

## Victoria's major rivers

**Key Learning Outcomes****Level 4 Science: Living together**

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

**Level 5 SOSE: Natural and social systems**

Compare features of natural systems.

**Extensions** English, Art

**Aims**

- to become familiar with Victoria's major waterways and wetlands

**Materials**

Student sheet 6: Victoria's major rivers.

Blackline master 3: Victoria's River Basins.

Maps of Victoria (showing major towns, lakes, rivers).

**Additional references**

*A Community Water Quality Monitoring Manual for Victoria*, pages 3-6 in Getting Started section.

Waterwatch Website <http://www.vic.waterwatch.org.au>

**Advanced preparation**

- Duplicate required copies of Student sheets 6 and Blackline master 5 (or prepare as an OH).

**Activity instructions**

- Show the overhead of Victoria's River Basins (Blackline master 5) or distribute the Student sheet 6. Explain the basis of the 'River Basins' map.

*[Victoria has 29 major catchments or 'River Basins', linked to the major rivers in the State. Each Basin is a major catchment of one of Victoria's major rivers, and is named after that river.]*

Illustrate this by pointing out some major rivers and showing that the River Basin is named after the major river within it. Most of the surface water within a particular River Basin eventually drains into its major river.

A number of smaller rivers and creeks and their catchments are contained within each of these 29 major River Basins in Victoria.

- Explain the term 'discharge' in relation to rivers.

*[The discharge is the volume of water flowing past a given point of a river or stream over a given time, e.g. megalitres per annum.]*

- Distribute the student sheets, blackline masters and maps for individual or small group work.
- Summarise the class findings from Student sheet 5.
- Use samples of the student's sketches to illustrate the differences between mountain streams (*steep and narrow*) and lowland rivers flowing across a plain (*wider, slower*). Use the sketches to illustrate how topography affects the shape and speed of creeks and rivers.

**Note**

The completed map from Student sheet 6 can be used again in later activities about water use.

**Extension activities**

- Compare the number and type of rivers and lakes in your catchment to other Victorian catchments.
- Students research further information about selected major Victorian rivers and report to the class. Draw comparisons between the rivers. What are their major differences?
- Students find out which river in Australia has the highest discharge. What factors contribute to its high discharge? Before their research, have students suggest in which State/Territory they expect the river to be located, and why.
- Select major Australian and overseas rivers for students to research and report to the class on the. major similarities and differences of these rivers?

*[Select rivers so as to compare tropical and desert areas in Australia and other countries.]*

- Students research and write an essay about Victoria's rivers, comparing those in the east and west of the State, north and south of the Great Dividing Range.

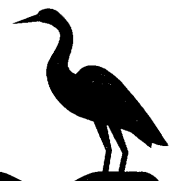
*[Refer to description of Victoria's rivers in Student sheet 6.]*

Students should investigate whether the river is dammed or free flowing and whether its water is used for water supplies, irrigation, agriculture, recreation or conservation purposes.

- Compile a class list of the ways in which Victoria's rivers are used.

