

## 4.25b FLOODS RELATED TO TC-OSWALD

**ISSUE** – TC-Oswald crossed the gulf coast in Queensland on 22 January and moved out to sea near Newcastle on 29 January. During this time it caused widespread major and some record flooding of many coastal catchments in QLD and the NSW north and central coasts.

### KEY POINTS

- Category 1 TC Oswald crossed the Queensland Gulf Coast during the early hours of 22 January and decayed to a tropical low.
- Ex TC Oswald moved in a south-easterly direction over land along the Queensland coast from 22-27 January and then into NSW before moving out to sea south of Sydney on 29 January. (A track map is included in this brief)
- Oswald caused major flooding from Innisfail in north Queensland to Grafton in NSW with some rivers such as the Clarence in NSW and the Burnett in QLD reaching record flood levels.
- The warning lead time for the majority of the locations that the Bureau provides a forecast exceeded all performance criteria, even in catchments that respond rapidly to heavy rainfall. In other words, warnings were both timely and accurate.

### New South Wales

- As Ex-TC Oswald moved through NSW it caused widespread flooding in coastal and some inland river systems, extending from the Queensland border south to Sydney.
- Record major flooding was recorded in the Clarence River at Grafton where levels exceeded the record 1890 flood. Major flooding also occurred downstream at Ulmarra and Maclean.
- Moderate to major floods also affected communities along the Tweed River (Murwillumbah and Chinderah) and the Wilsons and Richmond Rivers (Lismore and Coraki).

### Queensland

- Ex-TC Oswald caused major flooding in the Tully, Herbert, Haughton, Don, Dee, Conners, Isaac, Dawson, Fitzroy, Boyne, Kolan, Burnett,

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Mary, Bremer and Condamine Rivers and in Lockyer, Laidley, Charleys and Myall Creeks.

- This affected many communities including Tully, Ingham, Giru, Rockhampton, Gladstone, Bundaberg, Maryborough, Gympie, Ipswich, Brisbane, Logan, Warwick and Chinchilla.
- The flooding was most severe in the Burnett River and affected the communities of Mundubbera, Gayndah and Bundaberg. Record flood levels were recorded at many locations and the peak at Bundaberg exceeded the 1890 flood level by nearly half a metre and caused large scale inundation of homes and businesses.
- Many of the catchments exceeded the flood levels reached in the 2010-11 floods including the Mary, Boyne, Burnett, Logan and Albert Rivers and Laidley Creek. The flooding in the Brisbane and Bremer Rivers was much less than 2010-11 but still the second highest since 1974.

**POSSIBLE QUESTIONS & SUGGESTED RESPONSES/ANSWERS**

***Q. Did you provide adequate warning for Bundaberg?***

A. YES. The seriousness of the situation was recognised early and warnings for major flooding were issued 17 hours before Bundaberg reached the major flood level. The SEWS was activated on the warnings from the morning of Sunday 27 January due to the risk to life and property. The rapidly changing situation, extent of coincident flooding and record levels reached made it difficult but the warning and forecasting services were good.

Time	What happened – from warning or observations
10:53 pm FRI 25/1/2013	First warning issued – focussed on upper Burnett.
12:41pm SAT 26/1/2013	Warning stated that Bundaberg may exceed minor flood levels from Sunday
10:59pm SAT 26/1/2013	First warning referring to major flooding at Bundaberg by Sunday evening. Current level at Bundaberg was estimated to be below minor.
04:45am SUN 27/1/2013	Rainfall at Walla and Fig Tree upstream of Bundaberg record 230mm in the last 6 hours and 450mm in the last 24 hours.  The most intense one hour rainfall was 74mm between midnight and 1am Sunday.

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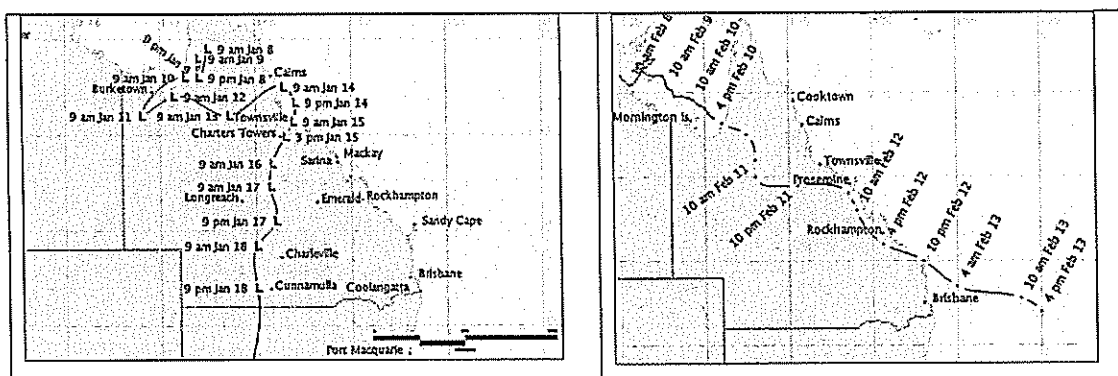
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06:25am SUN 27/1/2013	First report from Bundaberg manual observer, 5.45 metres and minor flooding.
9:16am SUN 27/1/2013	Warning requested the use of the Standard Emergency Warning Signal.  Bundaberg expected to reach major flood level Sunday afternoon and keep rising and exceed 8.5 metres overnight Sunday.  Current level at Bundaberg was 6.15 metres and moderate.
04:00pm SUN 27/1/2013	Reach major flood level of 7.5 metres
12:27am MON 28/1/2013	Warning stated that Bundaberg was expected to reach 9 metres during Monday morning with further rises likely later on Monday and on Tuesday.
02:00am MON 28/1/2013	Exceed 1942 flood level of 8.6 metres
12:00pm MON 28/1/2013	Exceed 1890 flood level of 9.04 metres
08:13pm MON 28/1/2013	Warning stated that Bundaberg would peak above 9.3 metres late Tuesday
04:46am TUE 29/1/2013	Warning stated that a peak up to 9.5 metres is expected late Tuesday
04:00pm TUE 29/1/2013	Peaked at 9.525m

