



Gingin Water Group Inc.

GINGIN BROOK WATER CATCHMENT

COMMUNITY ENGAGEMENT PROJECT

LANDHOLDER WATER STRATEGY

TECHNICAL INFORMATION

ZONE 5

Lennard Brook



Contents

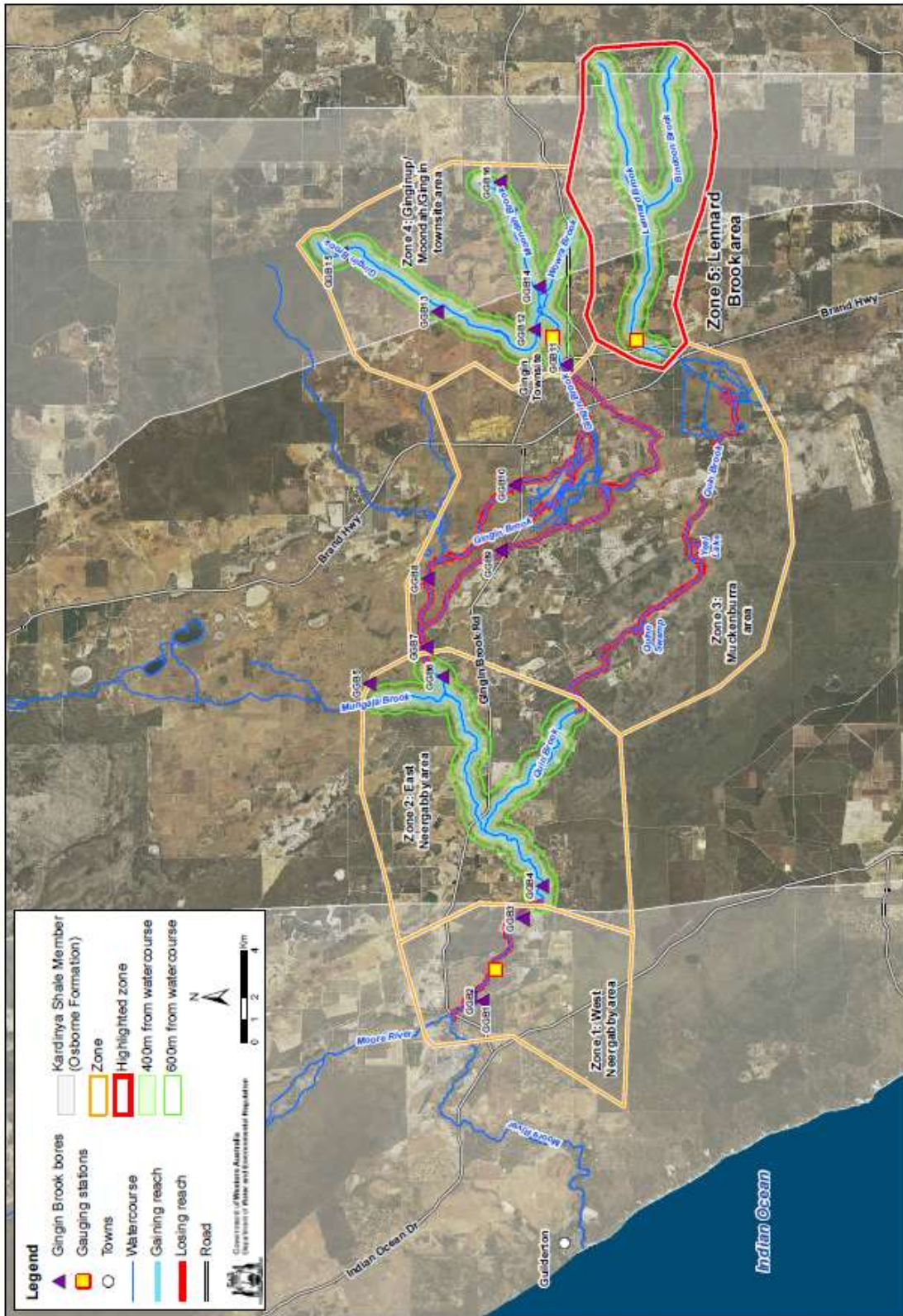
| | Page |
|---|-------------|
| Do You Live Here? | 3 |
| 1. Rainfall Decline | 4 |
| 2. Summer Rainfall Persists | 7 |
| 3. Future Rainfall Trends | 8 |
| 4. Stream Flows Reduced | 10 |
| 5. Lennard Brook in Zone 5 is a “Gaining Reach” | 17 |
| 6. Water Extraction affecting Water Quality and Levels | 19 |
| 7. Effects on Groundwater Dependant Ecosystems to the West | 20 |
| 8. Resources | 21 |