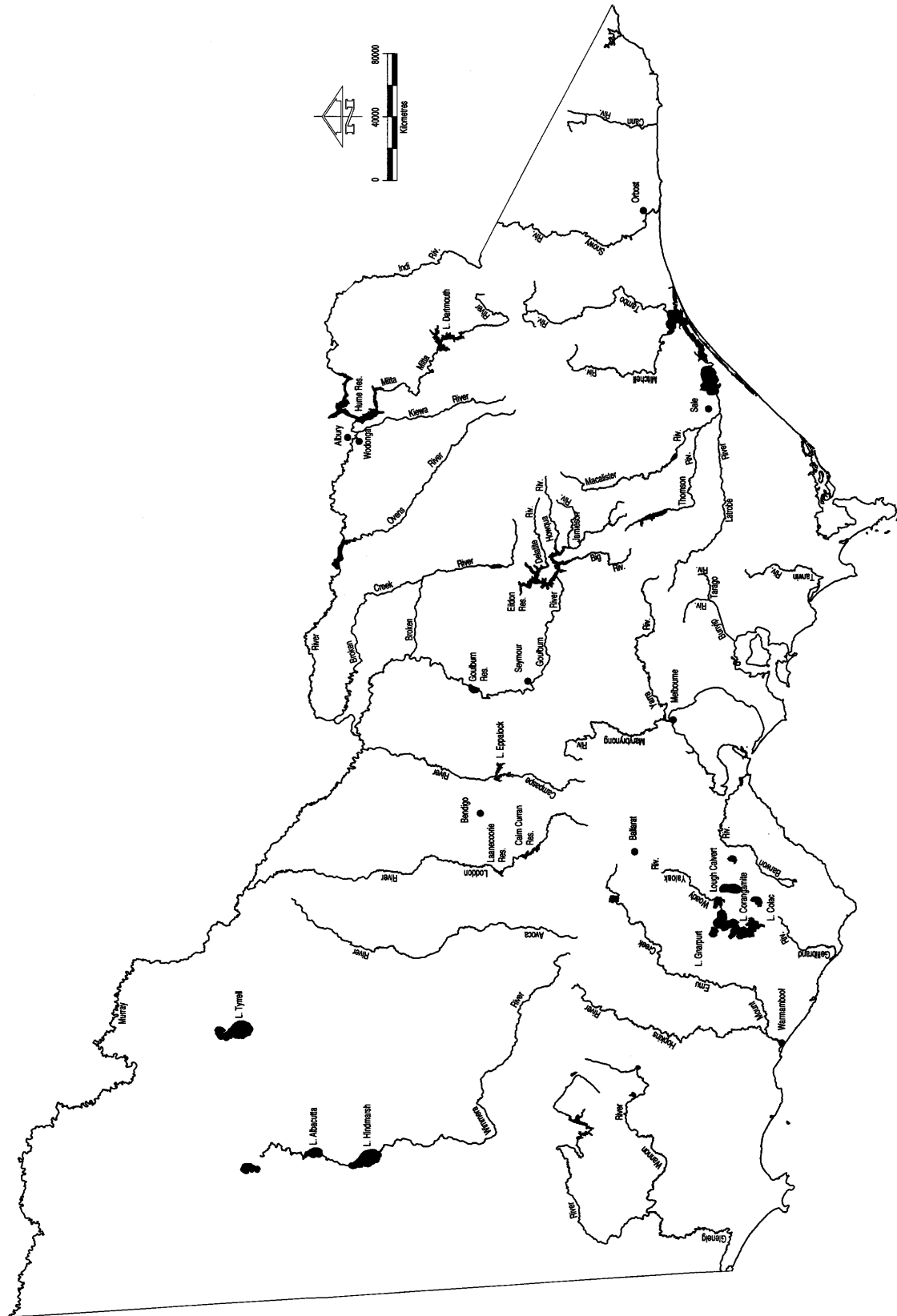
*[E.g. water source for domestic use, water source for industrial use, water source for agricultural use, recreation, transport.]*





# Victoria's major rivers

## Victoria's rivers and wetlands





## Victoria's major rivers

Although part of the world's driest inhabited continent, Victoria has a large number of creeks and rivers.

The types and conditions of these rivers varies a lot across the State. In the eastern forests they are mainly clear, cool mountain streams flowing between fern-fringed banks. On the western plains many of the rivers are muddy and slow flowing on flat, cropped land with grazed river banks and scattered River Red Gums. There are large permanent lakes in the coastal wetlands of Gippsland. The western volcanic plains have freshwater and saline lakes which dry up at times.

The amount of water in each river (river flow) in Victoria varies with the seasons and years. The heaviest river flows are during July to October. River flow naturally decreases during summer and autumn. Some years there are floods, some years there are droughts.

In general the rivers with headwaters in the upland areas of eastern Victoria have more reliable flows. The water flow in rivers in the west is much more variable. The water flows vary in Australian rivers much more than they do in rivers in Europe and Northern America.

1. After reading the paragraphs above, sketch these two river scenes in Victoria.

Use a separate page.

**A mountain creek.**

**A river on the plains.**

2. On your copy of Victoria's river catchments, trace over the rivers with a blue coloured pencil. Trace over the catchment boundaries with a different coloured pencil to make these boundaries stand out more clearly.

a) Which river catchment do you live in?

b) List the major river(s), lake(s) and reservoirs in your catchment.

c) Use a map of Victoria to list the major towns in your catchment.



## Victoria's major rivers

## Major Victorian rivers

ML stands for 'megalitre'. A megalitre is a measure of volume, i.e. 1,000,000 litres. An Olympic swimming pool holds one megalitre.

