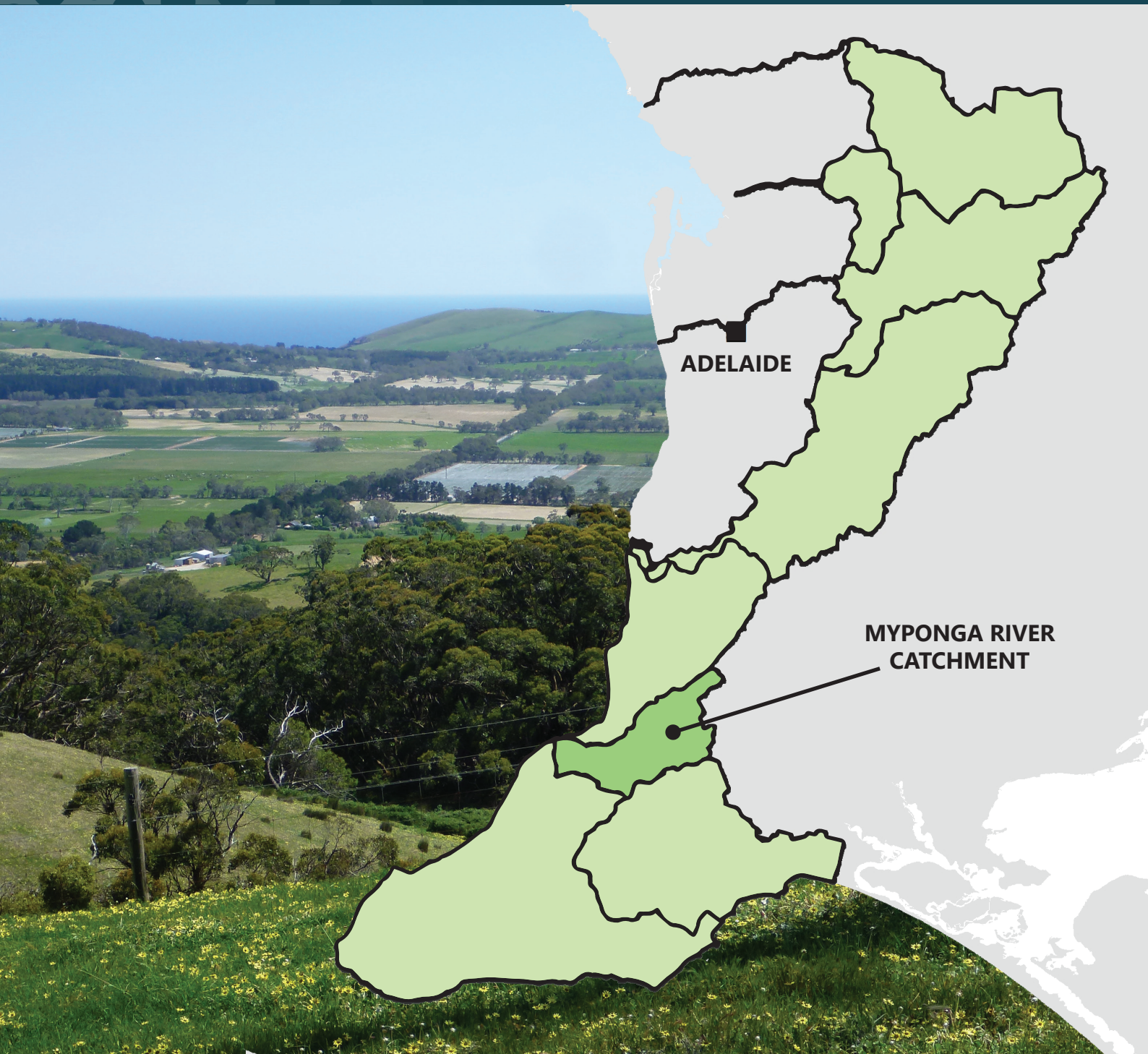
MYPONGA RIVER CATCHMENT SUMMARY

LANDSCAPE SOUTH AUSTRALIA HILLS AND FLEURIEU

This document provides summary data on rainfall, water resources, allocation and usage, and environmental trends for the Myponga River Catchment and the broader Western Mount Lofty Ranges.



MYPONGA RIVER CATCHMENT SUMMARY

Status of water resources 2023

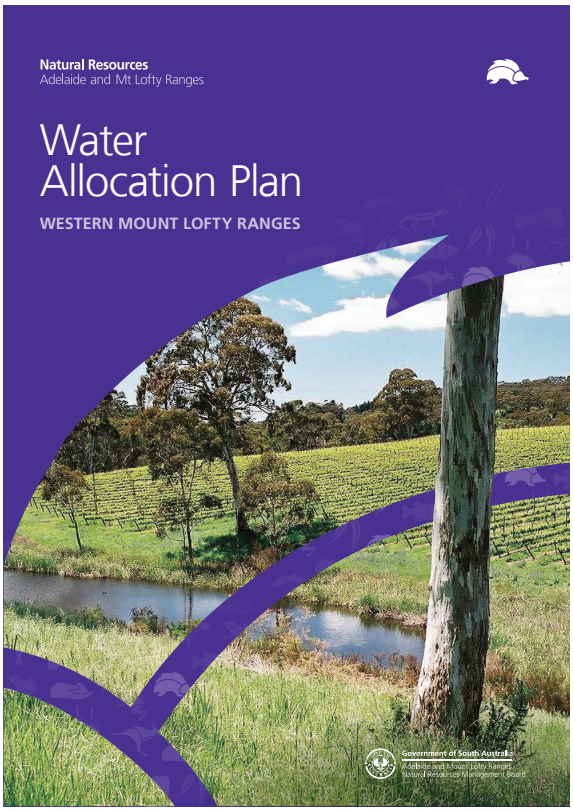
Water is a precious shared resource, and we need your help to manage it sustainably.

The Water Allocation Plan (WAP) for the Western Mount Lofty Ranges was adopted in 2013. The WAP aims to provide certainty to current and future users of water.

The WAP sets limits for how much water can sustainably be used in an area. It gives consideration to environmental, social, cultural and economic water needs and seeks a balance across these.

With the WAP now having been in place for ten years in the Western Mount Lofty Ranges, the Hills and Fleurieu Landscape Board is conducting an evaluation process. We are keen to hear from people in the community and local industry about what aspects of the plan have worked well, and what aspects need to be improved.

This document provides summary data on rainfall, water resources, allocation and usage, and environmental trends for the Myponga River Catchment and the broader Western Mount Lofty Ranges. Catchment summaries like this one have been prepared for all eight catchments within the Western Mount Lofty Ranges to support conversations throughout 2023 and beyond.



Get involved and provide feedback:

Does the information raise any questions for you?

What do you feel are the greatest challenges - for now and ahead?

We want to hear from you - please be in touch if you would like to learn more, offer feedback or contribute to the evaluation.

LANDSCAPE SOUTH AUSTRALIA HILLS AND FLEURIEU

Visit: landscape.sa.gov.au/hf/waterconsultation

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How to use this document

We've compiled this document to give you a summary of the status of water resources in the Myponga River Catchment in the Western Mount Lofty Ranges for 2023.

If you want to get straight to the point, a snapshot of key findings is provided on Page 3.

For more in-depth analysis, flip through to find more detailed data on rainfall, allocation and use of surface water (including streamflow and dams) and groundwater, as well as trends in ecosystem health. Use the table of contents below to guide you.

A glossary of key terms is provided at the end of this document for your reference.

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Water Resources Snapshot

Whole of Western Mount Lofty Ranges

Analysis of long-term monitoring data has found an overall **trend of decline in rainfall (1900-2021) and streamflow (1974-2021)** across the Western Mount Lofty Ranges, with **more pronounced declines in the northern areas**.

The **frequency of wetter-than-average rainfall years is considerably lower** across the Western Mount Lofty Ranges during the last decade compared to pre-millennium drought years, and this is resulting in a **marked decrease in the occurrence of above-average stream flows**.

Of the eight catchments across the Western Mount Lofty Ranges, five have total allowable use volumes (surface water) that exceed the sustainable take limits. The current take limits set out in the Water Allocation Plan (WAP) for surface water are **only sustainable where all dams over 5ML in size pass low flows** – and this has not occurred for the vast majority of dams.

Ecological monitoring of native fish, waterbugs and environmental flows across the Western Mount Lofty Ranges shows a **clear picture of declining conditions** relative to the objectives set out in the WAP.

Myponga River Catchment

Consistent with overall Western Mount Lofty Ranges data, a **declining trend in rainfall** is evident at Inman Valley, and a **declining trend in annual streamflow** volumes is evident at Myponga River.

In this catchment, both the total volume of surface water allocated and estimated to be used are **higher than the sustainable take limit**. A large proportion of the total surface water allocation volume in this catchment is associated with the **public water supply network**.

69% of the 846 farm dams in this catchment are less than 1 ML in size. **Large dams over 25 ML in size make up less than 1% of all dams in the catchment, but hold 25% of all dam volume**. The collective impact of farm dams on downstream users and environments is greatly reduced when low flows are passed.

The total volume of groundwater allocated to licence holders in this catchment is higher than the sustainable take limit – however, the volume of groundwater actually used is **typically below the limits set**. Monitoring of groundwater levels at most observation wells across the catchment show **generally stable trends over the past 20 years**.

The information provided here gives a broad overview to support conversations with licence holders, communities and industries throughout 2023 and beyond. Through these conversations, we want to work together to identify the challenges and opportunities most important to you.

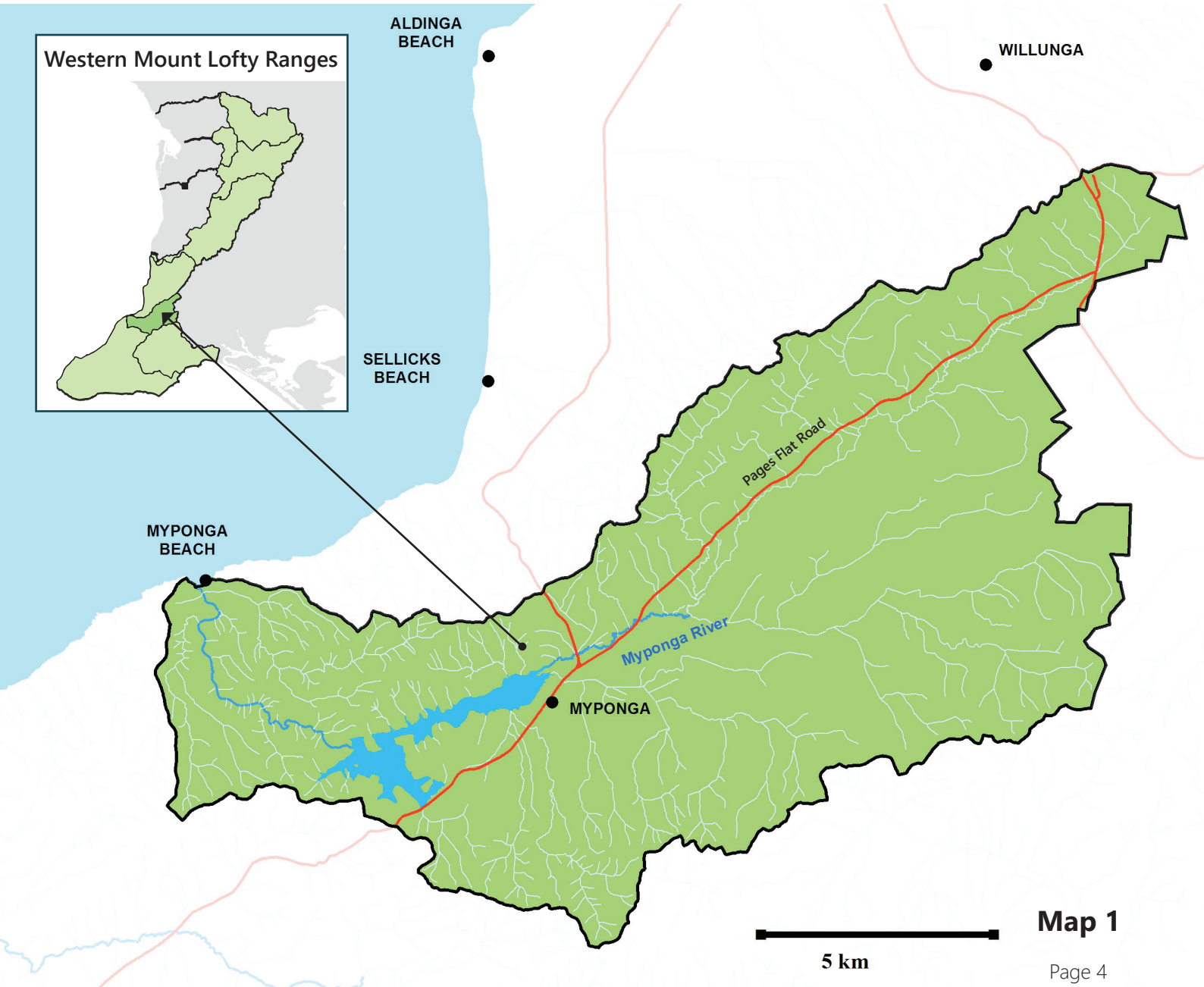
About the Myponga River Catchment

Myponga River Catchment (Map 1) is located approximately 50km south of Adelaide and covers 138 km^2. It includes the towns of Myponga and Myponga Beach and includes the areas behind Sellicks Hill Range out to Myponga Hill.