Note: This table does not include all warnings. Just key warnings and content.

**Q. Is it common or rare for a cyclone or low to do this?**

A. The most recent situation that is similar was in 2008 when two tropical lows moved inland from the gulf and Coral Sea during January and February and caused widespread flooding.



**Q. How has the Bureau performed during ex-TC Oswald?**

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- A. It was an extreme event over a large area. Bureau staff and services were stretched but we provided a good service to the public and our partners in the emergency services community. The expectation for greater lead time and more local level detail are pushing our current capabilities.

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## FURTHER BACKGROUND INFORMATION

### New South Wales Flood Services Summary

NSW – the key locations of interest were

- Grafton NSW - Clarence River. 12.5 hours prediction of flood peak accurate to within 0.18 metres. Record flood peak height recorded at Grafton. Major flooding.
- Maclean NSW - Lower Clarence River - 50 hours prediction of flood peak accurate to within 0.1 metres. Major flooding.
- NSW – Some additional statistics
  - 155 Flood Watches and Warnings issued for 16 major catchments between 28<sup>th</sup> January 2013 and 1<sup>st</sup> February.
  - Major floods occurred in 4 catchments, moderate in 2 and minor in 10.
  - All coastal floods were preceded by a Flood Watch issued 2 days before the heavy rain started in NSW.
  - Staffing – While there was on staff on leave in the NSW FFW section, they were supplemented by one from the National team and one from SA FFW.

Catchment	Date first warning	Date last warning	Number Warnings Issued	Flood Class	Flood Watch issued	Flood Watch Required ?
HASTINGS	27/01/2013	29/01/2013	13	Minor	Yes	Yes
CLARENCE	27/01/2013	Still active	28	Major	Yes	Yes
RICHMOND/WILSONS	27/01/2013	1/02/2013	23	Major	Yes	Yes
TWEED	27/01/2013	30/01/2013	17	Major	Yes	Yes
BELLINGER	27/01/2013	29/01/2013	16	Moderate	Yes	Yes
BRUNSWICK	27/01/2013	29/01/2013	11	Minor	Yes	Yes
NAMBUCCA	28/01/2013	29/01/2013	4	Moderate	Yes	Yes
MACINTYRE/DUMARESQ	28/01/2013	Still active	0	Minor	Yes	Yes
MACLEAY	28/01/2013	30/01/2013	9	Minor	Yes	Yes
GWYDIR	28/01/2013	31/01/2013	8	Minor	No	Yes
HUNTER	29/01/2013	1/02/2013	5	Minor	Yes	Yes
NAMOI	29/01/2013	29/01/2013	2	Below Minor	No	No
NEPEAN/HAWKESBURY	29/01/2013	29/01/2013	3	Below Minor	No	No
CAMDEN HAVEN	29/01/2013	29/01/2013	2	Minor	Yes	Yes
WYONG	30/01/2013	1/02/2013	4	Minor	Yes	Yes
BARWON	31/01/2013	Still active	3	Major	No	No
BELLINGER	1/02/2013	1/02/2013	2	Minor at Thora	No	No

## Queensland Flood Services Summary

### 1. No of flood warnings – January and February for the event

- 379 warnings have been issued for the event, thus far. Warnings still continuing for the border rivers.
- Note SEWS used for Bundaberg flood warning, first used on 9:16am issue on Sunday, 27th January 2013, and last used on the 6:24pm, Tuesday 29<sup>th</sup> January issue.

