



Gingin Water Group Inc.

GINGIN BROOK WATER CATCHMENT

COMMUNITY ENGAGEMENT PROJECT

LANDHOLDER WATER STRATEGY

TECHNICAL INFORMATION

ZONE 2

Neergabby East

Gingin Brook West



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**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).



1. Rainfall Decline

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

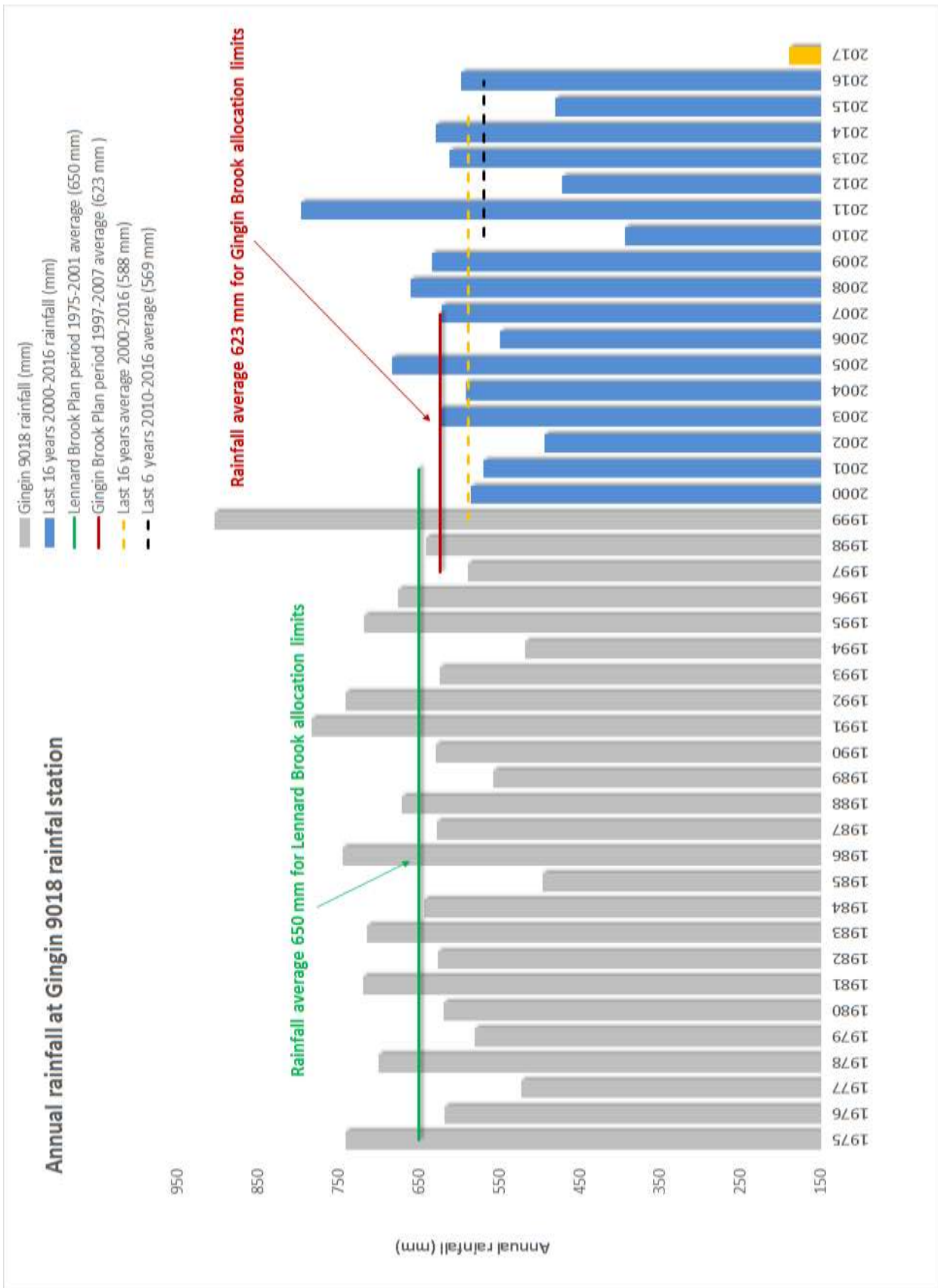
**Climate science predicts it is
going to worsen.**

