Lesson 6: Improving liveability

Figure 1 Lake Bellfield in the Grampians/Gariwerd. Source: Wimmera CMA.

As you learnt in the previous lesson, the water resources of the Wimmera region face a number of threats. These threats have the potential to impact the liveability of the region. For example, if a farmer cannot access enough fresh water to grow crops they may leave their farm as, for them, it is no longer a liveable place. In the same way, a small town where the local water supply becomes too salty or impacted by blue-green algae becomes a less liveable place.

By responding to the threats to the water supply, communities improve the liveability of the place in which they live. This response may be at the local scale such as fencing riverbanks to keep cattle out or banning the collection of firewood in particular places. Some threats, however, require a response at a much larger scale and these responses have the potential to increase the liveability of an entire region.

Perhaps the biggest threat to the water resources of the region is the change in river flows as rainfall patterns change and the demand for water increases. The communities of the Wimmera have responded to this threat by building one of the biggest water infrastructure projects ever seen in Australia.

Wimmera-Mallee Pipeline

To supply water to the farms and towns of the Wimmera region, water has been captured in lakes and dams in the wetter Grampians/Gariwerd areas and then transferred north for more than 100 years. As the system expanded over the years, a huge network of open channels, almost 20,000 km long, was built across the region. This greatly increased the liveability of the region as the system supplied towns and farms with a reliable supply of water.

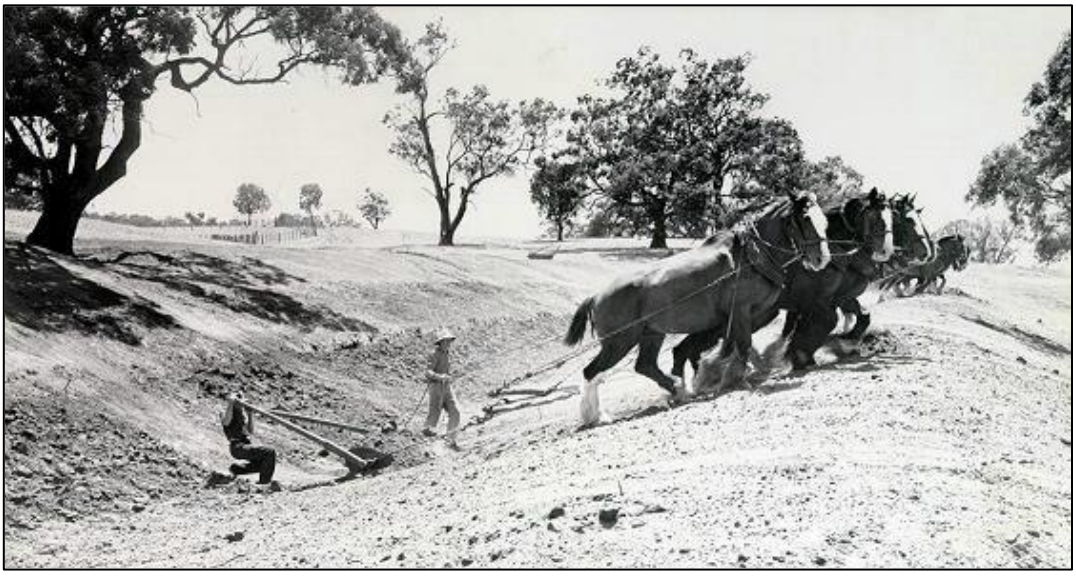

Figure 2 Constructing the open channels in the Wimmera. Photo supplied by GWMWater

However, over time, this system became less efficient. It has been estimated that only 15% of the water that entered the channels at the start of the system made it to the people who needed it. This is because water seeped down into the soil lining the channels or evaporated into the atmosphere. The loss of water from the channels was made worse by a drought, known as the Millennium Drought, between 2001 and 2009.