**Prepared by the Gingin Water Group Inc and Perth NRM with the support of the Department of Water and Environmental Regulation, the Shire of Gingin and Northern Agricultural Catchment Council.
September 2017.**

Disclaimer: This information is provided as a guide to general ground water tendencies in the Gingin Brook Catchment at the time of preparation 22nd September 2017. It is not considered conclusive evidence. Those using this information are advised to do so using it as a guide and to seek other professional validation advice from Hydrologists, specialists in the area and the State Water Regulator the Department of Water and Environmental Regulation (DWER).



Do you live near here?





1. Rainfall Decline

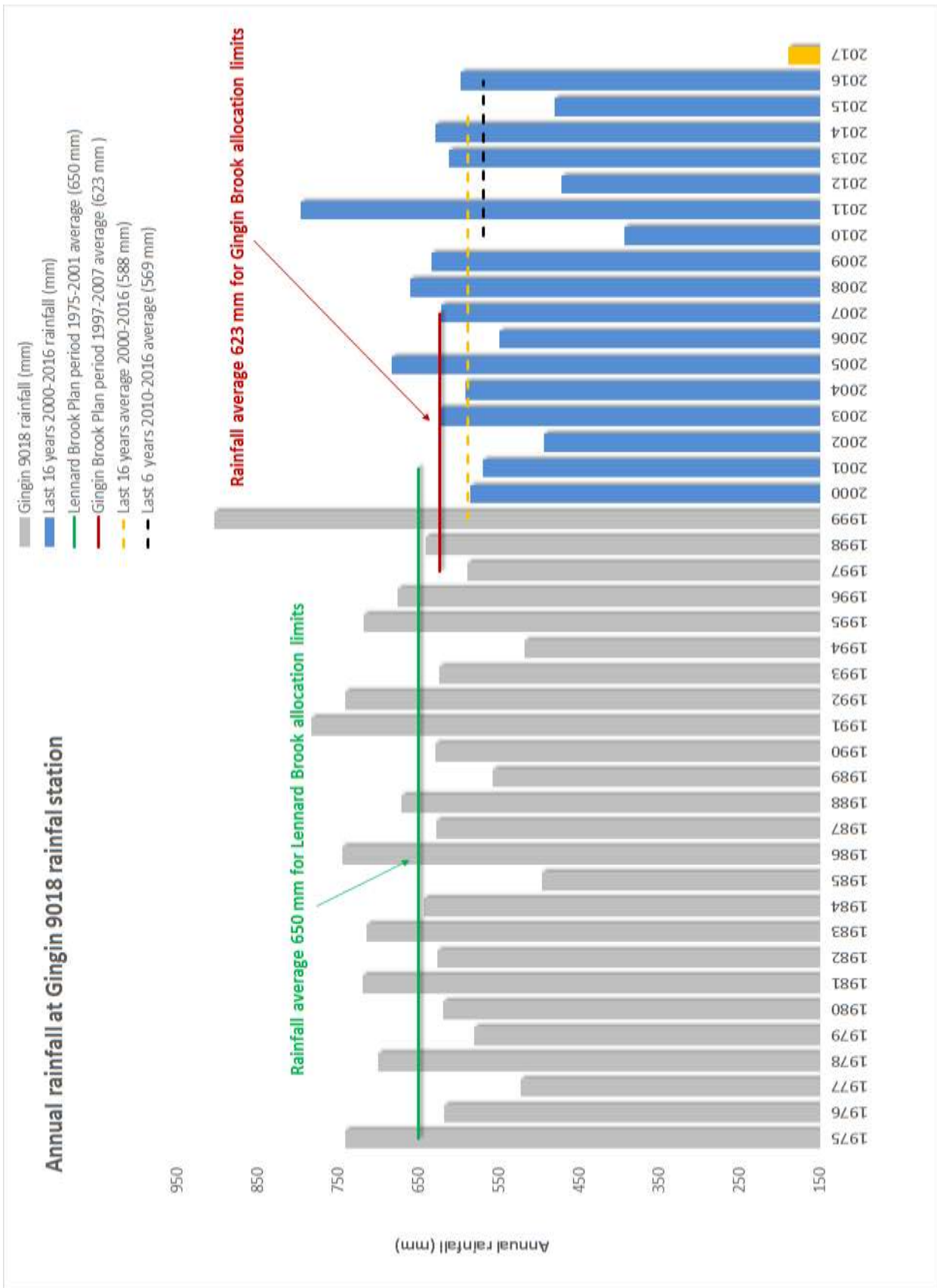
**Did you know the rainfall in
this area is much less than it
once was?**

