

# Climate and Oceanographic Summary, Great Australian Bight 2019 - 8

Kirsten Rough – 23<sup>rd</sup> January 2019

Please find below the latest update for recent and expected conditions for the 2019-fishing season. Please don't hesitate to call or email if there are any questions, contact details and links to the various websites used are listed at the end.

## **Summary:**

Recent weather is continuing to contribute to warming over a broad area of the GAB sea surface.

The outlook remains that there are no indications that fish will leave the GAB at an unusually early point in time. However the very wide area of suitable temperature is likely to mean that fish continue to have patchy distribution over a wider area than seasons past.

The upwelling continues to be a significant feature of sea temperature images with regular large pulses of cold water that are particularly obvious in the sea floor regions of lower and western Eyre Peninsula. There continues to be large temperature differences of 3-5°C between the sea surface and the sea floor at most historic and recent fishing locations.

The upwelling and ocean circulation so far this season is leading to a very wide distribution of productive areas that should be highly suited to SBT. Nutrient input from the upwelling and sunny conditions means that 'productivity levels' in an area can change to become favourable or unfavourable over very short time frames (days).

The government has now approved the large seismic survey below Eyre Peninsula. This is the survey proposed by Norwegian company PGS; that we have managed to prevent from occurring through the 2017, 2018 and 2019-fishing seasons. The survey covers 30,000km<sup>2</sup> and is scheduled to occur over 2 seasons starting 1<sup>st</sup> September 2019 to 30<sup>th</sup> November 2019 and 1<sup>st</sup> September 2020 to 30<sup>th</sup> November 2020. This is a significant concern.

Fishing and Towing skippers, please keep note of any jellyfish contacting tuna in purse shots or passing through tow nets (note location, take photos, collect samples and keep fresh in sea water or freeze).

## **Long-term Forecasts of Sea Surface Temperature (SST):**

The sea surface temperature and SBT habitat distribution across the broader area of the GAB over this past week is shown in Figure 1. In these images green and bone/tan colour denotes areas 'highly suitable' for SBT.

Forecasts for the remainder of the fishing season are shown in Figure 2.

Better resolution of these forecasts is now possible so a funding application is being prepared so that a project can develop these for future fishing seasons. Please put forth any ideas for items that might be useful to include through the redevelopment.

The current website includes observed conditions, historic conditions (previous week and by month previous 10 years), and forecast conditions (at time points 2-weeks, 4-weeks, 8-weeks, 12-weeks into the future).

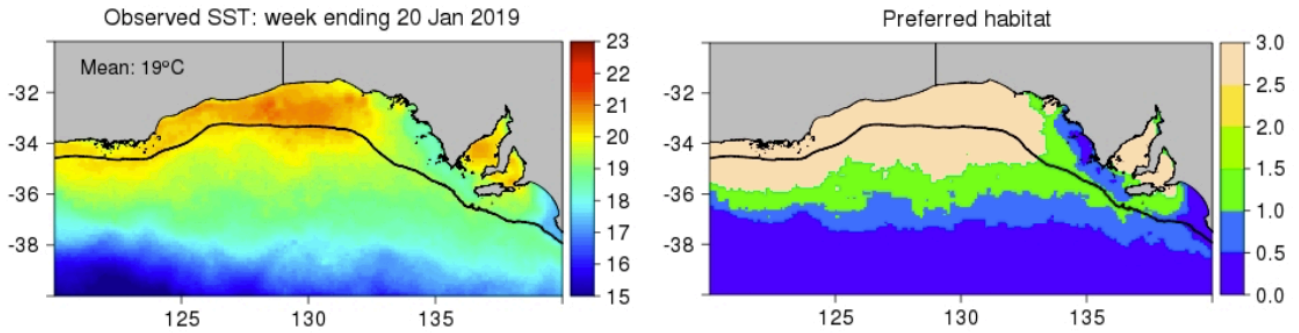


Figure 1: Now-cast of the sea surface temperature and SBT habitat situation over the week up to 20th January 2019 (CSIRO 2019)

