

Catchment Overview

The Cooper Creek Catchment comprises the Thomson River, Barcoo River and Cooper Creek sub-catchments.

The Thomson River is made up of permanent and semi-permanent waterholes which drain into Cooper Creek from seven local government areas as far north as Charters Towers. It collects water from across central Queensland's many creeks before becoming the Thomson River at Muttaborra. It continues through Longreach and Jundah before joining the Barcoo River at Winton.

The Barcoo River adjoins the Thomson River sub-catchment to the south. Major towns on Barcoo include Barcaldine and Blackall. This large catchment area includes land within the local government areas of Barcaldine, Barcoo, Blackall-Tambo, Longreach and a small part of Quilpie Shire.

Where the Barcoo River meets the Thomson River lies the beginnings of true channel country.

The principal town is Winton, situated on the edge of the sprawling tributaries of the Cooper Creek where the abundant tributaries of the Thomson River and the Barcoo River join to form a riverbed some 70km wide in true channel country form. The catchment spreads across the Barcoo Shire to parts of Quilpie Shire and Bulloo, and across the border to South Australia.

Climate & Rainfall

Weather and climate characteristics in the Cooper Creek Basin in the last 30 years from 1989 - 2018 (BoM, 2018):

Annual rainfall has been relatively stable - increasing by around 20mm over 30 years while still naturally fluctuating.

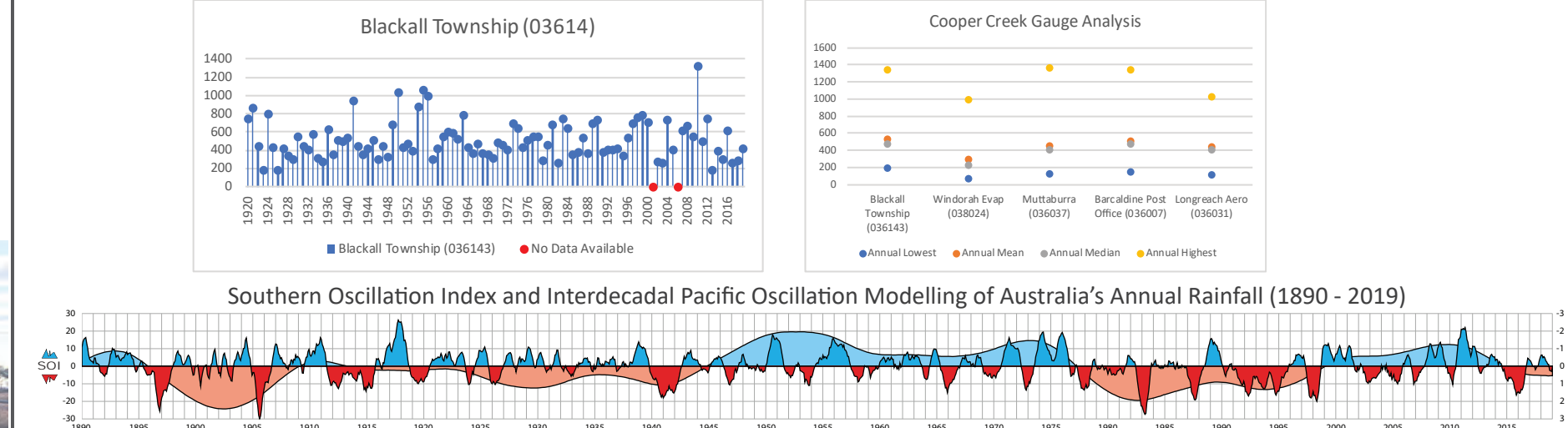
Dry years have occurred six times and wet years 11 times with the remainder remaining in the average range.

Wet season rainfall averages have increased in some areas. The average rainfall during the wet season in Longreach was 344mm, which is 24mm higher than the average for the previous 30-year periods (1959-1988).

Rainfall has been moderately reliable in the north east of the region around Longreach during monsoon season, however is less reliable during the early wet season.

Useful rain events have occurred an average of twice a year. As of 2019, there have only been 13 summer seasons since 1900 that have not had 50mm rain event representing a 5% risk of occurring any year.