Catchment	First Warning	Last Warning	Number of Warnings issued	Flood Class	Flood Watch or Preliminary warning issued
Coastal Rivers - North	23/1/2013	24/1/2013	9	Moderate	NR
Coastal rivers - Townsville to Mackay	24/1/2013	24/1/2013	1	Moderate	NR
Coastal rivers - Central	24/1/2013	25/1/2013	5	Major	NR
Coastal Rivers - South	25/1/2013	28/1/2013	15	Major	NR
Tully River	21/1/2013	25/1/2013	19	Major	Yes
Herbert River	22/1/2013	25/1/2013	12	Major	Yes
Haughton River	24/1/2013	25/1/2013	7	Major	Yes
Burdekin River	25/1/2013	26/1/2013	3	Minor	Yes
Don River and Adjacent Streams	24/1/2013	25/1/2013	8	Moderate	Yes
Pioneer River	24/1/2013	25/1/2013	2	Minor	Yes
Fitzroy River	24/1/2013	CONTINUING	31+	Major	Yes
Burnett River	25/1/2013	1/2/2013	40	Major	Yes
Kolan, Baffle, Boyne and Calliope Rivers	25/1/2013	30/1/2013	22	Major	Yes
Burrum River	26/1/2013	29/1/2013	11	Major	Yes
Mary River	26/1/2013	1/2/2013	34	Major	Yes
Sunshine Coast Rivers	27/1/2013	29/1/2013	10	Major	Yes
Stanley & Brisbane above Wivenhoe Dam	27/1/2013	29/1/2013	14	Major	Yes
Lockyer, Bremer, Warrill & Brisbane below Wivenhoe	27/1/2013	31/1/2013	20	Major	Yes
Logan-Albert	27/1/2013	31/1/2013	23	Major	Yes
Coomera, Nerang	27/1/2013	29/1/2013	7	Major	Yes
Condamine-Balonne Rivers	27/1/2013	CONTINUING	34+	Major	Yes
Macintyre, Weir & Border Rivers	21/1/2013	CONTINUING	36+	Major	Yes
Moonie River	27/1/2013	CONTINUING	16	Major	Yes

3.

Irrelevant - S22

4.

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## Irrelevant - S22

### 5. Forecast lead times and accuracy

The warning lead time for the majority of the locations that the Bureau provides a forecast exceeded all performance criteria, even in catchments that respond rapidly to heavy rainfall. In other words, warnings were both timely and accurate.

Location	Catchment	Highest Flood class level reached	First warning to predict flood class	Time when it reached highest flood class level	Lead time for reaching highest flood class level	Accuracy of peak prediction
Mundubbera	Burnett	Major (18m)	10:59pm 26/1/2013	12pm 27/1/2013	13 hours	Qualitative prediction only
Gayndah	Burnett	Major (15m)	10:59pm 26/1/2013	8:30pm 27/1/2013	21 hours	Qualitative prediction only
Bundaberg	Burnett	Major (7m)	10:59pm 26/1/2013	4:00pm 27/1/2013	17 hours	0.325m
Rockhampton (Fitzroy R)	Fitzroy	Major (8.5m)	5:06pm 29/1/2013	3:00pm 1/2/2013	70 hours	0.1m
Maryborough	Mary	Major (9m)	4:01am 27/1/2013	9:30pm 27/1/2013	11 hours	0.3m
Gympie	Mary	Major (17m)	9:43am 27/1/2013	9:47pm 27/1/2013	12 hours	1m
Ipswich <small>Note: Misprint - Correct Level was 11.7m</small>	Brisbane	Major (12.7m)	4:38pm 27/1/2p13	11:24am 28/1/2013	19 hours	0.6 - 1.1m
Waterford	Logan and Albert	Major (9m)	7am 29/1/2013	05:00am 30/1/2013	22 hours	0.05 m
Laidley (Laidley Ck)	Lockyer	Major (7.8m)	10:13am 27/1/2013	1:45pm 27/1/2013	3 hours	Qualitative prediction only
Warwick	Condamine	Major (7m)	12:03am 28/1/2013	12:00pm 28/1/2013	12 hours	0.7m

Note: (1) based on first mention of major flooding in warning and observed time when it reached major flood level.

Note (2) Qualitative predictions are provided when there is insufficient information to provide quantitative forecasts

