Climate and Oceanographic Summary, Great Australian Bight 2014 - 11

Kirsten Rough – 16th December 2013

This is the eleventh 2014-season update of sea surface temperature, ocean currents and chlorophyll distribution in the Great Australian Bight (GAB). If anyone has any questions or further suggestions please call or email (details appear at the end of this document).

Summary:

The general GAB sea temperatures have remained stable over the past week. Upwelling in the eastern section of the GAB is keeping temperatures lower than those along the shelf edge.

Actual Sea Surface Temperature (SST) this past week:

- Western GAB at 130°E 33°S is 18.8°C
- Central GAB at 133°E 34°S is 18.0°C
- Eastern GAB at 135°E 35°S is 17.1°C

The warmth of the Leeuwin Current (LC) is still only just rounding the southwest corner of WA. A number of eddies seem to be blocking the progress of this current.

The next full moon is on the 18th December.

GAB Sea Surface Temperature (SST):

An update of the most recent water temperatures around Australia and through the GAB fishing grounds to the 15th December 2013 can be seen in Figure 1 and Figure 2. The temperature through the GAB continues to be on the cool side, ranging between 16 to 19.2°C. This week there are patches of warm water well south of the GAB area - between longitudes 131 - 132 east, and latitudes 36 - 37 south.

The cold water from the upwelling that occurred mid November in the South East of SA continues to influence the conditions in the GAB (both temperature and water colour).

The SST at a number of specific sites across the fishing grounds, averaged for the week to the 14th December are shown in Table 1.

Table 1: Sea Surface Temperatures at specific locations along the shelf and shelf break of the Great Australian Bight, co-ordinates as degrees, minutes, seconds (CSIRO 2013).

130°E 33°S is 18.8°C	131°E 32°S is 18.8°C	131°E 33°S is 18.2°C	132°E 33°30'S is 17.7°C
133°E 34°S is 18.0°C	134°E 34°30'S is 17.4°C	135°E 35°S is 17.1°C	136°E 35°30'S is 16.1°C

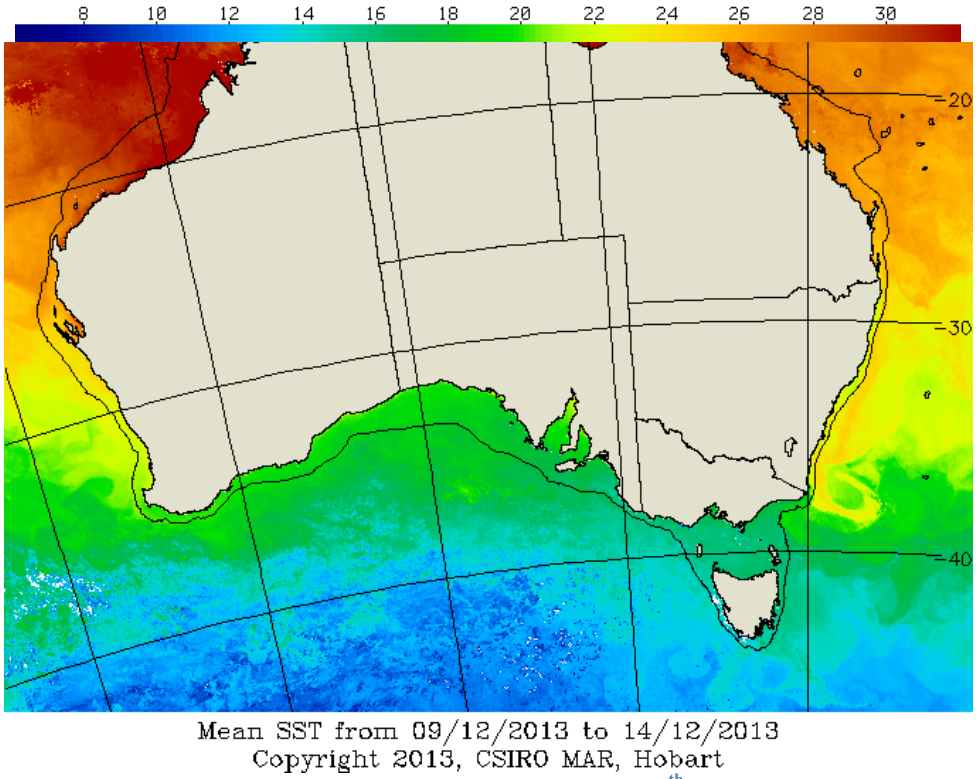

Figure 1: Sea Surface Temperature around Australia for the 5 days to 14th December 2013 (source: CSIRO 2013 http://www.marine.csiro.au).