**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.

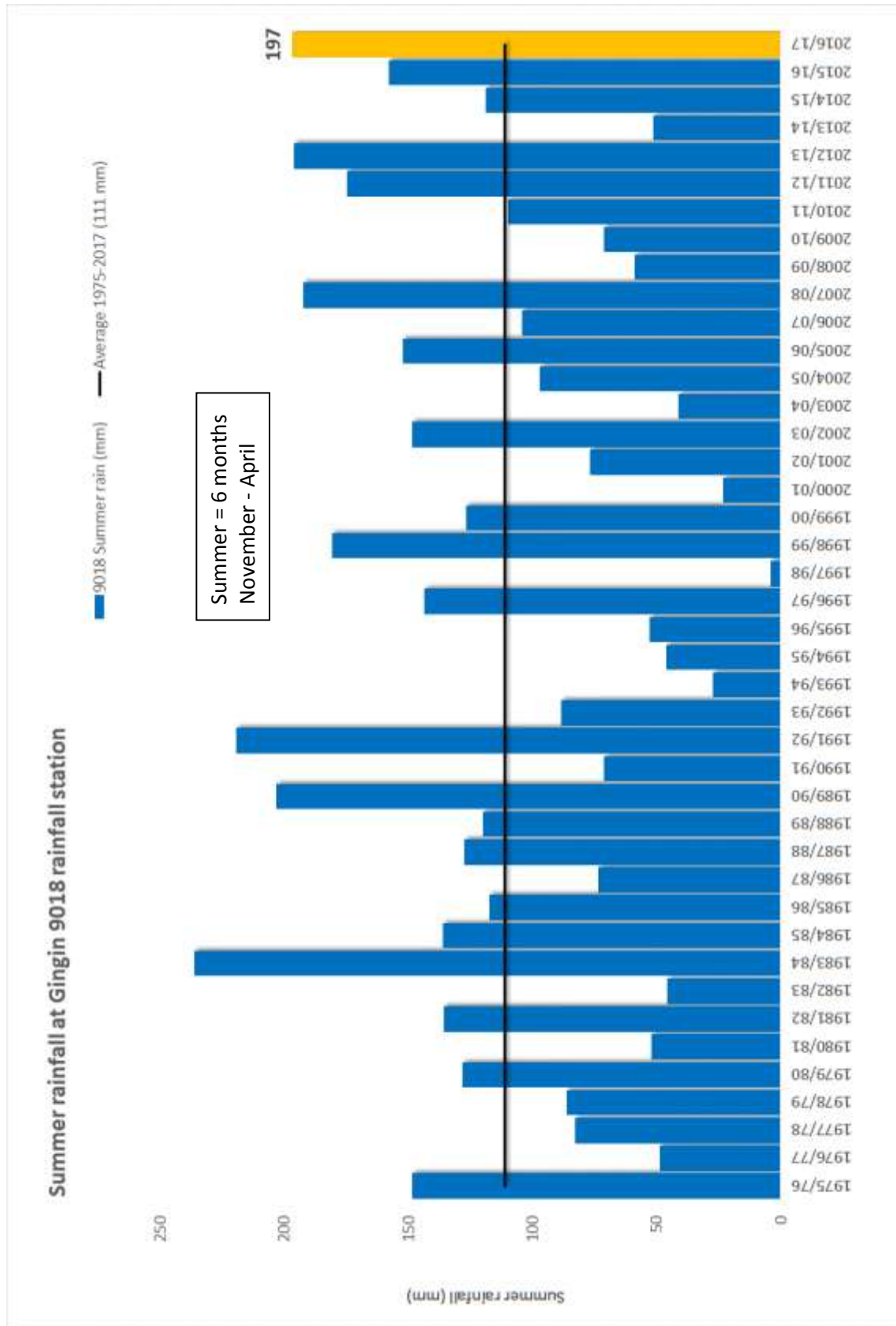
New average low rainfall seems to be occurring as time progresses.

The climate in Gingin appears to be changing.

