





Wimmera Catchment Region

Introduction

Water is not only vital for life, but also has economical, recreational, spiritual and aesthetic importance. As our climate continues to change, water availability is becoming less predictable and extreme weather events such as drought and floods continue to impact people and places. It is the role of Catchment Management Authorities (CMAs) to plan and coordinate the management of environmental values within their region. This includes protecting waterways, biodiversity and the land surrounding the catchments. Catchment management is achieved through the combined efforts of the community. Government and non-government organisations work together towards common and sustainable targets in order to achieve this balance.

The Wimmera region as a case study

The Wimmera catchment boundary is in western Victoria and covers an area of approximately 30,000km² or 10% of Victoria. The Wimmera catchment region extends from the Grampians National Park in the south to Lake Albacutya, near Rainbow in the north, and from the South Australian border in the west to past Stawell in the east. Rivers and streams are iconic in the Wimmera and provide a place of relief for the often hot and dry landscape. Rivers and streams provide social and recreational opportunities across all councils and are of significant cultural value. Rivers and streams create natural wildlife corridors and support much of the flora and fauna. The major waterway in the catchment is the Wimmera River. Its catchment is approximately 2.4 million hectares with numerous tributaries. The Wimmera River flows west to Horsham where it collects the waters of Burnt Creek and, just downstream, the MacKenzie River and Norton Creek from the south.

Wimmera CMA's five key environmental values are:

- Rivers & Streams
- Wetlands
- Soils

- Native Vegetation and
- Threatened Plants & Animals

In this resource, the Wimmera is used as a case study to explore the following:

- how water moves between and connects places,
- water scarcity in regional areas and how this is managed through environmental flows,
- the spiritual connection and local history of First Nations Peoples, and
- the impact of hydrological hazards over time in the region.

Opportunities to practise foundational geographical mapping and geospatial skills are presented throughout each of the 5 lessons.





Local information and data

The Wimmera has productive agricultural soils and valuable groundwater reserves. Today, the landscape is mainly used for agriculture (84%). Most of the vegetation that once covered the landscape is now rare or endangered and contained to national parks, reserves, and state forests such as The Grampians and Little Desert National Parks.

There are many cultural and environmental heritage sites in the Wimmera, with more than 2,000 sites of indigenous archaeological significance associated with the catchments' reserves, waterways, floodplains, and wetlands. The region is also home to about 1,500 species of native plants and 420 species of native animals. The Wimmera contains 25% of Victoria's wetlands, which are predominantly in the south-west of the region.

The human population of the Wimmera is around 50,000, with almost a third of residents living on farms or in small townships of fewer than 2,000 people. The median age of farmers is 57 and 10% are 75 years or older. Around 25% of residents rely directly on agriculture for income.

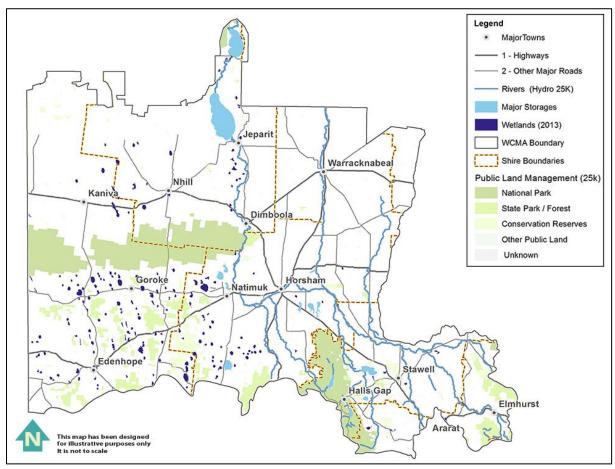


Figure 1. The location and key geographical features of the Wimmera region.

Source: https://wcma.vic.gov.au/about-us/Region#:~:text=Managers%20%26%20Staff-,0ur%20Region,to%20Navarre%20in%20the%20east.