River	Length (km)	Water flow Average annual discharge (ML)
Avoca	269	47,600
Barwon	187	236,000
Broken	192	236,000
Broken Creek	224	70,500
Campaspe	245	203,000
Glenelg	454	637,000
Goulburn	563	1,680,000
Hopkins	280	294,000
Kiewa	392	186,000
La Trobe	250	860,000
Loddon	392	186,000
Macalister	201	460,000
Maribyrnong	182	111,000
Mitchell	250	936,000
Mitta Mitta	219	1,230,000
Mt Emu	305	61,000
Murray	2,530	5,793,712 (into S.A.)
Ovens	227	1,110,000
Snowy (in Victoria)	162	1,740,000
Tambo	198	324,000
Thomson	208	305,000
Wannon	233	235,000
Wimmera	290	136,000
Yarra	245	722,000

(Source: Victoria's Inland Waters Report. 1988.)

Read the table above and use the map of Victoria to complete the following questions. The Murray River is by far the longest river and carries the most water.

- 3 a) Name the next 3 longest rivers in Victoria (i.e. apart from the Murray).
- b) Not including the Murray, name the 3 rivers in Victoria which carry the largest volume of water (annual flow or discharge).
- c) Locate these on the map of Victoria. Explain why these rivers have high discharges. (*Clues: What is the surrounding topography like? How big is the catchment? Is it a wet or dry part of the State?*)
- d) Name the 3 rivers in Victoria which have the smallest volume of water in them each year. Locate these on the map. Explain why these rivers have low discharges.

