HIGHFIRE RISK PROJECT

BLOW-UP FIRE EVENT (BUFE) POTENTIAL SOUTH-EAST AUSTRALIA

--The Hierarchical Predictive Framework--

Level 1: ; Level 2:

This page shows current Alerts
for
Blow-Up Fire Event potential.

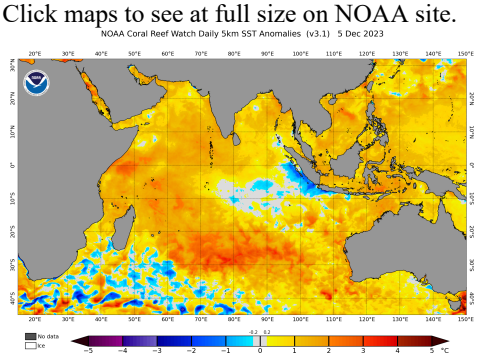
ISSUE DATE: LATE OCTOBER 2023.

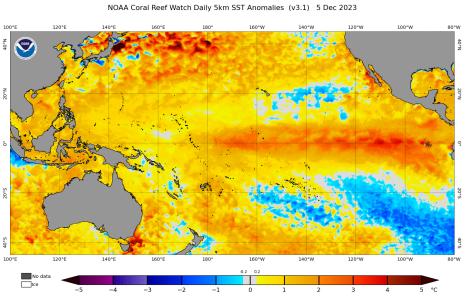
This is an Operational Trial.
It is intended to be an intelligence product to aid in informed decision making, and should not be used in any other way.
A pyroCb near Nymboida on 25 October was fully consistent with the content of this page.

A REQUEST

If anyone uses this draft model operationally, can they please send their results to the author:
Rick McRae

Current SSTA charts
(NOAA Coral Reef Watch)
Click maps to see at full size on NOAA site.





LEVEL 1 CANBERRA DIPOLE

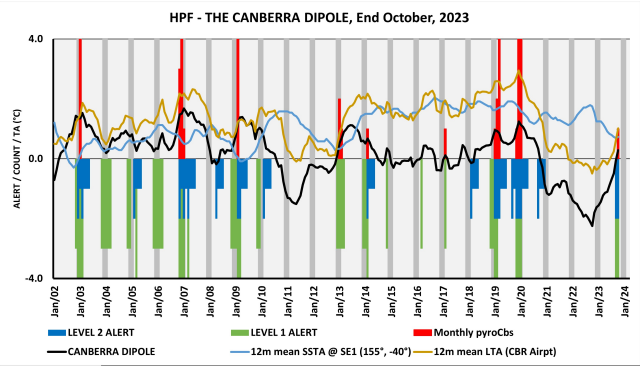
Current Alert Status:

LEVEL 1 ALERT ISSUED ON BASIS OF LEVEL 2 ALERT.

This reflects interactions between land and sea that influence synoptic patterns conducive to wildfires (or rain).

Data:

- Sea Surface Temperature Anomalies (SSTAs) - NOAA Coral Reef Watch;
- Land Temperature Anomalies (LTAs) & River flows - Bureau of Meteorology;
- PyroCbs - Australian pyroCb Register.



[Click on image to enlarge.]

ANALYSIS:

There is a Level 1 Alert in place due to river drying events. A Level 1 Alert on its own is likely by November.

UPDATE: There is a Level 2 Alert in place as stream flows have already started dring up, ahead of summer conditions. Due to El Nino - Southern Oscillation and Indian Ocean Dipole events reducing zonal moisture feeds and the Southern Annular Mode keeping cold fronts to the south, there is widespread discussion about the outlook for areas facing a severe fire season. Extreme Wildfires, and their different drivers, now need to be included.

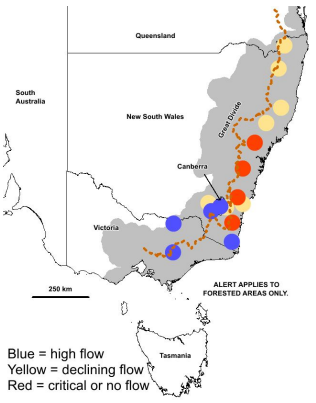
Current Alert Status:

LEVEL 2 ALERT IN PLACE

LEVEL 2 RIVER DRYING EVENTS

During a Level 1 Alert, an on-going drought may cause key river flows to cease. If enough of these are drying out it indicates a real potential for a BUFE or a pyroCb during the coming month.

