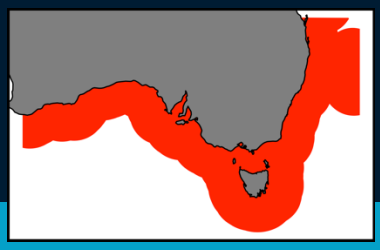
# Climate & Ecosystem Status Report

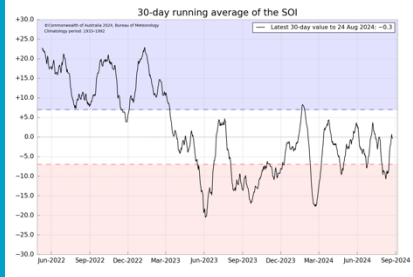
*Southern & Eastern Scalefish & Shark Fishery*

*November 2024*

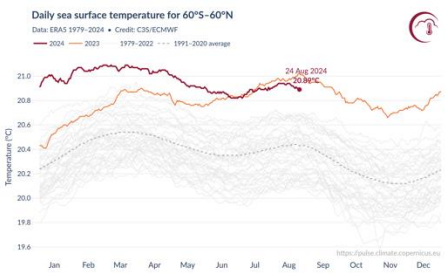


## Historical Period

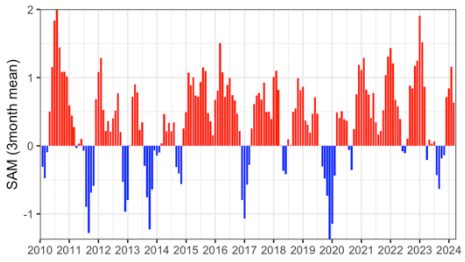
## Climate Drivers




Major climate influences in 2023: switched from La Niña, to El Niño; strong +'ve Indian Ocean Dipole, & positive SAM (link)[1].



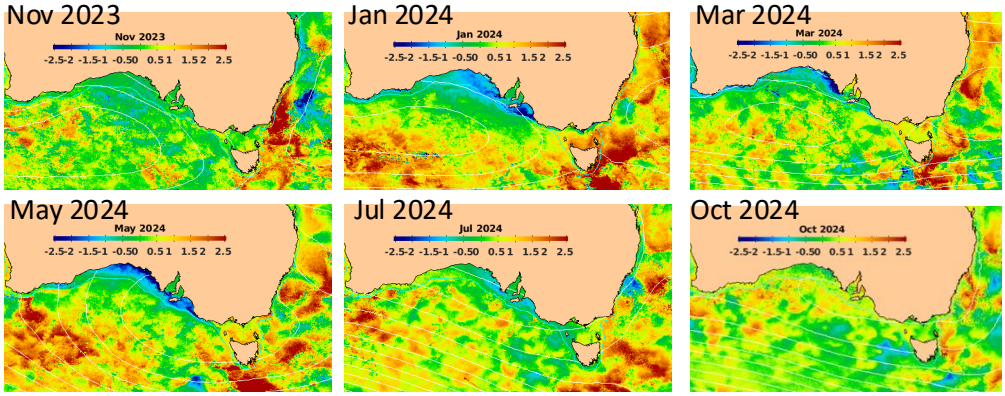

Global Sea Surface Temperature (SST) have been at record highs 2023-2024 (link)[2].




Southern Annular Mode (SAM) indicates the N-S movement of westerly winds that bring storms to southern Australia. Positive SAM (westerlies contract south) has become more common. Rainfall varies regionally and seasonally within each phase[1,3] (link).

**El Niño can: (1) weaken the Leeuwin Current, leading a cooler GAB and increased nutrients from a shallower thermocline; (2) strengthen the EAC, resulting in warmer waters extending further south.**

## Regional Dynamics: Sea Surface Temperature

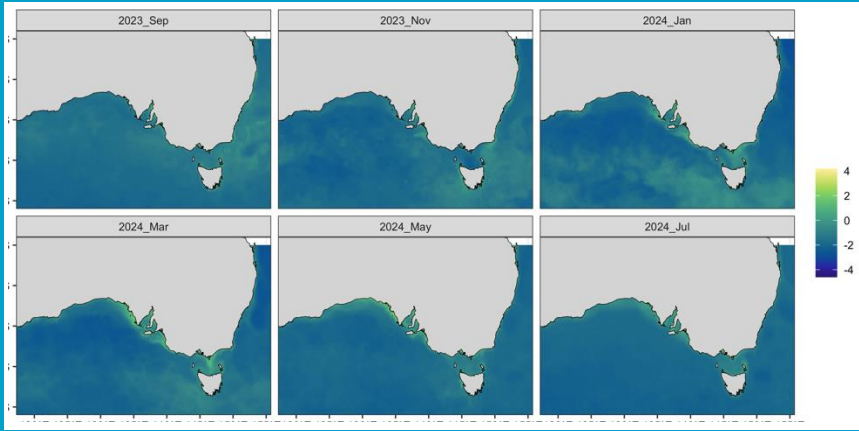



Monthly SST (°C) (link)[4].