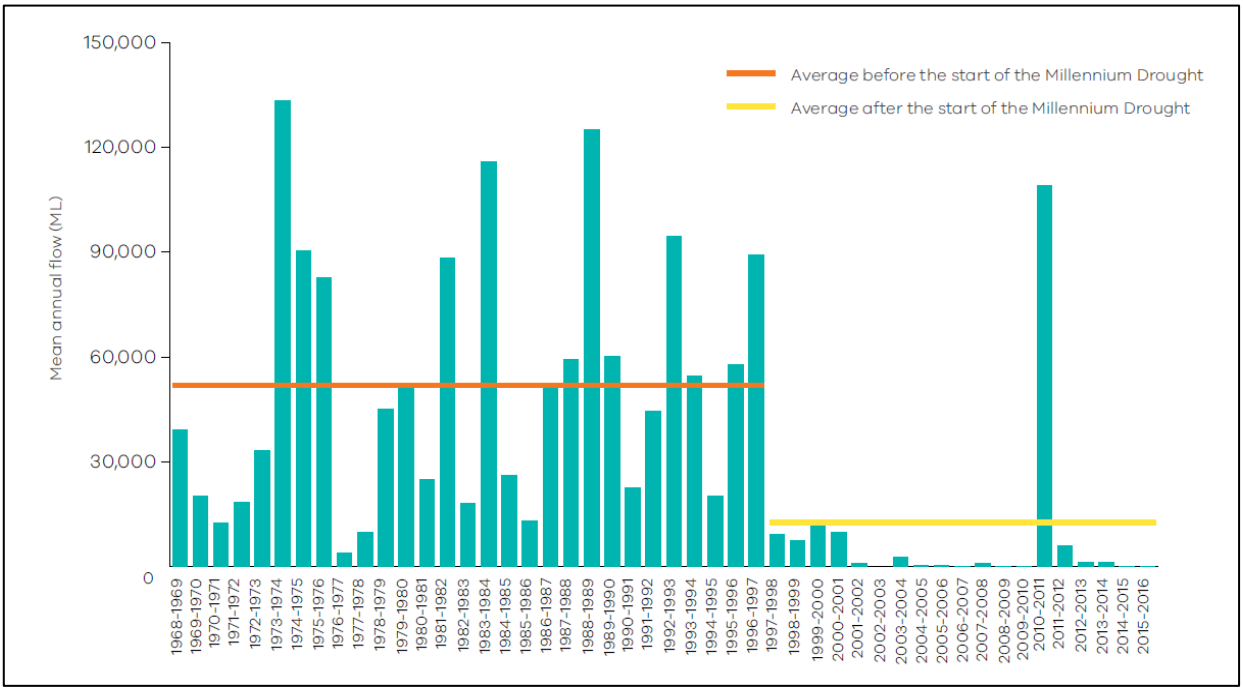

Figure 3 Water flows in the Avoca River at Quambatook, 1968-2016

Source: https://www.water.vic.gov.au/__data/assets/pdf_file/0013/420520/Wimmera-Mallee-WRP-Part-4.pdf

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Skill: Describing patterns on a graph

A graph, such as the one in figure 3, is a useful tool for geographers as they show changes that have occurred over time. Follow these simple steps to describe the pattern on this graph.

Step 1

Look closely at the title or caption so that you know exactly what is being shown in the graph. Also look at the scales so that you know what is being measured. In this graph, years are shown along the x-axis while mean (or average) water flows in ML is shown on the y-axis. ML is a Megalitre or a million litres.

Step 2

In one sentence, describe the overall pattern shown in the graph. Is water flow increasing, decreasing or staying the same between 1968 and 2016? Use the name of the place in your sentence.

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Step 3

Use some data from the graph to support the statement you made in the previous step. Use years and water flows in these two sentences.

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Step 4

Point out any exceptions to the pattern you described in step 2. For example, was there one wet year when the years before it and after it were dry?

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Task 1

1. Discuss in pairs the pattern of water flow shown in figure 4.

Between 2006 and 2010 the open channels were replaced with 8,800 km of pressurised pipes, most of which were buried. To keep the water flowing to the 38 towns and thousands of farmers who rely on it, 32 pump stations were built.