ANALYSIS: There are currently rivers that have reached critically low flow levels - see Map, right. Others can reach that state in around one month.
Heavy rainfall in the first week of October affected the high country and eastern Victoria, so those areas are not affected (although major fires preceding the rain showed that they were at Alert level.)



There is a potential for Blow Up Fire Events on significant bushfires that are in forested areas in regions with red dots (map, above) and meet certain criteria. This will persist until
(a) conditions ease at the end of this fire season OR
(b) there has been significant rainfall.

Those criteria form Level 3 of the HPF. It is expected that

FBANs or Technical Experts would conduct Level 3 analyses and generate Intelligence Products for the Incident Management Team to consider.
These river flows may be affected by regeneration from Black Summer fires, but they still indicate loss of moisture across the whole soil profile.
On October 20th, four sites were dry, and four more sites might have "dried out" when the next update is issued, taking us to 50% in a dry state.

LEVEL 3 BLOW-UP FIRE OUTLOOK

With a Level 2 Alert issued the bushfire threat covered here should now include the prospect of Extreme Wildfires as well, especially in areas not burnt in 2019/2020.
The official outlook does not suggest a raised potential for many of the forested areas of the southeast. However the potential for reburns, especially in Dry Sclerophyll Forests (some of which may have largely recovered from 2019/2020), should be monitored.
Operations at Level 3 require a trained FBAN or equivalent Technical Expert to use the BUFO2 model to assess the potential for a Blow-Up Fire Event during an on-going fire. This requires a series of data feeds specified in the model,

Click here for the BUFO2 worksheet.

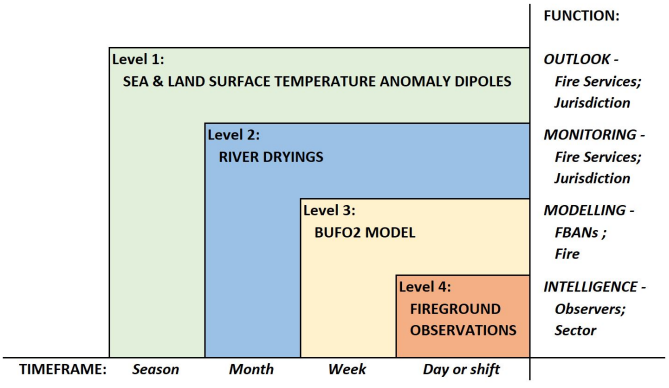
Click here for a PowerPoint presentation on BUFO2, from a workshop at the AFAC21 Conference.

Could anyone using the spreadsheet during the HPF trail please copy their results to us.

Page prepared by:
Adjunct Professor Rick McRae
UNSW Canberra
School of Science
Bushfire Research Group
r.mcrae@adfa.edu.au

BASIS

This work is based on analyses of data from Black Summer.
The structure of the four-tier Hierarchical Prediction System is designed to progress into smaller-scales of timeframe and function, shifting from seasonal outlook to incident operations:



HPF is described in a peer-reviewed paper in the October 2023 edition of the Australian Journal of Emergency Management.

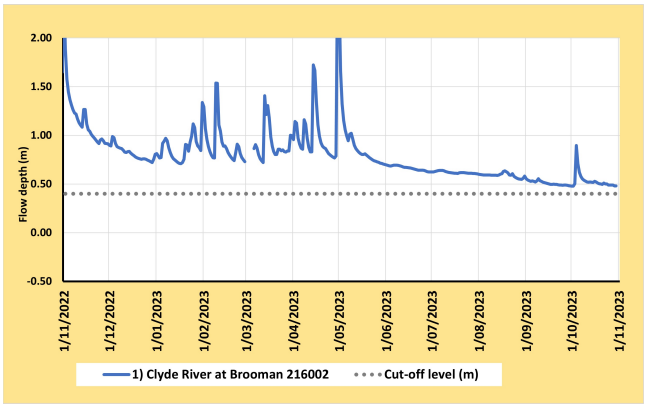
LEVEL 2 SOURCE DATA

The table and map below describe the stream flow reference sites used.

