ought to be, the natural drain of the south part of the town and its suburbs

(Quoted from B. Roberts 1996)

Neither of these schemes ever came off. After the Board of Commissioners of Waterworks was established in 1856 its biggest concern was the quality and supply of water to the town. The results of the water quality tests lead to fears that:

the waters of the Barwon, in the neighbourhood of the town - near Buckley falls, were not sufficiently good quality to encourage a supply from that source .. and (there was) danger of contamination arising from the winter floods bearing along with them down the Leigh, and so into the Barwon, the waters of Ballarat in a state totally unfit for domestic uses.....

(Quoted from B. Roberts 1996)

The Barwon and industry

For the first 40 years of settlement the Barwon River was Geelong's source of drinking water, and its drain. Hightt's Flour Mill, Barwon Paper Mill, the woollen mills and tanneries all drew water out of the river for various industrial processes and also disposed of their waste products into the river. In the 19th century water power and steam provided by the Barwon powered industries such the flour mill and later starch factory, and the Barwon Paper Mill at Buckley's Falls. Steam drove a four-storey flour mill in Latrobe Terrace and another in Chilwell. In addition steam was used for soap and candle-making.

Geelong became known as "textile town" because of its links to wool-based industries. Geelong provided a sea port for the transport of wool and supported the wool-growing industry. In 1865 Geelong became the site of Victoria's first woollen mill 'The Victorian Woollen and Cloth Manufacturing Company'. By 1875, there were 14 mills operating along the river and 15 000 people living in Geelong. These woollen mills relied on river water.

The 'noxious' animal-based trades of tanning, fellmongering, scouring and tallow rendering were traditionally located together. In 1890 there were 21 tanneries in Geelong. Some of the practises of the sheep-based industries include the following:

- Tanning* - impregnating hides and skins with tannic acid to make leather items.
- Fellmongering* - removing wool from the pelt of dead sheep, by soaking in vats.
- Scouring* - washing fleece with detergent, then rinsing it in the river.
- Tallow rendering* - boiling down sheep to make candles and soap.

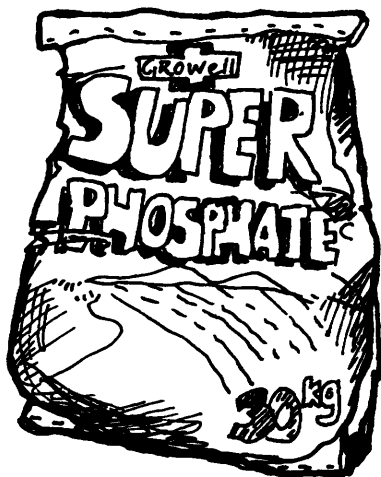
European settlement in the region cont.



As the Barwon River became polluted with industrial effluent and household waste (carried from street channels into the river), other sources of drinking water were found. The Moorabool River system began to be used in the 1880s and the upper reaches of the Barwon River in 1927. A sewerage system for Geelong was constructed in 1911.

In the 1920s, the river was described as 'malodorous' and a 'cesspool', particularly in summer. The Geelong Waterworks and Sewerage Trust created special areas and required owners of industries to settle out solids and greases and discharge their effluent into sewers rather than directly into rivers.

Eventually other sources of power were introduced into the area. In 1910 the Commonwealth Woollen Mill was established in North Geelong, the first mill not sited on the Barwon River. With the exception of the use of water in emergencies during the drought, the river was no longer used to the degree of early settlement times.



The Barwon and Agriculture and Horticulture

Due to its fertile plains the Barwon River and its banks were used to grow a large variety of cultivated crops. Market gardens and private gardens flourished along the river. In Fyansford valley, water from the Barwon and Moorabool Rivers allowed orchards, vines, nurseries and market gardens to flourish. The area was noted for these from the 1940s. Below Deviation Road opposite Queens Park, orchards were planted until the mid 1900s. One of the earliest orchards, at Walker's Newtown Valley farm, was washed away in the great flood of 1880.

Further downstream there were a number of nurseries and gardens. Of these were the Chinese gardens established at the riverside and in other sites in Newtown and Belmont.

Traditional water collection methods were used by the Chinese gardeners who carried buckets supported by shoulder yokes. Another method for carrying water to more distant gardens was with dray carts and barrels. Exotic crops such as tobacco and chicory were also planted at Queen's Park and various stretches of the land adjoining the river was used as pastures.

Sources

Corangamite Regional Catchment Strategy. CALP. 1996.

Do you remember? Memories of the Barwon. Barwon Water and Gordon Technical College.

The Cultural Heritage of the Barwon River. A study commissioned by Barwon Water. 1993. Bev Roberts. 1996.

Your local catchment



Preparing a map of your local catchment is necessary for understanding your monitoring site.

Key Learning Outcomes

Level 4

Science: Living together

Identify living and non-living things that affect the survival of organisms in an ecosystem.

SOSE: Natural & social systems

Describe responses of different elements (including people) to change in natural systems.

Level 5

Science: Living together

Explain the effects of various environmental changes on living things in ecosystems.

SOSE: Place and space

Compare natural and human environments and describe factors affecting them.

Advanced preparation

1. Decide which of the maps from the Blackline master 2 series is most suitable for your students to use.
2. Duplicate the required number of maps, and relevant sections from Information sheet 4.
3. If you need additional information (e.g. on soil type, landuse, catchment size and boundaries), contact your local Waterwatch Co-ordinator and local Council.

Activity instructions

1. Students use the map(s) provided to draw up a base map for their local catchment showing the length of their waterway and all of its tributaries.
2. Use the maps provided and local knowledge (or a field trip) to map onto their local base map:
 - major population centres
 - rainfall isohyets
 - contours (if required)
 - major landuses and industries
3. Summarise the major factors influencing your monitoring site.

Aims:

- to develop understandings of the main factors that affect water quality
- to understand how pollutants get into waterways
- to understand how waterways and water quality can be improved

Materials

Information sheet 4: Corangamite Catchment Region
 Blackline masters 1: Maps 1 of Corangamite Region
 Blackline masters 2A-D: Maps of Corangamite Region
 Contour map of the local area

Additional materials

Statewide section, Teacher sheet 18: Mapping your catchment.

A Community Water Quality Monitoring Manual for Victoria, pages 3-12, Getting started section.