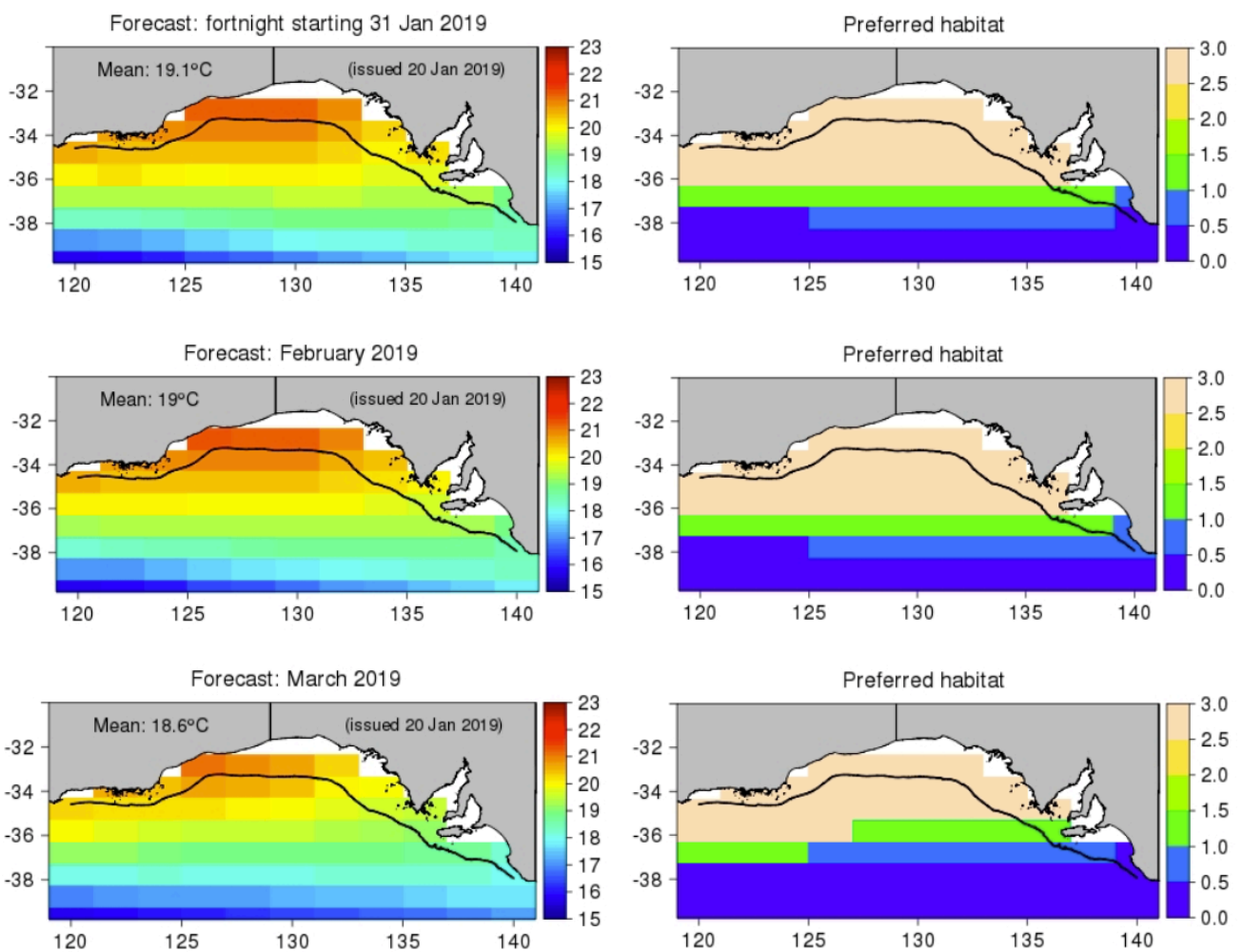


Figure 2: Longer term forecast of sea surface temperature and habitat distribution for 1st half of February (top); latter half of February and start of March (middle); and from mid March (bottom). (CSIRO 2019)

**GAB Sea Surface Temperature (SST):**

The situation across the broader area of the GAB over the past week is shown in Figure 3. This year continues to have less input from the Leeuwin Current rounding the southwest corner of WA. There continues to be a very broad area of upper layer or surface warmth across the area including crossing the border into Bass Strait.

The most recent fine-scale Sea Surface Temperature and short-term forecast are shown by the images in Figure 5. These images are clearly showing that the cold upwelling is continuing to have a major influence on water temperatures, showing as cool regions at the sea surface along the coast of western and lower Eyre Peninsula, western Kangaroo Island and down the South East of SA.

Sea Floor Temperature images are showing cold water upwelled from the deep Southern Ocean basin is also sitting along the sea floor of a large area of the shelf, particularly noticeable in the Kangaroo Island Pool and Bonney Upwelling areas (Figure 5).

It is turning into a somewhat difficult season for predicting tuna locations because the area of suitable surface temperature, i.e. inside the 18 and 20°C contour lines, is very widespread and extending beyond the area of the images. While sea floor temperatures remain very cool over a much wider area than previous seasons where we have had the ability to monitor this.