Rainfall varies across the catchment, being highest around the areas north-east and lowest towards Myponga Beach. The Myponga River Catchment supplies Myponga Reservoir, which is part of the public water supply network managed by SA Water.

The catchment supports a productive agricultural landscape as well as unique environments, such as those protected within the Stipiturus, Yulte, and Nixon-Skinner Conservation Parks.

The catchment is underlain by sedimentary aquifers comprising Permian Sand, Tertiary Limestone and Quaternary sediments, with some fractured rock aquifers around the catchment boundary.



Map 1

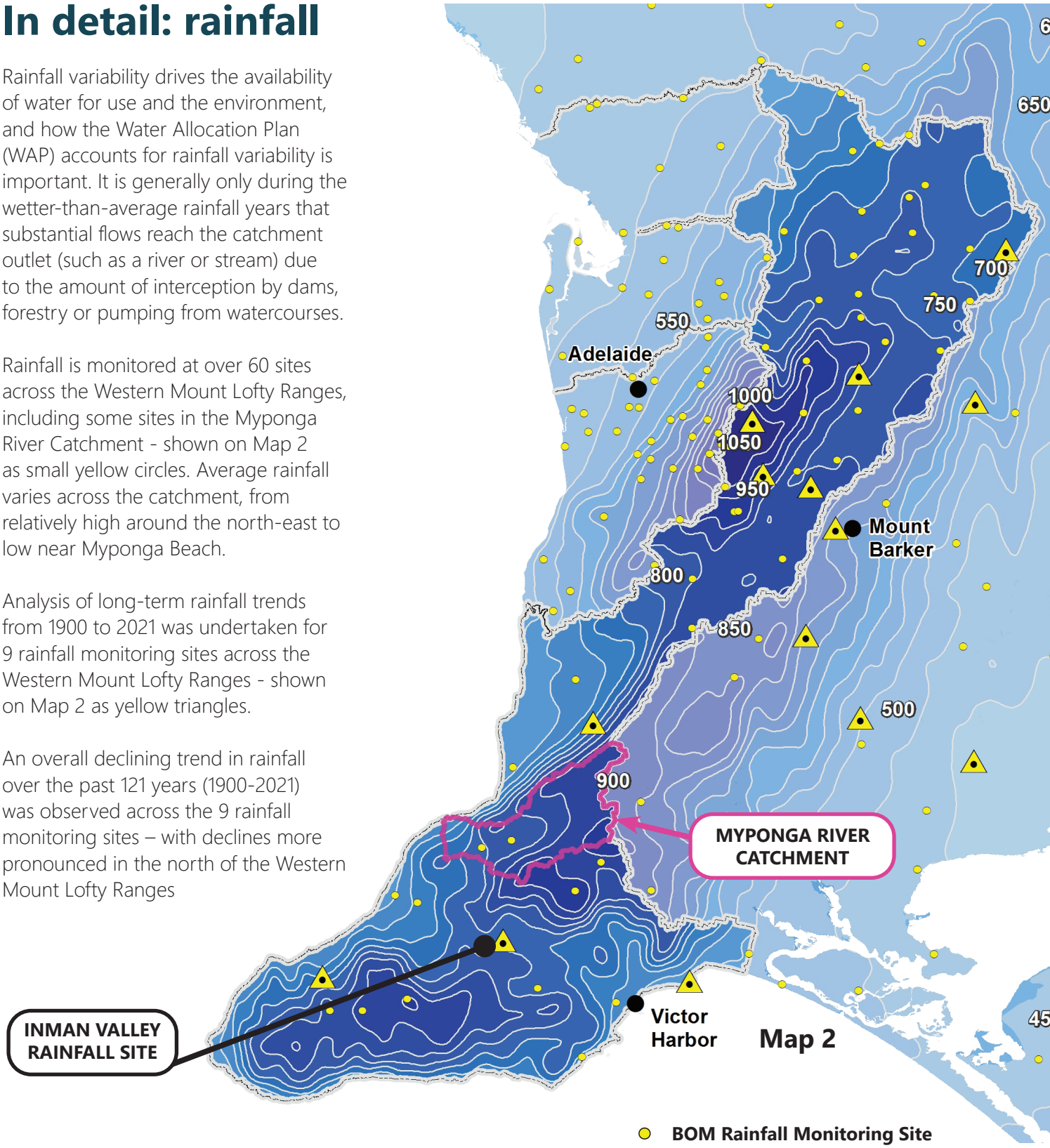
In detail: rainfall

Rainfall variability drives the availability of water for use and the environment, and how the Water Allocation Plan (WAP) accounts for rainfall variability is important. It is generally only during the wetter-than-average rainfall years that substantial flows reach the catchment outlet (such as a river or stream) due to the amount of interception by dams, forestry or pumping from watercourses.

Rainfall is monitored at over 60 sites across the Western Mount Lofty Ranges, including some sites in the Myponga River Catchment - shown on Map 2 as small yellow circles. Average rainfall varies across the catchment, from relatively high around the north-east to low near Myponga Beach.

Analysis of long-term rainfall trends from 1900 to 2021 was undertaken for 9 rainfall monitoring sites across the Western Mount Lofty Ranges - shown on Map 2 as yellow triangles.

An overall declining trend in rainfall over the past 121 years (1900-2021) was observed across the 9 rainfall monitoring sites – with declines more pronounced in the north of the Western Mount Lofty Ranges



Map 2: Long-term (1900-2021) average rainfall for the Myponga River Catchment, with the colour gradient indicating relatively low (light blue) to high (dark blue) average rainfall. Locations of rainfall monitoring sites are indicated as yellow dots, and yellow triangles indicate long-term rainfall sites used in the analysis .

None of the nine long-term rainfall monitoring sites analysed across the Western Mount Lofty Ranges are located within the Myponga River Catchment, as the rainfall monitoring sites in this catchment were established slightly later. A nearby site in Inman Valley (BoM ID - 23723) represents a rainfall range similar to some parts of the Myponga River catchment.

Data for the Inman Valley rainfall monitoring site is displayed below. Information for the other monitoring sites in the Western Mount Lofty Ranges are available in the *Surface Water Technical Advice Memo* (DEW, 2023) on the Hills and Fleurieu Landscape Board website.

Annual recorded rainfall at the Inman Valley rainfall monitoring site (BoM ID - 23723) from 1900 – 2021 shows a decreasing long-term trend (Figure A, dashed line).

Rainfall data used in the water allocation plan to calculate resource capacity and take limits was for the period of 1974 to 2006.

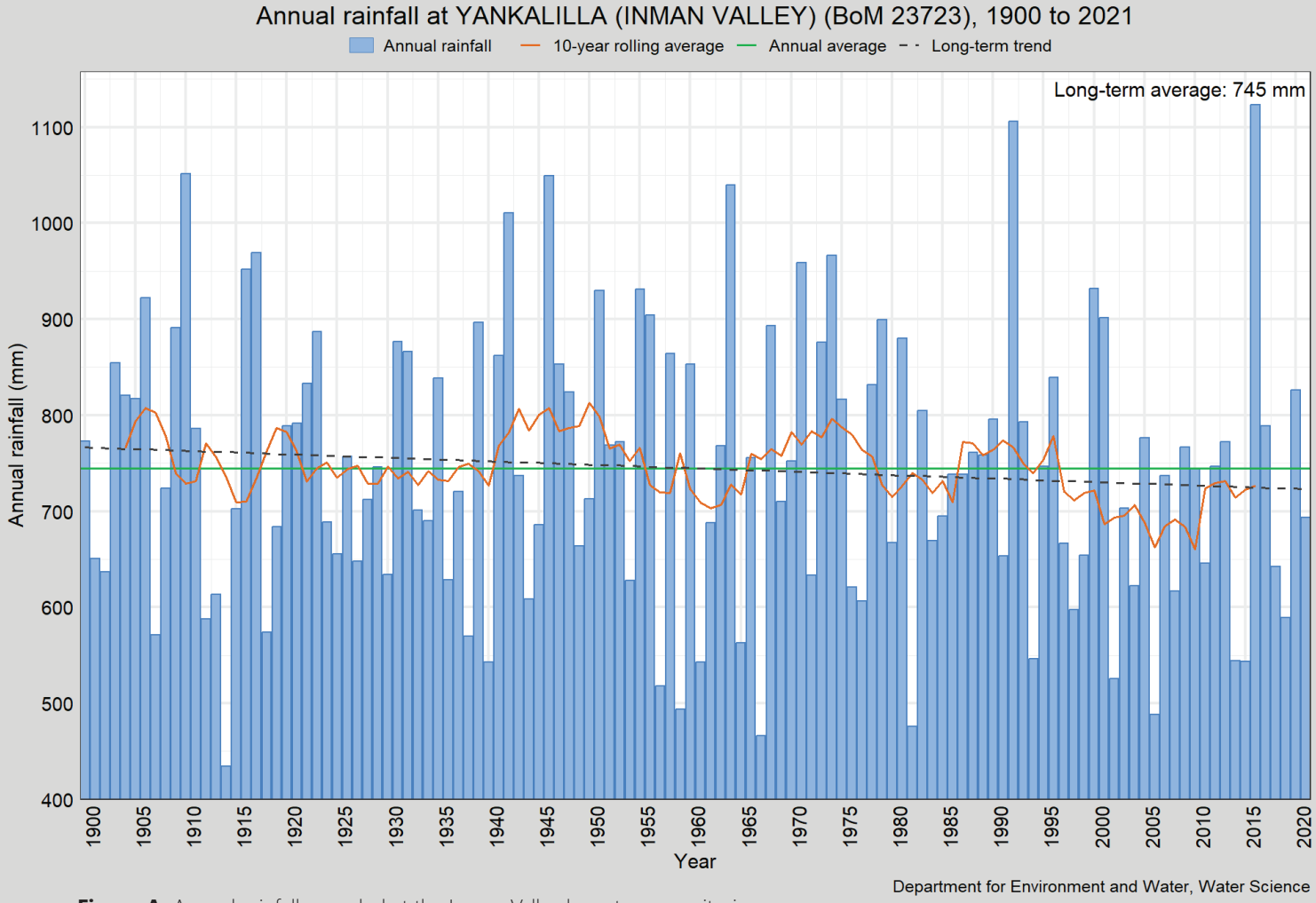


Figure A. Annual rainfall recorded at the Inman Valley long-term monitoring site, near to the Myponga River Catchment over 1900-2021 (DEW, 2023), with 10 year rolling average, annual average and long-term trend also indicated. BoM refers to Bureau of Meteorology.

In Figure B (below), annual rainfall recorded at the Inman Valley (BoM ID - 23723) site is displayed as the deviation of each year's rainfall from the long-term average (745mm). It is useful to view the data in this way because it helps to highlight the difference in annual rainfall from the long-term average.

The frequency of wetter-than-average rainfall years is considerably lower during the last decade compared to pre-millennium drought years at the Inman Valley site (the millennium drought went from 1997 to 2009). This same trend was also observed at the other 8 long-term rainfall analysis sites in the Western Mount Lofty Ranges.

Rainfall variability drives the availability of water for use and the environment. How the WAP accounts for rainfall variability is important.