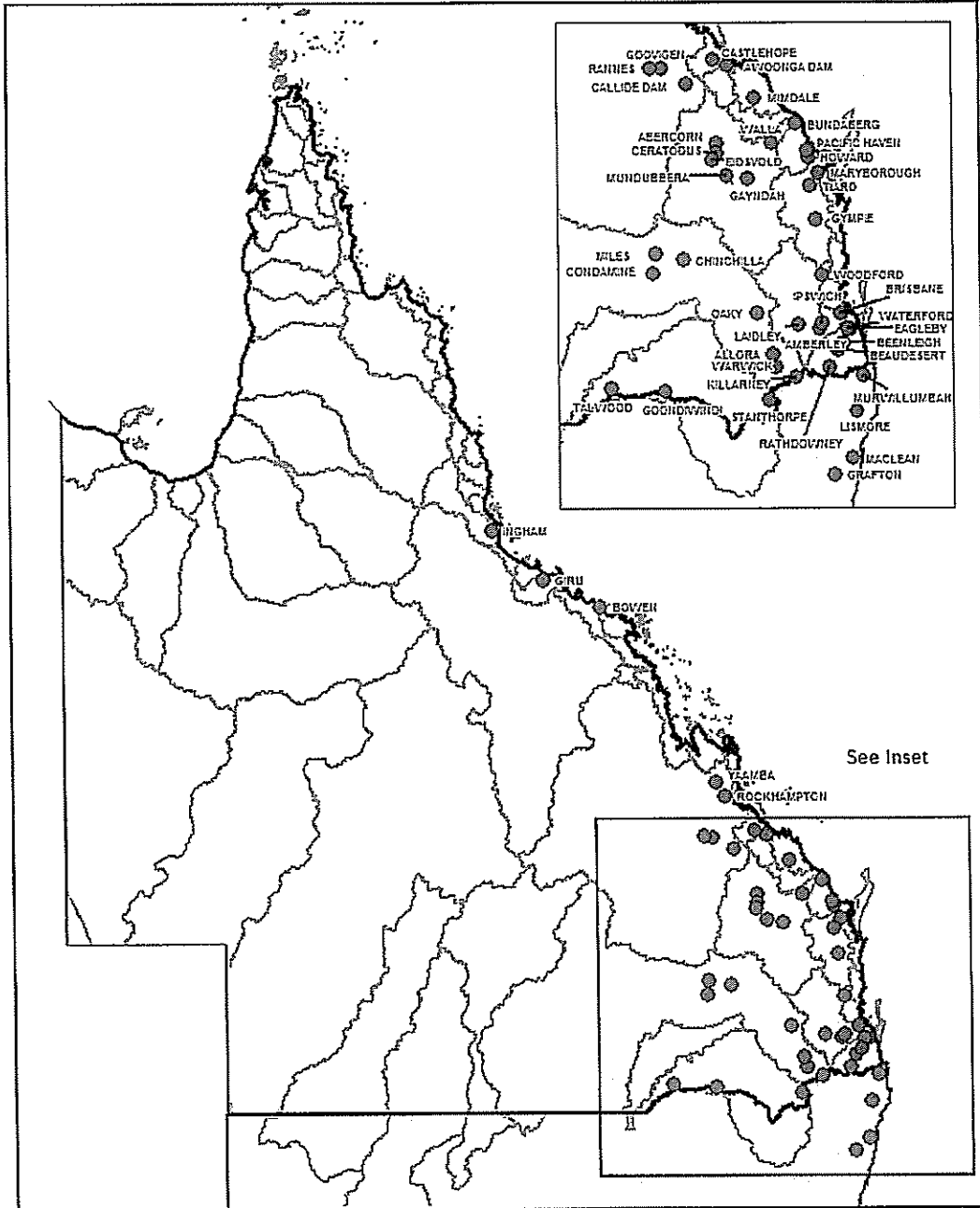
### 6. Historical Context

Record flooding in the Don, Dee, Boyne, Baffle Creek, Burnett, and Kolan Rivers. Greater than 2010-11 in Mary, Logan/Albert. Estimate we will have record floods at over 50 gauging stations but analysis is not complete at this stage.



Location	Peak Height	Flood Class	Start of Record	Ranking	Highest Since	Record
Mundubbera (Burnett R)	23.0m	Major	1942	2nd	23.42 m Feb 1942	23.42 m Feb 1942
Gayndah (Burnett R)	Estimated > 20.0 m	Major	1864	1st	19.66 m Feb 1942	New record
Bundaberg (Burnett R)	9.525 4pm 29/1/2013	Major	1875	1st	9.05m Jan 1890	New record
Rockhampton (Fitzroy R)	8.60m 9pm 2/2/2013	Major	1890	9th	9.2 m Jan 2011	10.11m Feb 1918
Maryborough (Mary R)	10.70m 7:30am 29/1/2013	Major	1864	4th	10.95 m Jan 1974	12.27m 1893
Gympie (Mary R)	19.98m 12:10pm 28/1/2013	Major	1870	8th	21.95m Feb 1999	25.45m Feb 1893
Ipswich (Bremer R)	13.9m 10:00pm 28/1/2013	Major	1840	20th	19.25m Jan 2011	23.47m Feb 1893
Brisbane (Brisbane R)	2.3m 10:52am 28/1/2013	Minor	1840	24th	4.46m Jan 2011	8.35m Jan 1893
Waterford (Logan R)	9.0m 04:30am 30/1/2013	Major	1887	6th	9.06m Feb 1991	13.7m 1887
Laidley (Laidley Ck)	9.24m 5:50pm 27/1/2013	Major	1997	7th	9.26m Jan 2011	9.36m Dec 2010
Warwick (Condamine R)	7.21m 12:47pm 28/1/2013	Major	1887	12th	8.35m Jan 2011	9.1m Feb 1976