**What might this mean
to you?**

2. Summer Rainfall Persists

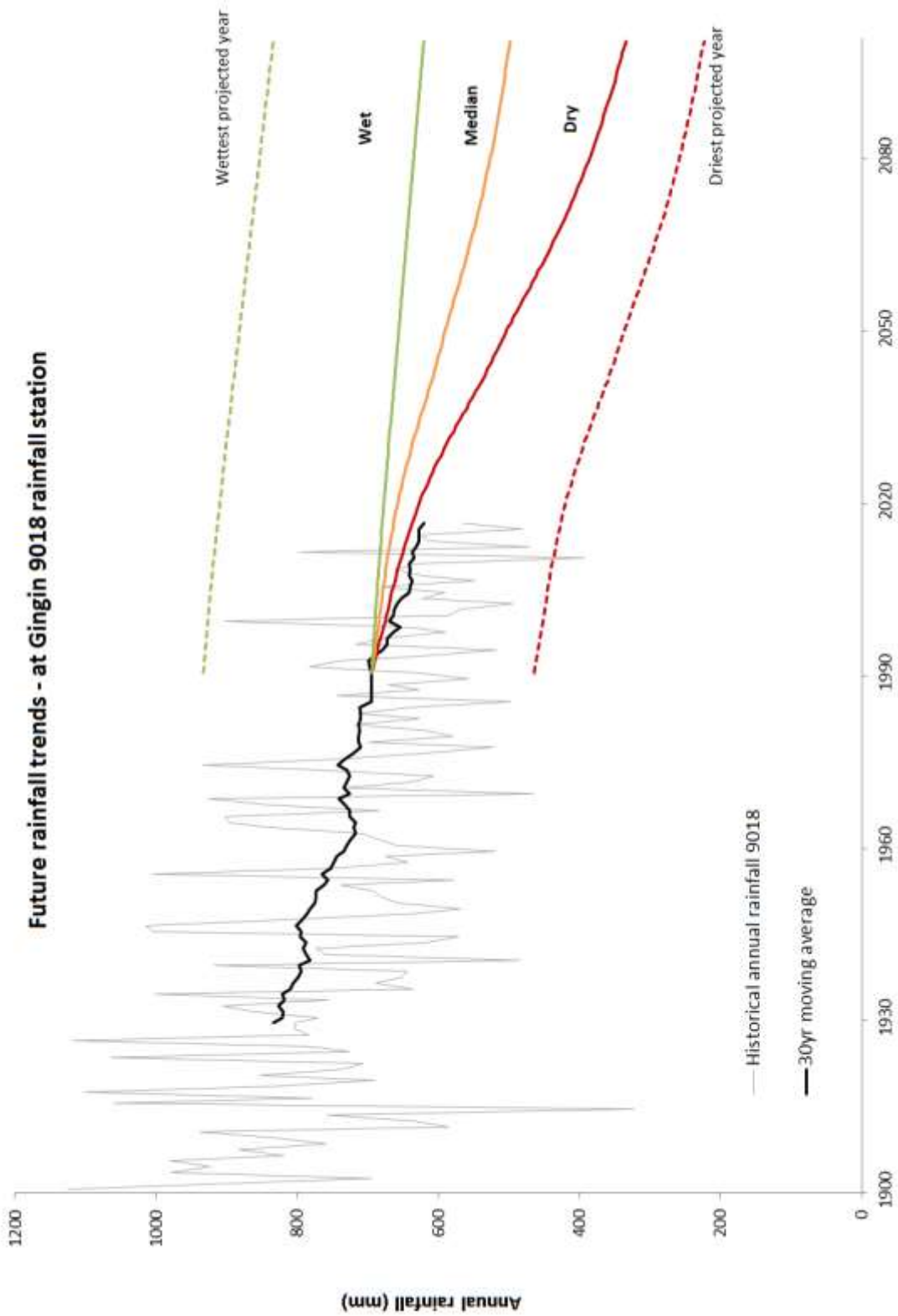
Figure 2: Summer Rainfall at Gingin 9018 Rainfall Station





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.