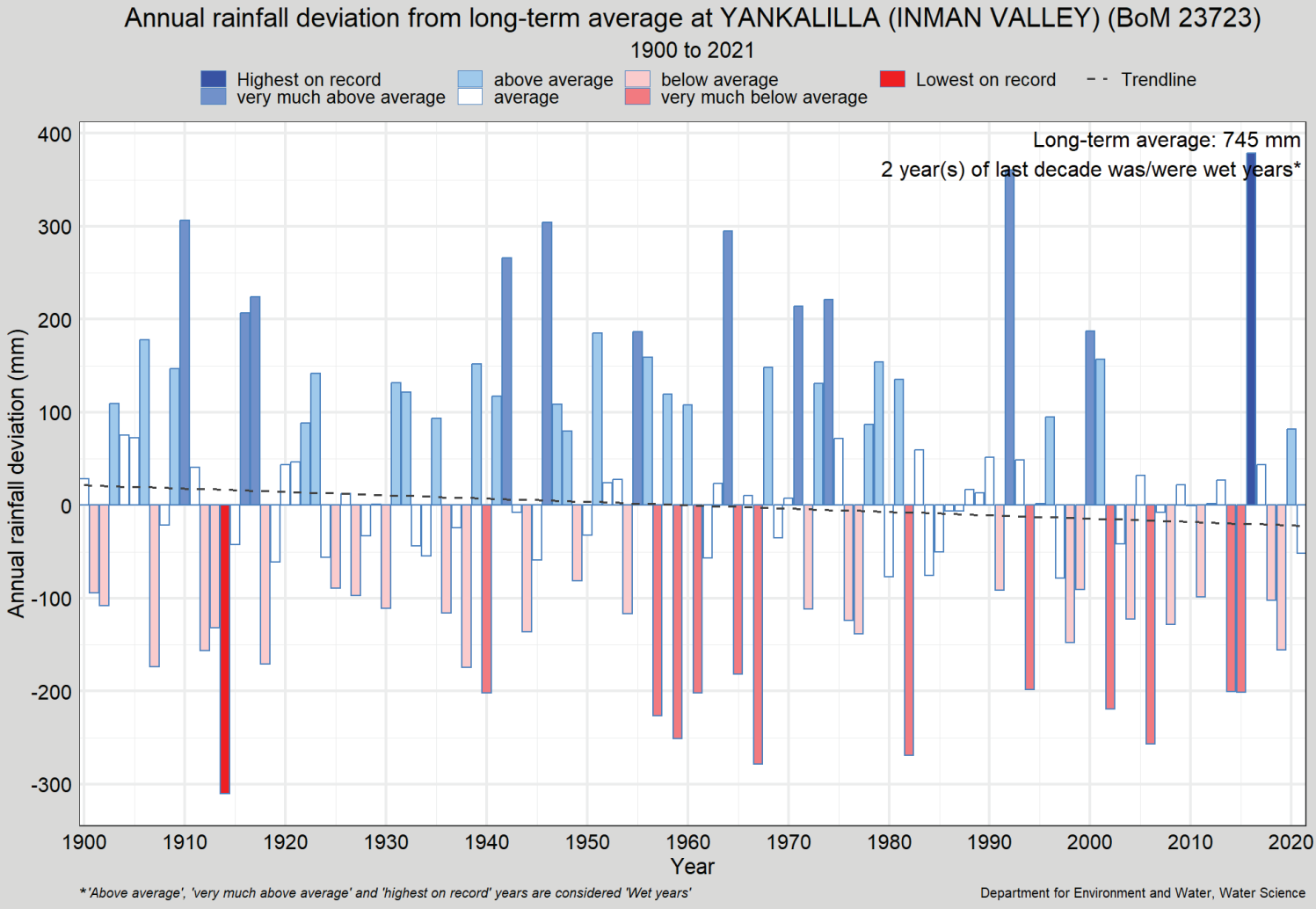


Figure B. Annual rainfall deviation from long-term average at Inman Valley, near to the Myponga River Catchment (DEW 2023). Years that were wetter (blue bars), drier (red bars) or within the average range (white bars) of the long-term annual rainfall average of 745mm are shown. BoM refers to Bureau of Meteorology.

In detail: surface water

What is surface water?

Surface water refers to water which runs across the surface of the land following rainfall and water flowing within watercourses, all of which is managed through the WAP. The status and trends of surface water are monitored closely as they underpin how much water is available for use.

In this section we present data on streamflow, allocation and use of surface water (including dams and public water supply) and the risks to surface water.

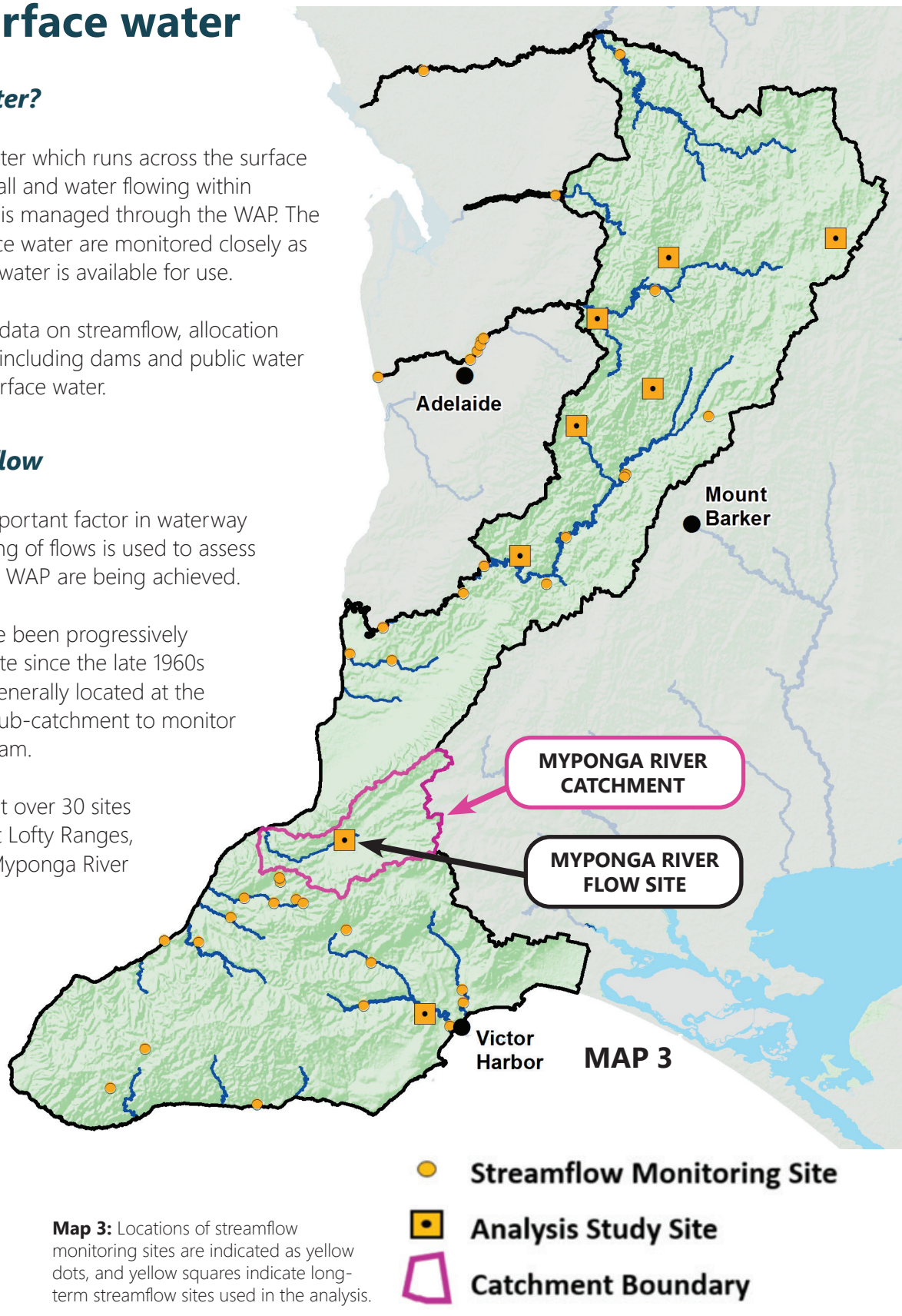
Monitoring streamflow

Streamflow is the most important factor in waterway health. Ongoing monitoring of flows is used to assess whether the targets of the WAP are being achieved.

Flow monitoring sites have been progressively constructed across the state since the late 1960s and early 1970s and are generally located at the outlet of a catchment or sub-catchment to monitor the flow generated upstream.

Streamflow is monitored at over 30 sites across the Western Mount Lofty Ranges, including one site in the Myponga River Catchment (yellow dots on Map 3).

Trend analysis was undertaken for 8 streamflow monitoring sites across the Western Mount Lofty Ranges region with long-term data from 1974 to 2021 (yellow squares on Map 3). One of these long-term streamflow monitoring sites is within this catchment.



Map 3: Locations of streamflow monitoring sites are indicated as yellow dots, and yellow squares indicate long-term streamflow sites used in the analysis.

Analysis of long-term streamflow across the Western Mount Lofty Ranges region found an overall declining trend since 1974 across all 8 sites analysed.

Figure C (below) shows the decline in annual streamflow for the Myponga River site.

Flows are the most important indicator of waterway health

A decline in flows since 1974 is evident at Myponga River

It is generally only in wetter-than-average rainfall years that above average streamflow occurs

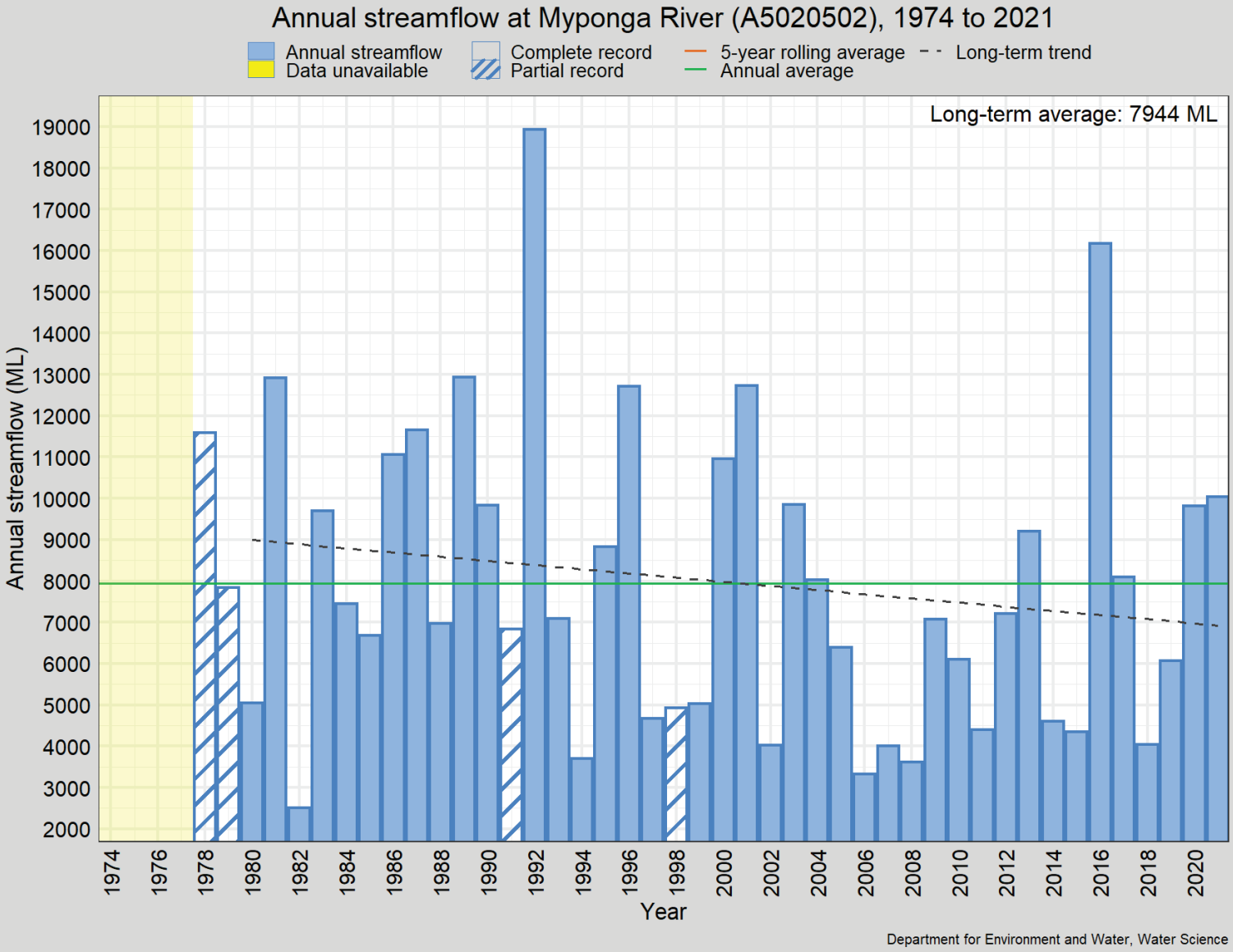


Figure C. Annual streamflow at Myponga River (Site ID: A5020502) from 1974-2021 (DEW, 2023). Bars show annual recorded streamflow, with annual average (7,944 ML) and long-term trend (dotted line) also shown.

The analysis also found the frequency of wetter-than-average streamflow years to be considerably lower during the last decade, in comparison to the pre-millennium drought decades. Figure D (below), displays the deviation of each year's streamflow from the long-term average (7,944 mega litres) for the Myponga River streamflow site.

The trends of declining streamflow and lower frequency of wetter-than-average years in the last decade were more pronounced in the northern parts of the Western Mount Lofty Ranges.

The frequency of above average flows (blue bars) was much lower during the last decade compared to pre-millennium drought years.