Moderate-severe marine heatwaves (MHW) occurred off east-Tas in summer (link)[5].

Cool water in GAB and strong Bonney upwelling occurred throughout summer.

## Regional Dynamics: Surface Chlorophyll-a




Maps of monthly surface chlorophyll-a (log scale; mg/m$^3$) for an example 6 months[2].

Chl-a indicates spring blooms along east coast and south of Tas. In summer and autumn, high chl-a coincides with cool (likely upwelled) waters along the Bonney coast and the GAB.

*Sources: BOM[1] Copernicus[2] NOAA[3] IMOS[4] MHWTracker[5]*

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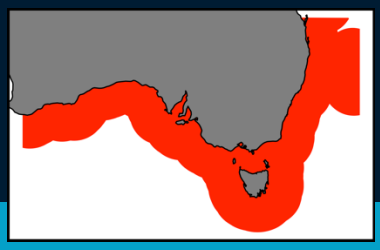
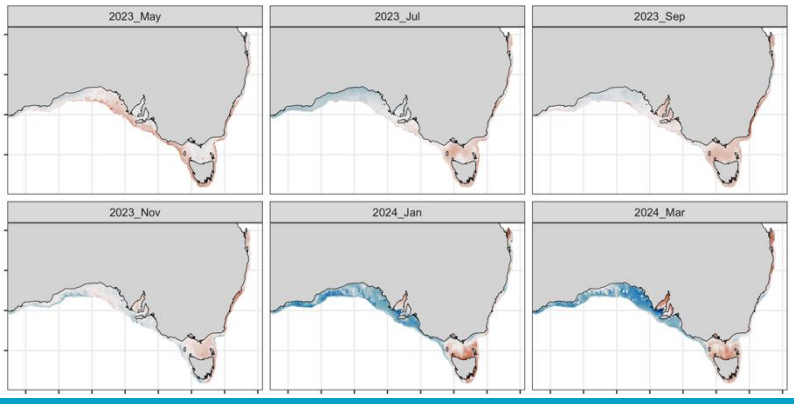


## Historical Period

## Regional Dynamics: Shelf bottom temperature anomaly




Monthly bottom temperature anomalies on the shelf (<500 m) (°C)[2], relative to 1993-2016.

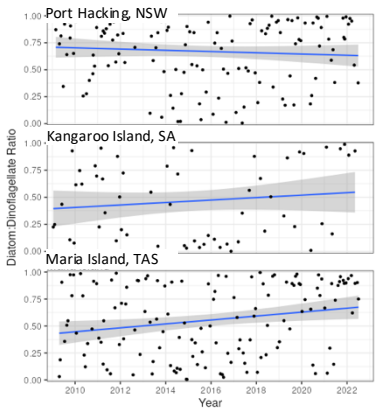
East coast and Bass Strait had anomalously warm temperatures.

Bonney Coast and GAB had very cool temperatures during summer.

Note: month range differs to previous page. Bottom temp is from an ocean model and subject to error.

## Ecosystem: National Reference Stations

Diatom:Dinoflagellate ratio

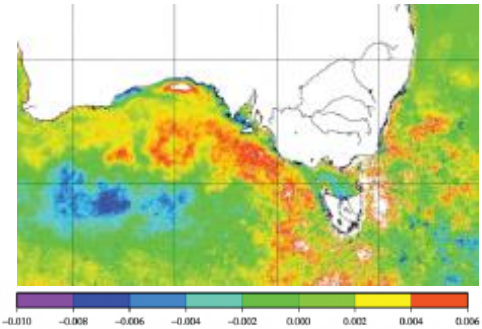



Diatoms are part of the base of the food-web for many fished species.

The ratio of diatoms has increased off TAS, but has been relative stable in NSW and SA[4,5] (link).

Seasonal spring blooms in TAS have become stronger in recent years [4,5] (link).

Chl-a trend (mg $m^{-3}$ $yr^{-1}$)




Trends (2003-2009) in surface chl-a are spatially variable, with increases and decreases seen across the SESSF region (link)[4].

## Observations

**GAB-RAG/MAC**

- Cold-water upwelling in the GAB seems to have supported higher juvenile fish catch.
- Catch rates for flathead and redfish were some of the best ever, sustained until June.

### Observations from 2024

**SESSF-RAG**

- Species have been moving deeper in the GAB and caught later.
- The fishery (location and catch) in the GAB varies from El Nino to La Nina.

**SE-RAG**

- Cooler water from cold upwelling events are being seen later each year.

**Shark-RAG**

- Lots of draughtboard sharks of edge of TAS shelf, and larger school shark catch on TAS east coast.
- More bronze whalers in GAB.
- Smaller school sharks seen earlier in the season in north Bass Strait.

