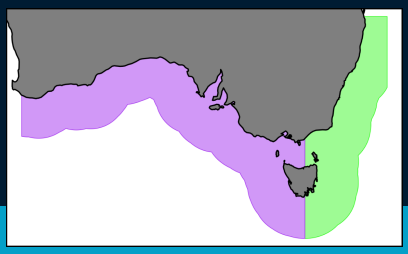
Climate & Ecosystem Status Report

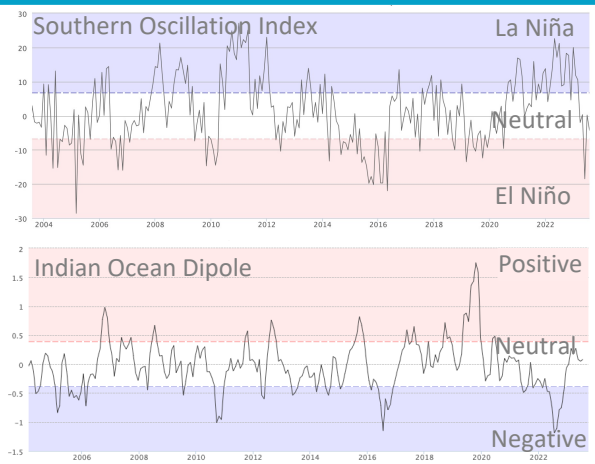
Southern Bluefin Tuna Fishery

August 2023

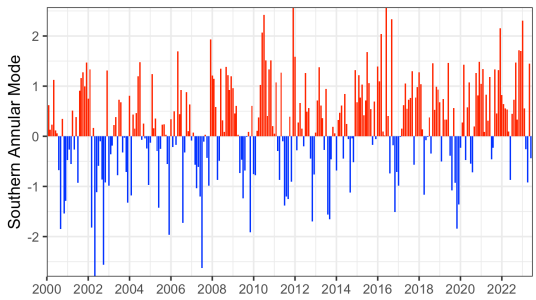


Historical Period

Climate Drivers

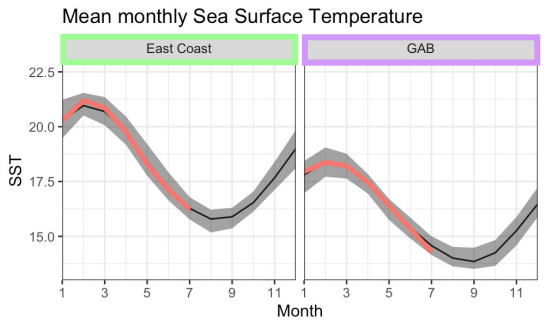


Historical phases of ENSO (link), and the IOD (link)[1].

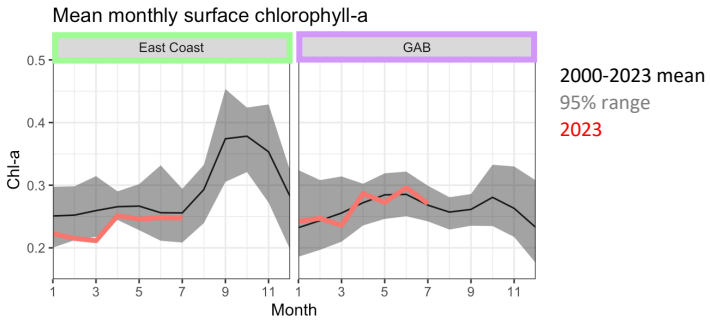


Southern Annular Mode indicates the north-south movement of strong westerly winds that bring storms and cold fronts to southern Australia. Positive phases have become more common over time, where westerlies move poleward[1,2] (link).

Regional Dynamics: Surface Temperature and Chlorophyll-a

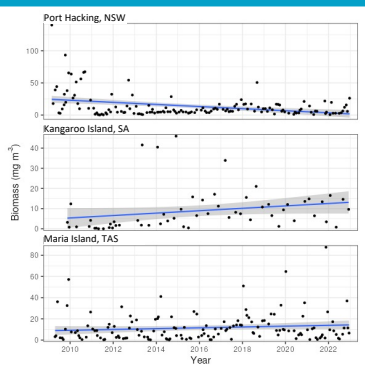


Regional dynamics (see map) of SST from year 2000, with the red line showing 2023[3]. Temperatures are similar to what has been seen since 2000.



Regional dynamics (see map) of surface chlorophyll-a from year 2000, with the red line showing 2023[3]. Chl-a on the east coast is low in 2023, but the GAB is similar to conditions since 2000.

Ecosystem and Fishery



Zooplankton biomass at National Reference Stations can indicate ecosystem productivity.

Over time, zooplankton biomass has declined off NSW, but increased off SA and TAS[4,5] (link).

