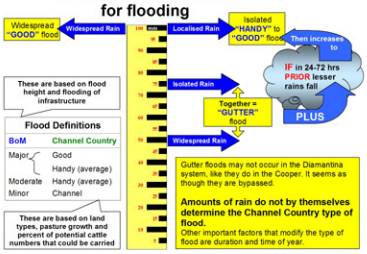
Diamantina River Catchment Flood Rules of Thumb

How to use this guide:

This guide has used the best information available at present. It is intended to help you assess what type of flood is likely to occur in your area and maybe even indicate what amount of feed you might expect. You may wish to record your own flooding guides on the map. You can add more value to this guide by participating in an MLA EDGEnetwork Grazing Land Management (GLM) training package. GLM training helps you identify land types and flood zones and to develop a grazing management plan for your property

Amount of rain needed for flooding



Gutter floods may not occur in the Diamantina system, like they do in the Cooper. It seems as though they are bypassed.

Amounts of rain do not by themselves determine the Channel Country type of flood.
Other important factors that modify the type of flood are duration and time of year.

Channel Country Flood descriptions

Flood type	Description	Land Systems flooded	Hydrology	Pasture growth which supports:
Good	Good floods are similar to handy floods, but cover a much higher proportion of the floodplain (75% or more) and grow more feed per area than a handy flood.	C1, C3, C2	Flooded across most of floodplains 80-100% inundation	85 - 100% of potential cattle numbers
Handy (or useful)	Handy floods occur when the water escapes from the gutters, connecting up to form the large sheets of water. It can cover up to 50% of the floodplain. There is a large pasture response from these floods but yield and area is less than a good flood.	C1, C3	Pushing out of gutters across floodplain and into swamps and depressions 50-60% inundated	45 - 85% of potential cattle numbers
Gutter	Gutter floods occur when the water escapes from the main channels and spills over to the many small waterways (gutters) that flow from the main channels. These floods promote growth of a good body of herbage and grasses along the gutters.	C1	Pushing out of channels into gutters 5-15% inundated	5 - 25% of potential cattle numbers
Channel	The major channels run and water just spills over banks but does not escape to the surrounding floodplain. Limited feed grows along margins of major channels.	C1, limited to channel margins	Major channels breaking banks <5% inundated	5 - 15% of potential cattle numbers

What are the Channel Country floodplain land types?

C1: Frequently flooded alluvial plains with braided channels, often with deep and fast moving water in major channels.

C2: Occasionally flooded, flat alluvial plains, generally with shallow and slow moving water. This land zone is usually the furthest from the major channels, but includes higher areas of floodplains.

C3: Poorly drained swamps and depressions on alluvial plains of intermittent flooding frequency, with variable water speed and depth, generally associated with the outer lying channels.

Estimated Summer Flood Pasture Growth in the Channel Country Floodplains.

Flood type	Frequently flooded plains (C1) (kg DM/ha of useful feed)	Occasionally flooded plains (C2) (kg DM/ha of useful feed)	Swamps and depressions (C3) (kg DM/ha of useful feed)
Good	1200-2500	1500-3500	4500-8000
Handy	750-1500	100-250	3500-6500
Gutter	400-1200	No growth	2000-4500
Channel	250-750	No growth	1200-2500

The western side of the Diamantina is hard range country and is what really drives the floods

"How Often" are flood rains received?
Proportion (%) of years that rainfall in 24hrs is at least

100 mm	*75 mm*	*50 mm*	*Location*
4	10	42	**Mackunda Downs**
16	33	71	**Kynuna**
6	14	50	**Lana Downs**
10	28	62	**Bladensburg**

The Wokingham catchment has large areas of Mitchell grass clay plains, which need a lot of rain to run enough water for a flood

Combo waterhole at Kynuna is one of the few permanent holes in the upper catchment

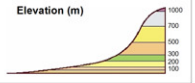
Legend

- Localities

Watercourses
- Important creeks
- Main rivers
- Drainage lines

Waterbodies
- lake
- flood plains
- swamp

Elevation (m)