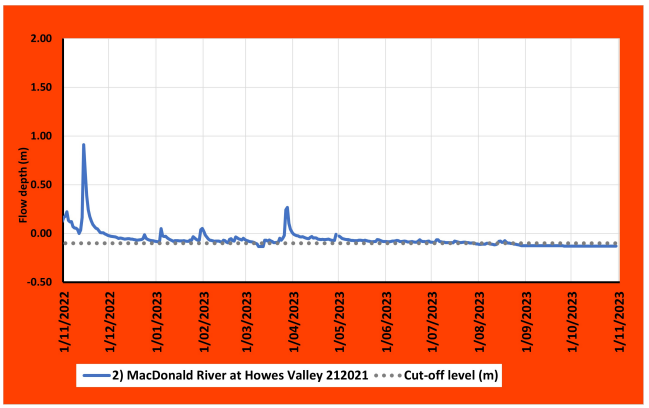
No.	Site Code	Name	Latitude	Longitude	Owner	1st date on record	Minimum level (m)
1	216002	Clyde River at Brooman	-35.4681	150.2394	NSW DILW	8/07/1960	0.17
2	212021	MacDonald River at Howes Valley	-32.8611	150.8611	NSW DILW	9/02/1976	-0.20
3	41000261	Goobarragandra River at Mac's Crossing	-35.4183	148.4357	NSW DILW	13/06/2012	0.86
4	225219	MacAlister River at Glencairn	-37.5162	146.5665	Vic DELWP	7/04/1967	0.25
5	220004	Towamba River at Towamba	-37.0715	149.6593	NSW DILW	5/04/1970	0.35
6	212260	Kowmung River at Cedar Ford	-33.9481	150.2431	NSW DILW	17/05/1968	0.17
7	204014	Mann River at Mitchell	-29.6931	152.106	NSW DILW	10/05/1972	0.35
8	204051	Clarence River at Paddys Flat	-28.7198	152.4198	NSW DILW	26/03/1976	0.60
9	207015	Hastings River at Mt Seaview	-31.3683	152.2425	NSW DILW	31/05/1984	0.55
10	208001	Barrington River at Bob's Crossing	-32.0284	151.4671	NSW DILW	31/01/1944	0.47
11	410535	Murrumbidgee River above Tantangara Reservoir	-35.7706	148.5703	Snowy Hydro	2/05/1960	0.45
12	401554	Tooma River above Tooma Reservoir	-36.1	148.26	Snowy Hydro	19/09/1968	0.44
13	215208	Shoalhaven River at Hillview	-35.1845	149.9536	NSW DILW	6/11/1973	0.37
14	410734	Queanbeyan River at Tinderry	-35.6144	149.35	Icon Water	2/08/1966	0.65
15	403221	Reedy Creek	-36.3109	146.6012	Vic DELWP	11/11/1964	0.25
16	218007	Wadbilliga River at Wadbilliga	-36.257	149.6926	NSW DILW	12/06/1974	0.65
17	410731	Gudgenby River at Mt Tennent	-35.5722	149.0683	Icon Water	12/11/1964	0.35

- These plots are of data from the Bureau of Meteorology (BoM) and WaterNSW (https://realtimedata.waternsw.com.au/water.stm).
- These sites do not reflect risk to life or property, rather they are from streams with long records that are not dammed or otherwise signficantly modified, and are intended to reflect underlying hydrological dynamics. Elevated levels or concave drying trends indicate wet landscapes. Near minimum flows or low flows decaying in a convex curve are indicators of a River Drying Event.
- Note that minimum flows are not zero flows - the value reflects the circumstances at the flow measuring station.
- Also note that many catchments burnt out during Black Summer, and this may cause anomalous flow dynamics.
- There are currently some disruptions to data provision, causing gaps in the graphs. These may be updated as datasets are updated.

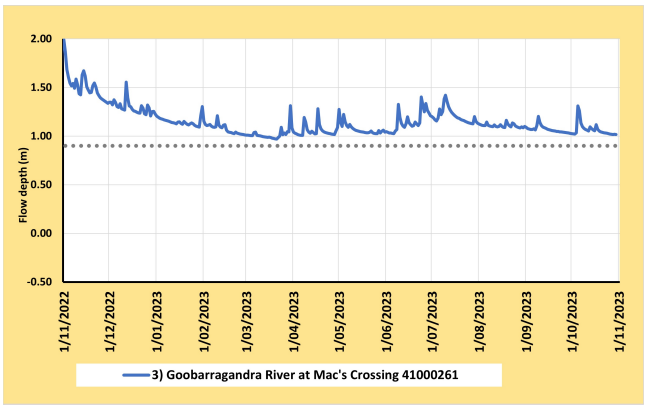
1. Clyde R at Brooman (site ID 216002)
Min. level = 0.40 m.