# Flood Affected Towns January 2013



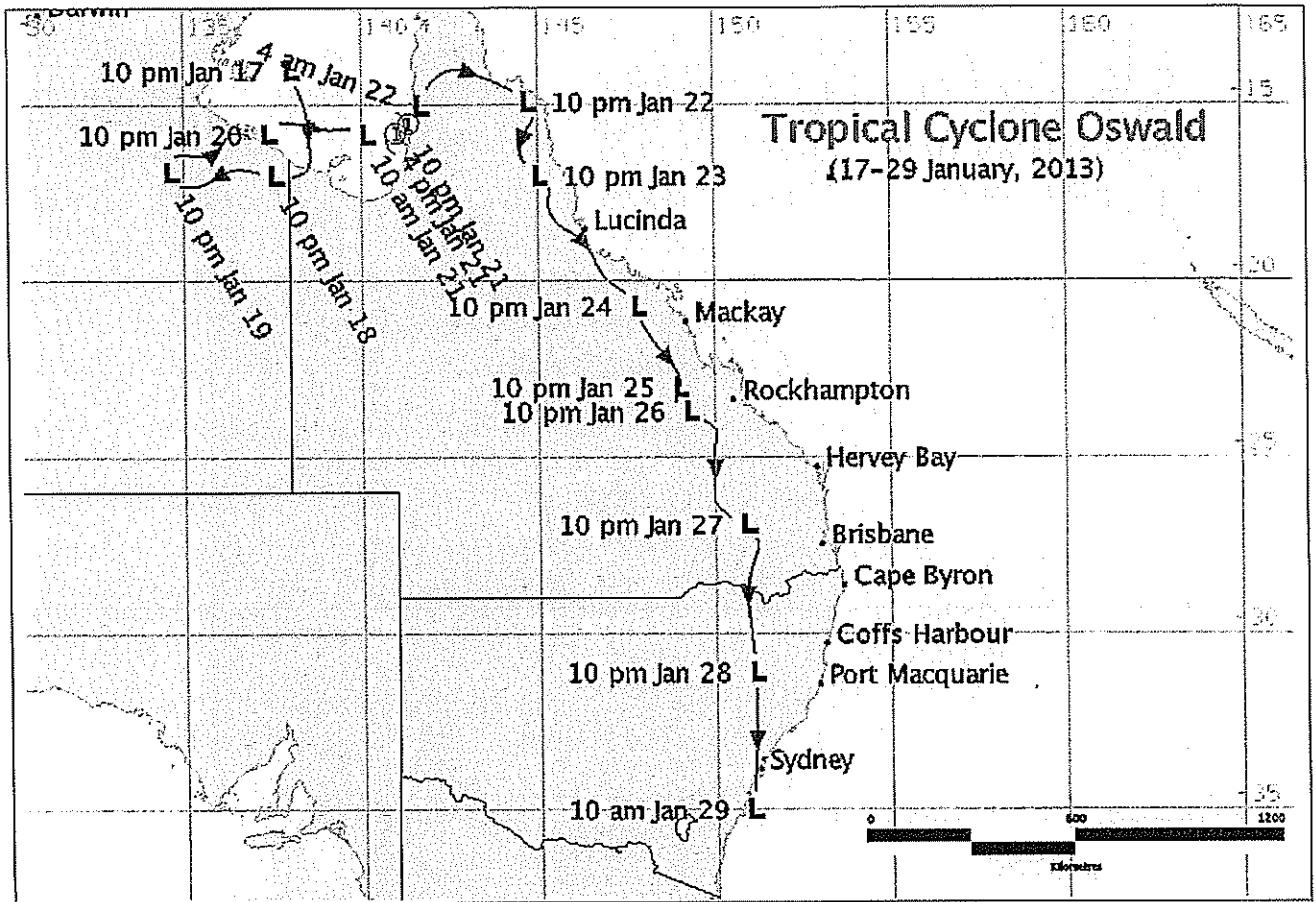
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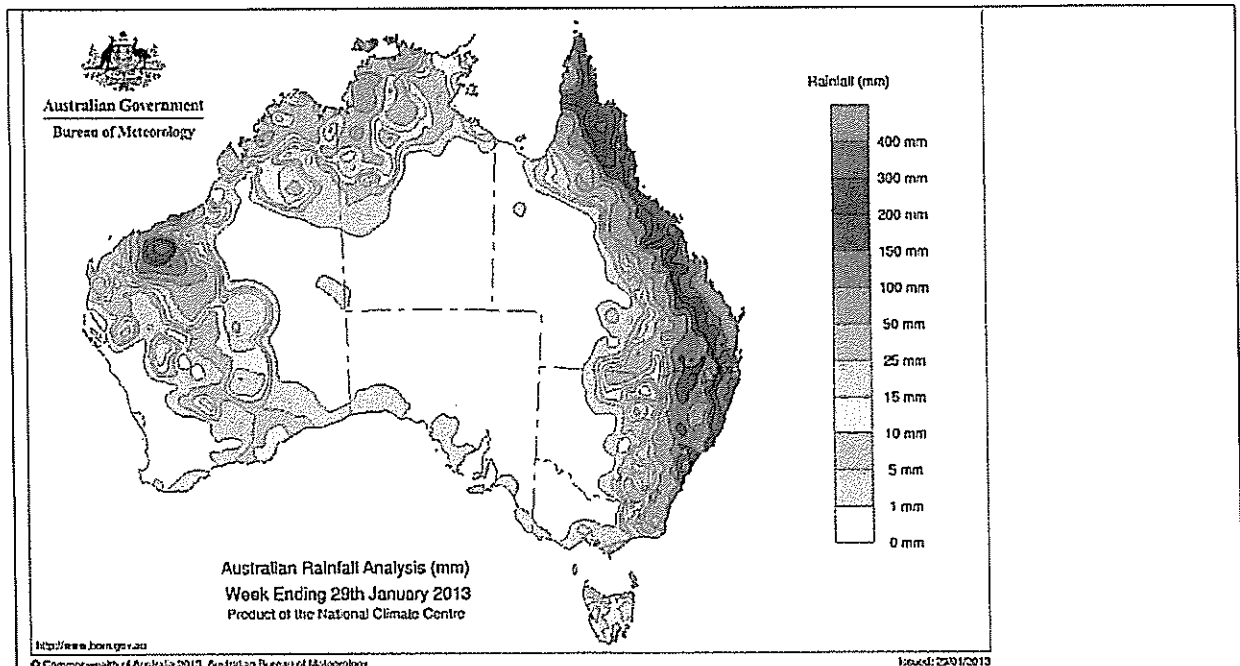
Australian Government  
Bureau of Meteorology