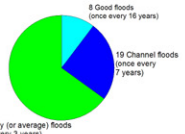


- General Information
- Flood height information
- Flood speed information

Floods recorded in the Diamantina

Year	Flood type
1876	Handy (average)
1879	Handy (average)
1880	Handy (average)
1882	Handy (average)
1887	Handy (average)
1890	Handy (off flood)
1893	Handy (average)
1894	Good
1899	Channel
1901	Handy (average)
1906	Good
1906	Handy (average)
1907	Handy (average)
1908	Good
1910	Handy (average)
1912	Handy (average)
1913	Channel
1914	Channel
1916	Channel
1917	Handy (average)
1918	Good
1920	Handy (average)
1922	Handy (average)
1925	Handy (average)
1926	Channel
1931	Handy (average)
1932	Handy (average)
1933	Channel
1935	Handy (average)
1937	Good
1939	Handy (average)
1940	Handy (average)
1945	Handy (average)
1950	Good
1953	Handy (average)
1955	Handy (average)
1956	Handy (average)
1963	Good
1967	Handy (average)
1968	Good
1969	Handy (average)
1971	Good
1972	Handy (average)
1973	Good
1974	Good
1975	Handy (average)
1976	Good
1977	Good
1978	Handy (average)
1979	Channel
1980	Handy (average)
1981	Good
1982	Handy (average)
1983	Handy (average)
1984	Good
1985	Handy (average)
1986	Handy (average)
1987	Handy (average)
1988	Handy (average)
1989	Handy (average)
1990	Handy (average)
1991	Handy (average)
1992	Handy (average)
1993	Handy (average)
1994	Handy (average)
1995	Handy (average)
1997	Handy (average)
1998	Handy (average)
1999	Good
2000	Good
2001	Handy (average)
2003	Handy (average)
2004	Good
2006	Handy (average)

Flood events in the Diamantina between 1876 and 2006 (estimated from historical flood records from Diamantina Lakes)



on average, there is a flood every 1.8 years in the Diamantina

An extra good flood at Brighton Downs, such as in 2000, registers 16.5 feet (5 m) at Diamantina Lakes. Above, the homestead surrounded by floodwaters and below, looking south at the Diamatina Lakes boundary

Usually an average (good) flood, of 11.5 - 14.7 feet (3.5 - 4.5 m) stays up on Brighton Downs for 7 - 10 days, such in 2004

The DPI&F pasture site at Monkira during the average (good) flood of 2004

Flood waters receeding after a good (average) flood in the Diamantina between Durrie and Monkira. Note the high areas that flooded only during a really good flood

- Little floods make big floods.
  The little floods fill up the waterholes, wet the catchment and allow the next one to go further
- Local rain is important to pre-wet the ground before the flood waters arrive. The soil is soaked and the watreholes and swamps are filled, thus allowing the floods to spread futher
- Where floods occur in succession the second flood will travel more slowly due to vegetation grown from the first flood. The second flood will often flow clearer, because of the vegetation filtering more sediment out and slowing water flow
- A handy flood is made better if there is local rain after the flood; a lot more feed will grow
- If there are 3 - 4 runs in the Diamatina prior to the main water flowing in December, it generally won't stop flooding until April or later
- A winter flood doesn't grow as much feed as a summer flood, but the feed lasts a lot longer
- You need the water to hold up at a decent (guage) height for a good flood. This helps water more country and grow more feed

The DPI&F and Marree Soil Board pasture site on Clifton Hills is in Goyder Lagoon

The head of the flood waters in the Warburton River in 2004

The Warbuton River at Cowarie is usually a shallow waterhole (left), but it can run a banker (right) from a couple of inches of rain in the stony plains to the north

"How Often" are flood rains received?
Proportion (%) of years that rainfall in 24hrs is at least

100 mm	*75 mm*	*50 mm*	*Location*
3	9	34	**Springvale**
2	6	27	**Diamantina Lakes**