**Climate science predicts it is
going to worsen.**

**What might this
mean to you?**

See Figure 1: Annual Rainfall at Gingin 9018 Rainfall Station (over)

Figure 1: Annual Rainfall at Gingin 9018 Rainfall Station





1. Rainfall Decline (cont.)

The rainfall graph shows records taken from Gingin since 1975 (figure 1).

Since the 1970s annual rainfall has continued to drop in a manner that does not fit the typical drought pattern.

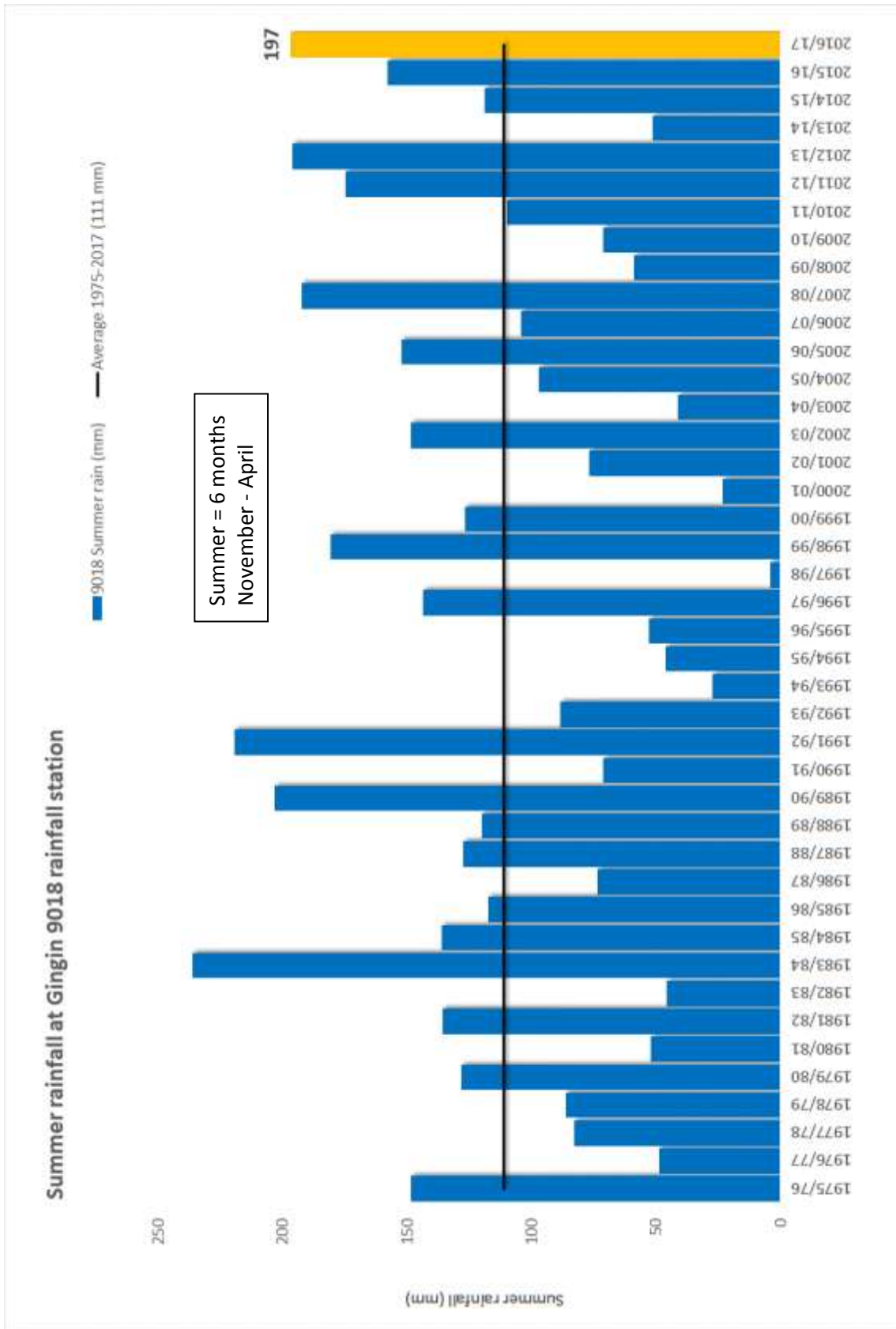
New average low rainfall seems to be occurring as time progresses.