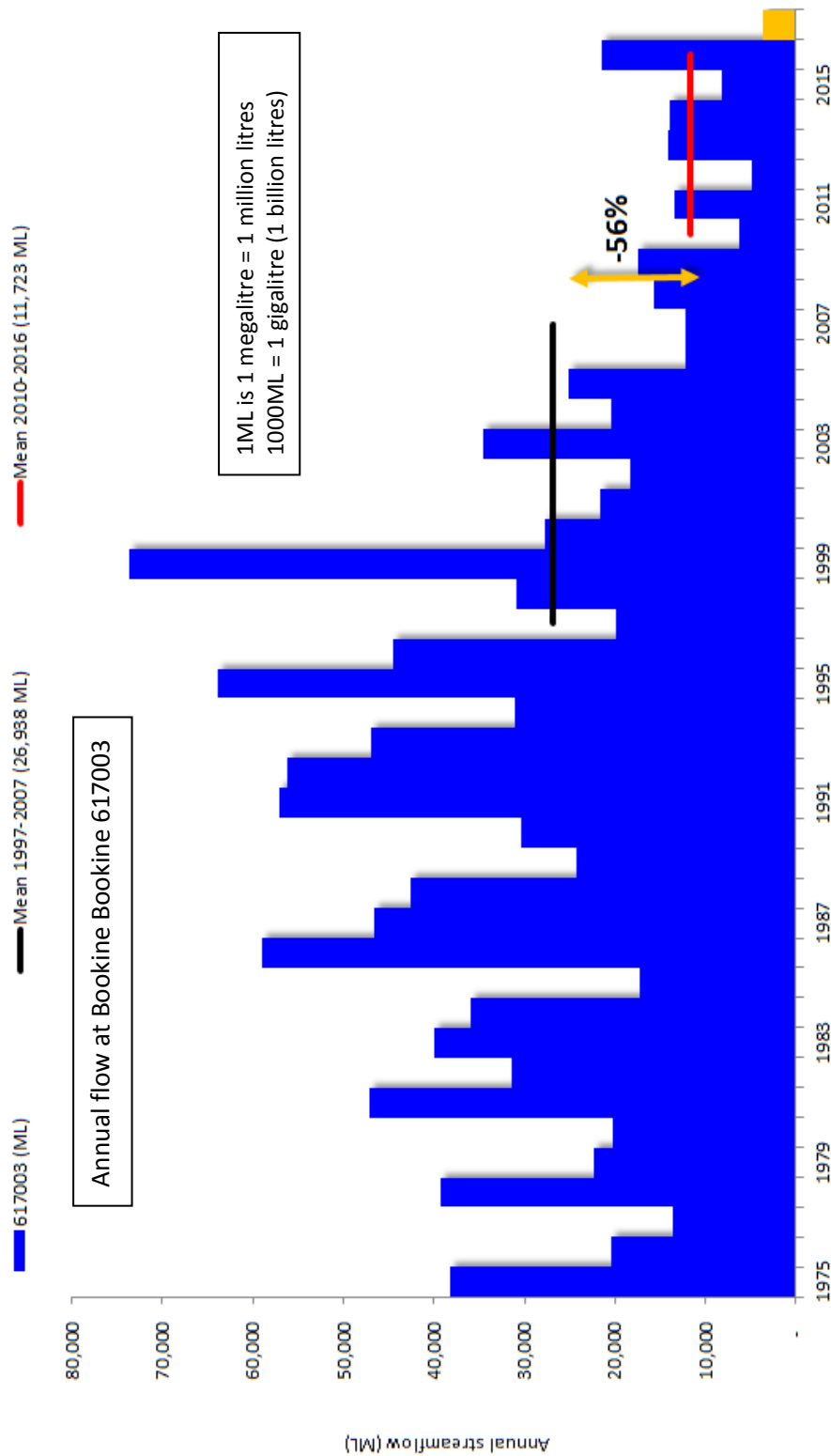
This was a predicted possibility but not an expected outcome for Gingin. **It is now observed reality.**