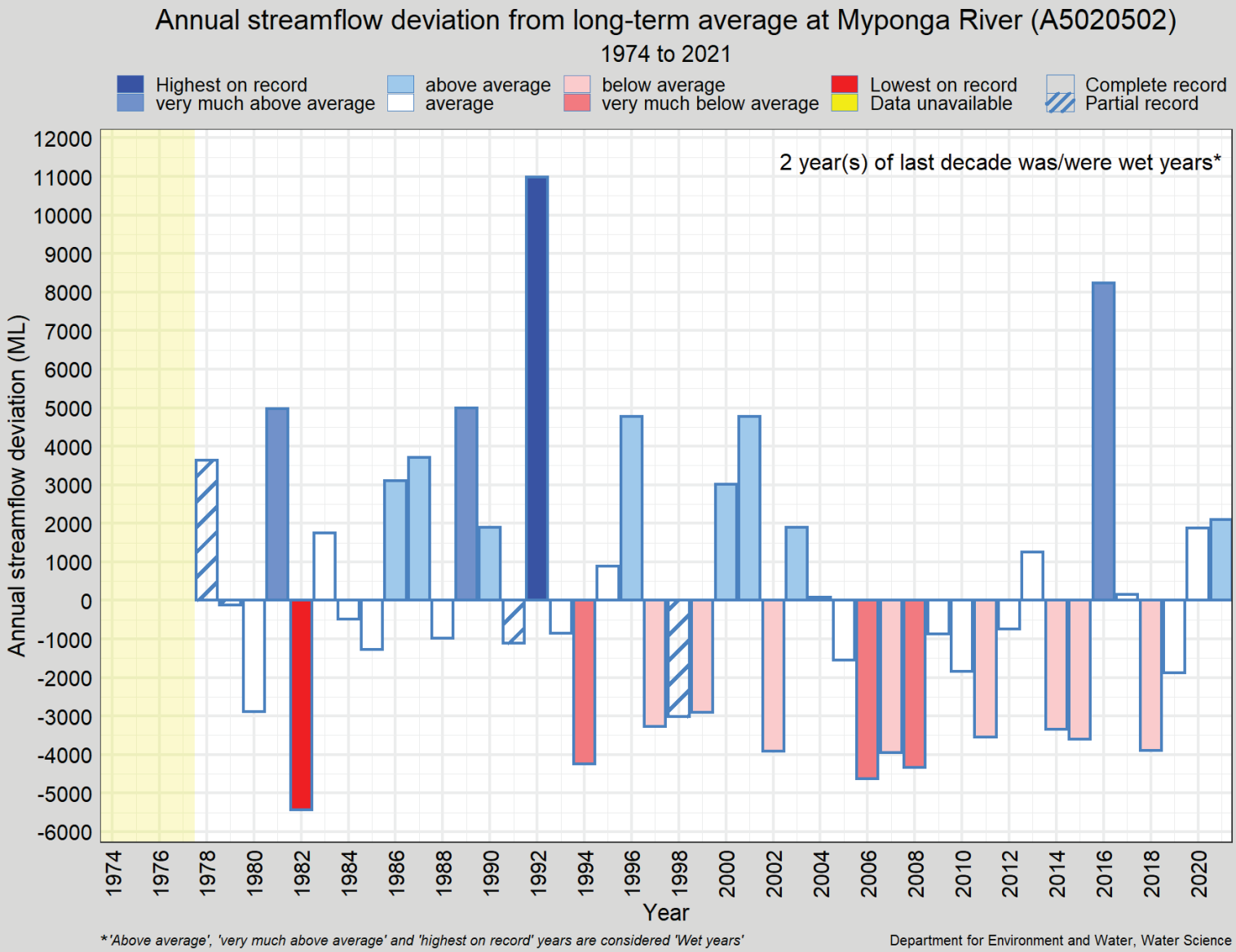


Figure D. Annual flow deviation at Myponga River (Site ID: A5020502) from 1974-2021 (DEW, 2023). Years that had higher flows (blue bars), lower flows (red bars) or within the average range (white bars) of the long-term average of 7,944 megalitres (ML) are shown.

How the Water Allocation Plan (WAP) manages surface water

For each of the catchments across the Western Mount Lofty Ranges, the WAP sets out:

- **Resource capacity:** how much surface water is available in total, based on long-term average rainfall and streamflow data from 1974-2006.
- **Take limit:** of the total resource capacity, how much water can be sustainably used or extracted each year for consumptive purposes, whilst still allowing enough water to stay in the natural system to recharge aquifers, reach the next dam and provide water for the environment.
- **Allocation:** the total volume of water allocated to licence holders each year.

When the current WAP was adopted in 2013, it was part of a significant transition from unregulated water use, to a regulated system with water licences and allocation limits. During this transition, water licences were issued to existing water users and the allocation volumes on each licence were calculated based on existing use. The allocation volumes granted to existing users did not directly consider the take limits set in the WAP and there has not been a subsequent process to align allocations with take limits. This means that the volume of surface water allocated is above the take limit for many management zones (see Map 4).

This section provides a breakdown of how much surface water is allocated and used in the Myponga River Catchment, compared to the whole of the Western Mount Lofty Ranges.

Surface water allocation and usage data

There are 1,084 surface water licences across the Western Mount Lofty Ranges, and 36 are held within the Myponga River Catchment.

In the Myponga River Catchment, the total allowable use (9,487ML) for surface water is well over the take limit (3,912ML) (see Table 1 and explanation of key terms, below). The volume of surface water allocated to licence holders makes up 204% of the take limit.

Comparing total allowable use (9,487ML) to total estimated use (7,076ML) shows that for 2021-2022 estimated use was below allowable use.

A significant proportion of the total allocation volume in this catchment is held for public water supply at the Myponga Reservoir.

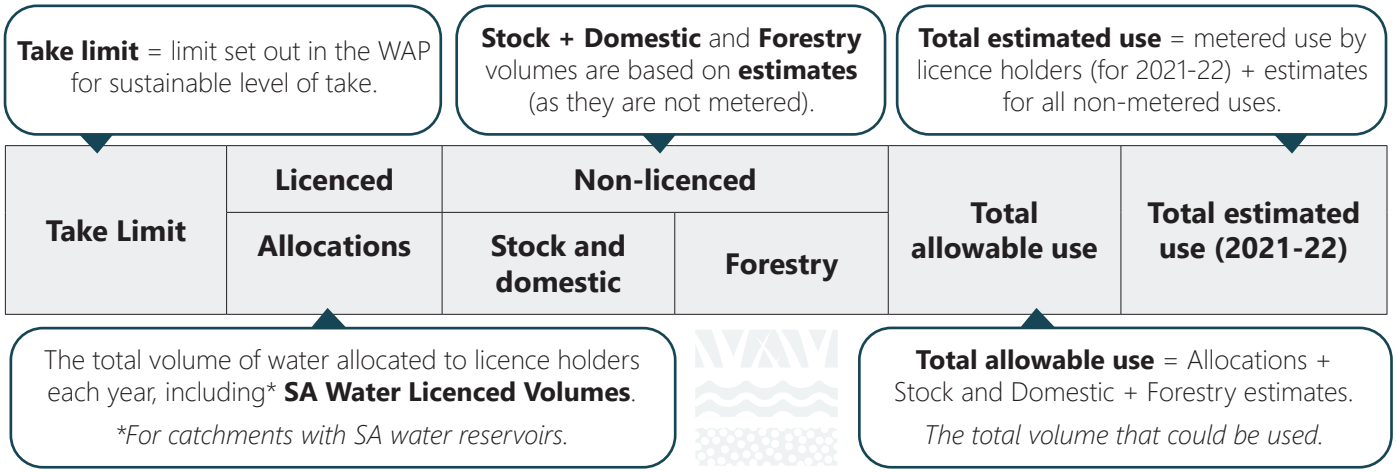
Estimated water use by forestry (non-licenced) makes up a relatively significant share of the total estimated water use in the Myponga River Catchment.

Table 1 Volumes of allocation and use for licenced and non-licenced purposes, from surface water for 2021-22 in the Myponga River Catchment and the Western Mount Loft Ranges in entirety. Volumes are also expressed in ML (megalitres) and as a percentage of the take limit.

	Measure	Take limit	Licenced	Non-licenced		Total allowable use	Total estimated use (2021-22)
			Allocations	Stock and domestic	Forestry		
Myponga River Catchment	Volume (ML)	3,912	7995	357	1,135	9,487	7,076
	as % limit		204%	9%	29%	243%	181%
Total WMLR	Volume (ML)	99,451	167,294	7,901	17,441	192,636	116,812
	as % limit		168%	8%	18%	194%	117%

Key terms used in Table 1 are explained on the next page

Figure E. Explanation of key terms used in managing surface water in the WAP.



The Public Water Supply in the Western Mount Lofty Ranges

Across the Western Mount Lofty Ranges, the public water supply represents a significant proportion of the surface waters allocated and used. On average, the flows from the Mount Lofty Ranges supply 60% of metropolitan Adelaide's water needs, with additional sources such as groundwater, desalinated water and the River Murray providing the rest.

Surface water flows from the Western Mount Lofty Ranges are captured within 8 public water supply reservoirs (Barossa, South Para, Little Para, Warren, Millbrook, Kangaroo Creek, Mt Bold and Myponga).

The allocation volumes for all five Western Mount Lofty Ranges catchments that contain public water supply reservoirs (the Myponga, Onkaparinga River, Torrens, South Para and Little Para catchments) are much higher than the take limit. Recognising that most reservoir catchments are over-developed, the additional water sources (listed above) are very important to the water security of greater Adelaide.

Water licence conditions require environmental flows (EFlows) to be released from public water supply reservoirs to support downstream river health in the Gawler, Little Para, Torrens and Onkaparinga Rivers.

The demand for water from the public supply network will increase over the next 50 years, with climate projections showing that flows from the Mount Lofty Ranges will decrease.

Recognising the future risks to water security and supply, the Resilient Water Futures project has been established, which will look at ways to adapt the public water supply network in the face of a warmer, drier climate.

Myponga Reservoir

Surface water in farm dams

Farm dams are an important asset to rural properties, for capturing and storing surface water. Dams shorten the flowing season by delaying the passing of flows until they fill and spill, significantly altering the timing of flows and impacting ecosystems.

There are 14,479 dams in the Western Mount Lofty Ranges – including 846 dams (holding 1,488 megalitres) in the Myponga River Catchment – and collectively these have a significant impact.

In the Myponga River Catchment, over half (69%) of all dams are less than 1 ML in size. Although large dams (over 25 megalitres in size) make up less than 1% of all dams in the catchment, they hold 25% of all dam volume.

To reduce their impact on downstream flows, all dams over 5ML in size are required to pass low flows (see Box 1 below).

Through targeted projects and trials, a small number of dams across the Western Mount Lofty Ranges are now passing low flows. However, low flows are not being passed at the vast majority of dams and this remains a significant challenge

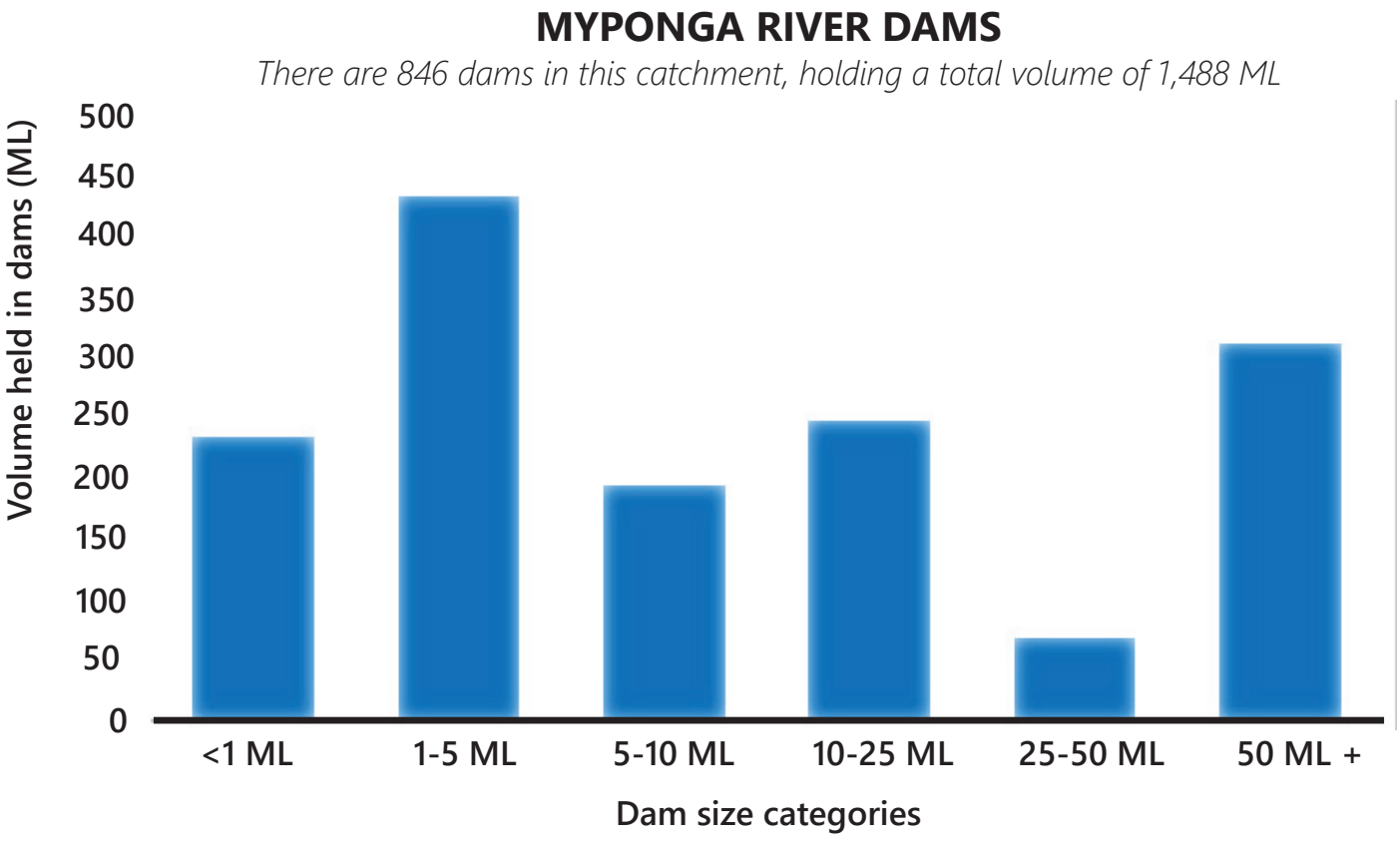


Figure F. Volume of surface water held in dams in the Myponga River Catchment, organised according to dam size. Volume is shown in megalitres (ML) for dams of sizes ranging from less than 1 megalitre to over 50 megalitres.