The climate in Gingin appears to be changing.

**What might this mean
to you?**

2. Summer Rainfall Persists

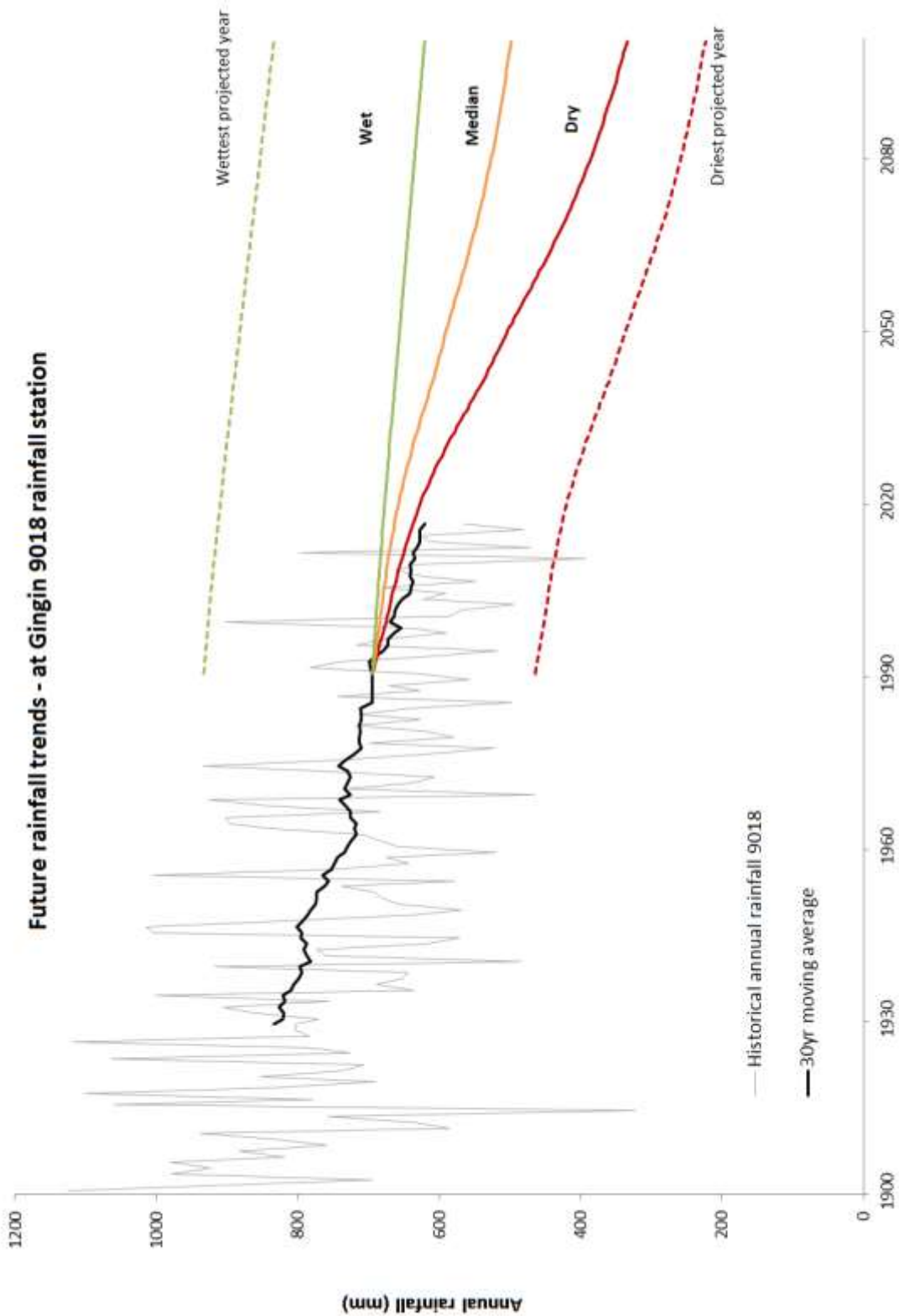
Figure 2: Summer Rainfall at Gingin 9018 Rainfall Station





3. Future Rainfall Trends

Figure 3: Future Rainfall Trends at Gingin 9018 Rainfall Station





Summer Rainfall and Future Rainfall Trends (cont.)