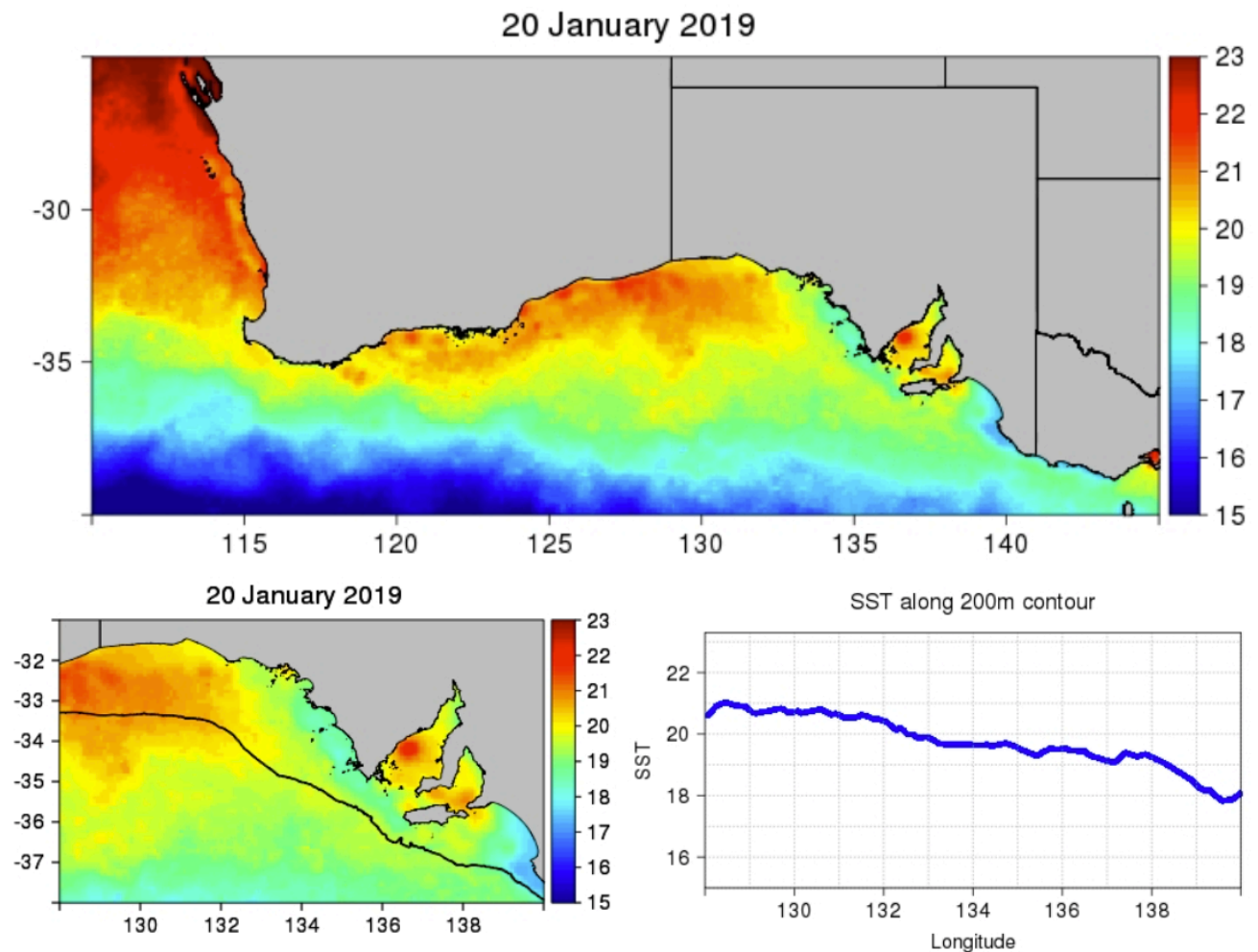


Figure 3: GAB Sea Surface Temperatures for the 3-day period centered around the 20<sup>th</sup> January 2019, for southern Australia (top) and between longitudes 128° to 140° (bottom). In these images aqua to orange are highly suited to SBT (CSIRO 2019 - GAB Forecasting Website).