Box 1: What are Low Flows?

Low flows are a small proportion of all flow events. They are critical to the health of waterways, especially in the lead up to and following the main rainfall periods where most flows are received.

At the beginning of the flow season, in autumn, dams capture all flows until they fill entirely and then spill (overflow). This significantly delays when water reaches rivers and streams that have been dry over summer. For many aquatic species, breeding success depends on the length of the flow season, so shortening the flow season has a big impact on the health of watercourse ecosystems. Having farm dams pass low flows has a small impact on the total volume of flows they capture, but a big benefit for watercourse health.

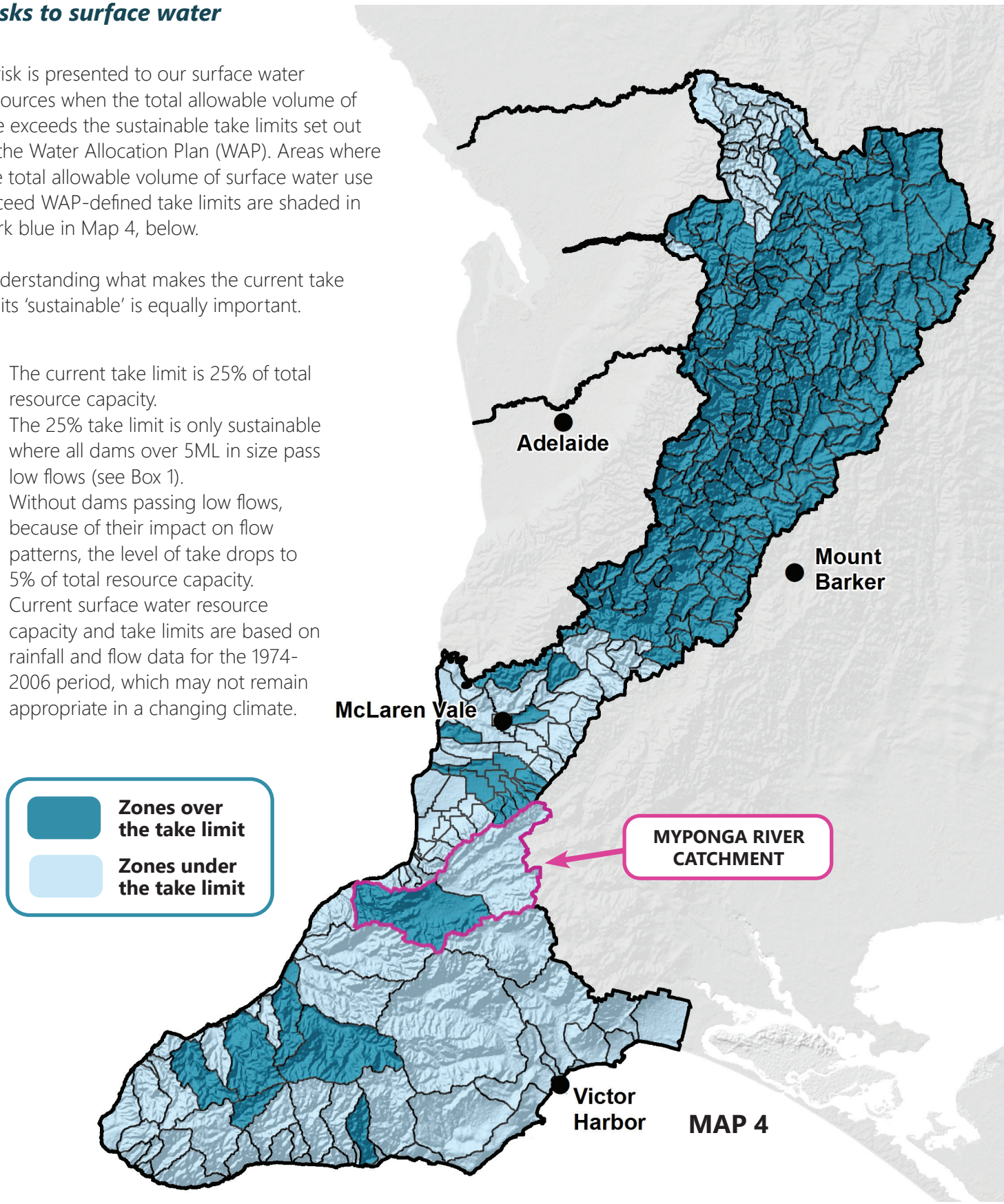
The current take limits in the WAP are underpinned by the need for all dams over 5ML to pass low flows.

Risks to surface water

A risk is presented to our surface water resources when the total allowable volume of use exceeds the sustainable take limits set out in the Water Allocation Plan (WAP). Areas where the total allowable volume of surface water use exceed WAP-defined take limits are shaded in dark blue in Map 4, below.

Understanding what makes the current take limits 'sustainable' is equally important.

- The current take limit is 25% of total resource capacity.
- The 25% take limit is only sustainable where all dams over 5ML in size pass low flows (see Box 1).
- Without dams passing low flows, because of their impact on flow patterns, the level of take drops to 5% of total resource capacity.
- Current surface water resource capacity and take limits are based on rainfall and flow data for the 1974-2006 period, which may not remain appropriate in a changing climate.



MAP 4

In detail: groundwater

Groundwater is the term given to underground water resources that occur within different aquifers. There are two broad aquifer types in the Western Mount Lofty Ranges: fractured rock aquifers and sedimentary aquifers.

- **Fractured rock aquifers** occur where groundwater is stored and moves through joints and fractures in the basement rocks.

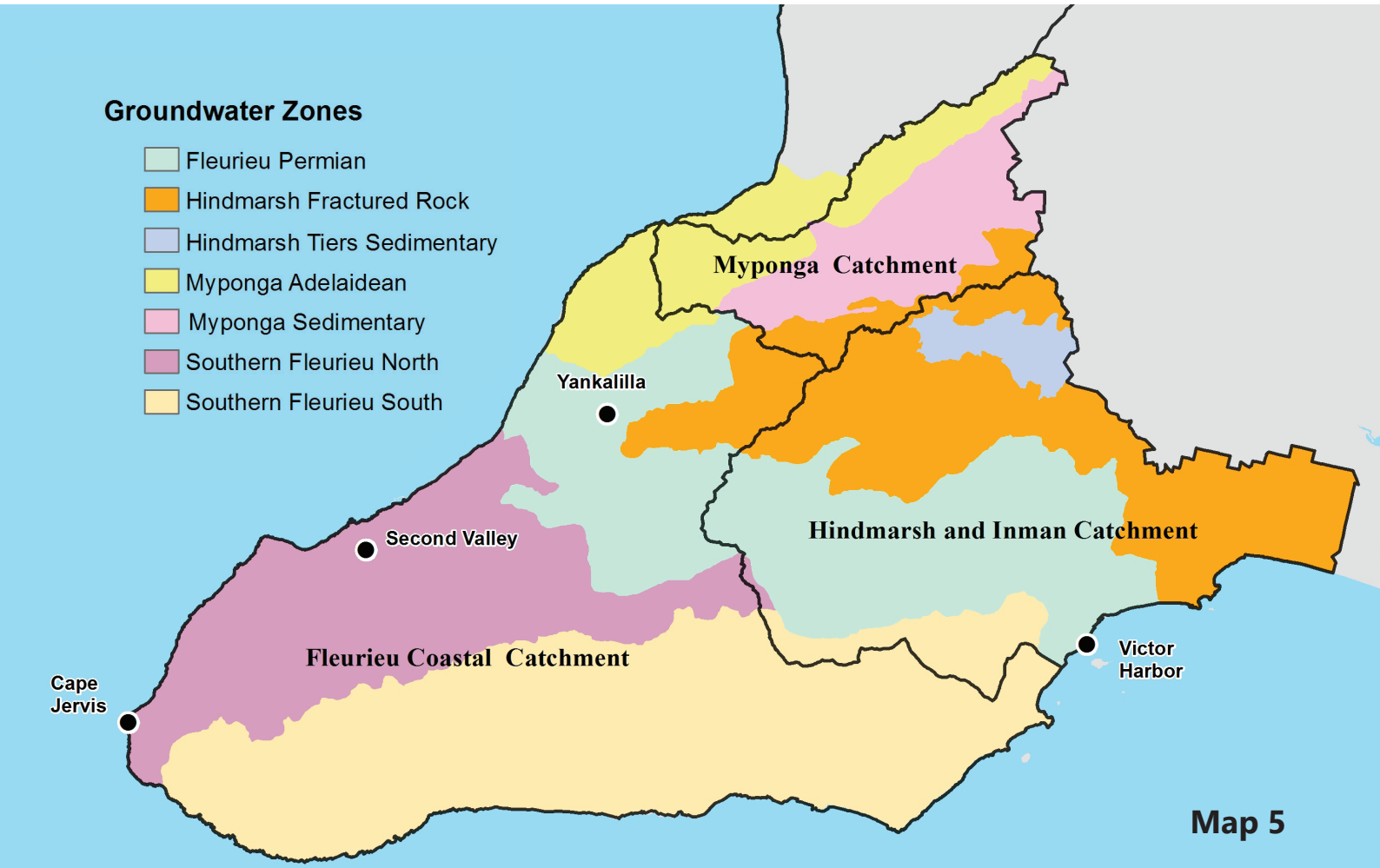
- **Sedimentary aquifers** occur in the valleys and plains where groundwater flows through the pore spaces within the sediments.

Recharge to both aquifers occurs directly from the portion of rainfall that percolates down to the water table through the soil profile. In the case of the sedimentary aquifers, recharge also occurs indirectly by through flow from adjacent aquifers.

The groundwater management zones that underlie the Myponga River Catchment are:

- Myponga Adelaidean
- Myponga Sedimentary
- Hindmarsh Fractured Rock

The location of these three groundwater management zones (GWMZ's) are shown below in Map 5 with different colours indicating each zone, alongside the catchment boundary (black outline). Data given in this section is for the whole of each GWMZ (whole of each coloured area). Some of these zones extend partly beyond the Myponga Catchment boundary.



Map 5

How the WAP manages groundwater

There are 45 individual groundwater management zones (GWMZs) in the Western Mount Lofty Ranges and for each of these zones the Water Allocation Plan (WAP) sets out:

- **Resource capacity:** how much groundwater is available in total.
- **Take limit:** how much of the resource capacity can be used or extracted each year for consumptive purposes, while still maintaining aquifer levels and health, provide base flows to watercourses and support groundwater dependent ecosystems.
- **Allocation:** the total volume of water allocated to licence holders each year.

When the current WAP was adopted in 2013, it was part of a significant transition from unregulated water use, to a regulated system with water licences and allocation limits. During this transition, water licences were issued to existing water users and the allocation volumes on each licence were calculated based on existing use. The allocation volumes granted to existing users did not directly consider the take limits set in the WAP and there has not been a subsequent process to align allocations with take limits. This means that the volume of groundwater allocated is above the take limit for some management zones (see Map 6).

This section provides a breakdown of allocation and usage volumes for the Myponga River Catchment.