The Summer rainfall at Gingin 1975-2017 now averages 111mm (6 months Nov-April) (Fig 2).

Total year rainfall at Gingin 2000-2016 is 588mm and falling.

Can you remember when it was closer to 700mm?

Scientists at DWER (Department of Water and Environmental Regulation) used Gingin rainfall figures to show how Gingin rainfall (black line) (see Fig 3.) fitted with the possible future rainfall for south west of Western Australia predicted by the CSIRO in the 1990s.

Gingin annual rainfall is tracking just lower than the predicted dry climate scenario.

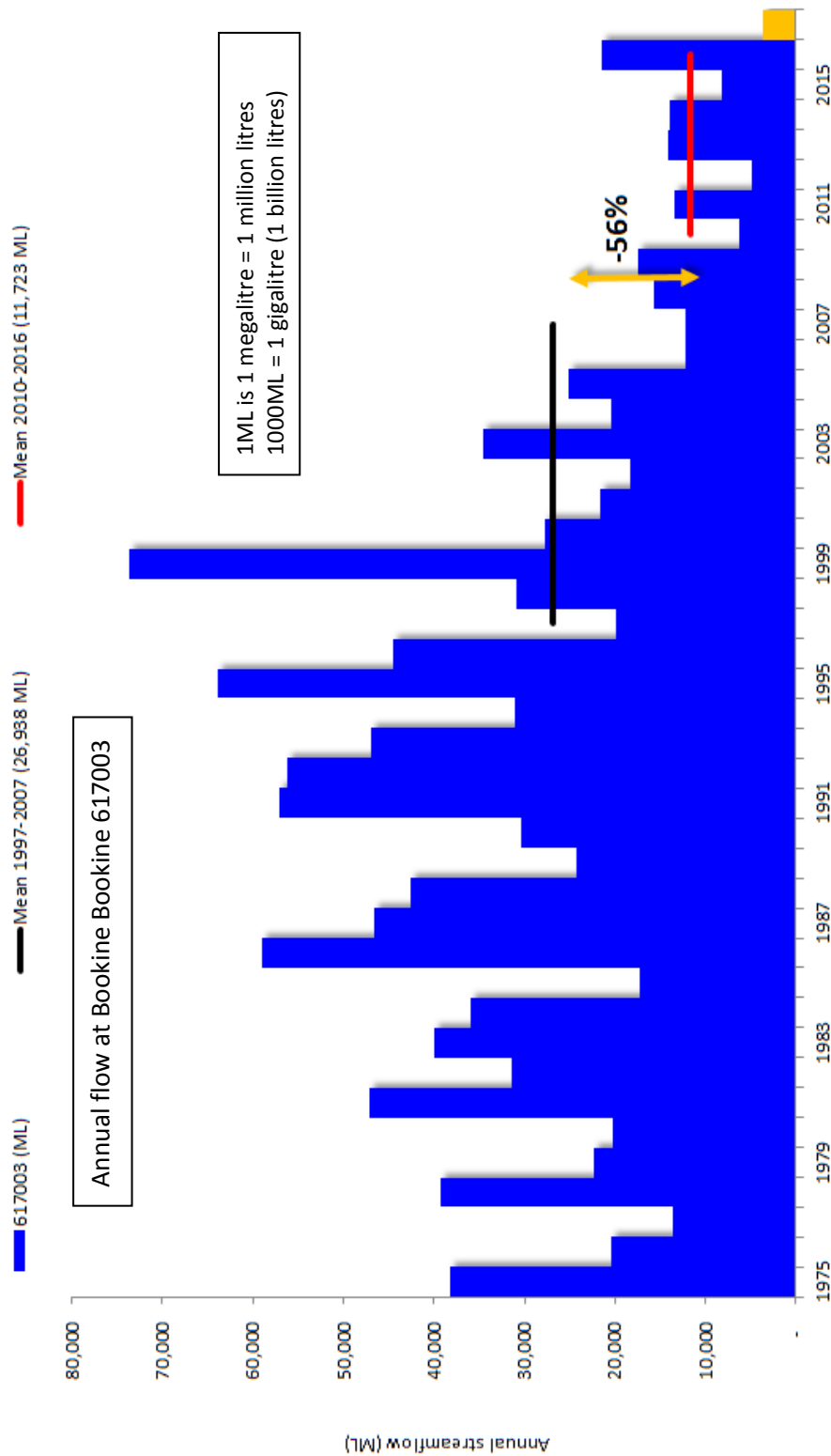
This was a predicted possibility but not an expected outcome for Gingin. **It is now observed reality.**

We must now learn to live with the changed weather patterns and a dryer climate.