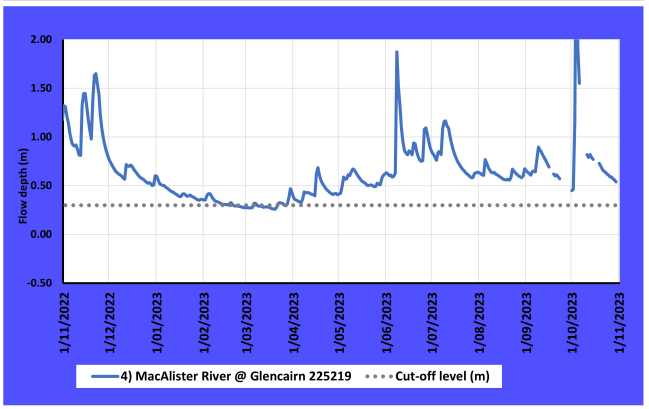
2. Macdonald R at Howes Valley (site ID 212021)
Min. level = -0.10 m.



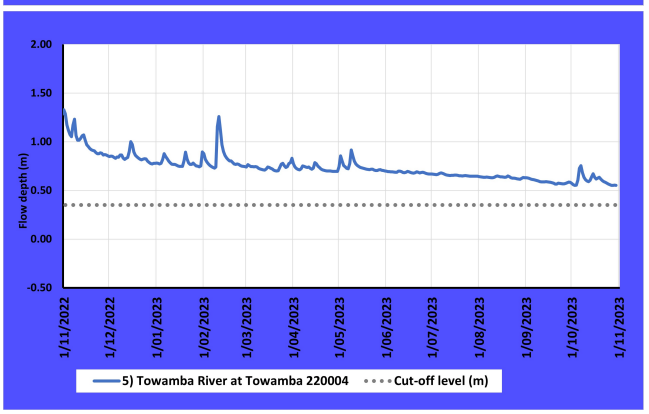
3. Goobarragandra R at Macs Crossing (site ID 41000261)
Min. level = 0.90 m.



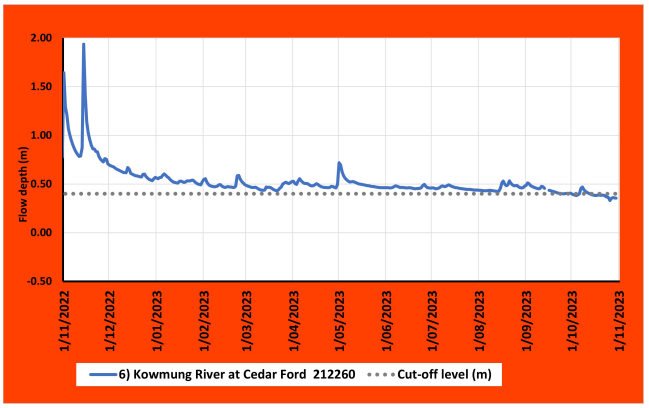
4. Macalister R at Glencairn (site ID 225219)
Min. level = 0.30 m.



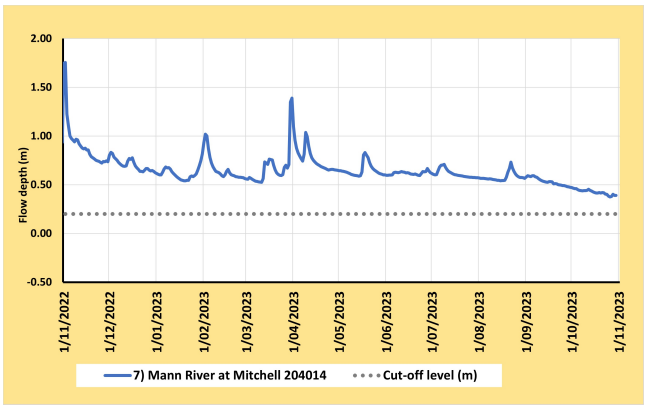
5. Towamba R at Towamba (site ID 220004)
Min. level = 0.35 m.