Groundwater allocation and usage data

There are 119 groundwater licences held across the GWMZs that underlie the Myponga River Catchment, compared to 1,445 across the whole Western Mount Lofty Ranges.

As shown in Table 2 on the following page, the total allowable use for two of the zones (Myponga Adelaidean and Hindmarsh Fractured Rock) is well below the take limit set out in the WAP, and the total estimated use in those zones for 2021-2022 is lower again.

Of the three zones presented in Table 2, the Myponga Sedimentary zone has the higher volumes of allocations and total estimated use. In this zone, the total allowable use volume is 135% of the take limit set out in the WAP. However, the estimated use by licenced and non-licenced user for 2021-2022 was much lower, at 57% of the take limit.

In this catchment, estimated use for non-licenced purposes (stock and domestic, forestry) is a small proportion of total allowable use, with licenced allocation volumes being the far greater proportion.

Table 2. Volumes of allocation and use of groundwater for licenced and non-licenced purposes 2021-22, summed for the Myponga River Catchment group of groundwater management zones (GWMZ) and for the whole of the Western Mount Lofty Ranges (WMLR). Volumes are expressed in ML (megalitres) and as a percentage of the take limit.

	Unit	Take limit	Licenced	Non-licenced		Total allowable use	Total estimated use (2021-2022)
			Allocations	Stock and domestic	Forestry		
Myponga Adelaidean	ML	1,627	290	4	4	298	14
	% of limit		18%	0%	0%	18%	**1%**
Myponga Sedimentary	ML	4,969	6,057	79	560	6,696	2,857
	% of limit		112%	2%	11%	135%	**57%**
Hindmarsh Fractured Rock	ML	2,291	812	174	78	1,064	496
	% of limit		35%	8%	3%	46%	**22%**
Total across whole WMLR	ML	78,210	53,248	1,768	6,117	61,133	22,188
	% of limit		68%	2%	8%	78%	**28%**

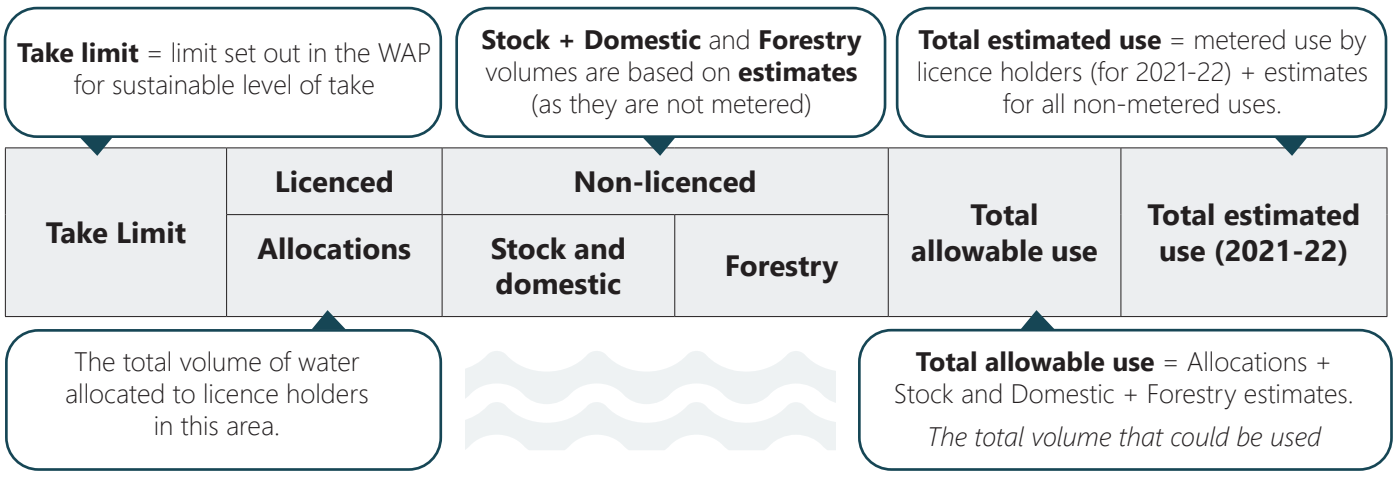


Figure G. Explanation of key terms used in managing groundwater in the WAP.

Groundwater trends

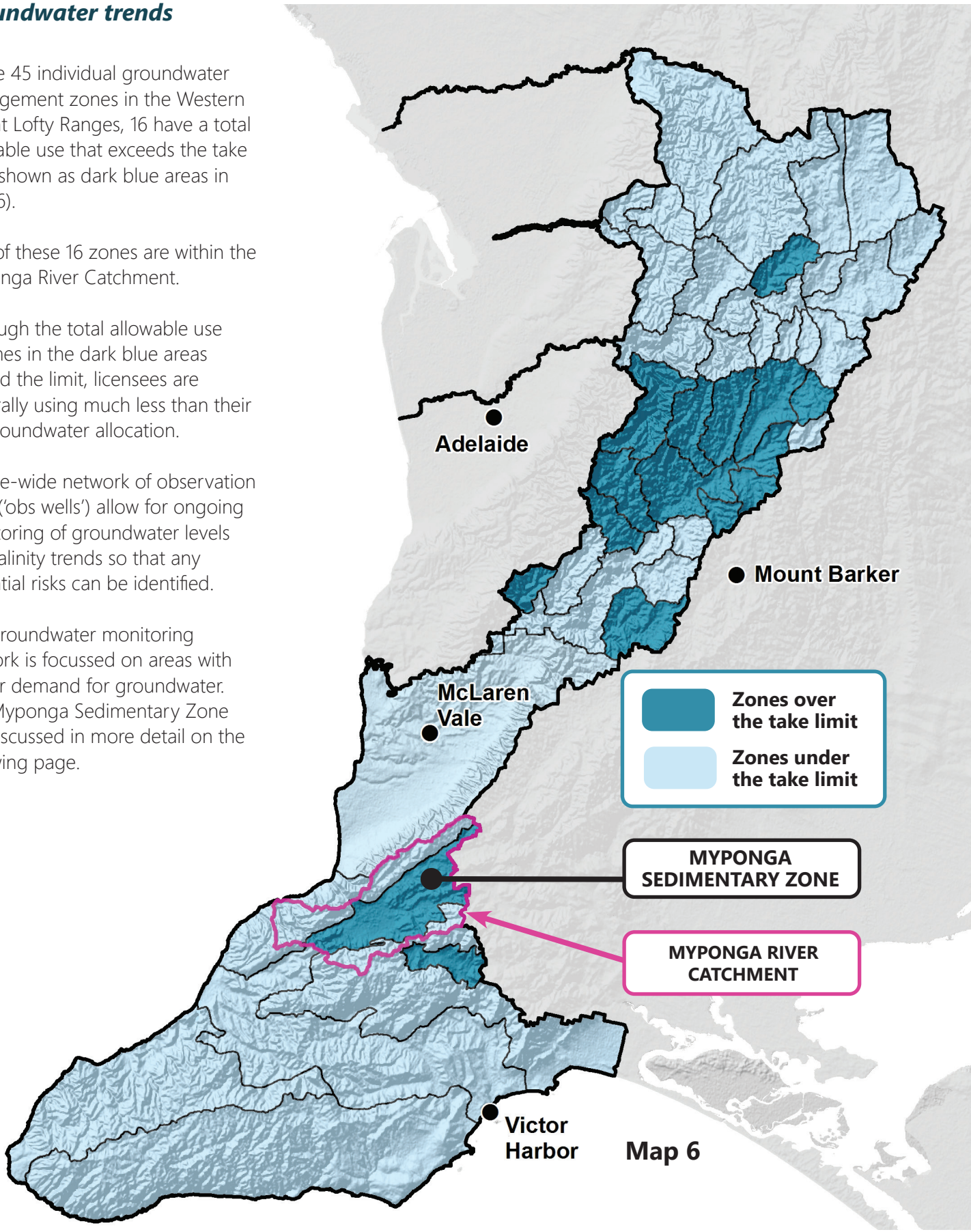
Of the 45 individual groundwater management zones in the Western Mount Lofty Ranges, 16 have a total allowable use that exceeds the take limit (shown as dark blue areas in Map 6).

One of these 16 zones are within the Myponga River Catchment.

Although the total allowable use volumes in the dark blue areas exceed the limit, licensees are generally using much less than their full groundwater allocation.

A state-wide network of observation wells ('obs wells') allow for ongoing monitoring of groundwater levels and salinity trends so that any potential risks can be identified.

The groundwater monitoring network is focussed on areas with higher demand for groundwater. The Myponga Sedimentary Zone – is discussed in more detail on the following page.

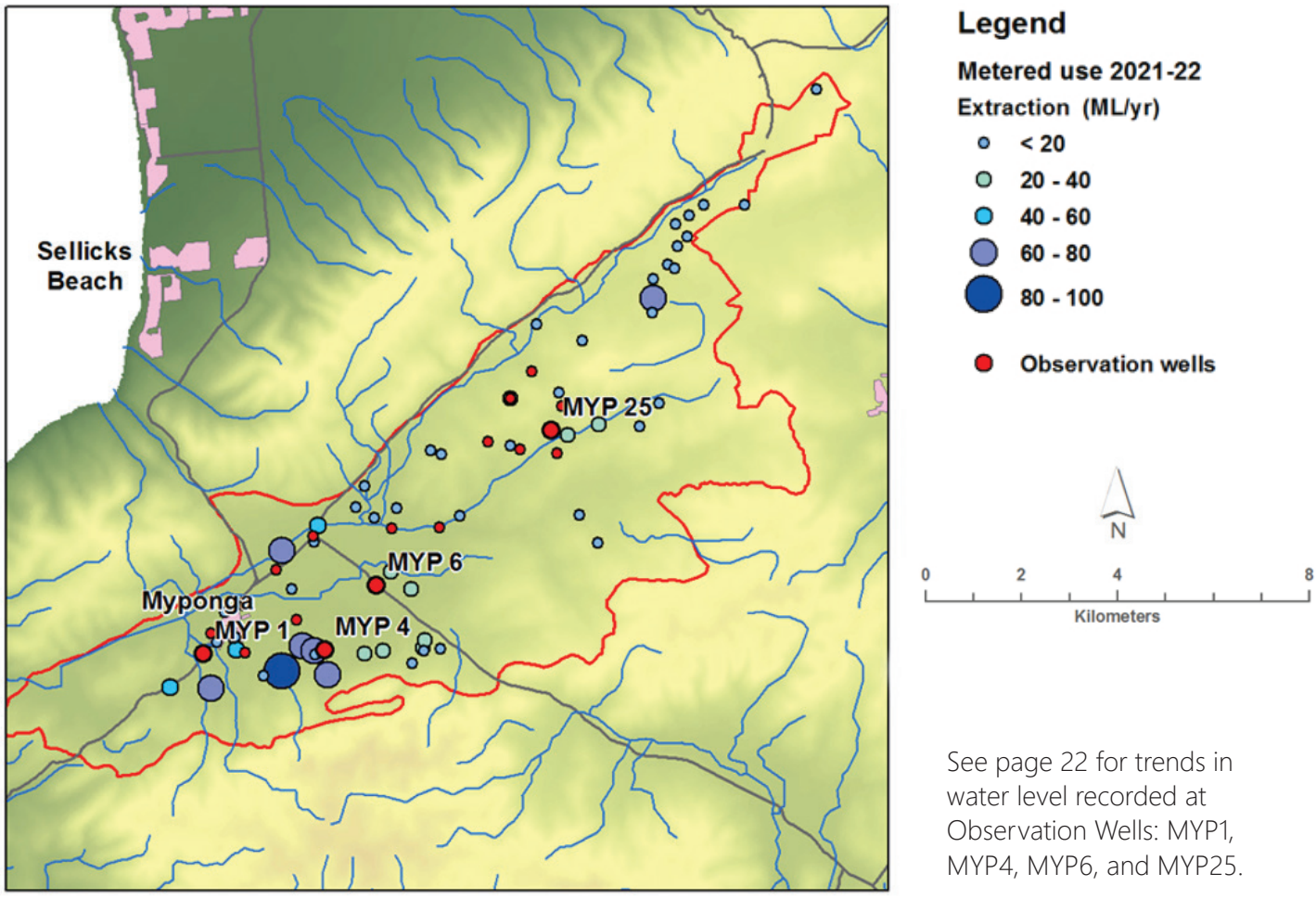


Map 6

Focus on Myponga Sedimentary groundwater management zone

The Myponga Sedimentary groundwater management zone (GWMZ) is an area with higher groundwater demand in the Myponga River Catchment, and encompasses the areas surrounding Myponga and further east to Munetta. Along with other high demand areas, groundwater trends in the Myponga Sedimentary zone are closely monitored so that any developing risks can be swiftly identified.

Data for four observation wells within the Myponga Sedimentary zone groundwater management zone are shown on the following pages (Figures H, I and J). Data for other high use groundwater management zones across the Western Mount Lofty Ranges can be found in the *Groundwater Resources Assessment Report* (DEW, 2023) on our website.