- Good rain at Springvale (over the Spring creek and Nail creek catchment), holds up the river to Brighton Downs
- About 2 inches (50 mm) of rain on pebbly country can lead to handy local flooding e.g. from Edkins Creek
- At Monkira Station:
  - Need 10 feet (3.0 m) of water before it starts to spread out
  - If water holds up for 1 week, it will give a handy flood at Monkira & Durrie
  - If water holds up for 3 weeks at 11 feet (3.3 m) it will give a good flood at Monkira , Durrie, Pandie Pandie & Clifton Hills

"How Often" are flood rains received?
Proportion (%) of years that rainfall in 24hrs is at least

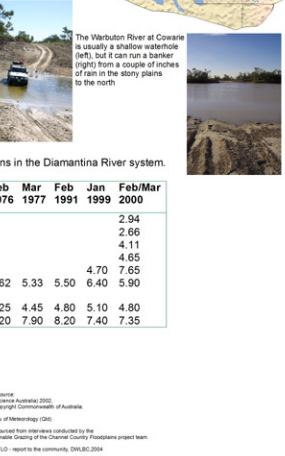
100 mm	*75 mm*	*50 mm*	*Location*
7	17	31	**Monkira**

- Good local rain backs up outside water at Monkira
- Local rain and the running of Boundary creek fills the surrounding swamps (which take up a lot of water) and helps spread the water onto Mooraberree
- Milwarina creek flows into Nurigully waterhole
- For Durrie, if the western creeks run, the water will reach Birdsville while the river is still rising. This leads to a better flood on the Westerm side and increases the flood value by about 25%
- A second run in the river at Durrie, is usually crystal clear

"How Often" are flood rains received?
Proportion (%) of years that rainfall in 24hrs is at least

100 mm	*75 mm*	*50 mm*	*Location*
5	10	26	**Birdsville**
2	7	19	**Pandie Pandie**

- Pandie Pandie needs the eastern channel of the Diamantina flowing to give a good flood
- A flood needs to be about 13 feet (4.0 m) at Monkira for 10 - 14 days to get a flood that spills out of the channels at Pandie Padie
- If the flood is 10.8 feet (3.3 m) and holds up for 1 week at Monkira, then Goyder Lagoon will half to three quarter fill
- Water will make it to Pandie Pandie when the gauge at Birdsville reads 24.6 feet (7.5 m)
- Moongera channel cuts the Birdsville track and flows into Goyder Lagoon
- Andrewilla waterhole (on the main channel at the boundary between Alton Downs and Clifton Hills), has to be filled before it runs into Goyder Lagoon
- If the Georgina and Diamantina Rivers hit Goyder Lagoon together, there will be an excellent flood downstream
- Georgina Water flows through Eyre Creek & the Mulligan River, into the western section of Goyder Lagoon near Tepamimi waterhole.
- Warburton Creek carries water fromthe Diamatina and Georgina Rivers into Lake Eyre



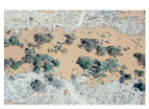
- Moonyem channel needs to flood to benefit Clifton Hills

Simpson desert sand hills (aeolian dunes) often cut across the floodplains

"How Often" are flood rains received?
Proportion (%) of years that rainfall in 24hrs is at least

100 mm	*75 mm*	*50 mm*	*Location*
5	15	28	**Clifton Hills**
1	6	12	**Cowarie**

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



Large and moderate sized channels distribute the water during initial flooding

- The Cadell Creek catchment gets quite a few storms. It is mainly hard ridge country so the water runs fast. This fast water can close the channels at Brighton ahead of the Diamatina River water