Note: As of 3rd February 2013 major flood levels are still affected towns in the Condamine and Weir River catchment

Flood affected towns in QLD and NSW – January 2013  
(Based on anecdotal evidence collected from briefs and media)

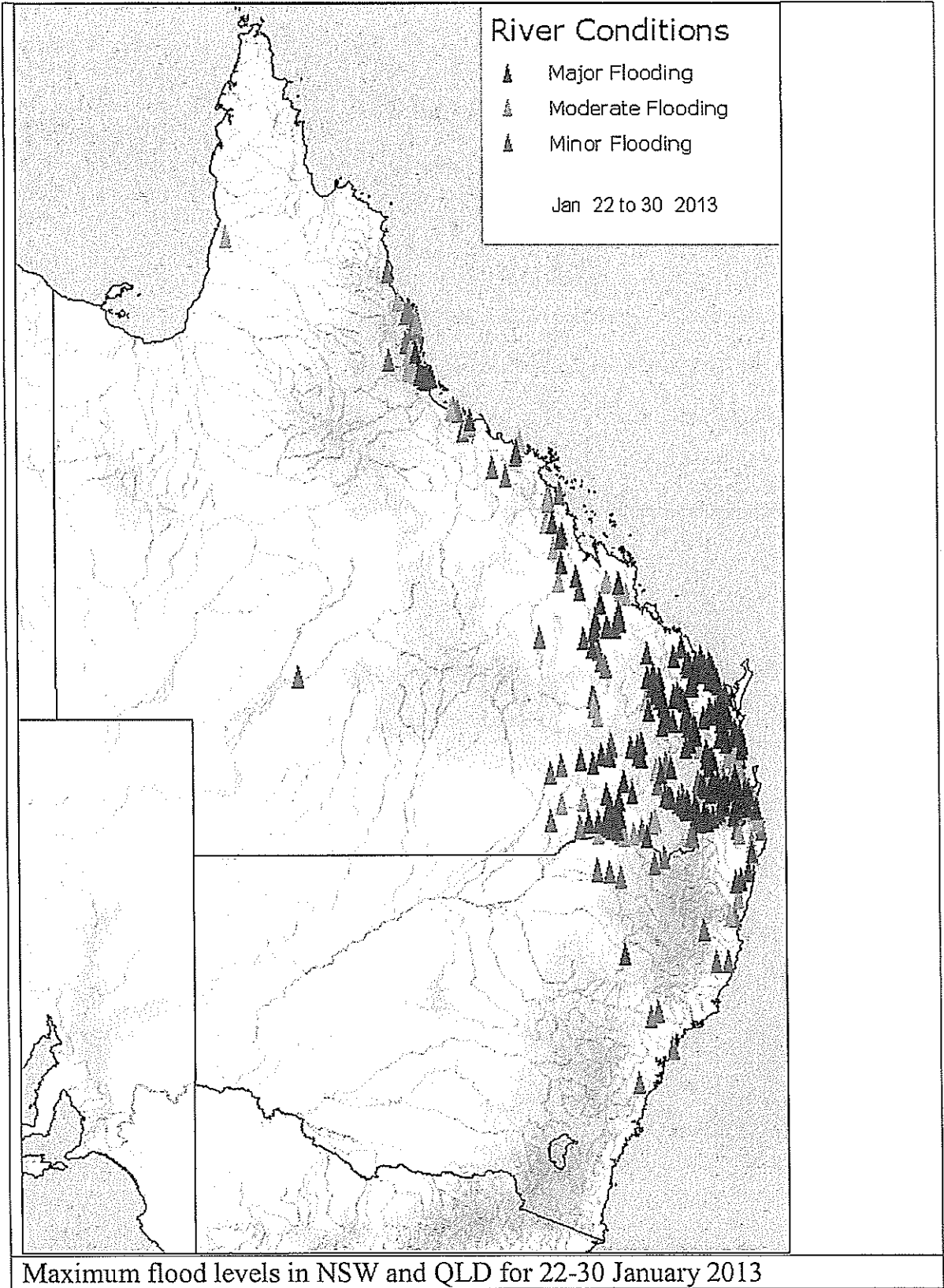


Track map for TC Oswald