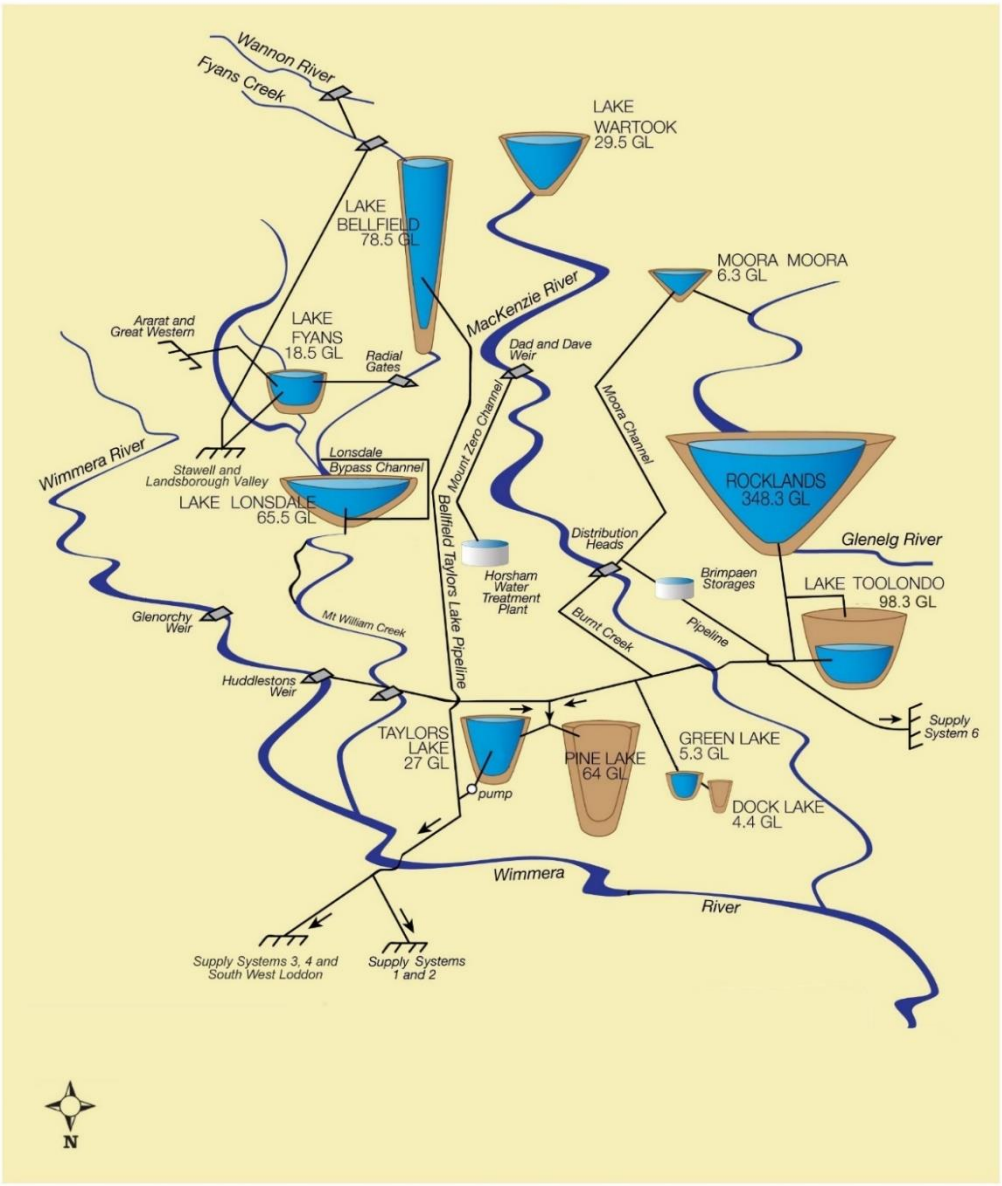

Figure 4 A stylised map showing the area in which the water is captured in lakes and dams and fed into the pipeline. Note that in this map, north is oriented to the bottom of the map. The capacity of each lake is shown in Gigalitres which is 1,000 Megalitres.

Source: Image supplied by GWMWater

Task 2

1. List the storage lakes in this system from the largest to the smallest in terms of capacity.

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2. What is the maximum storage of the lake shown in figure 1?

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3. Why would closed pipes be a better way of transporting water than open channels?

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4. Explain how replacing the old system with the new one improves the liveability of the Wimmera region.

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Skill: exploring a database

You can find out how much water is currently stored in each of these lakes and compare this water storage to previous years by accessing the database at https://www.storagemanager.com.au/reservoir-levels-and-other-information/reservoirs-level-summary

1. Which reservoir currently holds the most amount of water?

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2. Which is currently the least full?