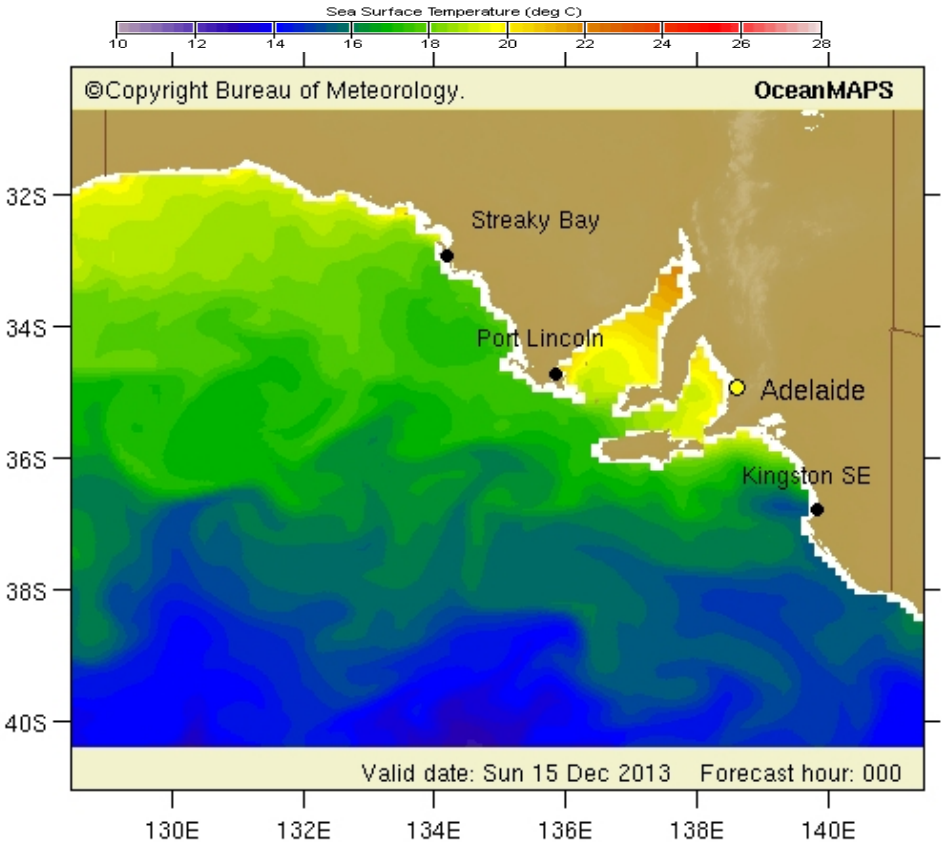

Figure 2: South Australian sea surface temperature from the Bureau of Meteorology website for the 3 days to the 15th December 2013 (source: Bureau of Meteorology 2013; http://www.bom.gov.au).

To put the water temperatures into context the SBT Habitat Forecasting project determines the profile of the sea surface temperature along the shelf break (200m depth contour) as shown in the graph below (Figure 3). The blue line is the water temperature, the grey shaded band represents

temperatures preferred by SBT recorded from archival tags, the grey line is the lower range of preferred temperature from a wider range of data sources. Please note that this project is ongoing and there are likely to be more changes as work continues.

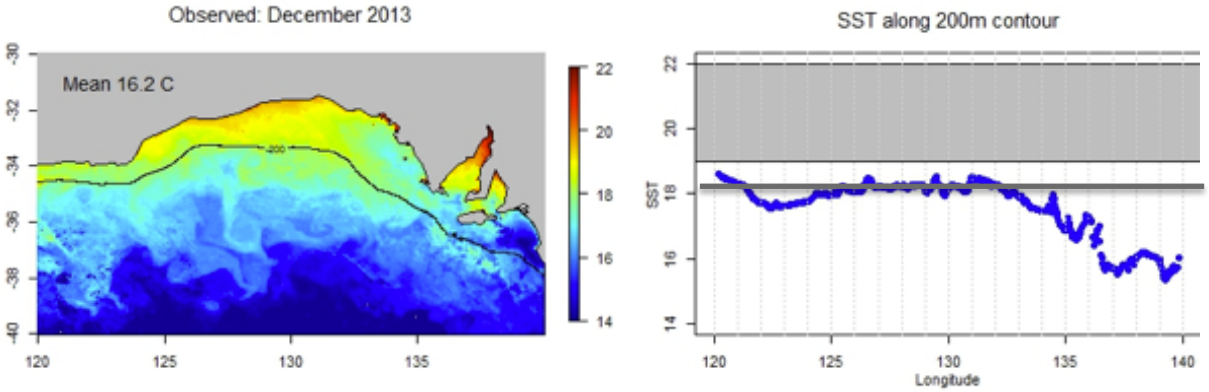

Figure 3: Sea Surface Temperatures from the ASBTIA-CSIRO habitat-forecasting project (2nd Dec 2013): satellite view on left, graph of temperature along the 200m depth contour on right.