Observations

- Year-round recreational SBT catches in Tasmania have been observed
- GAB purse-seiners have noted there are lots of smaller fish around and few larger ones.
- East-coast longline catch was further inshore than previous years.

Sources: BOM[1] NOAA[2] CMEMS[3] IMOS[4] CSIRO[5]

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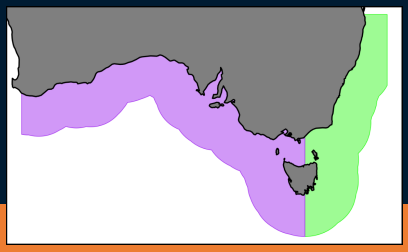
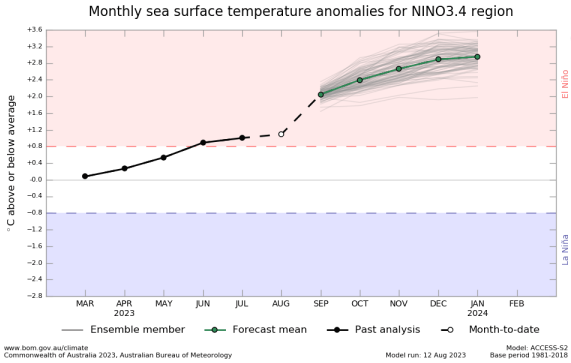


Future Outlook for 2023

Climate Drivers: ENSO

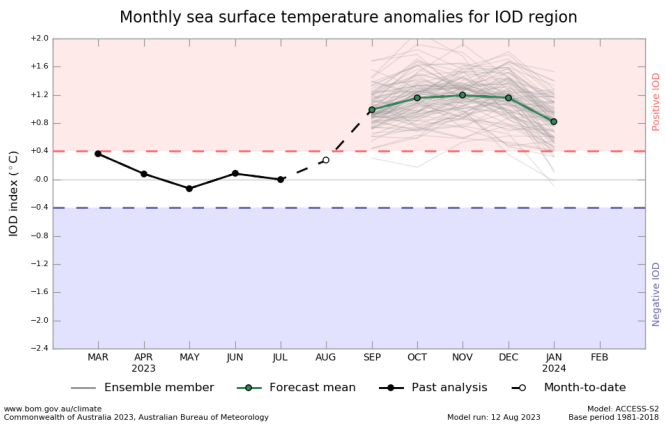
Currently transitioning to El Niño[1] (link)



El Niño is predicted (link)[1]. These conditions:

- Weaken the Leeuwin Current, which impacts the timing of SBT migrations & leads to a cooler GAB.
- Raise the thermocline which can increase nutrients & cool water on the GAB shelf.
- favour a negative Southern Annular Mode, where westerly winds shift north.
- Strengthen the EAC.

Climate Drivers: IOD



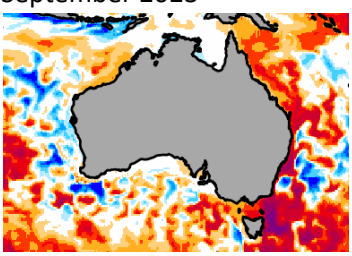
A positive phase of the Indian Ocean Dipole is predicted to develop (link)[1]. These conditions:

- indicate cooler sea surface temperatures in the East Indian ocean (near SBT spawning grounds).
- Usually coincide with El Niño.
- Occur seasonally (May-Dec) and don't form during the Australian monsoon season.

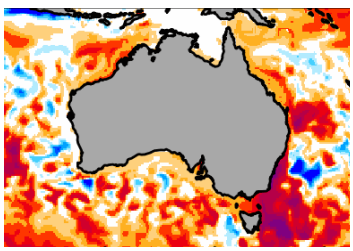
There are no clear links between IOD phase, the Leeuwin current, SBT spawning, or commercial catch.

Regional Dynamics

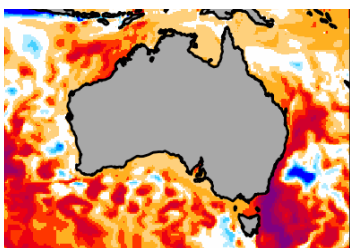
September 2023



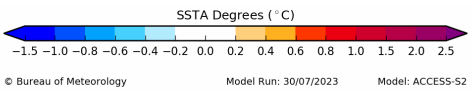
October 2023



November 2023



Forecasts of SST anomalies indicate warmer conditions for much of Australia. Notably, the south-east coast will exceed 2°C anomalies, while the GAB will be warmer than average from October. Parts of the SBT spawning region are forecast to be warmer than average[1] (link).



Sources: BOM[1] NOAA[2] CMEMS[3] IMOS[4] CSIRO[5]