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

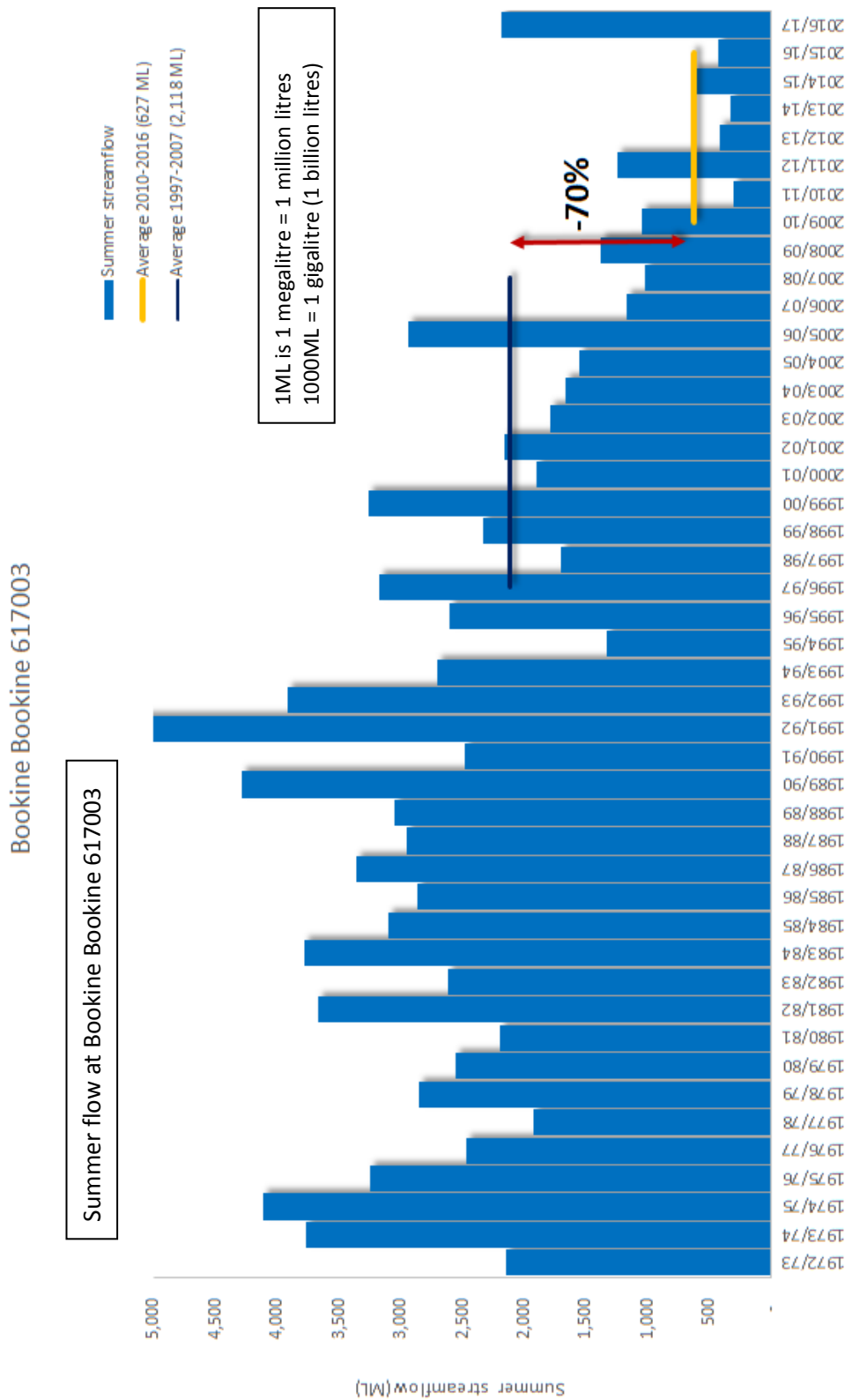
Figure 4: Annual flow at Booking Bookine 617003





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 56% under the Neergabby Bridge
- 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 6 - Gingin Brook Catchment Map, DWER, Sept 2017