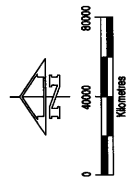




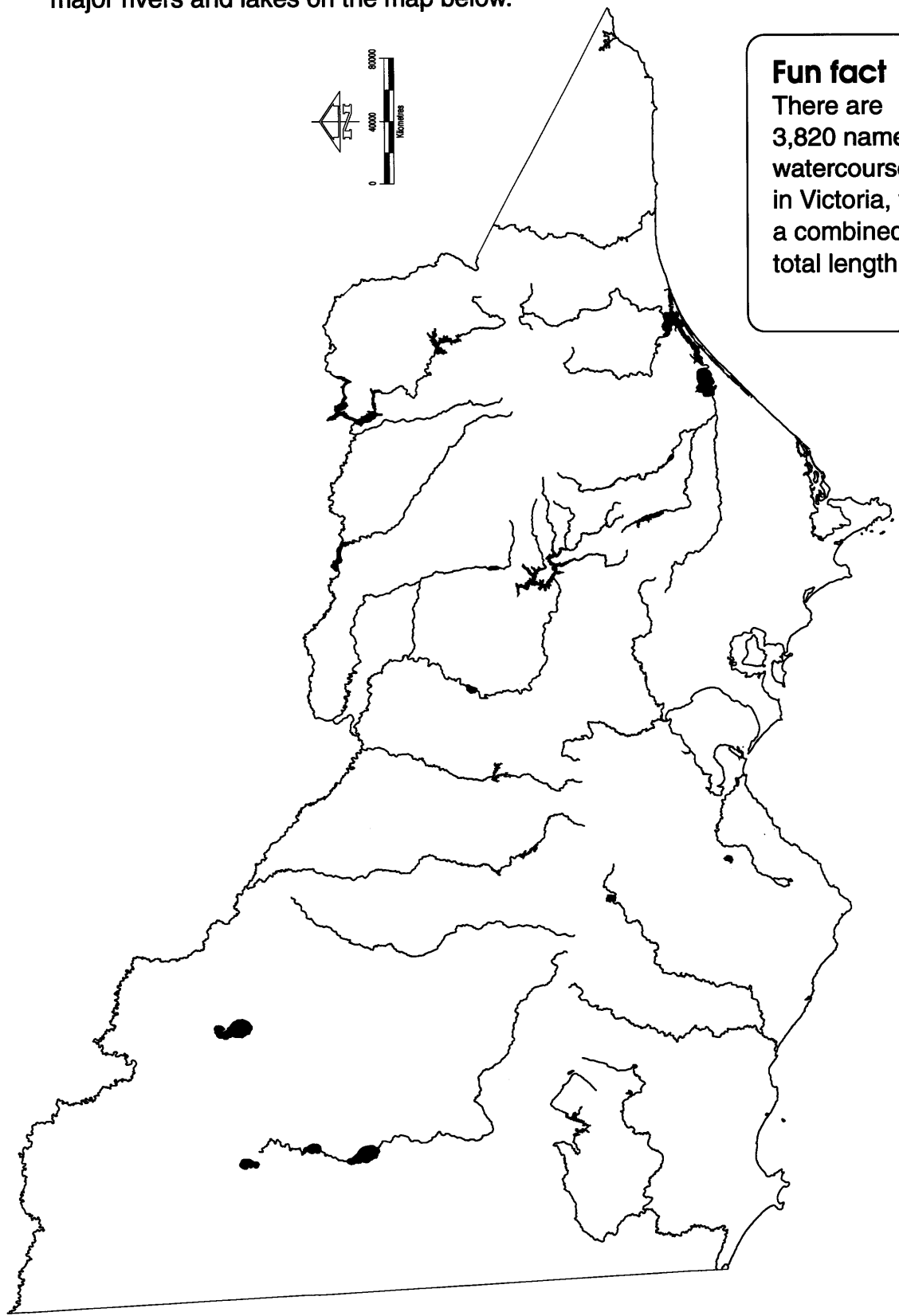
# Victoria's major rivers

## Victoria's rivers and wetlands

4. Use a map to identify these major rivers and lakes. Write the names of these major rivers and lakes on the map below.

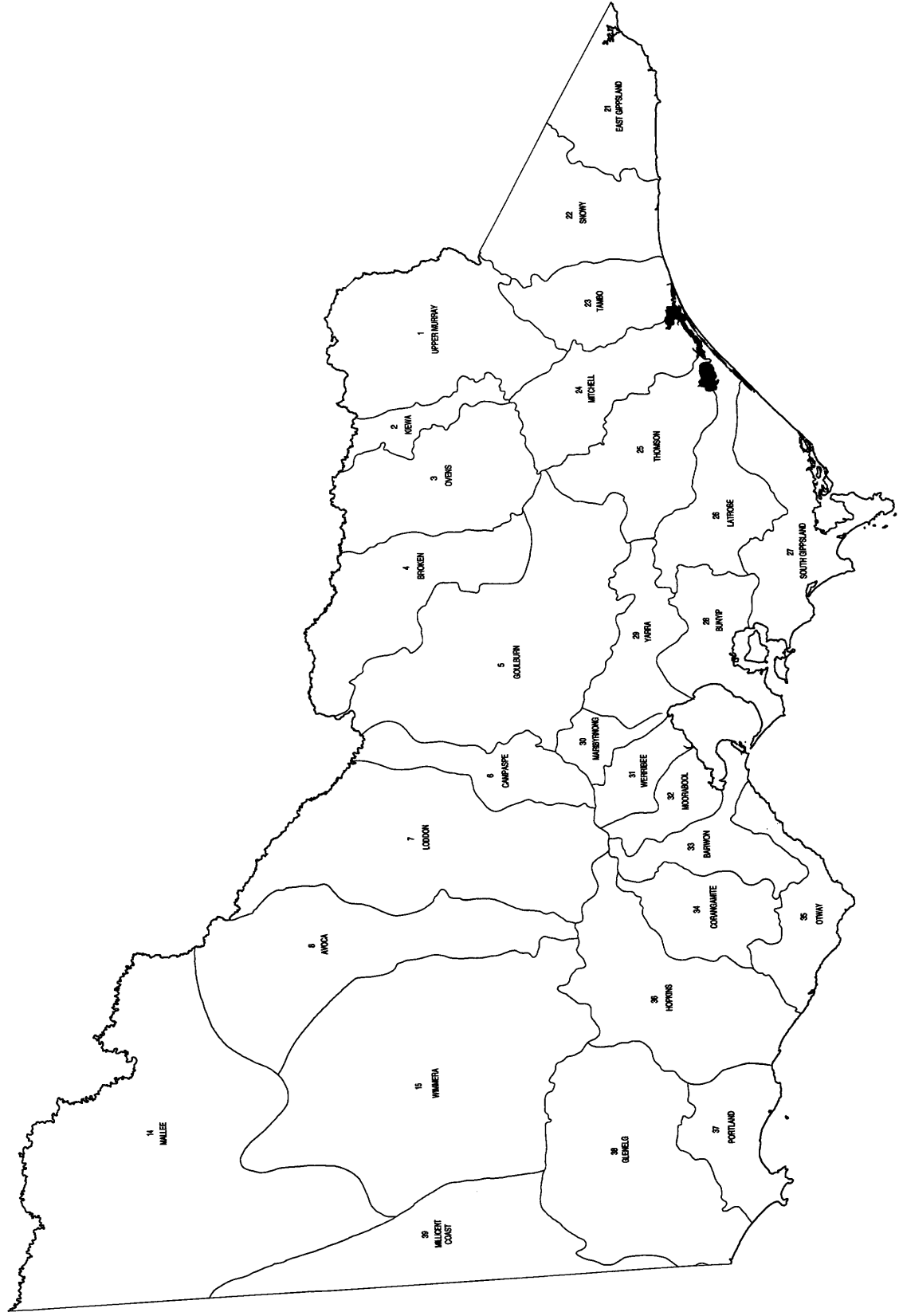


**Fun fact**  
There are 3,820 named watercourses in Victoria, with a combined total length of





# Victoria's River Basins





## River habitats

Do this activity before taking the students to complete the Stream Habitat assessment at your Waterwatch site.

Conduct using the Blackline master for individual or small group work. Or create a large mural based on this scene then conduct as a class activity.

### Key Learning Outcomes

#### Level 4 Science: Living together

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

#### Level 5 Science: Living together

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

#### Level 5 SOSE: Natural and social systems

Compare features of natural systems.

### Aims

- to illustrate the ways each section of the river bank vegetation affects the aquatic habitat
- to develop understandings about the habitat values of pools and shallows, snags, logs, boulders
- to introduce the stream habitat rating as used for Waterwatch tests

### Materials

Student sheet 7: River habitats.

Blackline master 4A & 4B: River habitats.

Habitat Survey Field Guide, p 5 in Habitat section of *A Community Water Quality Monitoring Manual for Victoria*.

### Additional resources

*A Community Water Quality Monitoring Manual for Victoria*, pages 2 & 3 in Habitat Survey section.

*Wetlands Wildlife*. Gould League of Victoria.

*Ponding*. Gould League of Victoria.

Waterwatch Victoria Website

<http://www.vic.waterwatch.org.au>

### Advanced preparation

- Duplicate Student sheet 6: River habitats.
- Make an OH of Blackline master 4A, or draw on the board.
- Cut out the cards from Blackline master 4B if required.
- Prepare a class mural (if required).
- Duplicate the Habitat Survey Field Guide on page 5, Habitat section of *Water Quality Monitoring Manual*.

### Activity instructions

- Explain that water quality scientists need to know the condition of different zones of a river. Students will gather this information as part of their water quality monitoring. This information tells us about the river's overall habitat value. Point out the verge, bank and in-stream vegetation zones of a river.