Year 7 Curriculum Links

Geographical knowledge:

Water in the world

- 1. Classification of environmental resources and the forms that water takes as a resource (VCGGK105)
- 2. Ways that flows of water connect places as they move through the environment and the ways this affects places (VCGGK106)
- 3. Nature of water scarcity and the role of humans in creating and overcoming it, including studies drawn from Australia (VCGGK108)
- 4. The spiritual, economic, cultural and aesthetic value of water for people, including Aboriginal and Torres Strait Islander peoples and peoples of the Asia region, that influence the significance of places (VCGGK109)
- 5. Causes of an atmospheric or hydrological hazard and its impacts on places, and human responses to it to minimise harmful effects on places in the future (VCGGK110)

Place and liveability

- 1. Factors that influence the decisions people make about where to live and their perceptions of the liveability of places (VCGGK111)
- 2. Influence of accessibility to services and facilities; and environmental quality, on the liveability of places (VCGGK112)

Geographical skills:

Place, space and interconnection

- 1. Explain processes that influence the characteristics of places (VCGGC099)
- 2. Identify, analyse and explain spatial distributions and patterns and identify and explain their implications (VCGGC100)
- 3. Identify, analyse and explain interconnections within places and between places and identify and explain changes resulting from these interconnections (VCGGC101)

Data and information

- 1. Select and represent data and information in different forms, including by constructing appropriate maps at different scales that conform to cartographic conventions, using digital and spatial technologies as appropriate (VCGGC103)
- 2. Analyse maps and other geographical data and information using digital and spatial technologies as appropriate, to develop identifications, descriptions, explanations and conclusions that use geographical terminology (VCGGC104)





Lesson objectives and outcomes

By the end of this unit students will have developed an understanding of the location of the Wimmera Catchment area, the local landscape, the peoples who used to and still live there and how these communities use the water resources located in the region.

Students will access various resources both written and digital secondary sources to develop an understanding of the location of the area covered by the Wimmera CMA, the location of natural and human made water resources, the use of water resources by First Nations people, early European settlers and current residents.

Students will be able to:

- Describe the relative and absolute location of the catchment area.
- Locate and map natural and human-made water resources.
- Identify the location of First Nations peoples within the catchment and their use of the natural water resources.
- Identify uses of water by early European settlers.

Key Literacy Vocabulary:

- First Nations Peoples
- Wimmera Catchment Management Authority (Wimmera CMA)
- Dam
- Catchment
- Pipeline
- Drought
- Flood
- Waterway
- Natural characteristic
- Human-made characteristics

Key Numeracy Vocabulary:

- Catchment storage size
- Rainfall measurement and recording
- Flood data





Learning Intention/s:	ge: Potential classroom activities	Key Vocabulary:	Differentiated Learning:	Resources		
	Lesson 1: What is the geography of the Wimmera Catchment Region?					
To develop an understanding of the location of the catchment area governed by the Wimmera Catchment Authority. To identify and label the key natural and human made features within the catchment. To be able to understand and overlay on a map. It is assumed the students will have limited prior knowledge on the geography of the	we have on Earth. Consider both liquid and frozen water sources such as rivers, creeks, lakes, and glaciers. Watch: https://youtu.be/gNI2gITNEDc?list=PLhQUtydg5pZRFn0tGhPERCDtprNi_LUJ5 and discuss the natural and human characteristics of the region as a class.	Creek Dam Lake Human-made Natural Geographical characteristics Overlay map Layer BOLTSS	Explore 'Waterways from Space' Google Earth Tour and form discussion around the different water sources on Earth and their importance. Extension: In groups, students discuss the statement: "Rivers are an	of the region Use of atlas or Google Earth to locate rivers and creeks and towns Tracing paper		





Learning Intention/s:	Prior Knowledge:	Potential classroom activities	Key Vocabulary:	Differentiated Learning:	Resources
		Lesson 2: What is the historical significance	of the region?		
To develop an understanding of the five Traditional		Explore and watch: https://wimmera.rcs.vic.gov.au/region/first- nations-introduction/	Explorer		Worksheet 2: The history of the Wimmera
Owner groups distribution and connection to the		Wimmera River Aboriginal Water project - YouTube - What is the role of the Aboriginal Water		with water and water	https://www.bglc .com.au/native-
Wimmera region.	Students will develop an	What is a native title?Why is this title significant?	Trade	highlighting the First Nations connection	title
To use maps to identify and display distributions.		Using the legend, discuss as a class the boundaries of the Barengi Gadjin Land Council <u>title</u> and identify			https://www.wat er.vic.gov.au/abo riginal-
	history, traditional	what traditional lands the Wimmera Catchment Authority expands using the map: https://wimmera.rcs.vic.gov.au/region/first-		Watch: <a hraju7"="" href="https://www.youtube.com/watch?v=">https://www.youtube.com/watch?v="hraJu7">hraJu7	
	role they played in caring for their	nations-introduction/ Worksheet 2 and watch:			gadjin-aboriginal- water-project-
	,	https://www.youtube.com/watch?v=OfNRrpmKiJw Discuss in groups:		people or groups of	http://wcma.vic.g
		 What is the story of this place? Why is this place valuable to First Nations peoples? Outline some history discussed about this 			ov.au/about- us/Region
		place. Why is this history significant? - How is water managed in this place?			