See page 22 for trends in water level recorded at Observation Wells: MYP1, MYP4, MYP6, and MYP25.

Figure H. Location and extraction data for observation wells of the Myponga Sedimentary GWMZ (DEW 2023). The red line indicates the zone boundary, and red dots indicate where groundwater monitoring sites (obs wells) are located. Blue dots indicate where licenced groundwater extractions occur; the size of these dots indicates how much water was extracted in 2021-2022 (see figure legend).

Extractions and allocation

Metering data for the Myponga Sedimentary zone has been available since the 2015-16 water use year, because by this time, most licence holders had installed meters.

Trends in metered use are presented below in Figure I, together with the take limit (or, extraction limit) and the volume allocated. It's clear that in the Myponga Sedimentary zone:

- The volume of groundwater allocated to licence holders is well above the take limit.
- The volume of metered use by licence holders from 2015 – 2022 is well below the full allocation volume, and below the take limit.

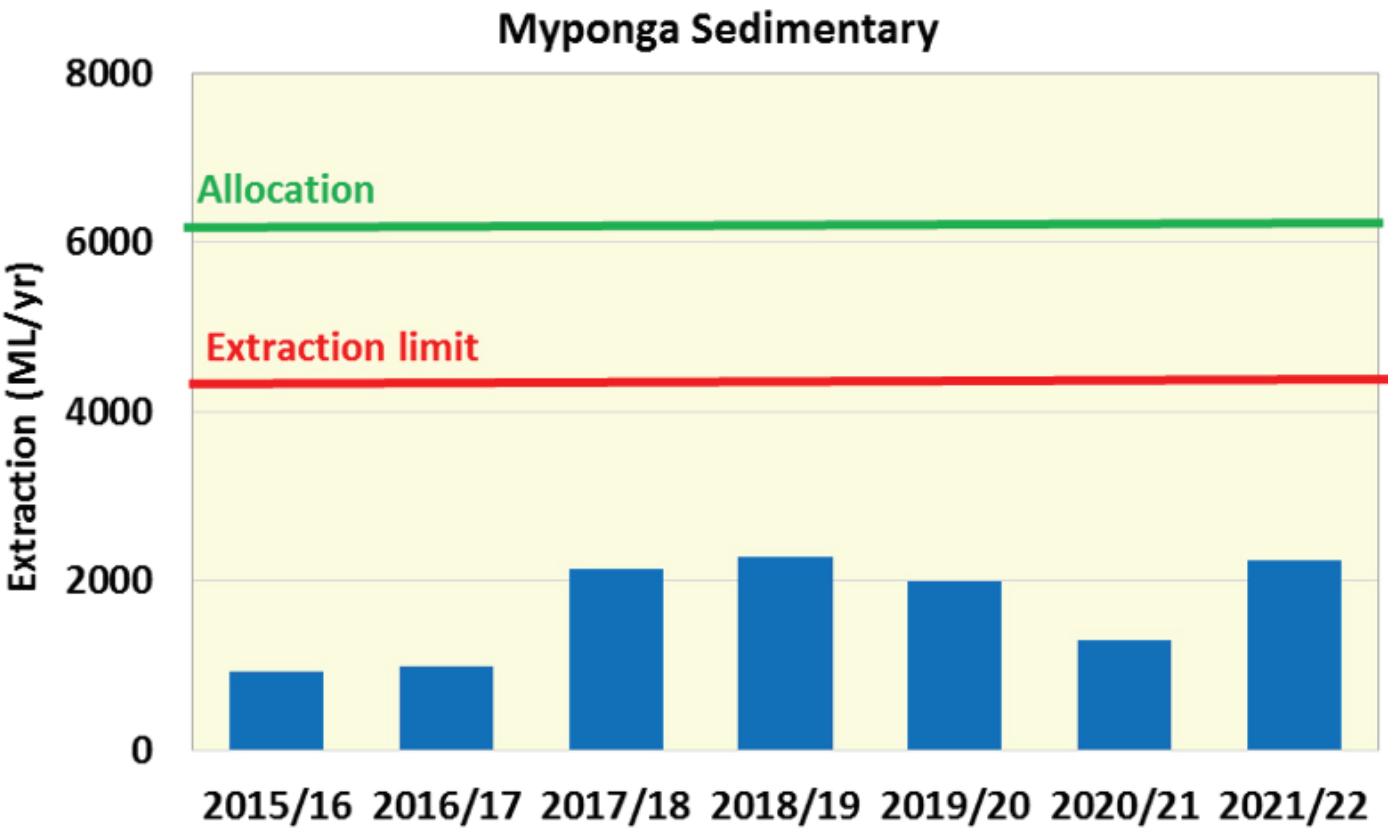


Figure I. Metered usage of groundwater (blue bars; megalitres per year) in the Myponga Sedimentary GWMZ for 2015/16 through to 2021/22 (DEW 2023). Groundwater allocation (green line) and extraction limit (red line) are shown. The terms 'take limit' or 'extraction limit' have the same meaning.

Water level monitoring

Water levels (Figure J) have been monitored via observation wells in the Myponga Sedimentary groundwater zone since the 1970's (see Figure H for well locations).

The fluctuating water levels recorded at the four observation wells graphed below show how the aquifer responds to periods of higher extraction (irrigation over summer months) and periods of recharge (rainfall over winter). Over the past 20 years, the water levels monitored at the observation wells graphed below appear to be relatively stable, despite declining rainfall over the same period.

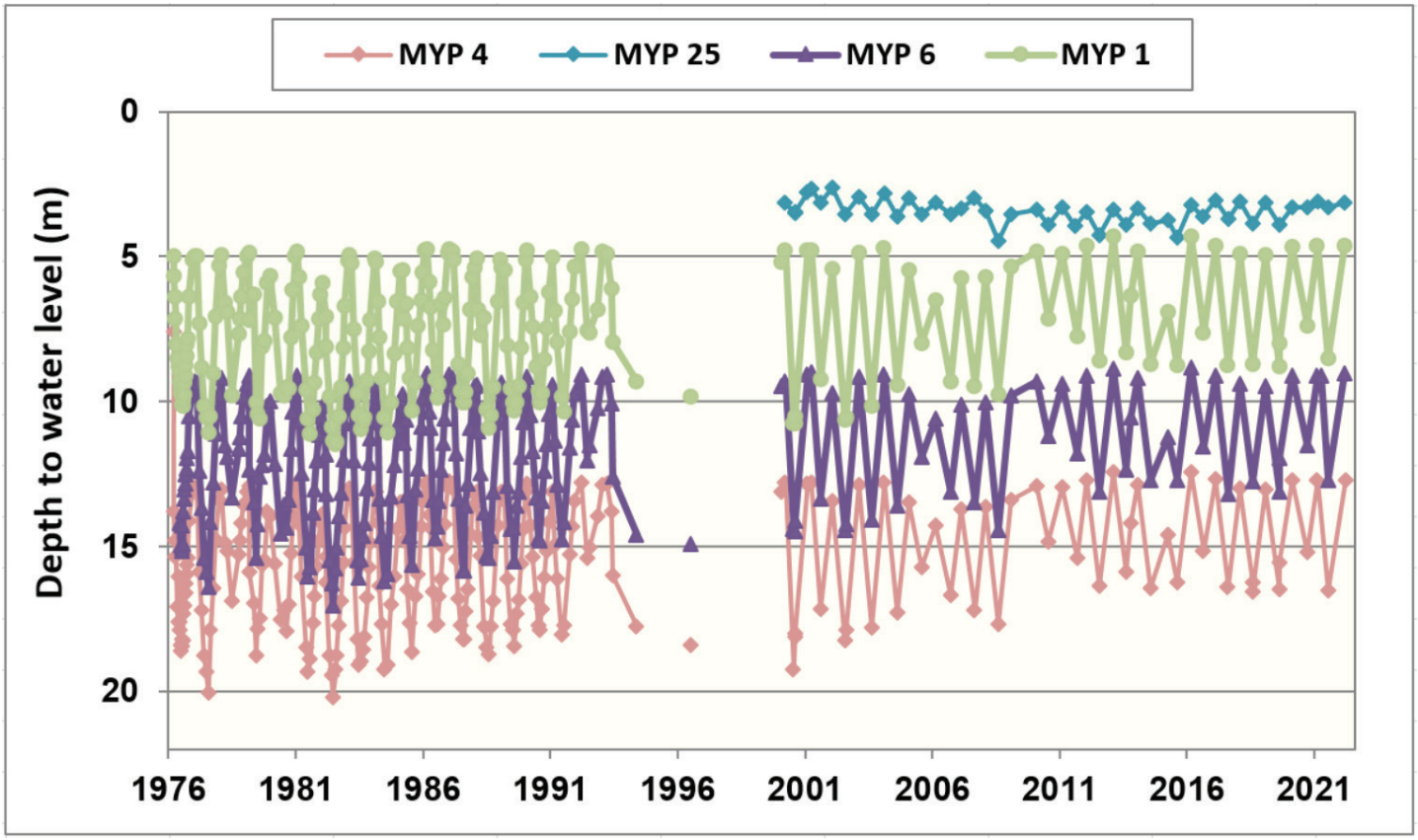


Figure J. Myponga Sedimentary groundwater zone water levels. Water levels (measured in metres from Australian Height Datum (AHD)) for four observation wells over time are shown: MYP1 just south of Myponga (green line), MYP4 just south-east of Myponga (pink line), MYP6 east of Myponga (purple line), and MYP25 south of Pages Flat (blue line) (DEW 2023).

In detail: ecosystem health

How the WAP manages ecosystem health

The Water Allocation Plan (WAP) for the Western Mount Lofty Ranges sets out environmental objectives that are to be met to keep ecosystems at an acceptable level of risk.

Understanding what condition water dependent ecosystems are in, and how they are tracking over time, is one of the core measures used to assess the effectiveness of the WAP.

Ongoing ecological monitoring focuses on the condition and trend of native fish populations and macroinvertebrates (waterbugs) to provide a picture of overall ecosystem health. Monitoring of streamflow is a third critical indicator, with information on streamflow trends given in the surface water section.

Figure L. Photographs show (clockwise): flow monitoring station in the Fleurieu; fish sampling at Onkaparinga River using a 'fyke net'; native fish (Mountain Galaxias) caught during sampling.

Native fish

In the Mount Lofty Ranges 30 native freshwater fish species have been recorded, with some species requiring particular conditions and others found in a wide variety of habitats. Regular sampling of native fish enables the health of watercourses to be monitored. Data is given in this report for 237 sites across the Western Mount Lofty Ranges visited by monitoring teams between 2006 and 2021 to assess the condition of habitat and the condition of all native fish species caught, which are given a Biological Condition Gradient (BCG) rating between 1 (excellent) to 6 (very poor).

The WAP sets recruitment (or, successful breeding) targets for two indicator species of native fish to provide an overall picture of waterway health, with one of these - the Mountain Galaxias – reported on here. The Mountain Galaxias is a good indicator species because they can be found in a wide range of habitat types and are relatively short lived (around 3 years). For the sites where Mountain Galaxias were present the number of young fish caught is recorded as a measure of how successfully they are breeding at that site, which is then compared to the WAP targets. Recruitment data for Mountain Galaxias is given for 303 sampling events across both the Eastern and Western Mount Lofty Ranges visited between 2012-2021.

Macroinvertebrates (water bugs)

Macroinvertebrates, also referred to as water bugs, include creatures such as yabbies, native shrimp and insect larvae (such as the Mayfly or Dragonfly). The quantity of waterbugs and the diversity in species found at a particular site is an excellent indicator of waterway health, with some waterbugs being very tolerant and others being more sensitive to changing conditions.

For this report, data for 238 waterbug monitoring samples collected from 190 sites across both the Eastern and Western Mount Lofty Ranges between 2008 and 2020 is presented. Data from these sites is given a community condition score between 'excellent' and 'very poor'. Waterbug data is collected through a variety of programs, including the SA Environmental Protection Authority (EPA) aquatic ecosystem condition reporting and community BioBlitz Programs.

Key findings from ecological monitoring

Native fish

Across all 237 sites sampled between 2006-2021 across the Western Mount Lofty Ranges, average fish community condition and habitat condition was given a Biological Condition Gradient (BCG) 3.85 (fair) (see Figure M).

Out of the 237 fish monitoring sites, 23 had been sampled five times or more and could be assessed for trend over time. Of the 23, 11 sites (48%) were classed as declining, six (26%) were stable and six (26%) were improving (see Figure M).

Based on 2021 survey data, the number of young Mountain Galaxias native fish caught at a site (an indicator of recruitment, or successful breeding) was identified as being below objectives set in the WAP for 79% of the 88 sites assessed in that year. Of these 88 sites, 25 showed no recruitment (successful breeding) at all.