- Hand out Student sheet 7: River habitats, for students to label the zones (Q.1). Or label these on the mural.
- Use examples in the Blackline master or mural to illustrate ways each section of the river bank vegetation affects the aquatic habitat and influences animal life in the river.
- The water level varies with the seasons, and can vary from year to year. Show different water levels (flood, winter, summer, drought) on the OH or use a length of blue wool on the mural, each time emphasising how the waterways habitat conditions are affected by the water level change.

*[Estimate these water levels; floods waters extend well beyond the river bank and cover the lower trunks of trees growing on the riparian zone. In droughts the water in the river bed may even dry up completely. Winter water levels will generally be near the top of the river bank. Summer water levels will generally be about half way down the river bank.*

*Wetland plants and animals are adapted to these changing water levels and have a variety of ways for coping with the floods and the dry times.]*

Students answer their Q.2 about water levels.

- Use the River habitats overhead to illustrate and explain the different types of physical conditions and living conditions in the pool, riffles and run sections of a river.
 

*Pools are deep and have silt or mud bottoms. Riffles are shallow, rocky and well aerated. Runs are deeper and not as rocky as riffles and have some mud or silt among their rocks and stones. ]*

Students answer their Q.3 and 4.
- Using Blackline master 4B, draw lines to match the right habitat value to each of these zones identified in Student sheet 7: River habitats (Step 2). If doing this as a mural activity, select students to place the correct card(s) in each type of river habitat on the mural.



# River habitats

7. Read aloud selected descriptions in the Habitat Field Survey Guide sheet [from page 5 in Habitat section A *Community Water Quality Monitoring Manual for Victoria*.].
8. Use the Blackline master scene or mural to illustrate the terms and descriptions used in the Habitat Field Survey Guide sheet. Discuss these so that students are clear about what each description means.
9. Demonstrate how to use the Habitat Field Survey Guide sheet and Stream Habitat Rating table to rate a river scene. Students rate the river scene in top half of Blackline master 4 (or the mural).

