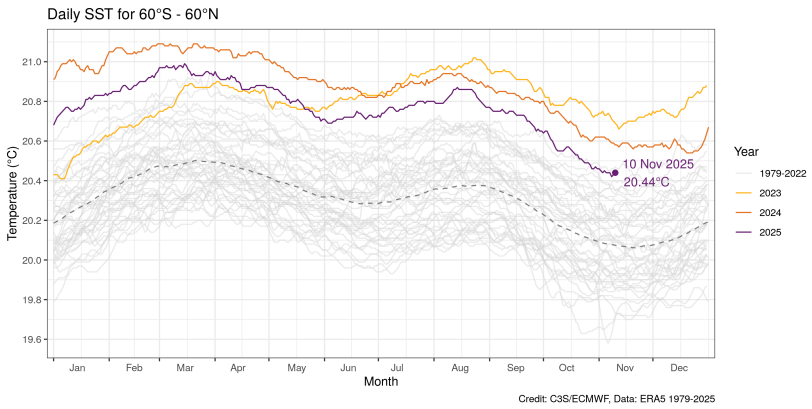
Small Pelagics Fishery

November 24, 2025

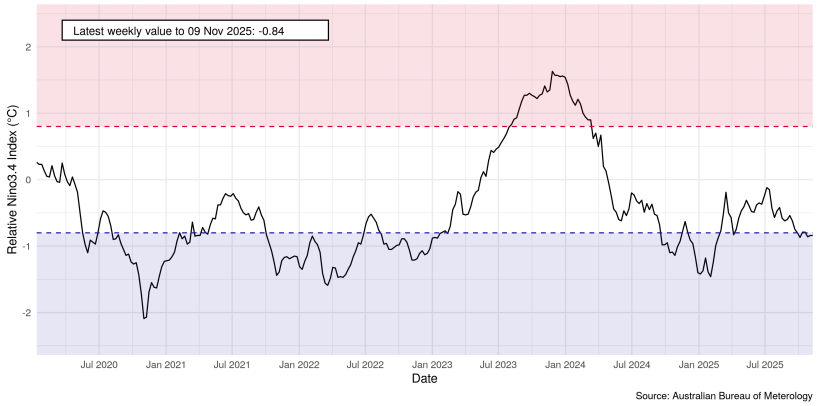
Historical Period

Climate Drivers: Sea Surface Temperature (SST)



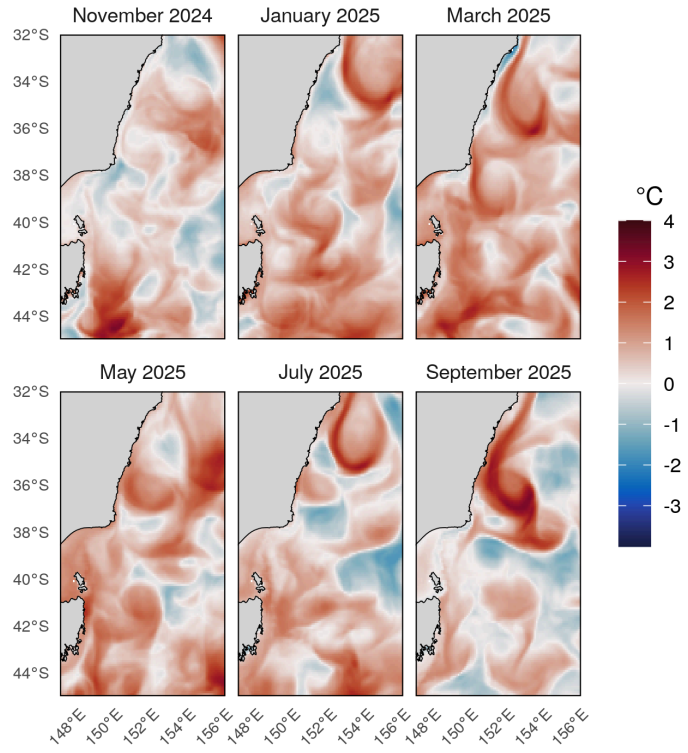
Global Sea Surface Temperatures (SST) from 2023-2025 have been at record highs (*Copernicus*)[2].