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Now follow these steps to compare current storage levels to previous storage levels.

Step 1

Click on the 'View' button to the right of the storage levels. This will show you a graph of storage in the current year.

Step 2
Click on the drop down menu next to 'Add' and select the data for last year. Click the + to add the data for last year to the graph.

Step 3
You can continue to add and remove data for individual years by using the Add and Remove buttons.

Task 3

Complete these activities for one of the large reservoirs such as Rocklands or Lake Bellfield.

1. Describe the pattern of water storage last year.

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2. Using figure 3 as a guide, add a very wet year to the graph.

3. Using figure 3 as a guide, add a very dry year to the graph.

4. Describe the differences between these two years in terms of water storage.

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Figure 5 Aerial photo of Rocklands Reservoir 2006. Source: Wimmera CMA. Photographer: David Fletcher

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Skill: using a GIS map

In previous lessons you have used a GIS map and even constructed your own. There is a GIS map of the Wimmera-Mallee pipeline at https://www.gwmwater.org.au/connecting-services/locating-our-services/interactive-map-of-gwmwater-assets

Use your skills as a GIS map reader to explore the way in which water is distributed to users at the local level. For example, you could zoom into a small town such as Donald and explore the 'Rural Water Main' layer to see the distribution of the pipelines.

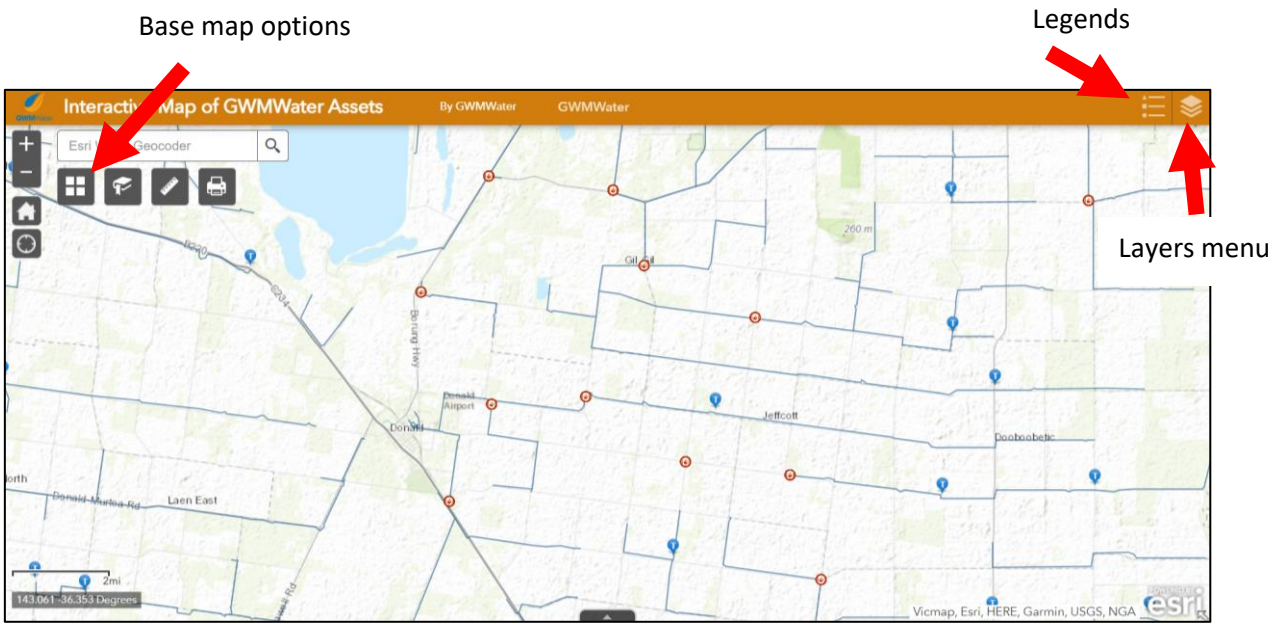

Figure 5 Screenshot of Wimmera-Mallee Pipeline GIS map

1. Describe the pattern of how the pipelines are distributed.

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2. Explain how pipelines highlight the concept of interconnection.

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