[*Excellent rating.*]

Check that all the students can use the tables to rate stream habitat.

10. Students use the Habitat Field Survey Guide sheet to draw a Very Poor Stream Habitat.

[*Use this to illustrate that the Very Poor stream is eroded and erosion prone, and provides few living places and little food for animals.*]

## Extension

1. Repeat Step 10 for other habitat ratings.
2. Use the Habitat Field Survey Guide sheet and Stream Habitat Rating table to rate the river scene.
3. Visit the Waterwatch Victoria internet site. Students can complete the Habitat Survey section by viewing habitat photographs and ranking them for each habitat value criteria.

## Habitat values (Blackline master 4B)

- *Bank vegetation*

Leaves and branches that fall into the water become sources of food and shelter for aquatic animals.

The bank vegetation provides protection from erosion.

- *Verge vegetation*

The roots of the plants hold the soil together and reduce the amount of sediment and nutrients being washed into the river.

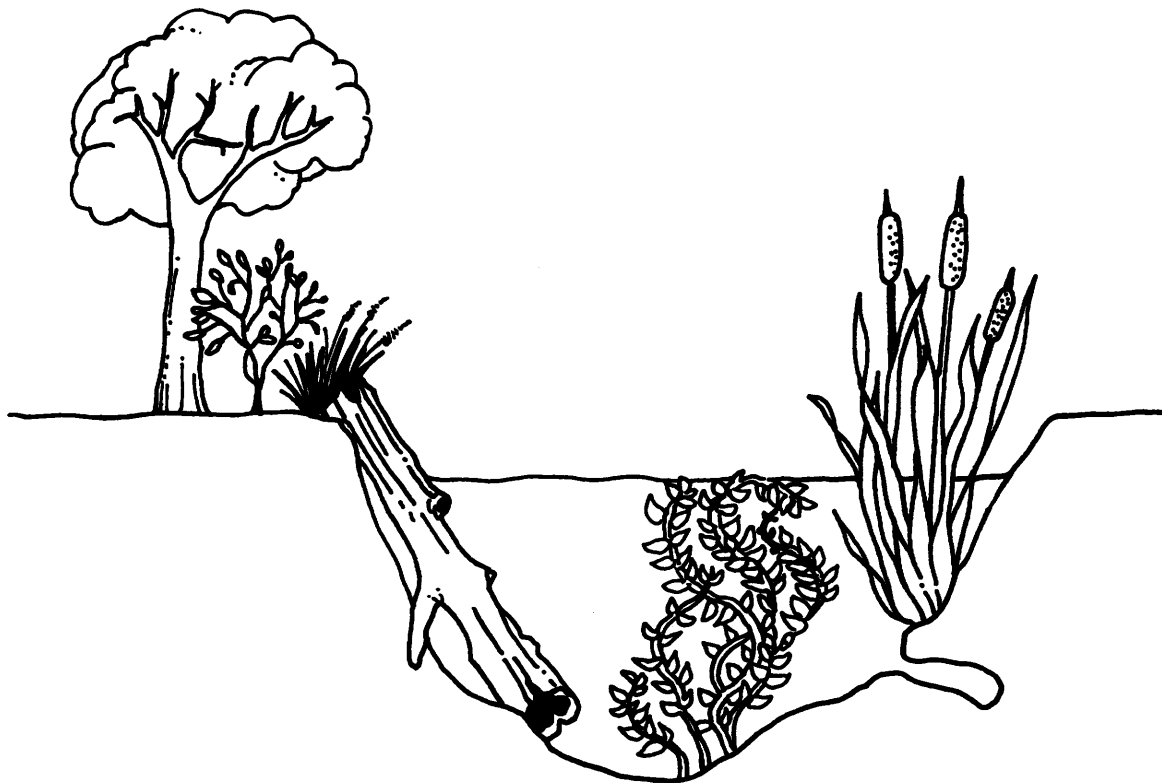
- *In-stream cover*

This provides habitat and food.

- *Pools, riffles & bends*

These provide for a variety of aquatic habitats.

Riffles and bends are good places for aerating the water.







# River habitats

A river is more than just water. It is a habitat for many different animals. The plants in and beside the water are very important parts of this habitat.