Longreach has experienced 10 or more days in a row exceeding 42°C during 2014-2018. The last time Longreach had 10 days in a row exceeding 42°C before 2014 was in 1913.



How to use this guide:

The term of phrase 'rule of thumb' refers to a principle with broad application that is not necessarily intended to be particularly accurate. It often refers to an easily learned and applied notion or local understanding of processes, based on practical experience rather than theory. The information below provides local knowledge on landscape characteristics and flood behaviour. This is provided for local land managers, Council staff, and Government Agencies to better understand the Cooper Creek Catchment and its unique characteristics. This guide has used the best available information at present derived from updating a previous map developed and significant local input from a series of community meetings with locals in 2019. It is intended to help you assess what type of flood is likely to occur in your area and indicate what amount of feed you might expect. You may wish to record your own flooding and landscape characteristics on the map.

Formal BoM Flood Hazard Classifications

Year	Grazer Flood Definition
1882	Handy
1883	Handy
1884	Handy
1885	Handy
1886	Handy
1887	Handy
1888	Handy
1889	Handy
1890	Handy
1891	Handy
1892	Handy
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2013	Handy
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2015	Handy
2016	Handy
2017	Handy
2018	Handy
2019	Handy

Channel Country Grazer's Definition

Water roars through as high as trees and can reach 6m due to the narrow 100m gap.

Large floods may isolate the hospital in Jundah.

Flash floods can occur in Jundah. In 2010, 240mm fell overnight in Jundah and surrounding areas which caused a sheet flood.

Adding 1.4m to the recorded flood height at Stonehenge gives an indication of flood height in Jundah.

A 7.3m flood that lasts at least three weeks at Winton will produce a 3.6m flood at Durham Downs causeway, and then a 7.3m flood at the Innamincka causeway.

A 5.5m flood at Winton equals a 2.7m flood at Durham Downs and will produce a major flood at Baryappa.

A flood needs to be 2.7m at Winton to flow west over the 'hump' in the town channel.

Low level floods flow through the Lignum channel here.

Of the floodplains immediately south of Winton, the eastern side needs a bigger flood to get across the floodplain there as the channels are deeper compared to the western side. The eastern side of the floodplain only stay flooded for about half as long as the western side from the same flood at Winton.

Handy Catchment Tips

Where floods occur in succession, the second flood will travel slower due to vegetation that has grown from the first flood. The second flood will often flow clearer, because of the vegetation filtering more sediment out and slowing water flow.

Little floods make big floods. The little floods fill up the waterholes, wet the catchment and allow the next to go further.

It can flood during periods of drought. The river still ran during the 2001-05 drought and there were many floods during the droughts of the 1920s and 1960s. The biggest floods come when a monsoonal trough moves further south than usual. Like during the big wet years of the 1940s, 1950s, 1970s and early 1990s.

The top part of the catchment is desert uplands. There is a lot of sandy Spinifex and rocky outcrop country which only needs about 50mm of rain to run water. 200-250mm of rain up there will produce a flood at Stonehenge.

The creek lines in the lower Cooper area have changed and there is a lot more vegetation along them than there was 50 years ago.

Water in the main channel of the Cooper is fast moving upstream. Local rain will make a flood travel faster.

The main flow of creek and river junctions like the Gin or Vergemont and the Thomson can get held up if the smaller creeks come in first. This backs up the main flow and spreads it out further. The Thomson can flood and hold up smaller tributaries too.

Flood travel times are dependent on many different variables. These include when and where the water hits the catchment, how wet the catchment was beforehand, whether there is vegetation in the catchment, recent modifications to the channels and throughout the catchment, and water flowing in from other places.

Outside Country:
The pastures in the outside country are dominated by deep-rooted perennial grass and perennial broom species, some other perennial and annual herbage species. Additional species may include Mitchell grasslands, Spinifex grass, Mulga woodlands, and Gidgee woodlands. Pasture production in these areas is influenced primarily by local rainfall receiving an annual rainfall average less than 175mm per year, but is subject to wide variation and is location specific.