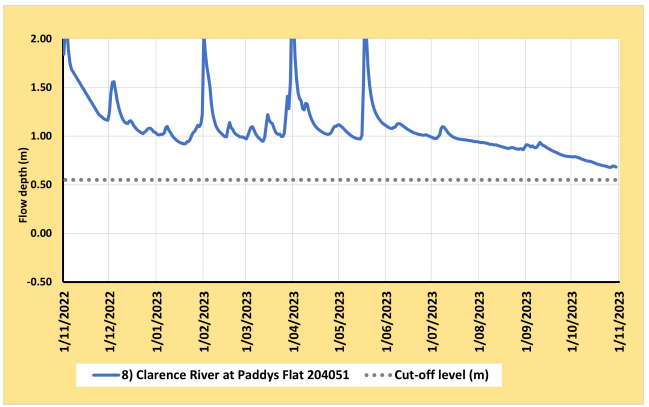
6. Kowmung R at Cedar Ford (site ID 212260)
Min. level = 0.40 m.



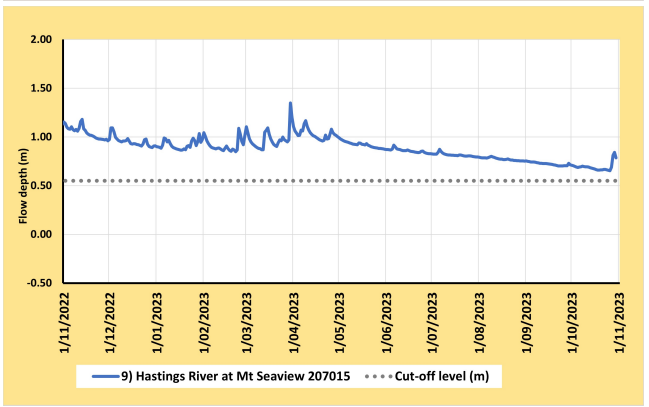
7. Mann R at Mitchell (site ID 204014)
Min. level = 0.20 m.



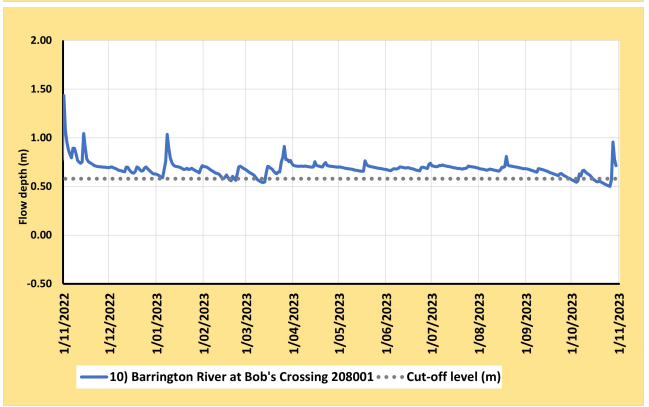
8. Clarence R at Paddys Flat (site ID 204051)
Min. level = 0.55 m.



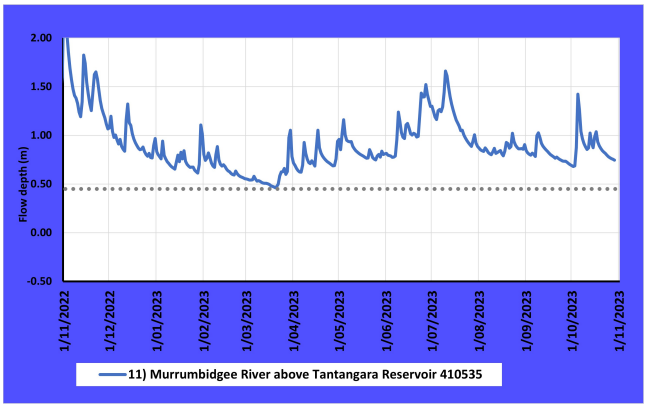
9. Hastings R at Mt Seaview (site ID 207015
Min. level = 0.55 m.