1. Label the 'verge', 'bank', and 'in stream vegetation' zones of a river on Blackline master 3: River habitats. Draw in the plants' roots.
2. Water levels in rivers keep changing. Draw in 4 different water levels, and label them, to show likely water levels in different seasons (winter, summer) and years (flood, drought).
3. Circle the correct answer and fill in the blanks about the different habitat sections of a river.
  - a) **Riffles** are [ deep / shallow ], rocky sections of a creek or river. The water moves [ faster / slower] as it bubbles over the rocks and stones.
  - b) **Pools** are [ shallower / deeper ] areas of the waterway. Here the water flows [ slowly / quickly ] and the streambed is usually of S \_\_\_ \_\_\_ \_\_\_ or M \_\_\_ \_\_\_ .
  - c) A \_\_\_ \_\_\_ \_\_\_ is a transition zone between a P \_\_\_ \_\_\_ \_\_\_ and a \_\_\_ \_\_\_ F \_\_\_ \_\_\_ \_\_\_ section of river.
4. Correctly label the 3 river habitat sections to show **Pool, Run and Riffle** sections of a river.
5. Fill in the blanks about riverside vegetation.
  - d) Overhanging trees provide \_\_\_ \_\_\_ \_\_\_ . Leaves fall into the water and provide \_\_\_ \_\_\_ \_\_\_ .
  - e) Insects living in the riverside vegetation may land or fall into the water and provide F \_\_\_ \_\_\_ \_\_\_ for aquatic animals.
5. Vegetation includes leaves, twigs, branches, roots, stems.
  - a) How might the in-stream vegetation influence animal life in the river?  
 \_\_\_\_\_  
 \_\_\_\_\_
  - b) How might the river bank vegetation influence life in and around the river?  
 \_\_\_\_\_  
 \_\_\_\_\_
  - c) How might the river verge vegetation influence animal life in the river?  
 \_\_\_\_\_  
 \_\_\_\_\_

**River habitats**

6. Use Stream Habitat Rating table below, and the Habitat Field Survey Guide sheet (from Water Quality Monitoring Manual), to rate the river scene in the top half of Blackline master 4A.

Write down a number rating for each factor:

Bank vegetation	Verge vegetation	In-stream cover	Erosion & stability	Pools, riffles & bends

Add up the numbers for the 5 factors above for the **Total Combined Score**: \_\_\_\_\_

Use the score table to determine the **Overall Stream Habitat Rating**: \_\_\_\_\_

**Stream Habitat Rating table**

Rating	Bank vegetation	Verge vegetation	In-stream cover	Erosion & stability	Pools, riffles & bends
Excellent	(10)	(10)	(10)	(5)	(5)
Good	(8)	(8)	(8)	(4)	(4)
Fair	(6)	(6)	(6)	(3)	(3)
Poor	(4)	(4)	(4)	(2)	(2)
Very Poor	(2)	(2)	(2)	(1)	(1)