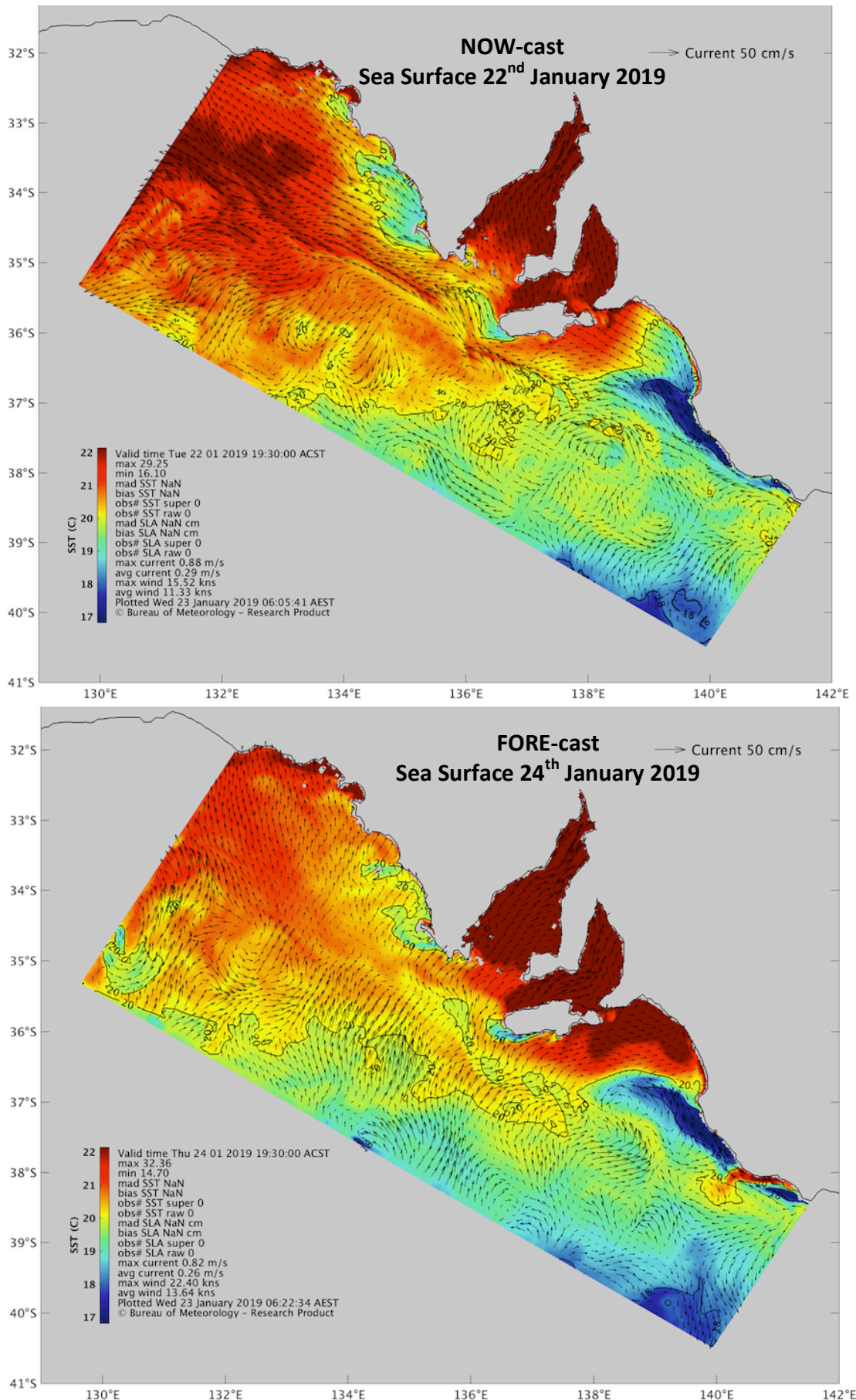


Figure 4: Fine scale SEA SURFACE Temperature and local currents on the 22<sup>nd</sup> January 2019, now-cast (TOP); and Fore-cast conditions for the 24<sup>th</sup> January (BOTTOM). The 18°C and the 20°C temperature contours are marked; please check the colour scale on each image for the ACTUAL temperatures that various colours represent (SARDI-BoM 2019)