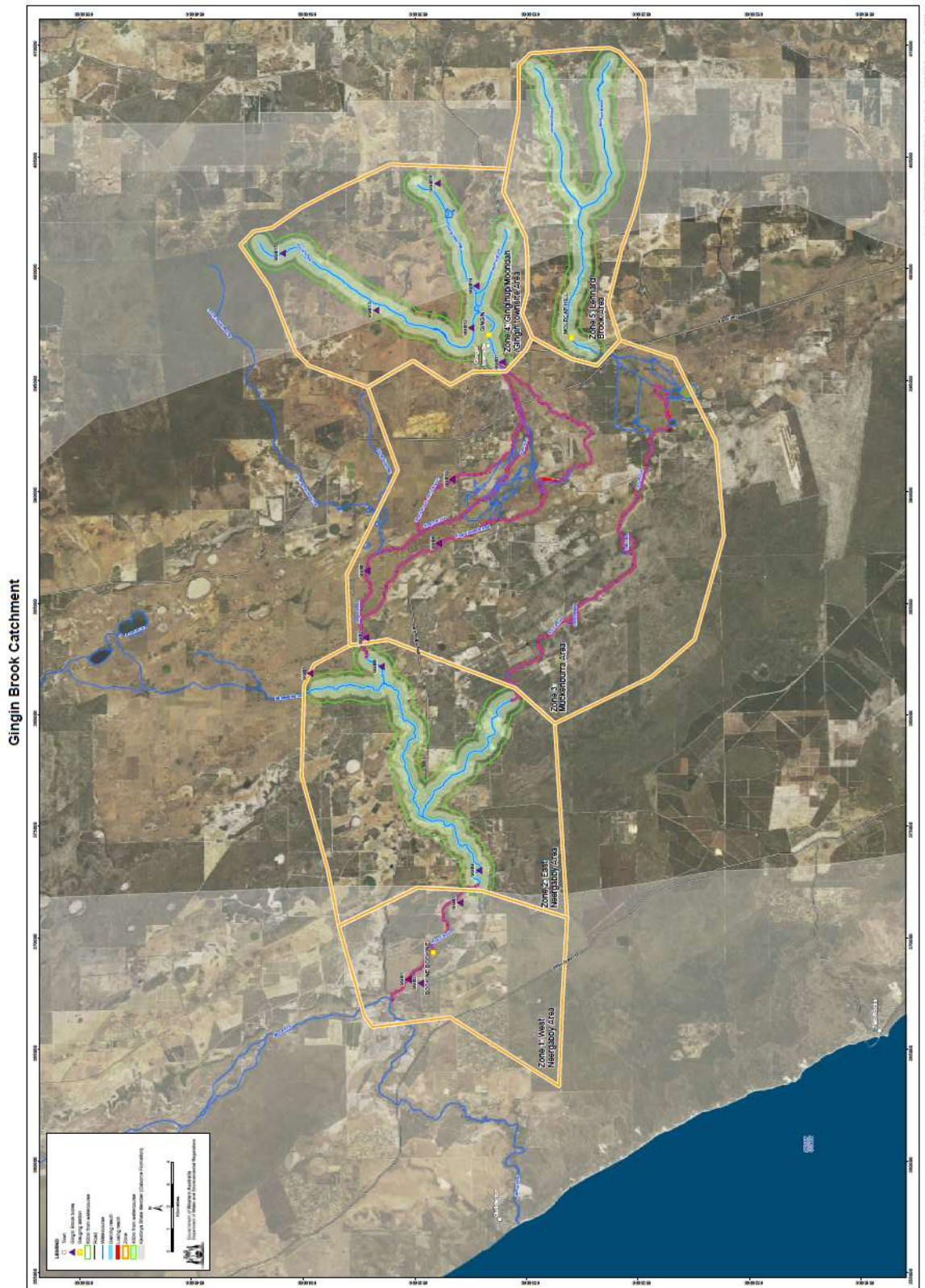




Figure 7
Gingin Brook Connectivity Mapping and Spot Flow