  2 inches (50 mm) rain off the ridges leads to local flooding.
  3 - 4 inches (75 - 100 mm) of rain will flood Cadell Creek enough to block up the Diamantina
- 2 - 3 inches (50 - 75 mm) of rain over the Makunda Creek catchment will run enough water to block up the Diamantina - this will push the water down the western side of the River to Diamantina Lakes
- Flood travel time varies and depends on what was before it. If it is a first flood it usually takes about 10 days from Winton to Brighton Downs. In Feb 2000 it only took 5 days because the waterholes were full from earlier runs
- Pot Jostler Creek comes out of a lot of hard country and floods out on Brighton Downs, growing useful feed. 5 inches (125 mm) of rain, plus water from Milparoo, will give a 9.8 feet (3 m) flood at Diamatina Lakes
- If the Diamantina River holds up at 10.8 feet (3.3 m) for 3 weeks at Diamantina Lakes:

  Monkira should recieve a handy flood;
  Durrie a good flood;
  Roseberth a handy flood; and
  Clifton Hills a good flood

Flood travel times between Davenport Downs and Goyder Lagoon

3-4 days from Davenport to Monkira
1-2 days from Monkira to Durrie
7-10 days from Durrie to Birdsville & Roseberth
2-3 days from Birdsville to Pandie Pandie
7-8 Days from Pandie Pandie to Goyder Lagoon

- Flood time between Kynuna and Davenport Downs

  Kynuna to the River junction near Eldersie 7 days
  the River junction to Brighton Downs 7 days
  Brighton to Diamantina Lakes 3 days
  Diamantina Lakes to Davenport Downs 2 days
- Western River water helps make floods bigger
- The Western River catchment is hard country and typically has very short floods that peak for only 1 -2 days. 2 - 3 inches (50 - 75 mm) of rain will give a channel run to Old Cork, or further
- If the Diamantina is in flood, then the Western River might stay up longer
- The 2000 flood arrived at Eldersie 22 hours after Winton. Usually it takes about 5 days
- If there is no other water, a BoM major flood at Winton should lead to a good flood at Brighton Downs
- Most years there is a flood at the Diamantina Bridge near Eldersie of 3.3 feet (1.0 m). Once the floods get more than about 5 feet (1.5 m) they spread out a huge amount for only a little increase in depth

"How Often" are flood rains received?
Proportion (%) of years that rainfall in 24hrs is at least

100 mm	*75 mm*	*50 mm*	*Location*
5	13	45	**Brighton Downs**
4	14	35	**Eildon Park**

- Kells Creek usually runs red

The Mayne River and Gum Creek can produce useful local flooding

The Mayne River always runs red and fast because it comes off hard country. It blocks up the Diamantina every 5 - 10 years

- Lake Billyer on Brighton Downs fills in most years - generally from Gum Creek but local flooding from the Mayne River can top it up

"How Often" are flood rains received?
Proportion (%) of years that rainfall in 24hrs is at least

100 mm	*75 mm*	*50 mm*	*Location*
4	8	27	**Ve Javis**

- Middle Creek runs fast, it can flow clear but is usually muddy
- Rain on the hard country at Palparara runs the western side of Farrar's creek
- If Farrars Creek holds up at 2.6 feet (0.8 m) for 2 weeks at Curawilla Crossing, the Farrars water will give good flooding from Mooraberree south including Roseberth and Pandie Pandie
- If Farrars Creek flows before the Diamantina, it will block the river thereby slowing and spreading the flow
- Farrars creek runs fast and mostly muddy
- If Farrars Creek & the Diamantina run together, it leads to good flood
- The Eastern channel of the Diamantina doesn't run until there is aprox 9.5 feet (2.9 m) at the Monkira house. 13 feet (4.0 m) will cut the Kingadurka Rd on Monkira (this is a good flood on Monkira)
- If there is 2.6 feet (0.8 m) at the Currawilla crossing for at least 14 days, there will be a good flood from Mooraberree down. This is important for Roseberth and Pandie Pandie
- The river drops 3.3 feet (1.0 m) between Diamantina Lakes and Monkira and a further 3.3 feet (1.0 m) from Monkira to Durrie

Water heights need to reach 11.4 feet (3.5 m) to flood out to the DPI&F site on Mooraberree (shown above)

"How Often" are flood rains received?
Proportion (%) of years that rainfall in 24hrs is at least