*Sources: BOM[1] Copernicus[2] NOAA[3] IMOS[4] MHWTracker[5]*

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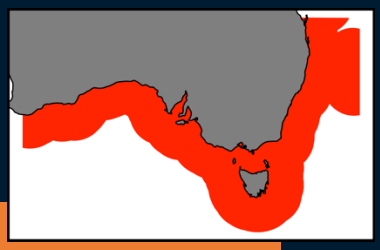
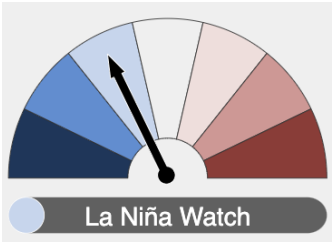
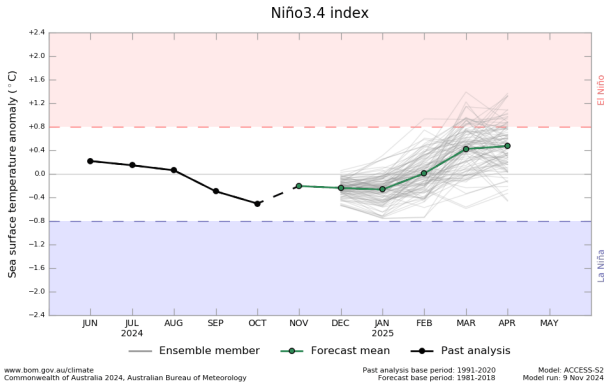


## Future Outlook for 2024/2025

## Climate Drivers




BOM Outlook is La Niña watch (a chance of La Niña) (link)[1].

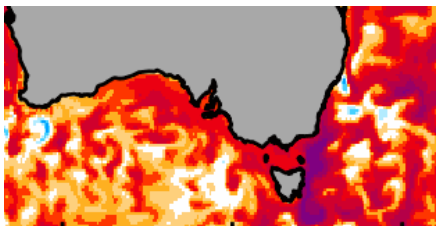



ENSO is currently neutral. Most model forecasts indicate neutral conditions will remain (link)[1].

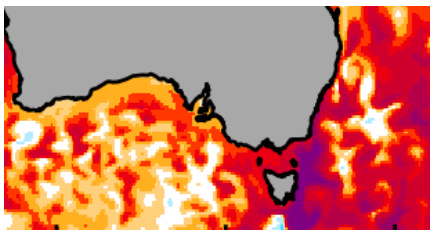
One model forecasts La Niña. Such conditions can strengthen the Leeuwin current, leading to warmer waters in the GAB.

## Regional Dynamics

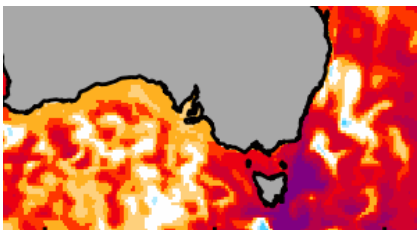
December 2024



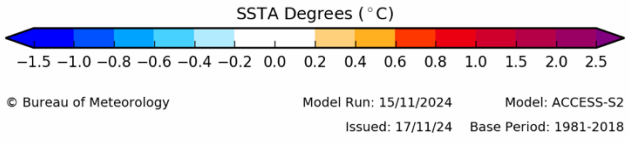
January 2025



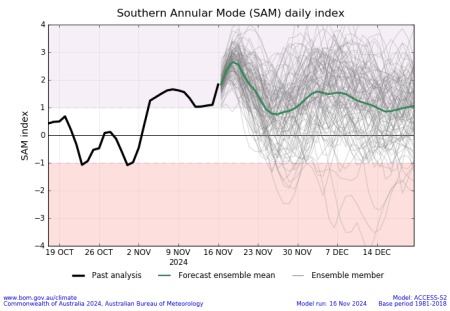
February 2025



Forecasts of SST anomalies for Dec 2024 – Feb 2025 indicate warmer conditions across most of the SESSF domain (link)[1].

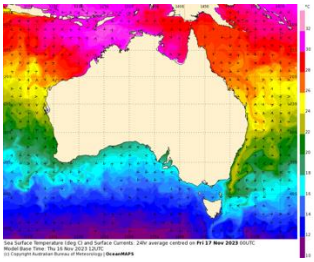


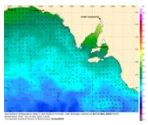

## Ecosystem and Fishery

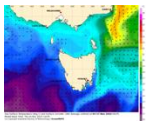



SAM can change quickly and forecasts are updated regularly (link).

Model forecasts indicate the SAM is more likely than usual to experience positive phases during November and December[1].







10-day forecasts of SST and currents around Australia (link)[1] may be useful for fishing operations. E.g. identifying upwelled waters, eddies, and currents.

*Sources: BOM[1] Copernicus[2] NOAA[3] IMOS[4] MHWTracker[5]*