Learning Intention/s:	Prior Knowledge:	Potential classroom activities	Key Vocabulary:	Differentiated Learning:	Resources
		Lesson 3: What are environmental	flows?		
'environmental flows' To understand the conflict between social and environmental sustainability and	aware of the location of the catchment area Students understand key geographical language such as 'natural or human characteristics'	Access Google Earth: https://earth.google.com/web/ Explore the Wimmera Region by dragging the screen and using street view to gain an understanding of more detailed localised characteristics of the region. Record any key natural or human characteristics or observations. Brainstorm the term 'flow'. How is this term connected to rivers? Watch: https://www.youtube.com/watch?v=ZeLETLbEqXE - What is meant by 'environmental flows'? - Why are environmental flows important? - Why does a conflict exist between human use of water and the environmental needs of water? Read: http://wcma.vic.gov.au/rivers-and-	Environmental flows Sustainability Societal Environment Dam Creek Infographic	Watch: https://www.youtube. com/watch?v=5n2 Uts Rh6w - Why do we need environmental water? - What are the	Worksheet 3: Environmental flows Data on environmental flows for infographic: https://www.vew h.vic.gov.au/ da ta/assets/pdf file /0006/342528/4. 2.01-FS01 What- is-enviromental- water SWP FS.p df http://wcma.vic.g ov.au/docs/defau lt- source/riversdocs /swp/wimmera-
		streams/EWR and explore the River Flows Map: River Flows (wcma.vic.gov.au)		explores the	cma-wimmera- mallee-pipeline-





Learning Intention/s: Prior Knowledge:	Potential classroom activities	Key Vocabulary:	Differentiated Learning:	Resources
	Complete Worksheet 3: Environmental Flow Create an infographic which illustrates the purpose and importance of environmental flows in the Wimmera region. The resources column has a range of data students can use to create an infographic. https://www.youtube.com/watch?v=Yvo-mHq1ojU		important than the sustainability of the local environment" Open: https://www.vewh.vic.gov.au/ data/assets/pdf file/0005/342536/4.2.05-FS05 How-do-we-know-if-environmental-watering-is-successful SWP FS.pdf and discuss the benefits of environmental flows and environmental water management to the sustainability of the	ov.au/rivers-and- streams/EWR Further reading: https://www.abo riginalheritageco uncil.vic.gov.au/t aking-care- culture- discussion- paper/waters- are-our-





Learning Intention/s:	Prior Knowledge:	Potential classroom activities	Key Vocabulary:	Differentiated Learning:	Resources
		Lesson 4: What is the significance of water in the	e Wimmera region?		
To understand the significance of water in the Wimmera region	geographical concept of 'sense of	Brainstorm the importance of water using SHEEPT factors to guide discussion. Define the term 'significance' in the context of water and water use/management.	SHEEPT Significance Sense of place Climate change Data	Locate local newspaper articles and reports about the different uses or significance of	water https://www.gw
Use data to draw conclusions Create summaries	SHEEPT as an	Create a poster which highlights the different ways the Wimmera River is used and how each use helps people form a 'sense of place' and connection to		Cut and paste heading and interesting information from these	
and recognise patterns in data	past	the region. Watch: https://www.youtube.com/watch?v=WFBYelgrkP8			supply/constructi ng-the-wimmera- mallee-pipeline
		&t=62s Allocate different groups of students sections of the following report: http://www.bom.gov.au/climate/climate-guides/guides/040-Wimmera-VIC-Climate-Guide.pdf Each group of students considers: - What does this data show you? Why would this data be reported?		Extension: Explore the concept of 'water trading'. https://www.mdba.gov .au/water- management/managin g-water/water- markets-trade Discuss the following statement: "Water is strongly	





Learning Intention/s: Prior Knowledge:	Potential classroom activities	Key Vocabulary:	Differentiated Learning:	Resources
	 How does climate impact the local environment? Why is management of the river system important to maintain its significance? What might happen if environmental flows are not managed in the current conditions? 		interconnected to the economy".	