100 mm	*75 mm*	*50 mm*	*Location*
2	8	25	**Mooraberree**
2	6	16	**Durrie**
1	10	19	**Betoota**

- Some recent floods at Durrie

  The 2001 Flood
  - ran clear water because vegetation from the 2000 flood had filtered out the sediments by the time water reached Durrie
  - The clear water killed the bluebush on Durrie and Monkira (it is comming back now)

  The 2004 Flood
  - Was a really fast flood. It went from 0- 9 feet (0- 2.7 m) at Durrie in 8 hours and ran hot water which was useless for feed growth

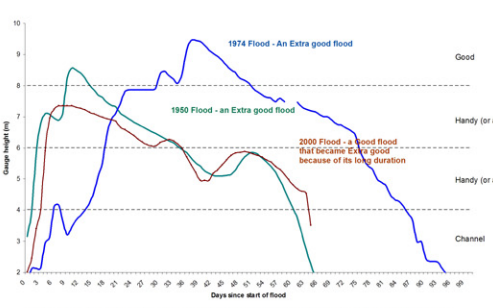
  However, upstream at Brighton Downs the 2004 flood was very good.

Cow vine and other herbages often dominate occassionally flooded plains following summer floods in the Channel Country

Channel Country native sorghum, pepper grass and bluebush pasture, circa 1947

Less frequently flooded ridges provide refuge and feed during flooding

Channel Country native sorghum pasture, May 2006



The 1974 flood was the biggest on record for most of eastern Australia. In the Diamantina River, 1950 and 2000 were other major, or good, floods. These graphs provide a useful comparison of the flood height and duration of these important floods at Diamantina Lakes.
Most of the major floods have resulted from monsoonal rain activity moving further south than usual and generally coincide with positive SOI years

When do flood heights get reported?

BoM flood height levels for gauging stations in the Diamantina River system.

River Height Station	First Report Height	Crossing Height	Minor Flood Level	Moderate Flood Level	Major Flood Level
Elderslie	1.5	1.6 (C)	1.5	2.5	3.0
Apsley	1.5		2.0	2.5	3.0
Aldingham	1.0		1.5	1.7	2.0
Oondooroo	1.0	0.6 (C)	2.0	3.0	4.0
Winton	1.3	1.3 (B)	1.5	2.0	3.5
Tulmur	4.0		5.0	7.0	8.0
Diamantina Lakes	0.3	0.0 (X)	1.0	3.0	5.0
Monkira	2.0	2.6 (A)	2.6	4.0	5.0
Birdsville	2.0	4.0 (A)	4.0	6.0	8.0

All heights are in metres on flood gauges. (A) = Approaches (B) = Bridge (C) = Causeway (X) = Crossing

Some major floods of the past.

BoM records of flood peak heights at gauging stations in the Diamantina River system.

River height station	Highest recorded flood		Mar 1950	Mar 1971	Feb 1976	Mar 1977	Feb 1991	Jan 1999	Feb/Mar 2000
Elderslie	Feb 2000	2.94							2.94
Aldingham	Feb 2000	2.66							2.66
Oondooroo	Feb 2000	4.11							4.11
Winton	May 1955	5.01	4.47						4.65
Tulmur	Jan 1974	9.75						4.70	7.65
Diamantina Lakes	Jan 1974	7.06		5.99	6.62	5.33	5.50	6.40	5.90
Monkira	Feb 1974	6.12	5.79	5.03	5.25	4.45	4.80	5.10	4.80
Birdsville	Feb 1974	9.45	8.54	8.08	8.20	7.90	8.20	7.40	7.35

All heights are in metres on flood gauges

desert channels QUEENSLAND

1:1,250,000 at AO size

Digital Terrain Model & property outlines supplied by Desert Channels Queensland.

Data source: (Geoscience Australia) 2002; (C) Copyright Commonwealth of Australia. Bureau of Meteorology (Qld)

Text sourced from interviews conducted by the Sustainable Grazing of the Channel Country Floodplains project team and ARIDFLO - report to the community, DWLBC,2004

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