Mitchell Grasslands:
Mitchell grasslands are treeless or sparsely timbered, and occupy cracking clay soils where average annual rainfall is between 200-550mm. Average annual rainfall decreased from east to west, but it is still highly variable, affecting both pasture yield and composition. The dominant perennials in these pastures are the desirable Mitchell grasses. Barley Mitchell grass is dominant on pebbly clay soils.

Spinifex Pastures:
Spinifex pastures occur either as a naturally open grassland, or as an understorey within eucalypt and acacia woodland. Spinifex pastures generally grow in infertile acid sand, loam or duplex soils and are present throughout much of Australia's dry interior. Spinifex pastures occur in the Cooper catchment to the north and south of Barcaldine.

'Dry Floods' occur when there is rainfall further upstream that flows into the rivers or creeks without any local rainfall.

A gully is a small, ephemeral lake formed from a depression in the soil surface in expanding clay soils.

All streams draining to the south-east away from Winton will flow from steep and rocky country. They contribute a lot of water to the Thomson River but their floods are short lived.

Local knowledge suggests increased termite activity and mound building could be an indicator of poor rainfall.

Braided gutters within the green zone.

Swamp gutters redistributing floodwater at flood stage.

Gutters (or reticulate channels) help distribute floodwaters out from the main channels.

Large and moderate sized channels redistribute floodwater during initial flooding.

Flood ways carry water during overbank stage, with floodwater flow cutting across the water holes in the catchment, how wet the catchment was beforehand, whether there is vegetation in the catchment, recent modifications to the channels and throughout the catchment, and water flowing in from other places.

General Risk Awareness Information

The Longreach River height gauging station does not record all water in the upper catchment. There is a lot of hard country that drains south-east from Winton into the Darri River, Vergemont Creek and others and then into the Thomson downstream of Longreach. These streams contribute about 30% extra flow compared to that measured at Longreach.

The headwaters of the Cooper catchment comprises the desert uplands. There is a lot of sandy Spinifex and rocky outcrop country which only needs a few inches (50mm) of rain to run water. Eight to ten inches of rain (200mm - 250mm) in these locations will produce a flood at Stonehenge.

A good flood in the Barcoo is 16 foot (4.9m) at the Isford Bridge. A major flood is 20 foot (6.1m).

The 1963 flood was bigger than the 1974 flood for the eastern side of the Cooper, however the speed of flow can vary across different systems.

Fires in spinifex, sandhill country can be blown by the wind and jump from the top of one sandhill to another. Sometimes fires will attack lightning and start fires. Mitchell grass must be at least 300mm to burn to reduce fuel load. There were also extensive fires across the Barcoo Shire in 1970.

Stonehenge is on a jump up and is not directly impacted by the flood, however it can be cut off by roads.

There are many variables which may contribute to a flood event before the catchment receives heavy rain. E.g. Prior to the 2019 monsoon trough, the ground was already wet, there was no sun, and the wind was blowing non-stop. Flood waters also run faster in higher country and is related to underlying geology.

The Barcoo runs faster than the Thomson and the larger floods often occur when both rivers flood at the same time and large flow events can push water back up the Barcoo.

If the eastern side of the Cooper gets going first, i.e. flooding in the Kyabra and Kerooropoloo Creek systems, water will be held up at the Thomson, Thornton and Barcoo. This can push the flood water further west and moderate to major flooding will occur Mayfield, South Galway and Tanbar. A useful flood reference point is the old bridge at Longreach. Local radio programs often announce when the water bridge goes up. This happens when the river level reaches approx. 3.65m. Start watching for a flood with reports of 50-100mm generalised rain around Muttaborra, Torrens Creek and Aramac.

In the bagging to Noonbah stretch of the Thomson River, it takes a flood height of about 3.6m to spill out of the channels and across the floodplains.

Isolated properties may have to wait several days before having access to a sealed road in some cases.

Fire breaks need to be as wide as possible in both forest and open downs country.

Cooper Creek Catchment Bioregions

General Landscape Knowledge

Water on the eastern side of the Cooper is relatively fast moving as channels are generally smaller with smaller floodplains and the plains are swept from currents. This area of the Cooper may grow less feed as a result due to little infiltration on harder geologies.