Leeuwin Current Temperature:

Sea surface temperatures and ocean currents around the Western Australian coastline for the 8th and 9th December 2012 and 2013 are shown below (Figure 4). The actual SST off the coast of North West Cape (Exmouth) is 27.2°C, out from Cape Inscription (Shark Bay) is 24.0°C, out from Cape Leeuwin (Augusta) is 19.5°C and out from Esperance is 18.7°C (CSIRO 2013). Other currents that work against the Leeuwin Current are creating eddies and effectively preventing it from progressing into the GAB area.

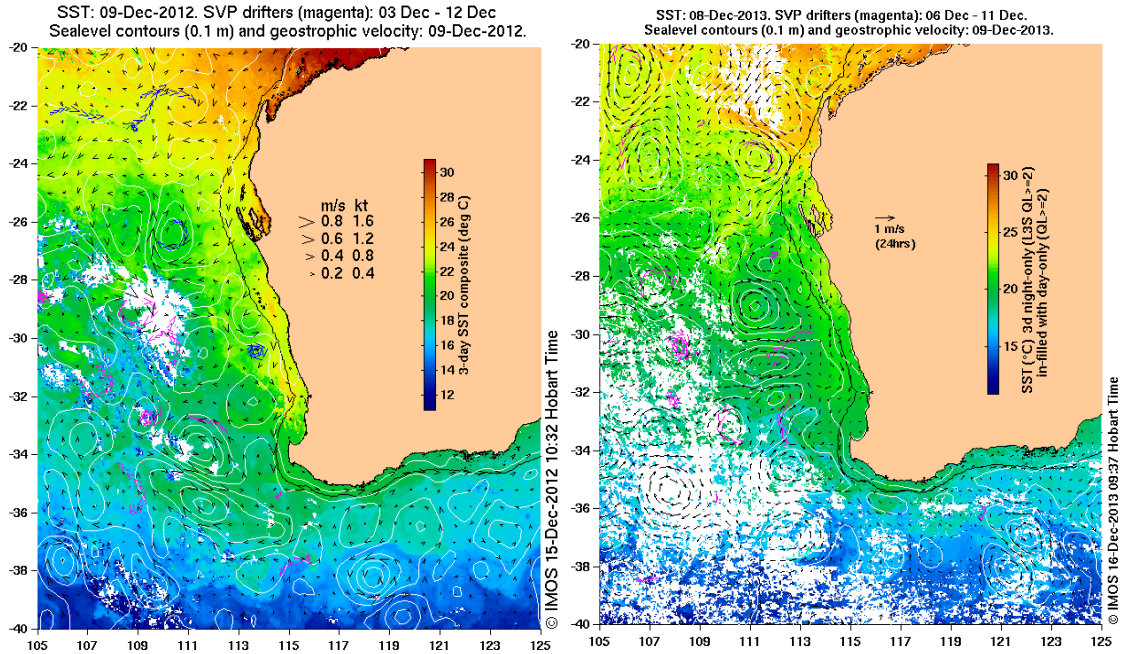

Figure 4: A comparison of the Leeuwin Current sea surface temperature and current speed and direction for the 8th and 9th December 2012 (left), 2013 (right) (Source: IMOS 2013; http://www.oceancurrent.imos.org.au).

Chlorophyll / Productivity:

Cloud cover has blocked satellite images of the GAB for much of the past week, but there was a very clear image of the area yesterday (Figure 5). The productivity along the inshore areas continues to be associated with the cool water of the upwelling reported in previously. There now appears to be large

areas of chlorophyll accumulating to the southwest of Eyre Peninsula, well south of the shelf break (the northern tip of this is shown in the picture below).