Climate Drivers: Nino3.4

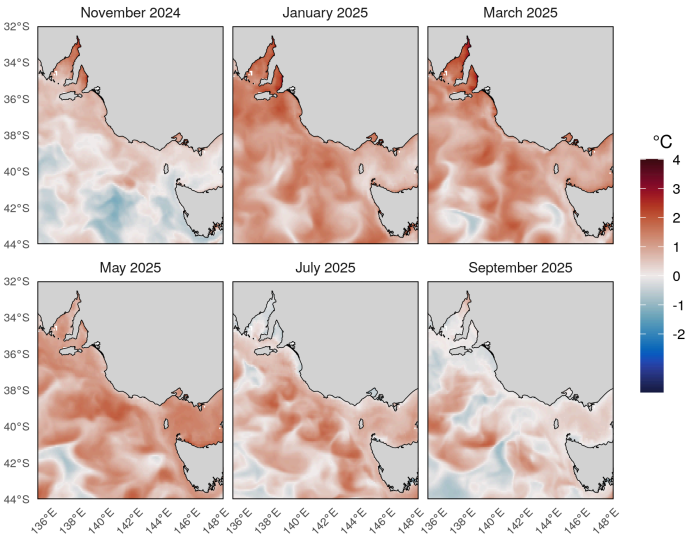


ENSO is currently neutral. The relative Niño3.4 index (a new index) measures the oceanic component of ENSO. Recently, BOM has revised Niño3.4 to account for changes in global SST from global warming. As such, conditions during the 2024/2025 summer have been reclassified as La Niña (*BOM*)[1]. La Niña conditions can strengthen the Leeuwin current, leading to warmer waters in the GAB.

Regional Dynamics: SST Anomaly



Source: CMEMS



Source: CMEMS

Bi-monthly maps of SST anomalies, relative to 1993-2016[3].

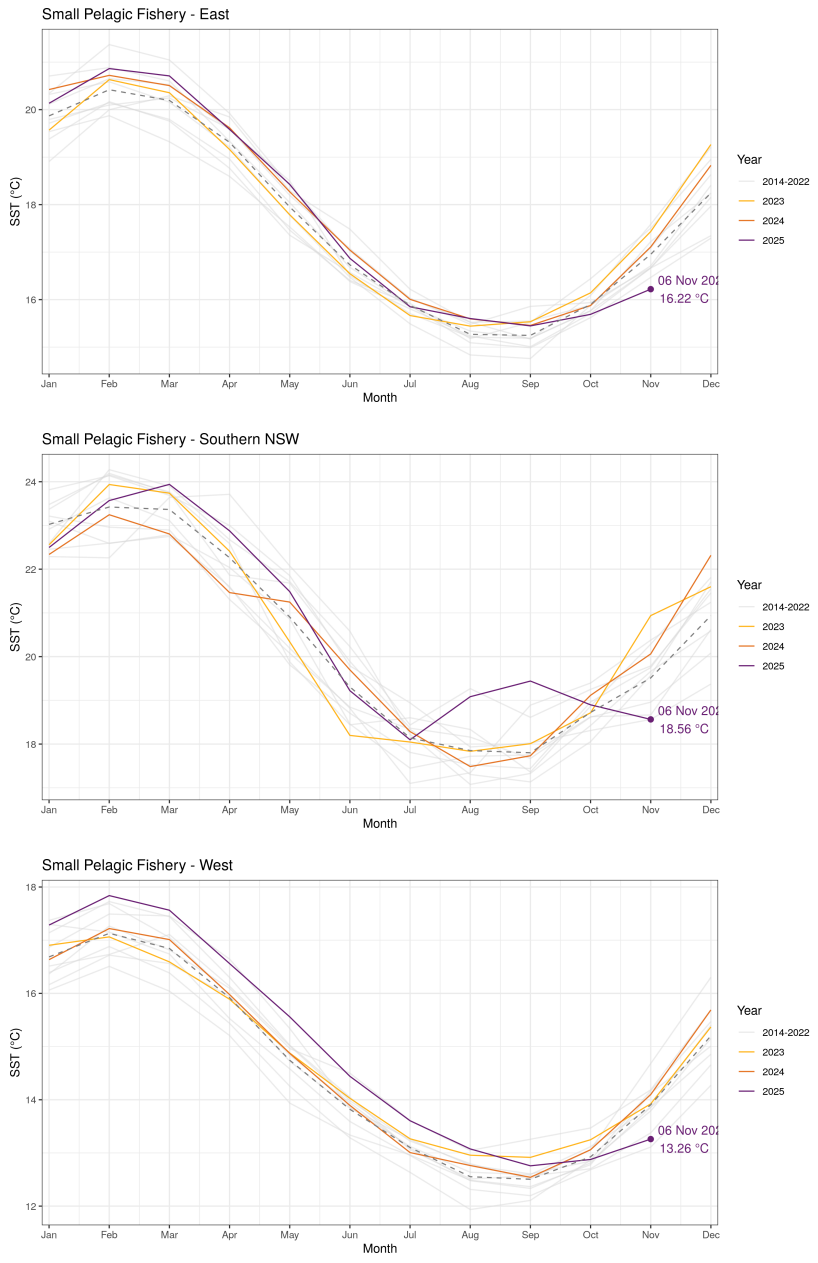
East region:

- Patches of anomalously warm and cool water south of Sydney reflect the dynamic eddy field that is characteristic of this region.
- A notable warm-core eddy off southern NSW had very high temperature anomalies.

West region:

- Anomalously warm water occurred across the region, with some coastal waters cooling in Jul and Sep.
- Waters in the Bass Strait and off west TAS remained warmer than average.
- SA waters experienced a significant Harmful Algal Bloom in late summer 2025. A marine heatwave combined with nutrients from strong upwelling in 2023-24 contributed to this bloom. This event is ongoing and has a dedicated website https://www.algalbloom.sa.gov.au/.

Regional Dynamics: SST monthly timeseries



Timeseries of monthly averaged SST for example years 2014-2025 in the east and west regions, and southern NSW (~Jervis Bay to Eden).

East region:

- In 2025, SST has been warmer than average for most of the year.

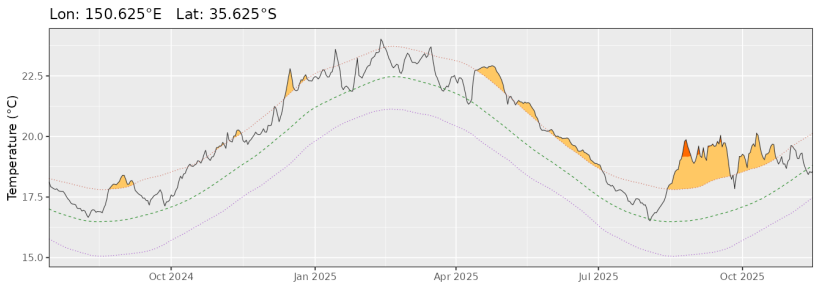
Southern NSW:

- SST in Aug - Oct showed unusual warming out of sync with the usual seasonal warming pattern. Temperatures in Sep were the warmest of all years.

West region:

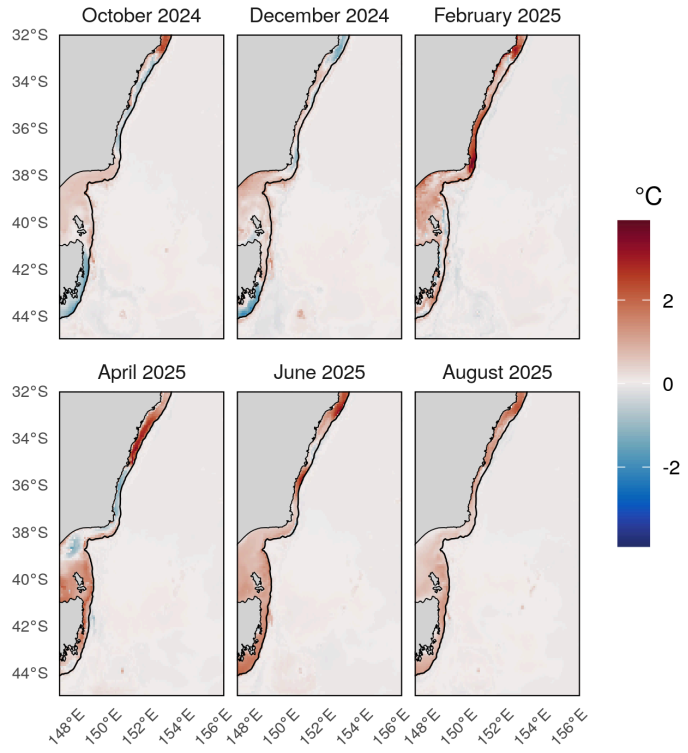
- In 2025, SST was the warmest of all years, until August.

Regional Dynamics: marine heatwaves

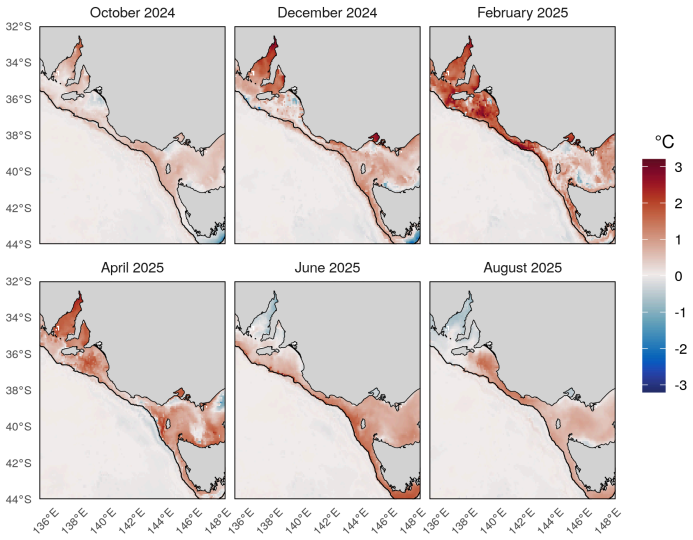


Marine heatwaves (sustained anomalously warm water), occurred across much of the region (*MHWtracker*)[4]. The time-series plot shows the long-term average temperature for a grid cell off Ulladulla (green line), with a moderate-to-strong MHW occurring from Aug-Oct. MHWs in southern NSW are associated with La Niña climate phases, with oceanic advection of warm water the primary driver of most MHWs. Anecdotal fishing reports indicate SPF catches were very low during this period.

Regional Dynamics: Bottom Temperature Anomaly



Source: CMEMS, Climatology: 1993-2016



Source: CMEMS, Climatology: 1993-2016

Bi-monthly maps of bottom temperature anomalies, relative to 1993-2016, with the 500 m contour shown in black[3]. Anomalies are from an ocean model and subject to error.

Most of the continental shelf region has seen average to anomalously warm waters across the domain over the past year.