We are concerned what the annual rainfall in Gingin will be by 2030 2050.

4. Stream Flows Reduced

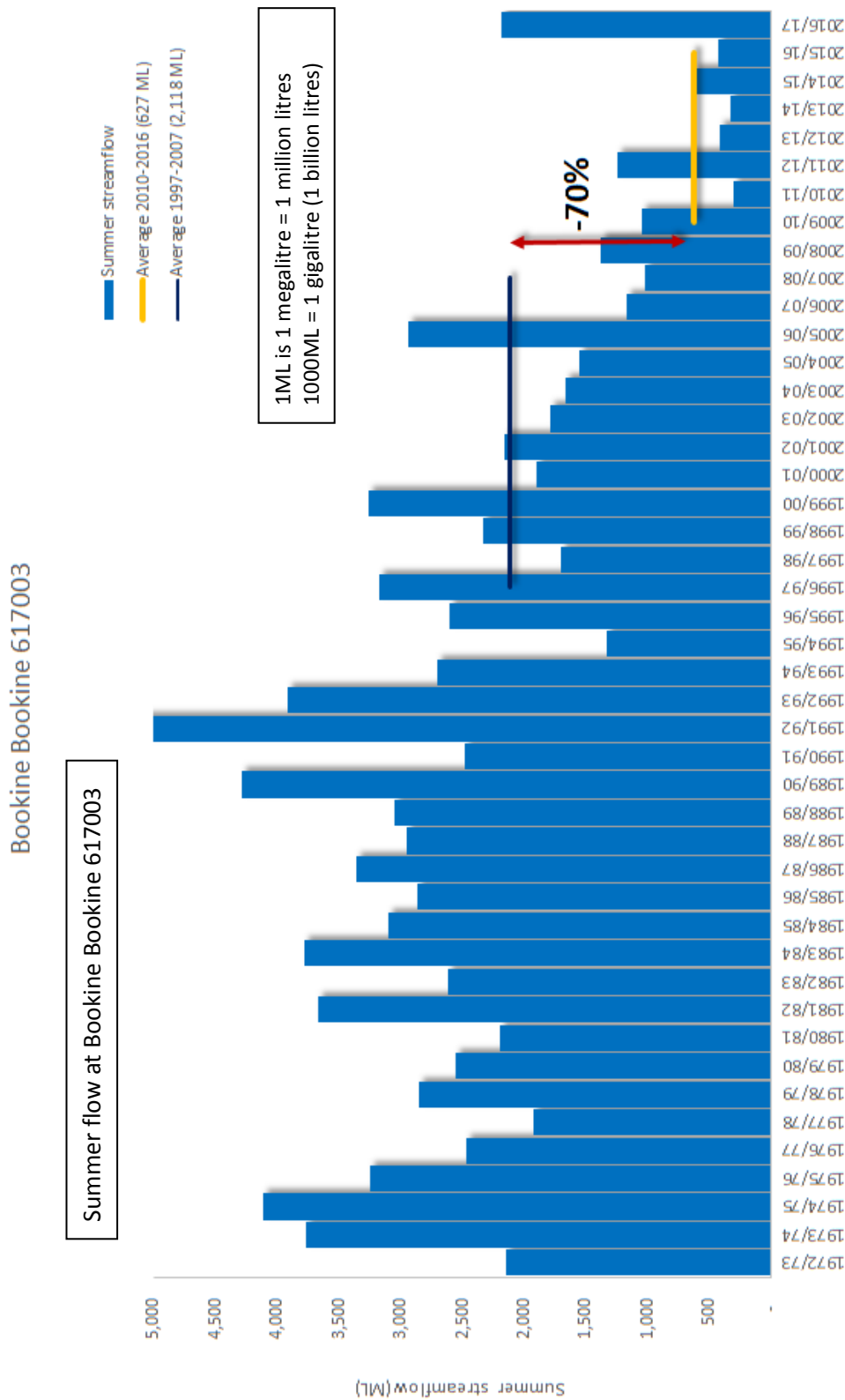
Figure 4: Annual flow at Booking Bookine 617003





4. Stream Flows Reduced (cont.)

Figure 5: Summer flow at Booking Bookine 617003





4. Stream Flows Reduced (cont.)

A reduction in rainfall leads to a much larger reduction in stream flow.