Diagram, DWER, Aug 2017

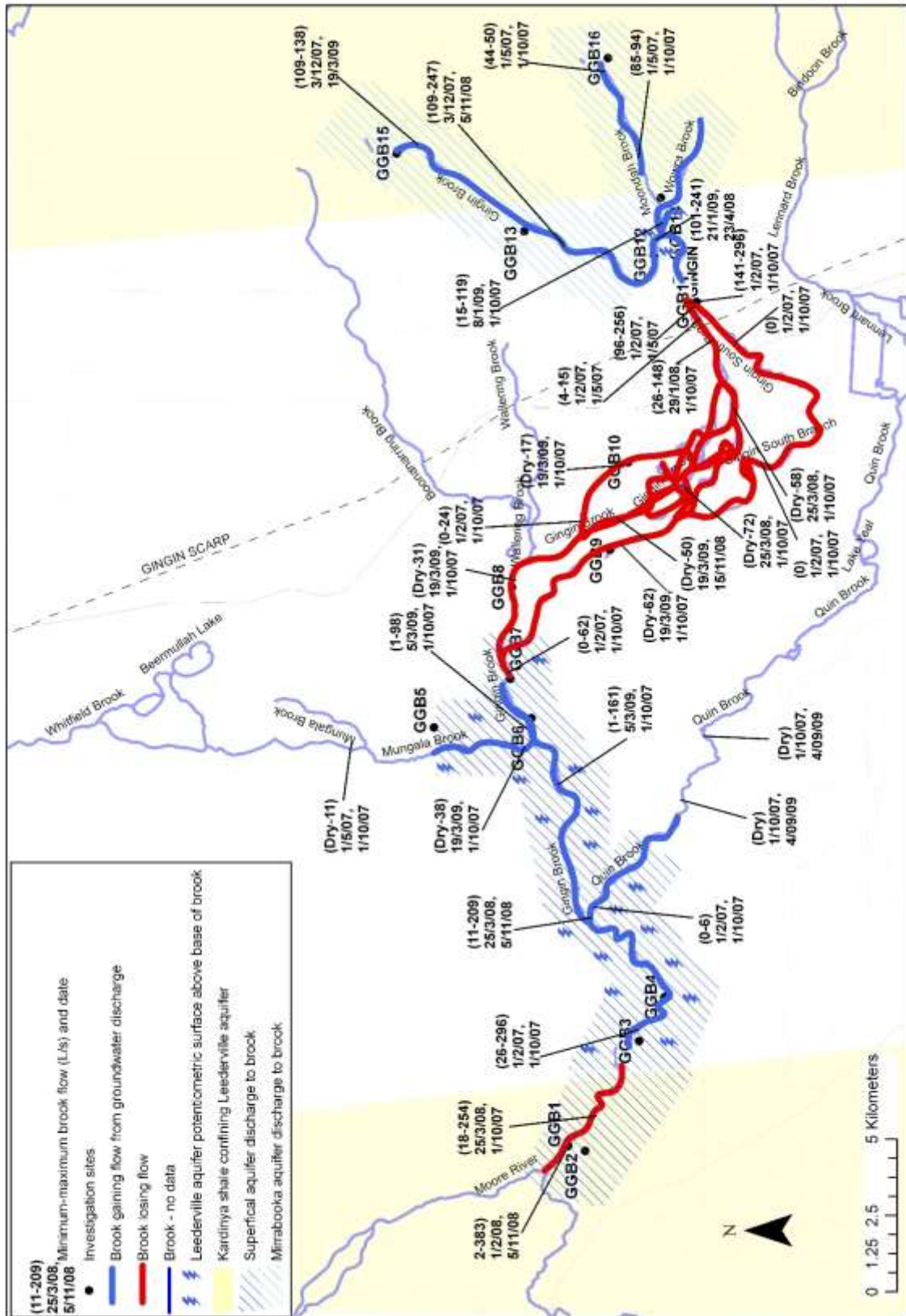
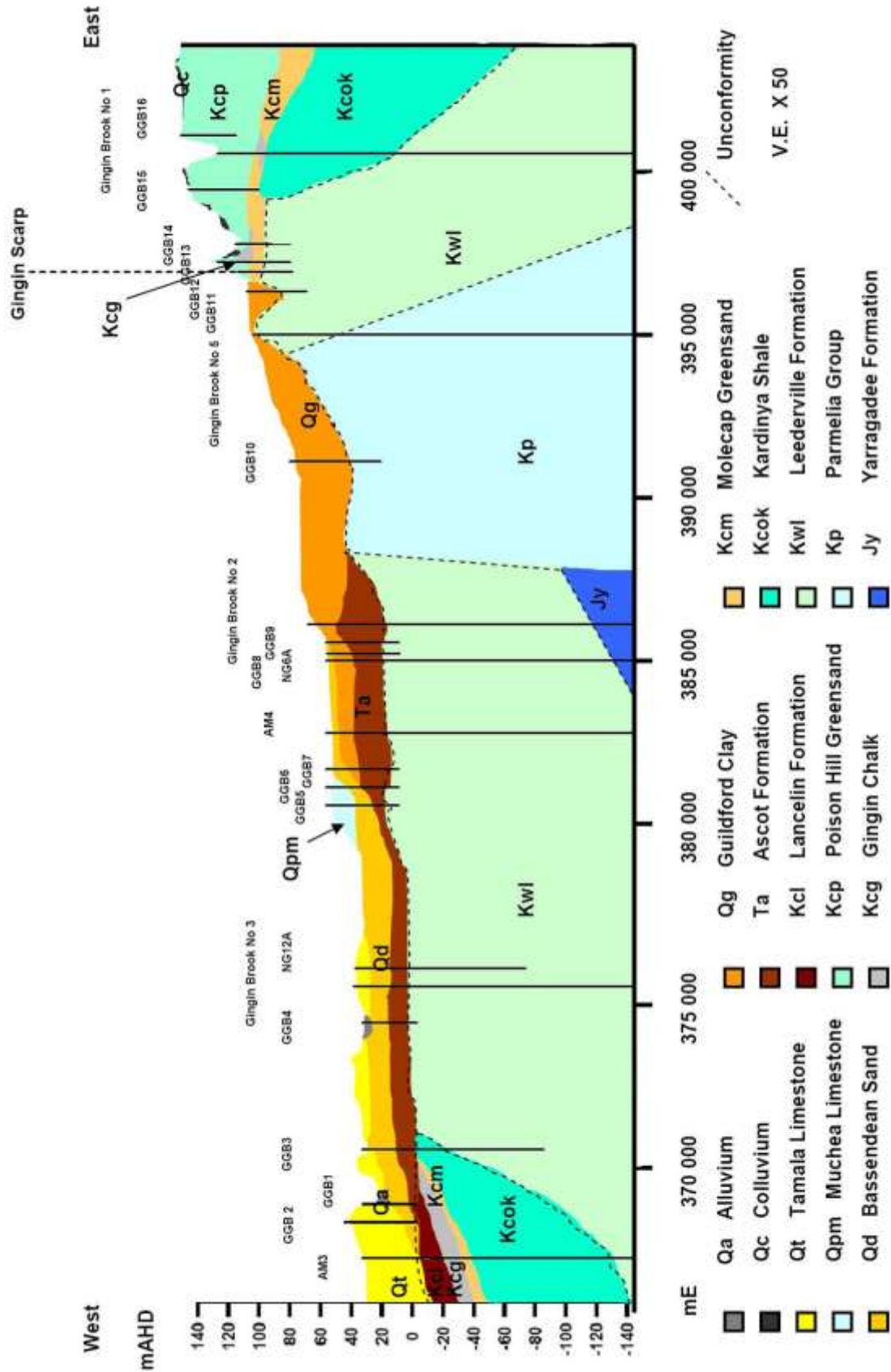