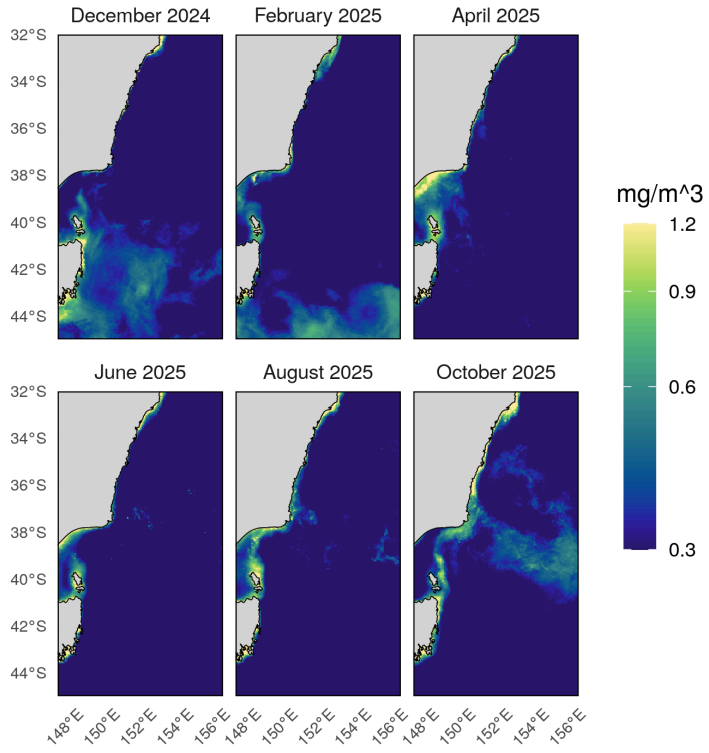
East region:

- Patches of anomalously cool temperatures off the east coast of TAS in Oct-Dec, and south NSW in Apr.

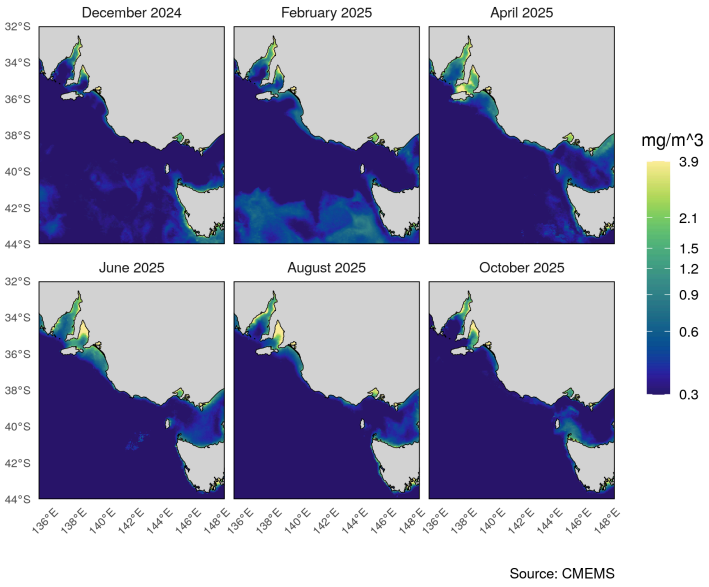
West region:

- Elevated temperatures have persisted in the region all year, with summer having notably high anomalies.
- Bottom temperatures off the Bonney coast were warmer than average, particularly during Feb.
- High bottom temperature anomalies in SA gulfs in Dec-Apr, switching to cooler than average in Jun-Aug.

Regional Dynamics: Chlorophyll-a



Source: CMEMS



Source: CMEMS

Bi-monthly maps of surface chlorophyll-a (log scale; mg/m3)[3]. Surface chl-a is a proxy for ecosystem productivity.

Higher chl-a along the coastal margin and continental shelf.

East region:

- Higher surface chl-a along the coastal margin, with summer blooms notable off TAS.

West region:

- Higher surface chl-a in SA gulfs reflect the algal bloom. Fish kills and fishery closures have occurred, but the impact to the SPF is not known.
- Chl-a blooms off West TAS and Bonney coast in summer.

Regional Dynamics: Chl-a monthly timeseries

Timeseries of monthly averaged chl-a for example years 2014-2025 in the east and west regions.

East region:

- In 2025, chl-a has been lower than average and similar to levels in 2023 & 2024.
- In Sep-Oct, the spring bloom has been lower than other years.