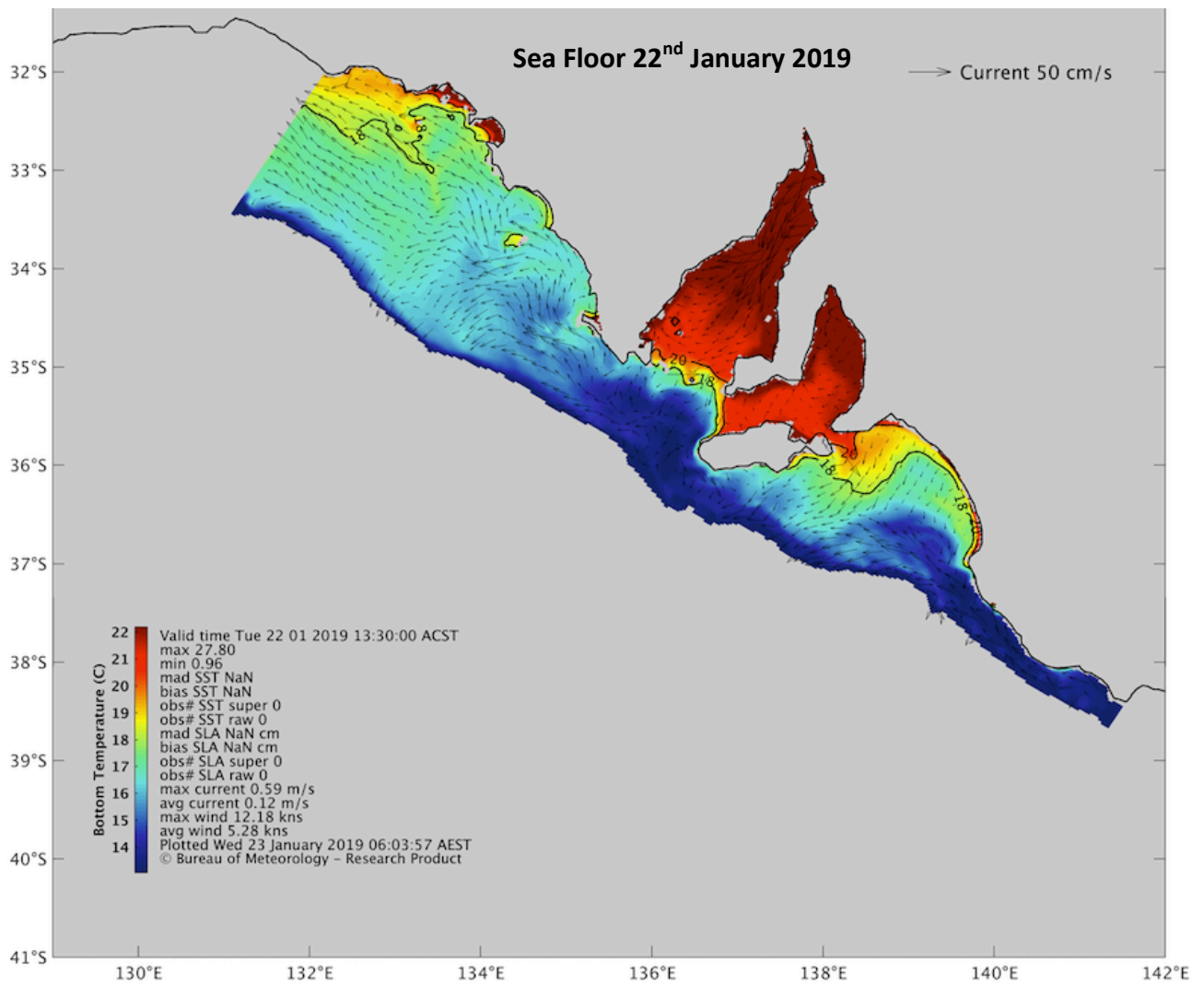


Figure 5: Fine scale SEA FLOOR Temperature and local currents on the 22<sup>nd</sup> January 2019. The 18°C and the 20°C temperature contours are marked; please check the colour scale on each image for the ACTUAL temperatures that various colours represent (SARDI-BoM 2019)

### Chlorophyll/ Productivity levels:

Clear skies have given good satellite coverage of water quality across the broader GAB area (Figure 6). Coastal inshore areas along western Eyre Peninsula and through the Bonney upwelling zone in the South East continue to have high productivity levels that would appear discoloured or 'dirty' by eye. The larger area of the shelf and beyond the shelf-break has productivity levels perfect for tuna.