Rainfall across east coast week ending 29<sup>th</sup> January

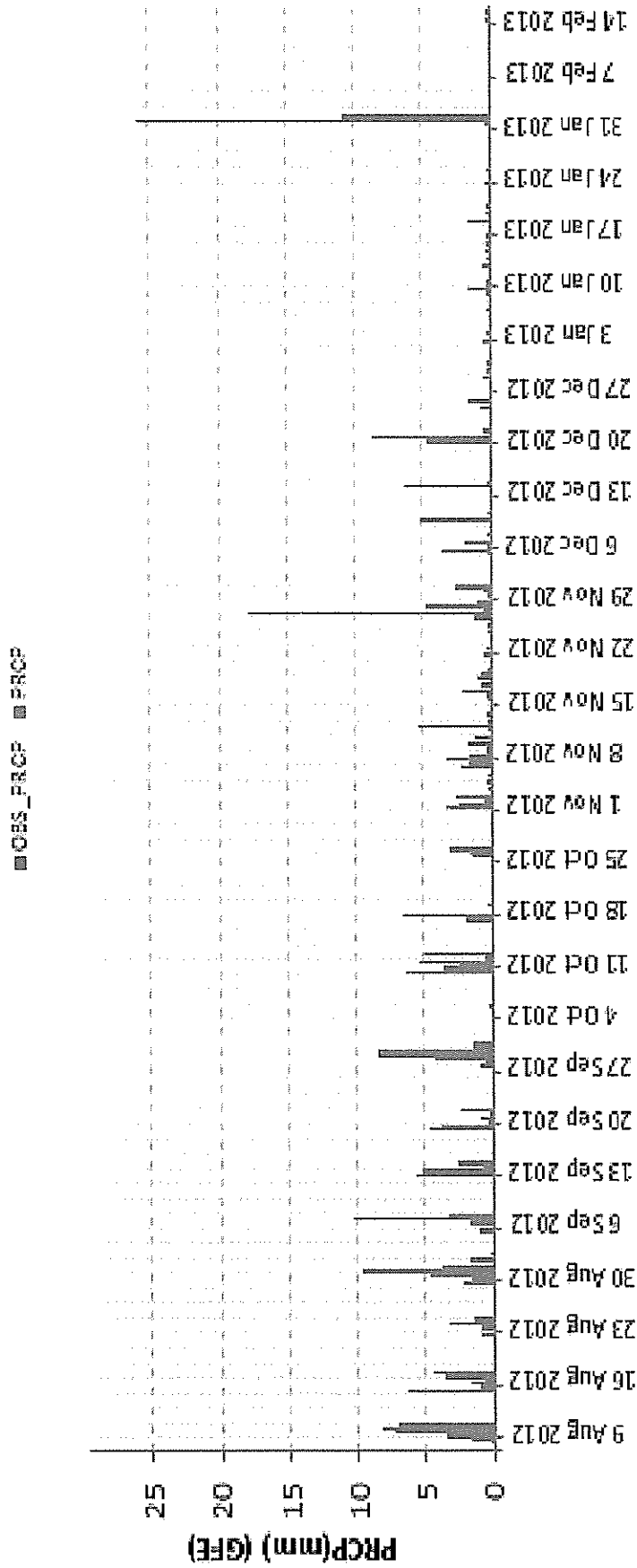
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Maximum flood levels in NSW and QLD for 22-30 January 2013

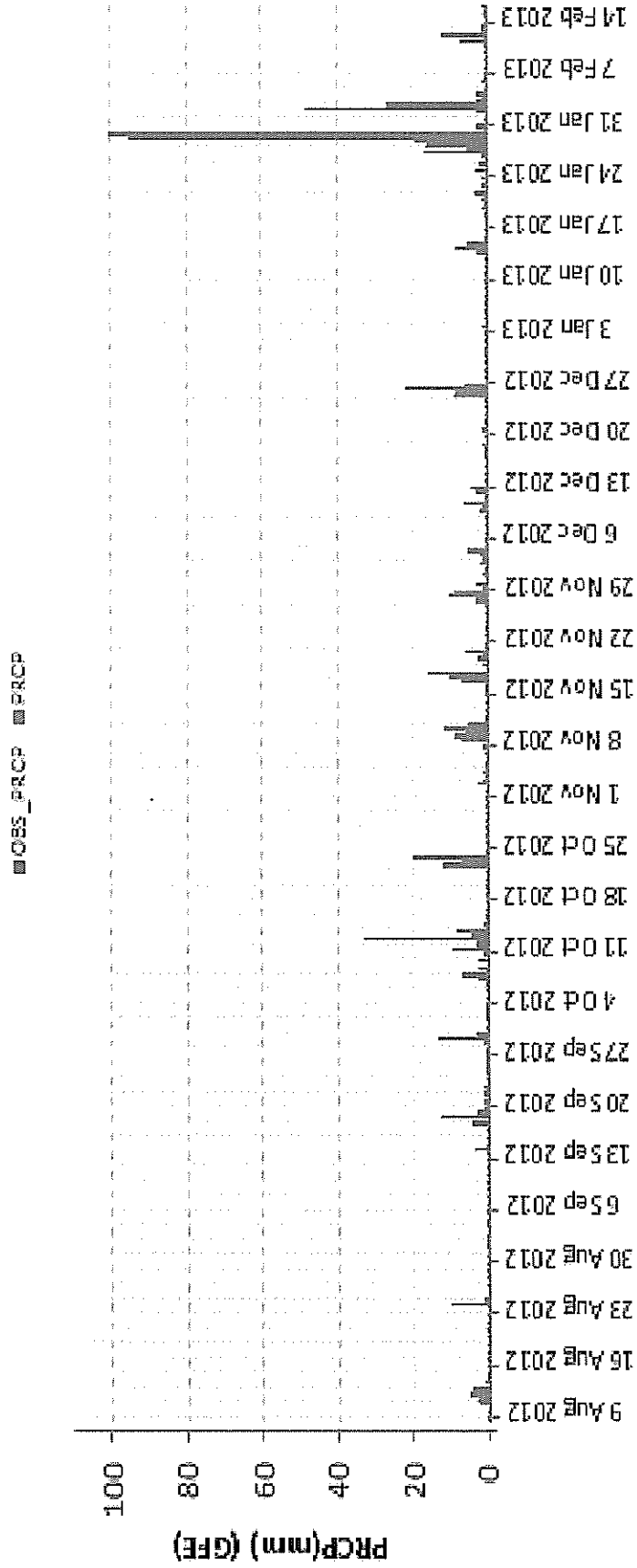
### Automated Rainfall Verification Statistics