Figure 8 –Gingin Brook conceptual hydrogeology, Tuff Report, Dec 2010





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 GGB3

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 GGB3

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. Gingin Brook at Neergabby East is a “Gaining Reach”

DWER have established that the Gingin Brook and the western end of the Quinn brook in this region are **“gaining reaches”** (figure 7).

This means they gain water from the soil beneath them. Much more so in the wet winter months.

Surface flow in the Quinn brook has drastically reduced as the level of the northern Gnangara mound aquifer drop.

Summer flows in this part of the Gingin brook have reduced in this region as ground water levels drop.

Some parts of the Gingin brook in the Neergabby region are recharged from the Leederville aquifer which comes very close to the surface.

This explains why some pools do not dry in the summer when others do.

This drying did not occur in the wetter years.

In the years ahead stream water should not be relied upon as it once was

This is predicted to be the normal flow pattern under the changed weather patterns for this locality.



6. Water Extraction affecting Water Quality and Levels

This area of Gingin contains many bores.

Many of the bores are licensed allocations by DOW but a number are unlicensed and water use is not known.

Water tables have been dropping in this area.

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

Water quality and static bore levels across this region are poorly recorded.

In a drying climate, landholders are encouraged to regularly monitor static bore levels and water quality.

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

What can you do?

Become a part of or contact your Gingin Shire Water subcommittee in your region.



7. Effects on Groundwater Dependant Ecosystems to the West

The flat land stretching to the coast from Brand highway (Figure 6) contains wetland features of swamps, lakes, soaks and streamlines/channels.

These support a range of living and non-living features which make up Groundwater Dependant Ecosystems (GDEs).

These GDEs collectively make up the wetland system so 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>