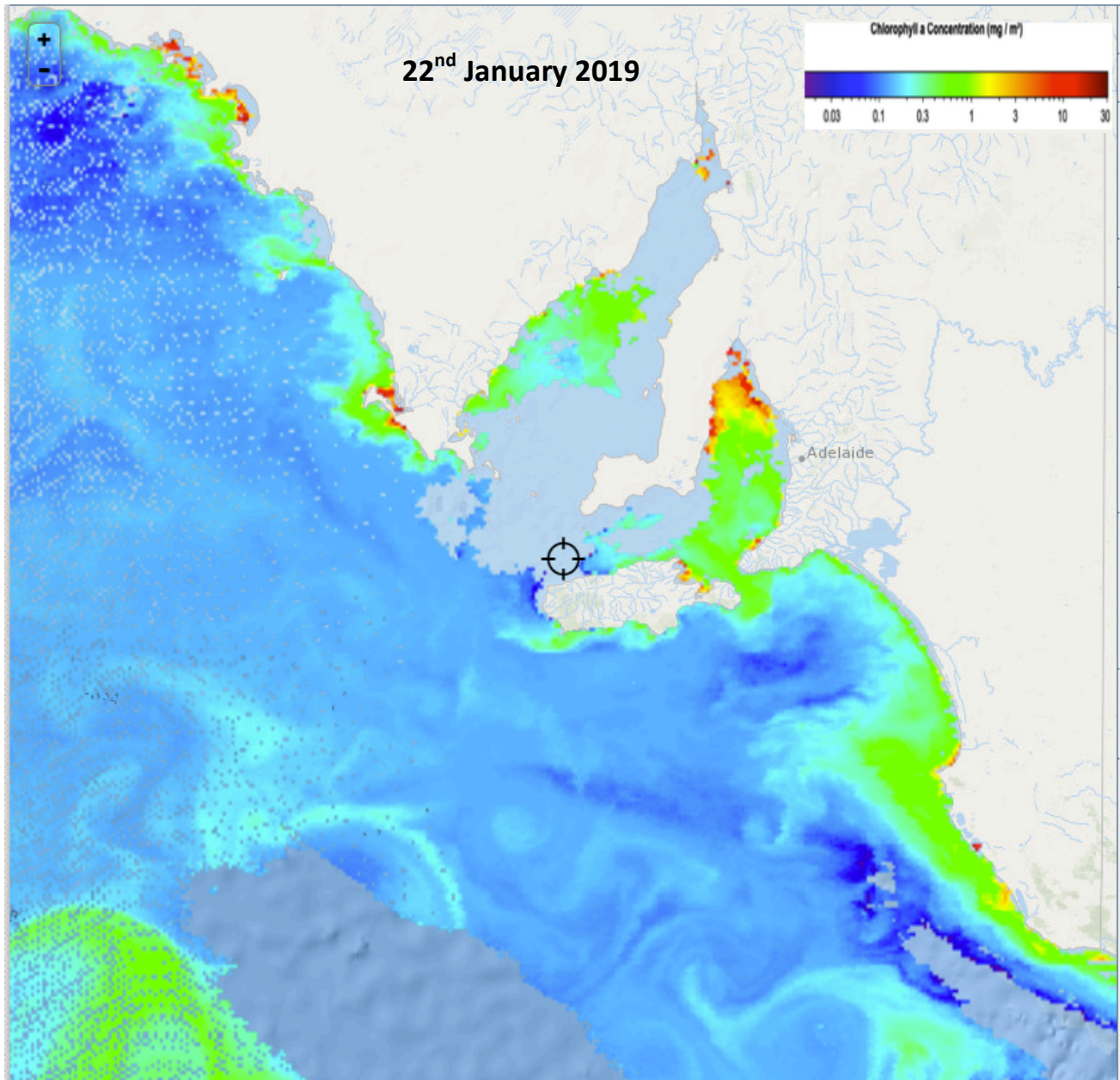


Figure 6: Chlorophyll plot covering the area from the Head of the Bight to the Victorian border taken on the 22<sup>nd</sup> January 2019. Pale blue-grey areas have no readings due to cloud cover. (FishTrack 2019)

## Seismic Survey Update:

The Tuna Association has been very actively involved in the consultation process of petroleum activities in the GAB after the BP seismic survey that occurred in 2012; including contributions towards improving regulations when policy reviews are undertaken.

The current situation in the GAB is largely due to the federal government opening up the entire region to international 'bidding' to encourage exploration from 2009. As such, many of the areas were actually allocated to various multinational companies before the 1<sup>st</sup> large-scale 3D seismic survey to ever occur in the GAB took place (this was the survey done for BP, by PGS in 2012).

PGS proposed to undertake large-scale seismic surveys through the 2017- fishing season, the points we made repeatedly to the company and to the regulator has meant this survey was not approved to operate through the 2017 or the 2018 or the 2019-fishing seasons. However, despite our continued concerns, the survey was approved on the 14<sup>th</sup> January to operate through the migration period of SBT for the next 2 fishing seasons (i.e. between 1<sup>st</sup> September 2019 to 30<sup>th</sup> November 2019 and between 1<sup>st</sup> September 2020 to 30<sup>th</sup> November 2020). The regulator has stipulated a number of conditions related to these surveys, which may have an influence over whether PGS intends to continue.

The link to read the conditions is at the end of this document (NOPSEMA decision notification).

The following maps show the actual survey area (Figures 7, 8 & 9).