Learning Intention/s:	Prior Knowledge:	Potential classroom activities	Key Vocabulary:	Differentiated Learning:	Resources		
	Lesson 5: How have atmospheric or hydrological hazards impacted the region?						
Understand the		Explore the following infographics:	Flood		Worksheet 5:		
	understand what a		Geospatial	Explore the various	Floods and		
*			technology	•	droughts in the		
weather and flooding		http://www.bom.gov.au/climate/enso/images/El-	Layer	https://wcma.vic.gov.a	area		
or drought events		Nino-in-Australia.pdf	Overlay map	u/permitsplanningfloo			
		Discuss the difference between El Nino (lower	Management	dadvice/HRfloodmaps	Local newspaper		
		rainfall in eastern Australia) and La Nina (more	Hazard		exploring impacts		
conclusions and	map to examine	rainfall in eastern Australia).	Hazard event	•	of drought:		
•	areas subject to		Monitoring	of flood on people,	https://www.mail		
	flood and drought		El Nino	,	times.com.au/sto		
		Watch: Climate and Water Outlook - YouTube	La Nina		ry/3538890/empl		
		, ,	Climate		oyment-offered-		
		managing river systems?		Access:	after-dry-harvest/		
		 How does 'higher than average rainfall' 		http://emergency.vic.g			
		contribute to flooding events?		ov.au/respond/	Wimmera CMA		
		 How do high temperatures impact river 		Locate the Wimmera	mapping tool:		
		systems?		Catchment region.	https://wcma.poz		
				Explore the current	i.com/#/x[142.16		
		Complete Worksheet 5: Floods and droughts in the			<u>000]/y[-</u>		
		area		occurring in this place.	36.50961]/z[9]/		
		Watch:		Discuss potential			
		https://www.youtube.com/watch?v=8DRafk4vnm0		environmental or			
		 How does satellite and aerial imagery 		human causes for			
		technology assist geographers understand		these events.			
		and manage flooding events?					





Learning Intention/s:	wledge: Potential classroom activities	Key Vocabulary:	Differentiated Learning:	Resources
	- Suggest the likely impacts of the 2011 floo		Further reading:	
	on the Wimmera region based on this visu data	al	https://www.abc.net.a u/news/2022-01-	
	dutu		27/very-dangerous-	
	Review the mapping terminology 'layers' and		thunderstorms-hit-	
	'overlay map'. Discuss how when we make paper maps, tracing paper acts as our layers which helps		melbourne-and- vic/100784278	
	us add more data to a base map. When we use		<u>VIC/ 100704270</u>	
	digital maps, we can simply turn layers 'on and offusing tick boxes.	,		
	Access Geospatial Technology: Using the Wimmera CMA digital map platform			
	ensure all the 'flood investigations' layers are			
	ticked. In groups, students can discuss what they see and consider why some areas are more prone to flooding than others.			





Appendix 1: Maps of the region

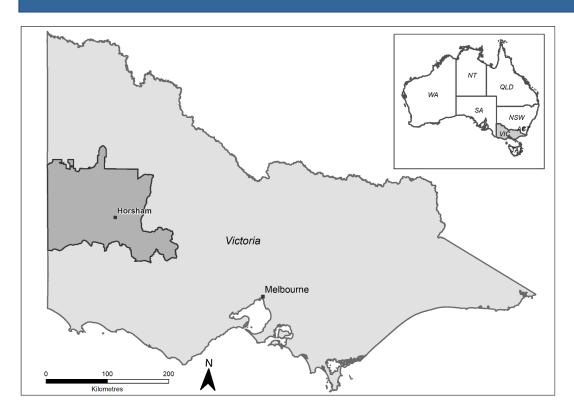


Figure 1. Location of the Wimmera CMA in Victoria.

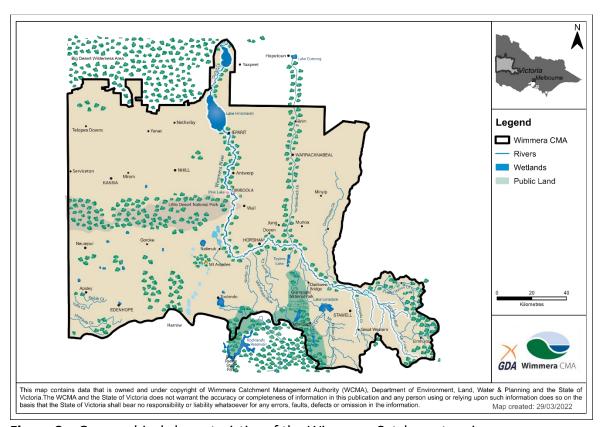


Figure 2. Geographical characteristics of the Wimmera Catchment region.