**Score table**

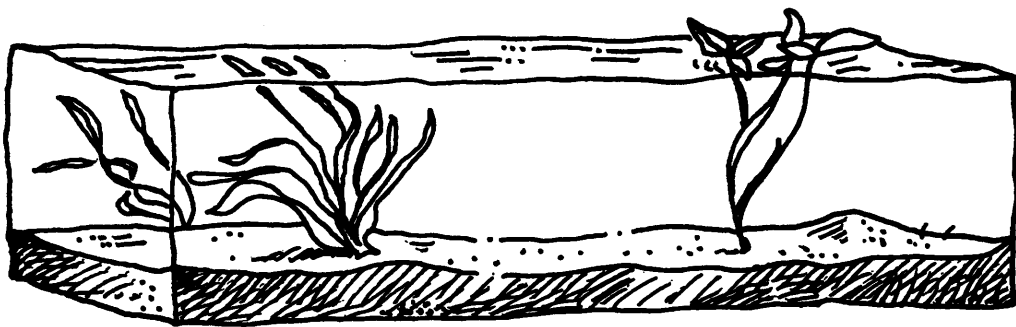
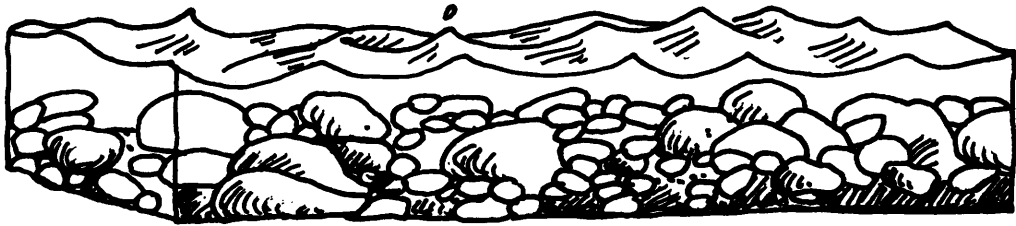
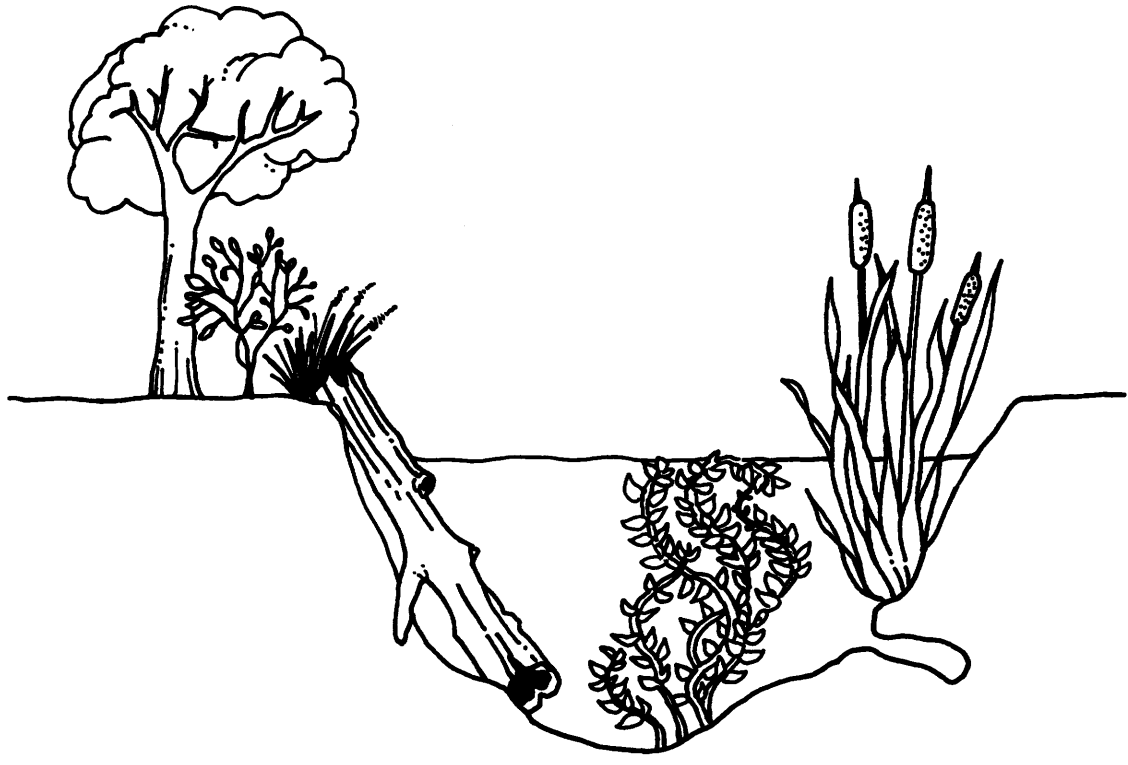
Overall Rating	Combined Scores
Excellent	36 - 40
Good	29 - 35
Fair	20 - 28
Poor	12 - 19
Very Poor	8 - 11

7. Using the descriptions in the Habitat Field Survey Guide sheet, draw a river scene to show:
- a Very Poor Stream Habitat Rating.
  - a Fair Stream Habitat Rating.

Label the scenes to highlight the amount and type of the bank, verge and in-stream vegetation, the level of erosion, and the presence or absence of pools, riffles or bends.



# River habitats





## River habitats

### Habitat values

*River habitat*

*Bank vegetation*

*Verge vegetation*

*In-stream cover*

### Habitat values

- These provides habitat and food within the stream.
- Some of these are good places for aerating the water.
- The roots of the plants hold the soil together and reduce the amount of sediment and nutrients being washed into the river.
- Leaves and branches that fall into the water become sources of food and shelter for aquatic animals.
- These provide for a variety of aquatic habitats.
- This vegetation provides protection from erosion.