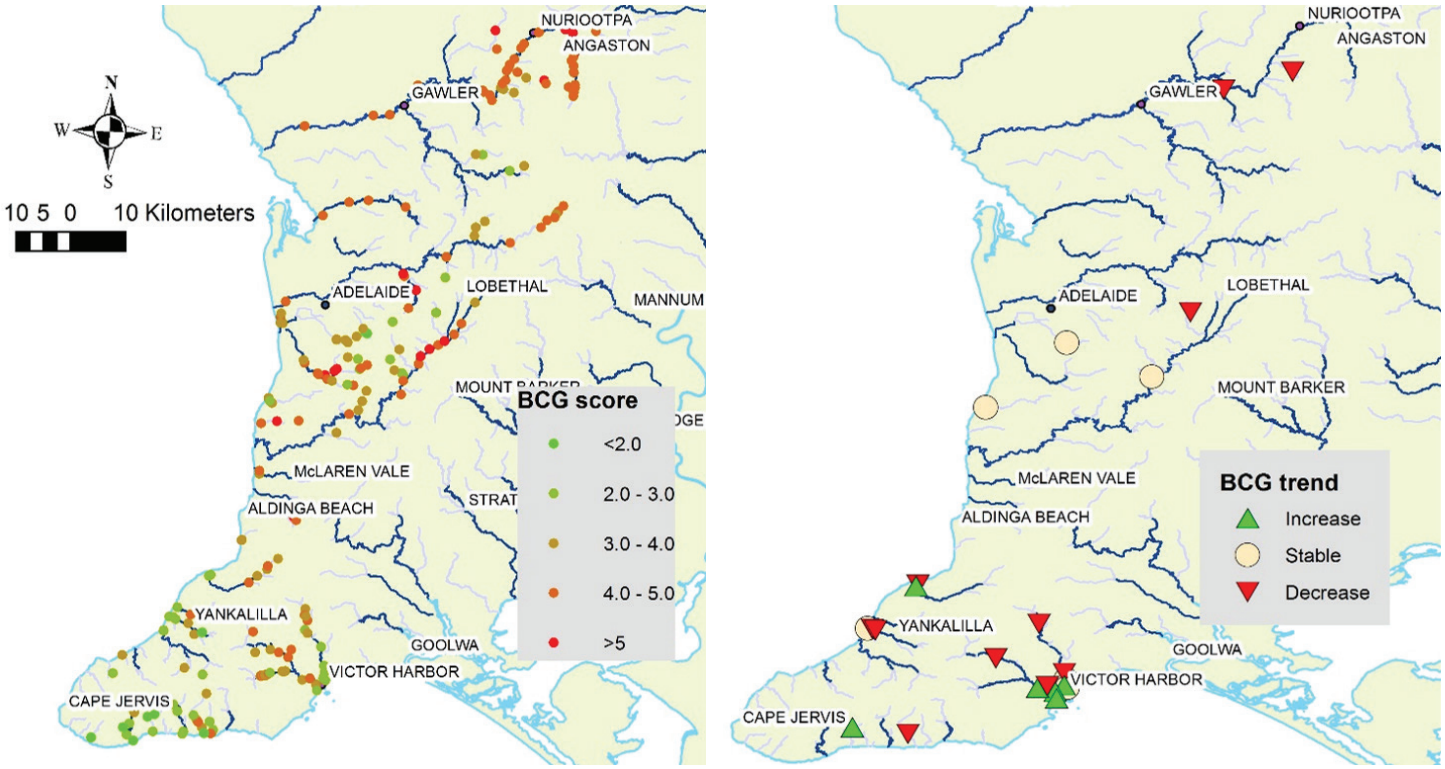


Figure M. Fish monitoring Biological Condition Gradient (BCG) scores between 1 (excellent) and 6 (very poor) for all sites visited between 2006-2021 (left) and trend over time (right) for sites visited four times or more in the Western Mount Lofty Ranges DEW 2022

Key findings from ecological monitoring

Macroinvertebrates (waterbugs)

For waterbugs, of the 238 waterbug monitoring samples collected from across both the Eastern and Western Mount Lofty Ranges between 2008 and 2020 - 15% were classed as very poor, 27% as poor, 31% as fair, 17% as good and 8% as very good. There were no sites that were classed as excellent (Figure N).

Trend over time was assessed for 25 sites that had been visited five or more times, shown in the map on the right hand side of Figure N.

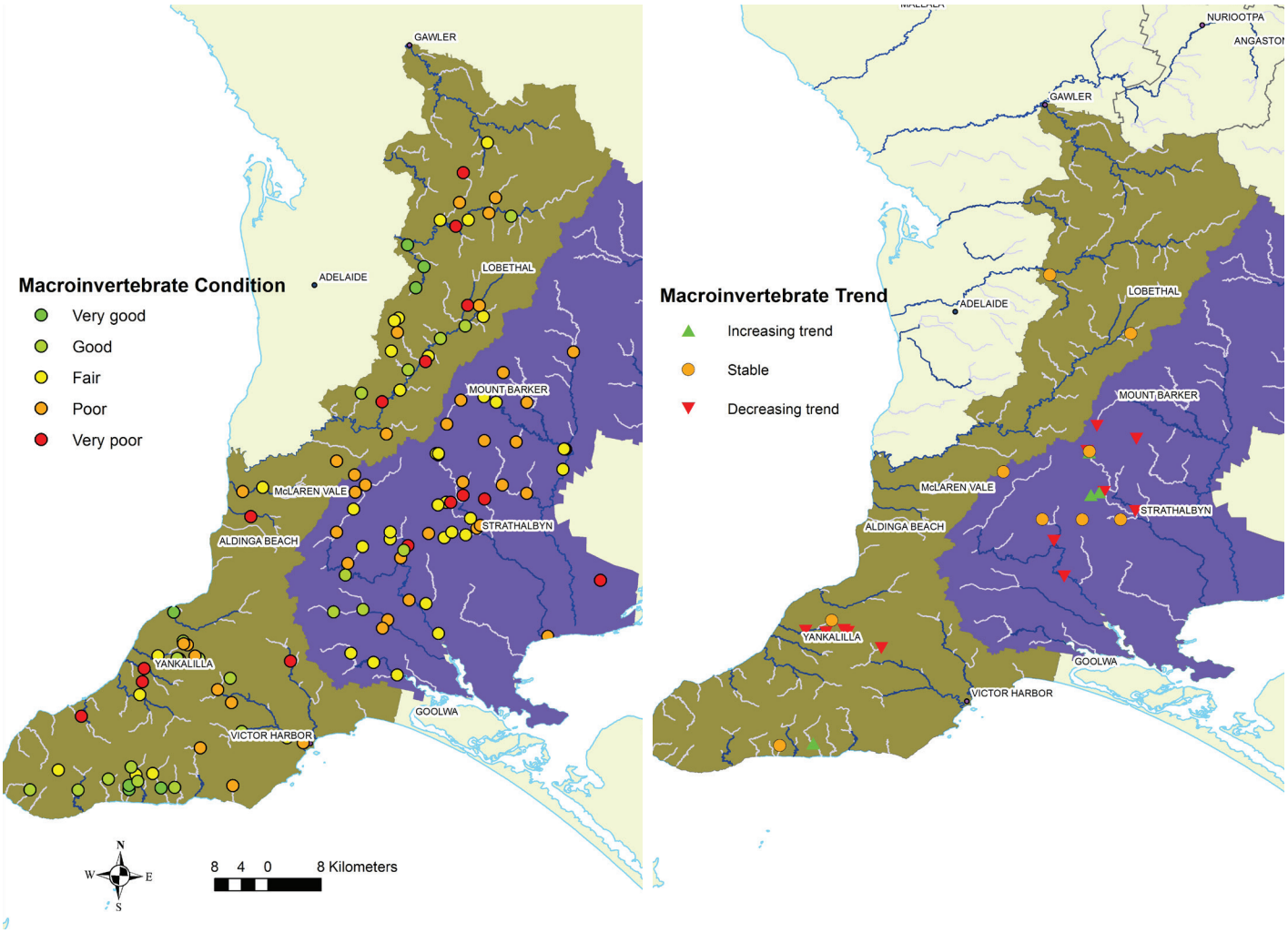


Figure N. Macroinvertebrate (waterbug) community condition for the most recent sampled year (left) and the trend in community condition across 2008-2020 (right) for the Western and Eastern Mount Lofty Ranges.

Implications of ecological monitoring findings

Across all of the assessments undertaken there is a clear picture of declines across the Mount Lofty Ranges relative to the objectives set out in the water allocation plans.
Some of the critical issues identified include:

- **The lack of sustainable breeding of Mountain Galaxias.** There are a number of sites across the Mount Lofty Ranges where Mountain Galaxias are no longer found. For much of the Mt Lofty Ranges, Mountain Galaxias are the only species of native fish now present, especially in the northern parts of the catchment. The loss of other fish species from these sites represents a significant shift in the character of the sites, a decline in biodiversity regionally, and is likely associated with other significant degradations in flow regime and water quality.

- **Overall, both fish and waterbug condition were below the objectives set in the WAPs.** The overall assessment showed that condition was either stable or declining. Stable sites were generally associated with wetter parts of the region or with sites that began data collection during the millennium drought.

Looking forward, it is evident that without additional support, the aquatic ecosystems of the Mount Lofty Ranges will continue to degrade, with localised loss of species and a shift to a less diverse generalist and tolerant community.

Where can I find more information?

To view Catchment Summaries for other parts of the region, view some of the technical reports which underpin this Catchment Summary, or learn how you can get involved in the Water Allocation Plan evaluations and amendments, head to our website:

landscape.sa.gov.au/hf/waterconsultation

You are welcome to reach out via email **HFWaterTeam@sa.gov.au** or call us on **08 8391 7500** to talk through this information.

- For annual status reports on water resources, visit WaterConnect: **waterconnect.sa.gov.au/Pages/Home.aspx**
- For near real time monitoring data about rainfall, streamflow and groundwater, visit Water Data SA: **water.data.sa.gov.au/**
- For information about low flows and the Flows for Future program, visit: **environment.sa.gov.au/topics/water/flows-for-future**
- For information on the latest climate change projections in South Australia, visit: **environment.sa.gov.au/topics/climate-change/climate-science-knowledge-resources/latest-climate-projections-for-sa**
- For information on water security planning across South Australia, visit: **environment.sa.gov.au/topics/water/water-security/water-security-statement**
- For information on the Resilient Water Futures project being led by SA Water and SA Gov partners, visit: **watertalks.sawater.com.au/resilient-water-futures**

MYPONGA RIVER CATCHMENT SUMMARY

Allocation: the total volume of water allocated to licence holders each year. Also 'water allocation'.

Aquifer: a permeable zone of rock or sediment in which underground water is stored and moves.

Catchment: the area of land determined by topographic features within which rainfall contributes to runoff at a particular point.

Ecosystem: a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Forestry: In this context means tree plantations grown or maintained for commercial purposes.

Groundwater: water occurring naturally below ground level in aquifers, or water pumped, diverted or released into a well for storage underground.

Groundwater level: the distance from the natural ground surface to the underground water surface.

Groundwater management zone (GWMZ): a defined zone for the purpose of underground water management, based on the predominant type of aquifer.

Licenced water uses: require an allocation and includes irrigation of pastures or crops, industry use (eg mining), intensive animal raising and public water supply from reservoirs.

Non-licenced water uses: do not require an allocation and includes water used for stock and domestic purposes (defined below) and water that is naturally intercepted by forestry plantations (not via direct irrigation).

Metered water use: all licenced groundwater use is measured using a water meter (metered) but only a small proportion of licenced surface water use (from dams or watercourse pumping) is metered. Water used for non-licenced purposes is not required to be metered, and estimates are used instead.

Macroinvertebrate: aquatic 'waterbugs' that you can see without using a microscope that live part or all of their lives in water - such as yabbies, dragonfly larvae or native shrimp.

Millennium drought: the drought across south east Australia from 1997 to 2009, which devastated communities, industries and the environment.

Observation well: a narrow well that is used to take water monitoring measurements, especially groundwater levels over a period of time.

Resource capacity: the total amount of water available to meet all water demands, including consumptive use and the needs of the environment, on a long-term average annual basis.

Stock and domestic: the taking of water for watering stock (stock that are not subject to intensive farming) and/or domestic purposes (e.g. watering less than 1 hectare of garden, not used commercially).

Surface water: Water flowing over land (except in a watercourse) after having fallen as rain or after rising to the surface naturally from underground.

Take limit: a limit set in the WAP for sustainable level of take for a year (it assumes passing of low flows).

Total allowable use: the total volume of water that could be used for licenced or non-licenced purposes.

Total estimated use: the metered use of water by licence holders plus the estimates for all non-metered uses of water for a given period.

Water Allocation Plan (WAP): a legally enforceable plan that sets the sustainable water management regime for each prescribed water resource in the region.

Watercourse: a river, creek or other natural watercourse (whether modified or not) in which water is contained or flows whether permanently or from time to time.

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