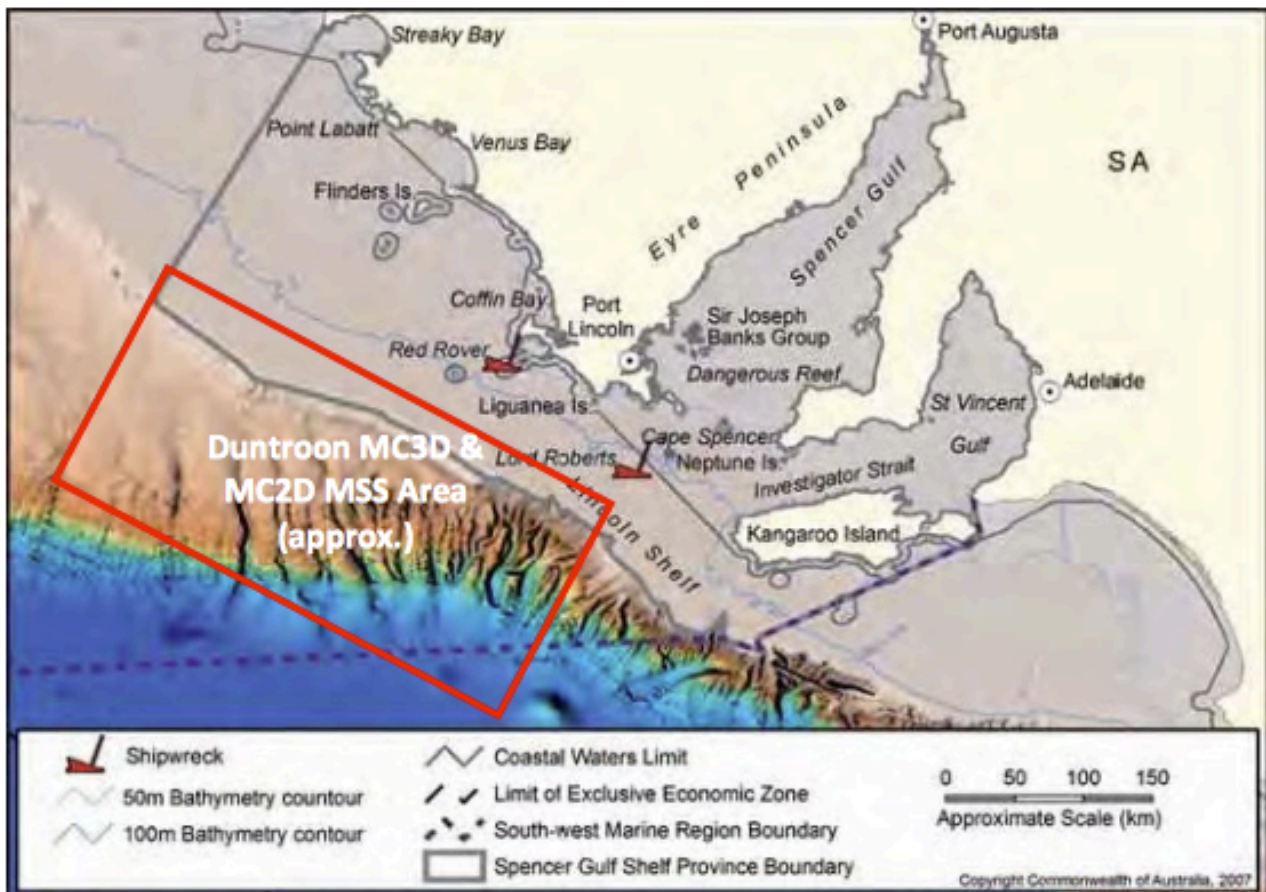


Figure 7: Location of the PGS seismic survey area, showing the proximity to canyons and the fishing areas of Rocky Island and Cabbage Patch

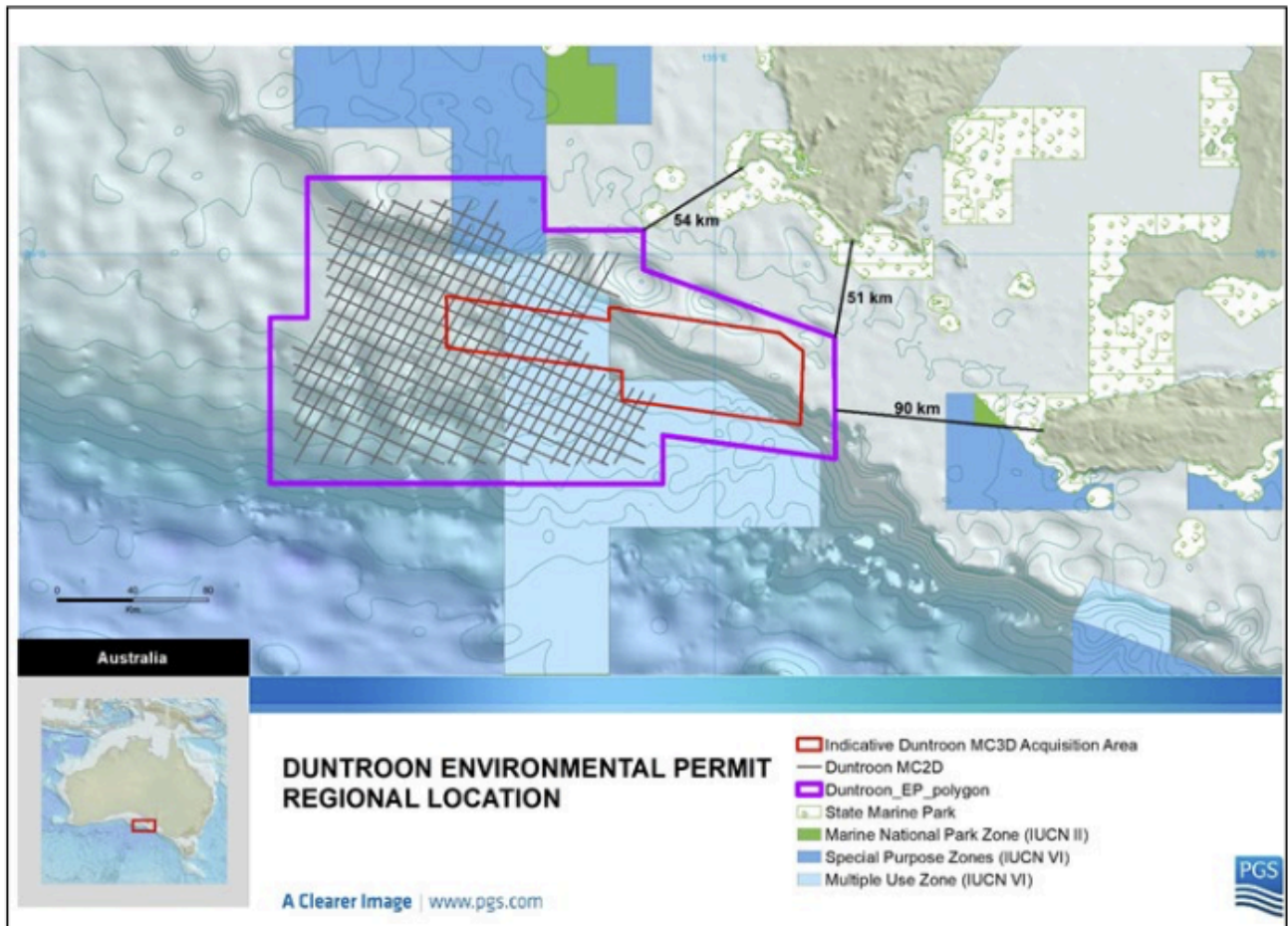


Figure 8: The PGS seismic survey area showing transect lines for the 2D component (ie 2 or 3 sets of air guns and a single streamer of hydrophones) and outline of the area for the 3D component (ie 2 or 3 sets of air guns, very close transect lines and 12 streamers of hydrophones)