Some small lakes and springs are a result due to high pH, calcium and no infiltration due to hard bottom. Salinity levels are also low in these lakes.

Water will often disappear into sand dunes and run quickly off the hard country. Floodplains can be covered by a single sheet of floodwater spreading as wide as 70km during major floods.

Lake Buchanan and Lake Dunn which flows into Cornish Creek are ephemeral lakes and rarely contribute to the Cooper system, however they could connect in large events.

A big flood in the Barcoo can push the Thomson water to the west. The Darri River, as well as the Vergemont and Maneroo Creek can contribute a lot of water to the Thomson. The Thomson can also hold up the Darri River, while bottlenecks at Stonehenge. This causes the water to back up and spread out further.

Grass seeds will be dormant and are self-regenerating after a flood event. If there is no rain, there will be no Mitchell grass, while Mulga grows in the harder country.

The volume of rainfall in one area of the catchment does not reflect the whole catchment.

Creeks and tributaries provide a sizeable input into the system. Channels help distribute floodwaters out from the main channels. Siltation throughout the catchment reduces time between rainfall and annual flow at key locations.

Floodplains are self-mulching. It cracks open and crumbles, before falling back inside the creek channels. These cracks are deep and as the flood dries, the cracks will close up while keeping the soil moist. Floodwater which disappears into these cracks will re-emerge up to 300m downstream. When the soil cracks, it is bone dry. Every flood produces a different mix of pasture plants and growth patterns which is directly linked to the time plants germinate after the flood water recedes over the following weeks, and is further influenced by the weather (air and soil temperature), cloud cover and/or additional rain on germinating plants. This can result in summer growing pasture species germinating upstream to winter germinating species downstream. If there is more than one flood event in a year, the subsequent flood(s) may drown the first pasture growth and different species may germinate and mature to be inferior in growth, vigor and bulk.

Cow vint and other herbage often dominate occasionally flooded plains following summer floods in the Channel Country.

Good feed, such as that pictured to the left, is made even better when local rains follow flooding. Rains alone grow little, if any feed because the heavy clay soils of the Channel Country are so thirsty.

Tips for Graziers

If the water is over the old bridge at Longreach, and backed up to Muttaborra, then stock movements need to be planned downstream.

Agriculture practices influence the sediment in waterholes and the water infiltration in the area. Sediment can also impact groundwater infiltration.

Cattle and water are also mainly responsible for the spread of weeds and seeds.

Grasshopper plagues often occur after floods to feed on new growth. They generally come from north of the catchment and travel south.

Feral pigs are a problem as they are attracted to permanent waterholes. They will usually erode and degrade the soil and vegetation surrounding these waterholes.

A handy flood is more beneficial if it is followed by local rain. This will enable more feed to grow.

A winter flood does not grow as much feed as a summer flood and the feed does not last as long, but it usually has higher protein and lasts over the full winter until dry winds start in early summer. Water needs to hold up at a decent (gully) height for a sustained period of time to create a 'good' flood. This helps reduce more country and grow more feed. Less frequently flooded regions provide refuge and feed during flood events. Cattle will be fat after a winter flood, but will have soft hides and horns. They will need to be put on the outside country to harden them up before sale.

Cattle will not graze in flood waters because the flies and sandflies are overwhelming, however they will still feed in the sand dunes. As the water recedes, cattle will move into the channels and to the feed. If the cattle have a diet of only water weeds then they can sometimes lose their hair.

Compacted and wet blacksoil can limit tree maturation and is generally a poorer quality feed that can cause cracks often metres deep. Blacksoil may also inhibit plant and root growth, foster erode soils and expose tree roots. Floodplain soils are moderately fertile, but limited by the high clay content, cracking and high alkalinity.

Drought can be observed to increase silt. Scour occurs during major flood events.

Flooding can occur in the absence of local rain. Floodwaters originating in the upper catchment will travel hundreds of kilometres downstream before evaporating, soaking into the floodplains and filling swamps and lakes before reaching its final destination of Lake Eyre during major flood events.