Observed rainfall figures show much of Gingin's rain reduction is occurring in winter.

This means:

- Annual streamflow has reduced by 31% through the Gingin townsite
- Peak water flows have reduced as winter volumes have reduced. This means streamlines are not being flushed out. Sedimentation blocks the flow in some channels
- Summer flows are minimal ... 70% reduction
- Water stored in the soil is getting less and not being recharged in wet winters as it once was.

How will this influence the health of the Moore River estuary and its ecology

What does this mean to you? How can you adapt to these changes?

See next pages for your location and read with notes on page 14:

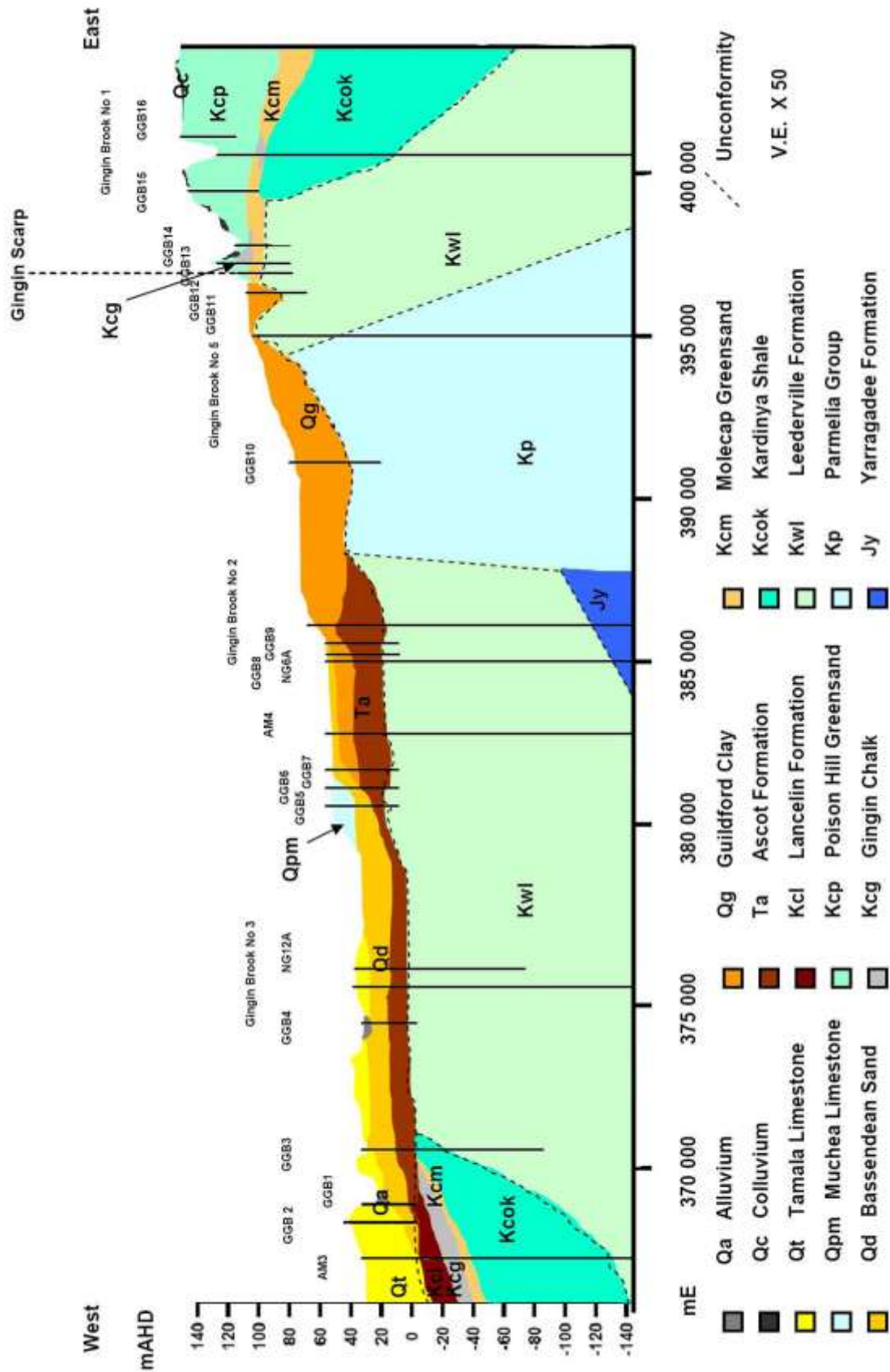
Figure 6 - Gingin Brook Catchment Map, DWER, Sept 2017 (page 13)