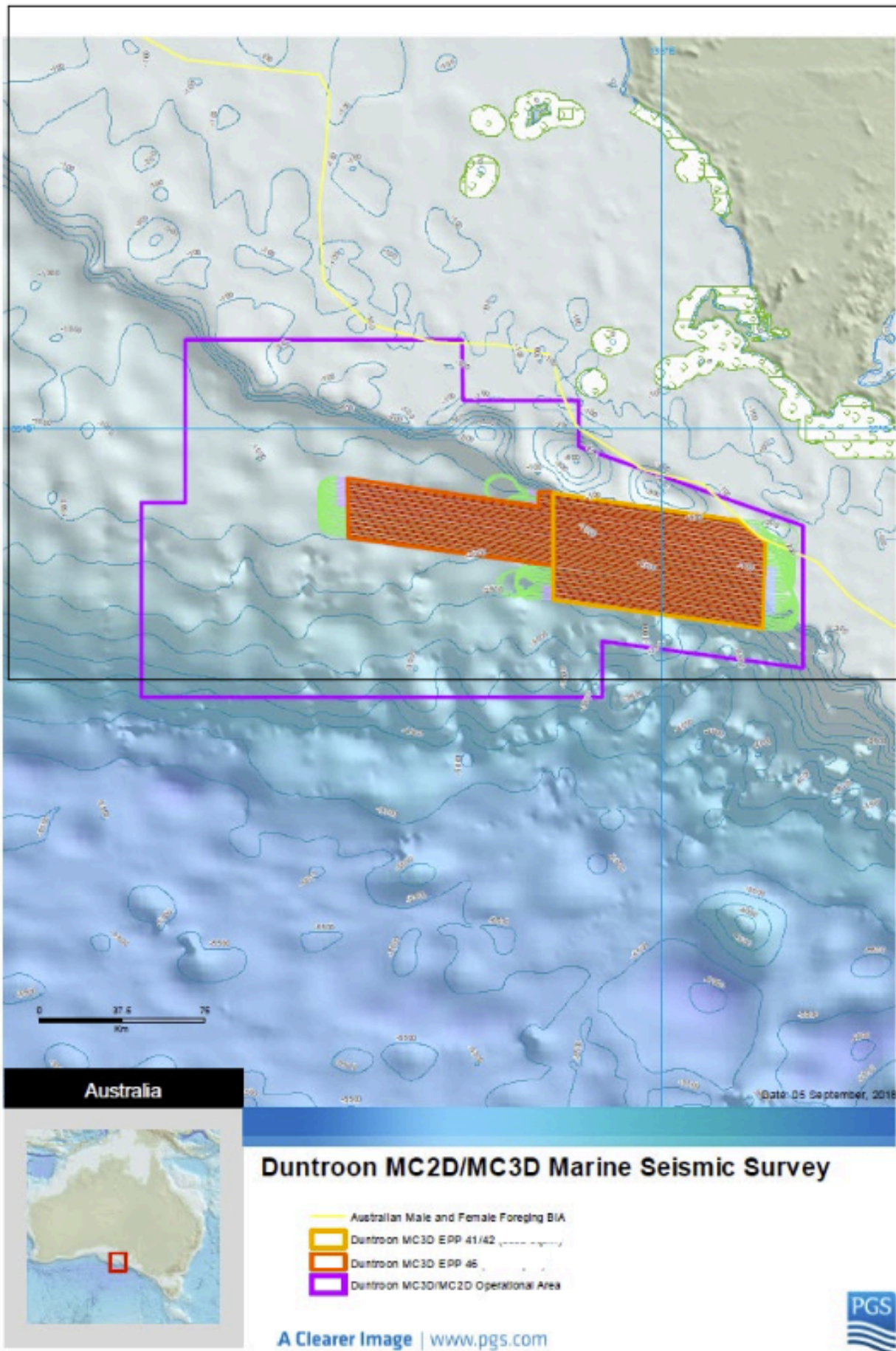


Figure 9: the PGS seismic survey area with the 3D transect lines shown

Any questions on any items in this update – please don't hesitate to call or email; contact details and links to relevant websites are listed here:

GAB SBT Habitat Forecasts (CSIRO): <http://www.cmar.csiro.au/gab-forecasts/env-observed.html>

eSA Marine (SARDI BoM): [http://pir.sa.gov.au/research/esa\\_marine/sarom](http://pir.sa.gov.au/research/esa_marine/sarom)

Bureau of Meteorology: <http://www.bom.gov.au>

NOPSEMA seismic survey decision notification:

<https://www.nopsema.gov.au/environmental-management/activity-status-and-summaries/details/387>

Commonwealth Marine Parks: <https://parksaustralia.gov.au/marine/parks/>

State Marine Parks: <https://www.environment.sa.gov.au/marineparks/maps-and-coordinates>

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