10. Barrington R at Bobs Crossing (site ID 208001)
Min. level = 0.58 m.

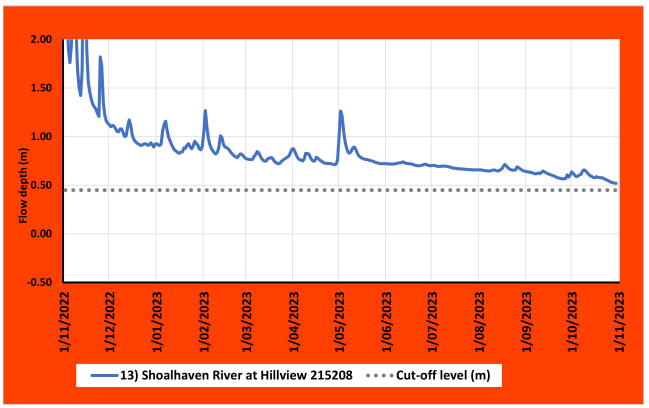


11. Murrumbidgee R above Tantangara Reservoir (site ID 410535)
Min. level = 0.45 m.

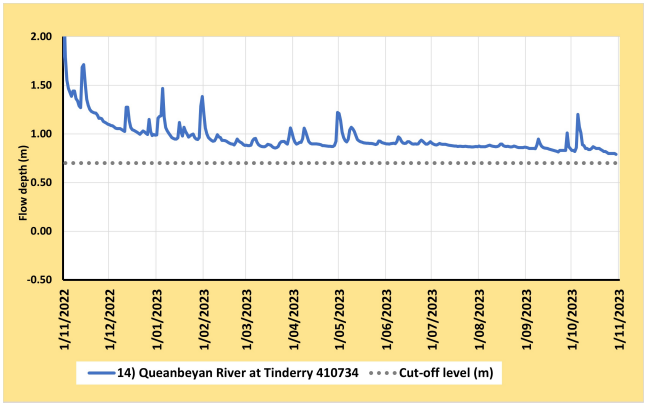


12. Tooma R above Tooma Reservoir (site ID 401554)
Min. level = 0.45 m.
The Federal Government has gazetted this site as a Commercially Sensitive Site under the Water Regulations 2008. It has been removed from this site.

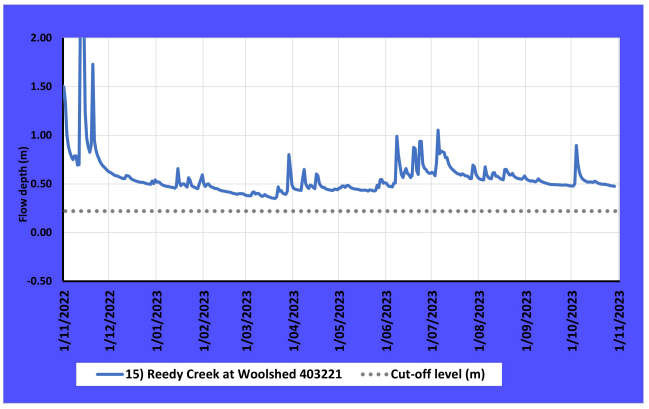
13. Shoalhaven R at Hillview (site ID 215208)
Min. level = 0.45 m.



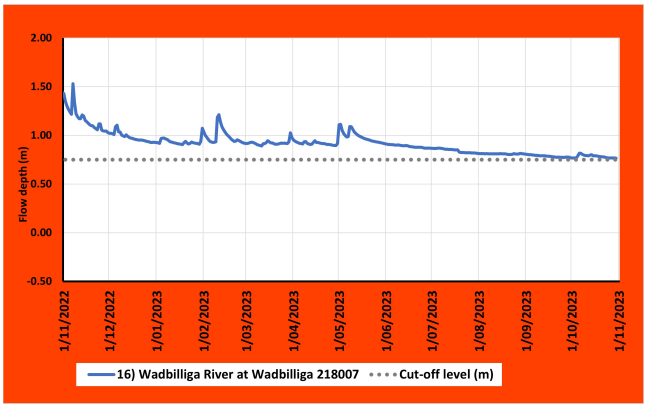
14. Queanbeyan R at Tinderry (site ID 410734)
Min. level = 0.70 m.



15. Reedy Creek (site ID 403221)
Min. level = 0.22 m.



16. Wadbilliga R at Wadbilliga (site ID 218007)
Min. level = 0.75 m.



17. Gudgenby R at Mt Tennent (site ID 410731)
Min. level = 0.45 m.