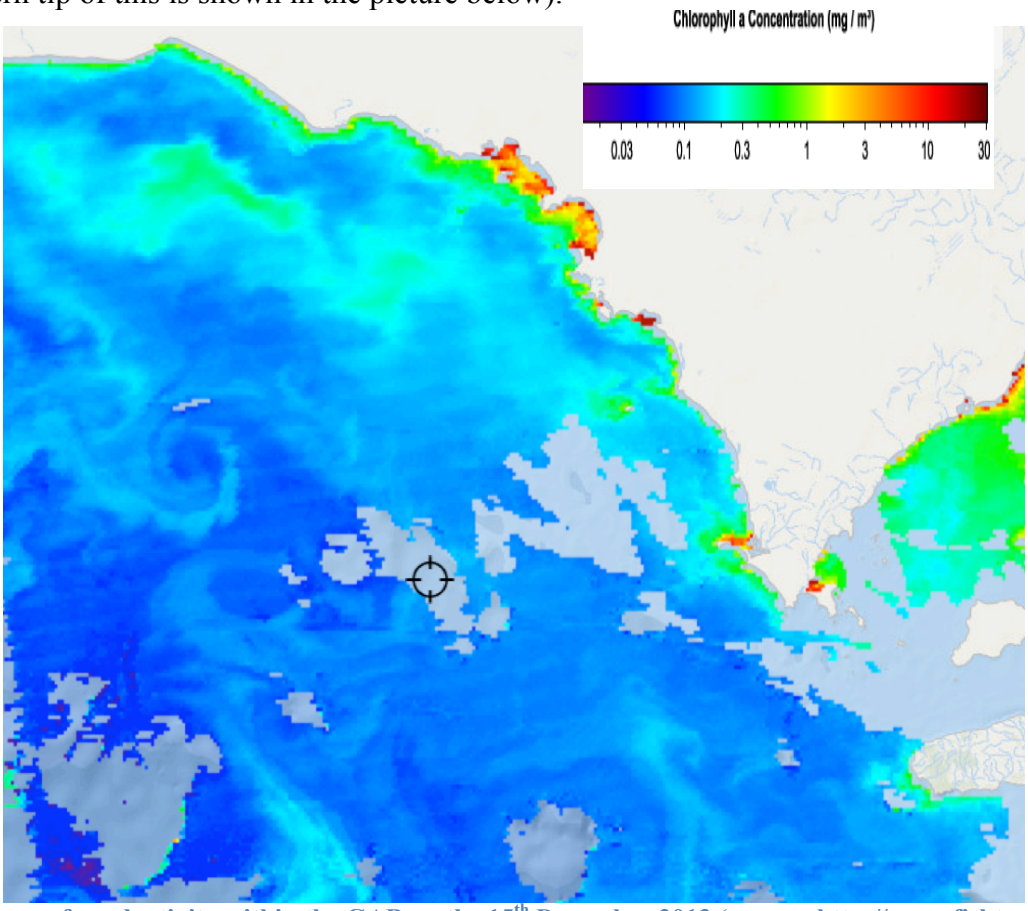

Figure 5: Areas of productivity within the GAB on the 15th December 2013 (source: http://www.fishtrack.com).

Climate and Ocean Trends:

The Bureau of Meteorology (BOM) continues to formally declare the Pacific Ocean Climate System as NEUTRAL through the upcoming fishing season. This is a similar situation to the last fishing season and the situation coming into the 2010-fishing season. This means there is no strong La Nina or El Nino signal. However, as you can see from Table 2 below there is a tendency for La Nina conditions through the pre-fishing period, the same as last year, but these are generally not strong or persistent enough to push a stronger Leeuwin Current through the GAB this summer.

Table 2: Southern Oscillation Index (SOI) coming into this season, and through the past 5 fishing seasons (source: Bureau of Meteorology 2013).

SEASON	Sep	Oct	Nov	Dec	Jan	Feb	Mar
2008-09	14.1	13.4	17.7	13.3	9.4	14.8	0.2
2009-10	3.9	-14.7	-6.7	-7.0	-10.1	-14.5	-10.6
2010-11	25.0	18.3	16.4	27.1	19.9	22.3	21.4
2011-12	11.7	7.3	13.8	23.0	9.4	2.5	2.9
2012-13	2.7	2.4	3.9	-6.0	-1.1	-3.6	11.1
2013-14	3.9	-1.9	9.2	*7.1**			

7.1 this is the value for the previous 30days NOT a final December value*

Forecasts from the other systems are suggesting that the situation experienced (e.g. weather patterns) over the past few weeks will persist for at least the next 2-3 weeks. From a likely sea temperature

perspective, Figure 6 shows the situation of where the warmer water bodies were located through December 2012 (coming into the 2013-fishing season) and where they are located now (past 7-days). The warmer water masses in the Indian Ocean are currently located further away from Australia than they were through December last year.