Figure 7 - Gingin Brook Connectivity Mapping and Spot Flow Diagram, DWER, Aug 2017 (page 14)

Figure 8 - Gingin Brook conceptual hydrogeology, Tuff Report (page 15)



Figure 8 –Gingin Brook conceptual hydrogeology, Tuff Report, Dec 2010





4. Stream Flows Reduced (cont.)

To gain a basic understanding of the geology of water under your property view Fig 7 (page 14) and Fig 8 (page 15).

Locate your farm position on Fig 7

Locate the closest DOW exploration bore eg GGB13

The other figures on that map show the minimum and maximum flows(L/sec) and the dates each was taken.

Turn to Fig 8 and locate the closest bore to you eg GGB13

The depth to which this bore was dug is shown by the vertical black line.

Use the key to read what soil layers the bore passed through.

Fig 8 shows how the various soil layers relate to each other across the landscape through which the brook flows-from the headwaters on the plateau to the coast.

For a more technical explanation of these figures contact Gingin Water Group or your Shire Water Advisory Subcommittee or consult the Tuff report on the DWER website.

Ref: Groundwater-surface water interaction along Gingin Brook Western Australia, Report no. HG 54, Tuff Report, Dec 2010



5. Lennard Brook in Zone 5 is a “Gaining Reach”

DWER assume this part of Lennard Brook is a **“gaining reach”** (figure 7) with similar characteristics to the Gingin Brook and Moondah brooks in Zone 3.

Lennard Brook and Quinn Brook west of Brand highway are **“losing reaches”**.

Gaining reaches obtain their water from emerging aquifers through the soils around and beneath them.

Losing reaches lose water into the soil beneath them.

In the dryer climate, these soils have been drying out.

Low flows in the summer start soaking (**losing**) into the dryer sands just below Cockram road.

In the years ahead summer stream water should not be relied upon as it once could be.

Horticultural Importance

The Lennard Brook region is very important for its horticultural activity.

These activities have historically relied on water taken from the Lennard Brook and the shallow sand aquifer.



DWER are working hard to understand the way rainfall recharges the shallow sands and the Brook.

As this region's rainfall is reducing, changes will have to be made to the amount of water taken from the Brooks and the various soil aquifers

DWER will determine how this can be done in a way that best satisfies the varied requirements of all landholders and the local environment.

In this drying climate, landholders are encouraged to regularly monitor water quality and static water levels in bores, soaks and wells on their properties.

You are advised to create a regional data base of this information so that any local change can be considered by the DWER.

What can I do?

Contact or become a part of your Gingin Shire Water Advisory subcommittee.



6. Water Extraction affecting Water Quality and Levels

Water tables have been dropping in this area.

Neighbouring bores may influence water levels in another bore or soak close by.

Study the three schematic diagrams in Zone 4 produced by the DWER to help landholders on the Gingin Brook better understand the surface water /groundwater interactions in that region.

No such diagrams can be created for the Lennard Brook system. However, these in the Zone 4 Documents are better than nothing to help illustrate potential problems.

For more information contact the Gingin Water Group or the Gingin Shire Water Advisory Committee.



7. Effects on Groundwater Dependant Ecosystems to the West

The course of the Lennard Brooks meander from the headwaters down to the Brand highway and beyond into the Bambun lake and Quin brook systems.

This water supports a range of living and non-living features which make up Groundwater Dependant Ecosystems (GDEs).

These GDEs collectively make up the wetland system loved and relied upon by residents and visitors to the region.

The plants and animals of this system rely on water on or within 10 meters of the surface.

The more diverse the plant life is the greater range of animals it can support.

The Brooks of Gingin and their associated GDEs make up a regionally significant biodiversity hot spot.

You may own some part of this system.

It is important that this biodiversity of nature is protected as our region dries

What can you do?



8. Resources

1. Managing our Water Ways – Water notes (DWER)

<http://www.water.wa.gov.au/water-topics/waterways/managing-our-waterways2/water-notes>

2. Small Landholder Guide – (NACC)

<https://www.nacc.com.au/wp-content/uploads/2015/06/NACC-Small-Landholder-Guide.pdf>