Melbourne: August 2012 – Feb 2013



### Automated Rainfall Verification Statistics

Sydney: August 2012 – Feb 2013



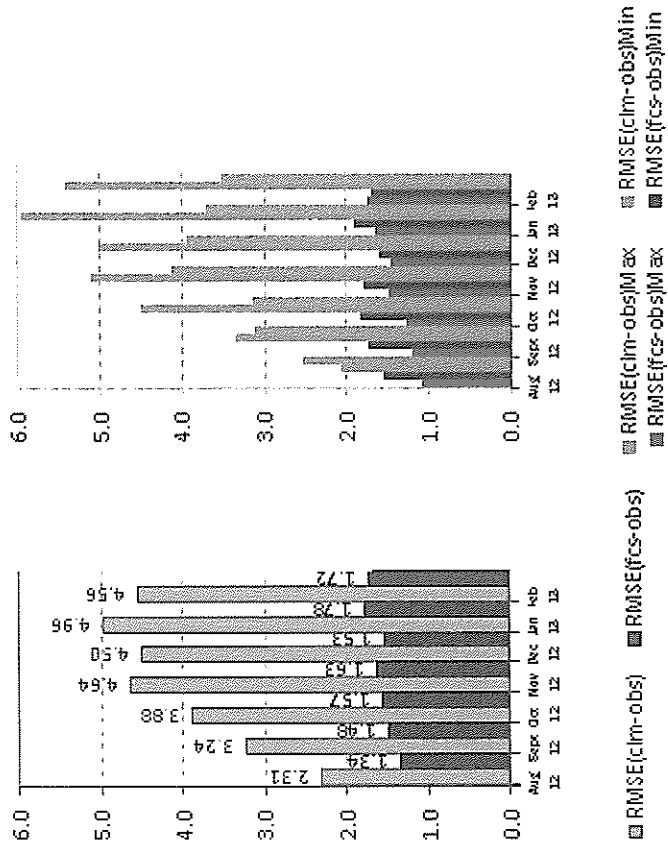
No GFE installation in Brisbane at this time

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## Automated Temperature Verification Statistics

Accuracy Performance Charts (VIC, Mildura, Shepparton, Melbourne, Ballarat, Warrambool, Day+1)

Aug 2012 – Feb 2013

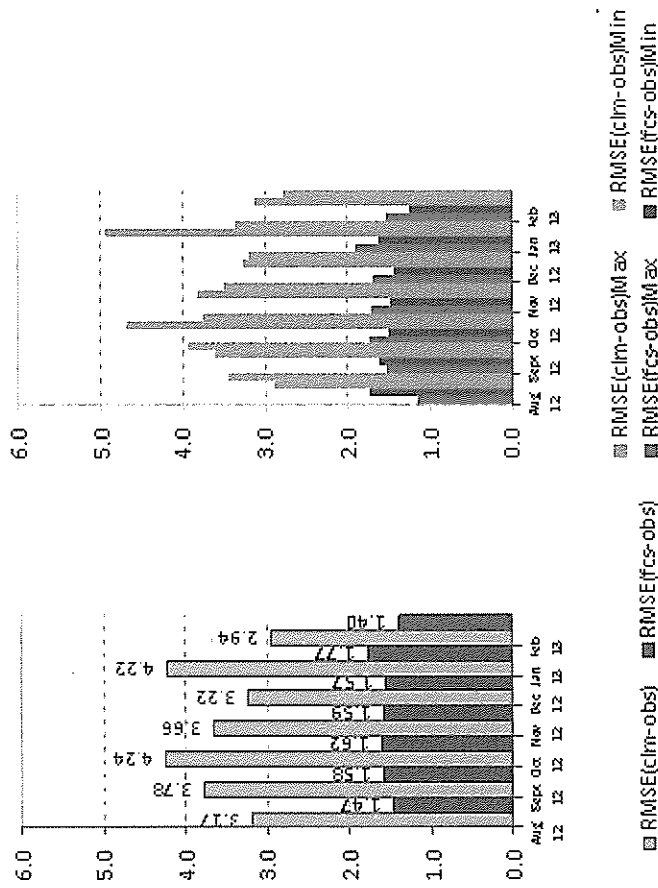


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## Automated Temperature Verification Statistics

Accuracy Performance Charts (NSW, Cobar, Moree, Coffs Harbour, Sydney, Wagga Wagga, Day+1)

Aug 2012 – Feb 2013





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## Automated Temperature Verification Statistics

Accuracy Performance Charts (QLD, Cairns, Mackay, Longreach, Brisbane, Charleville, Day+1)

Aug 2012 – Feb 2013