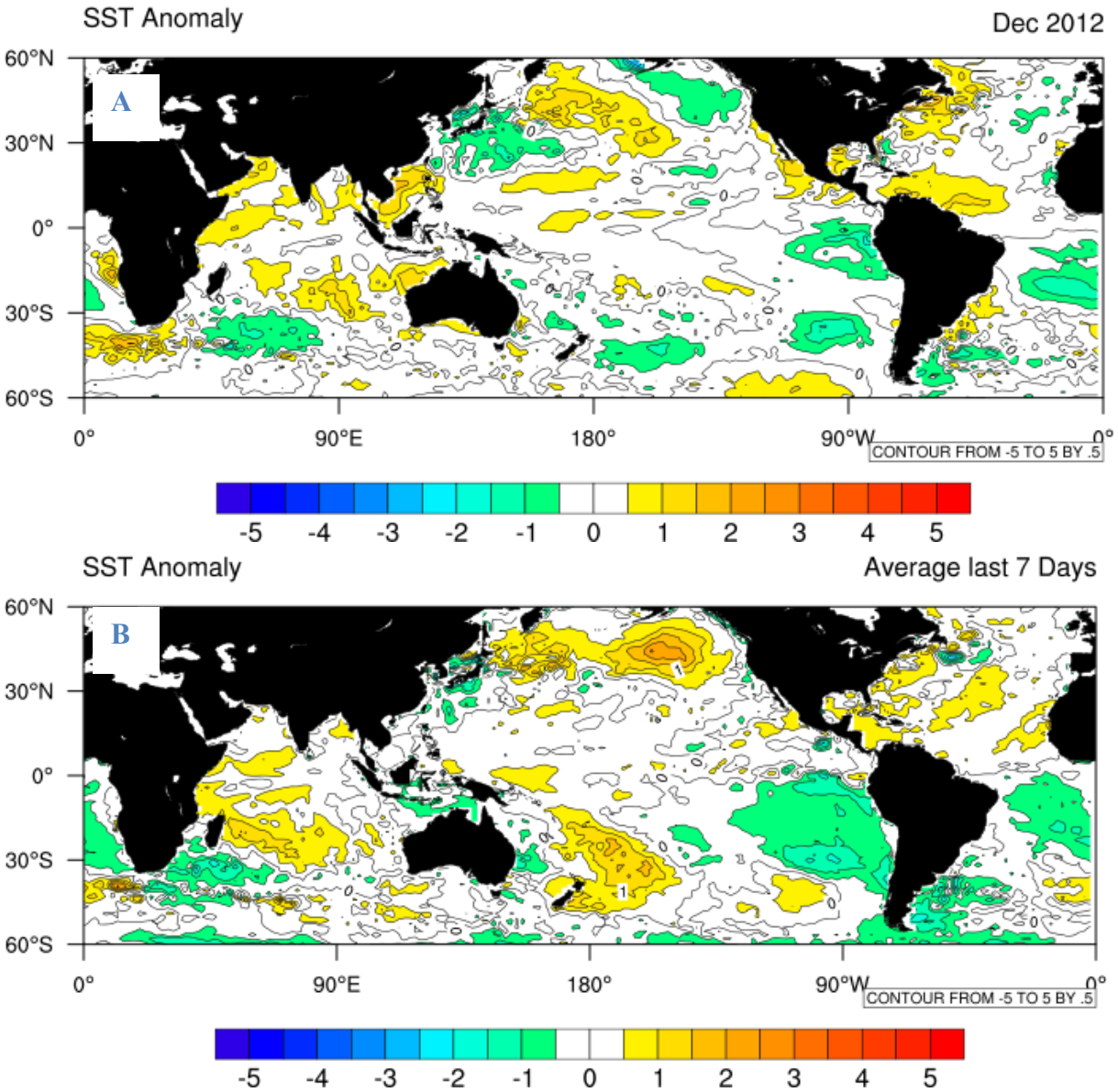

Figure 6: Global sea surface temperature anomalies (i.e. areas that are warmer or cooler than the long-term average) - (A) shows the situation December 2012; (B) shows the situation for the past 7 days December 2013. Take note of the location of the yellow (warmer) areas in the Indian Ocean (Bureau of Meteorology 2013).

Useful Websites:
http://www.bom.gov.au
http://www.csiro.au
http://www.fishtrack.com
http://www.oceancurrent.imos.org.au

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