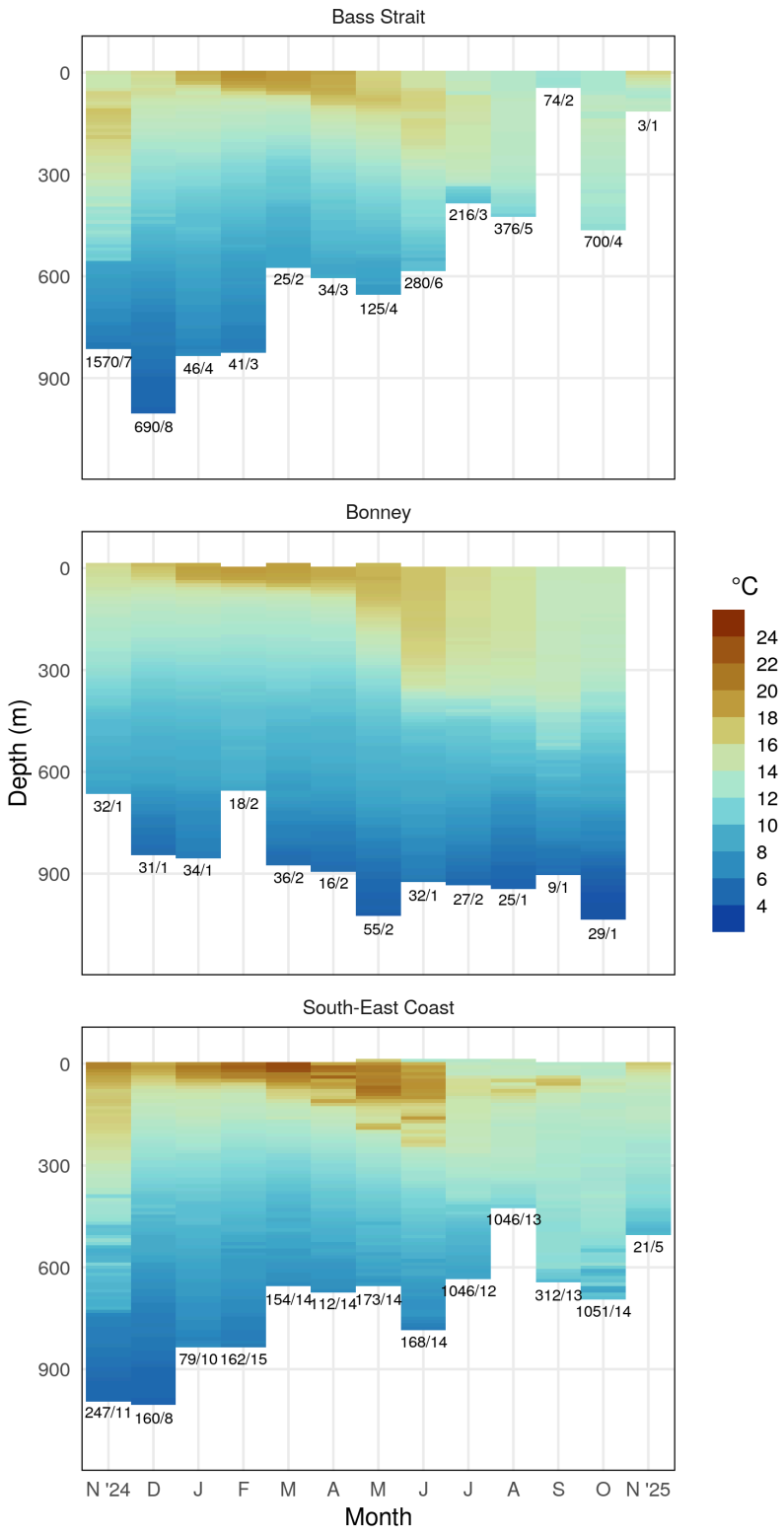
Southern NSW:

- Chl-a was lower than past years during Aug - Oct when the warm-core eddy was present. Warm-core eddies typically have lower productivity than surrounding waters.

West region:

- In 2025, chl-a has been similar to the average (dashed line).
- In Sep-Oct, the spring bloom has been lower than other years.

Regional Dynamics: FishSOOP Temperature-Depth Profiles

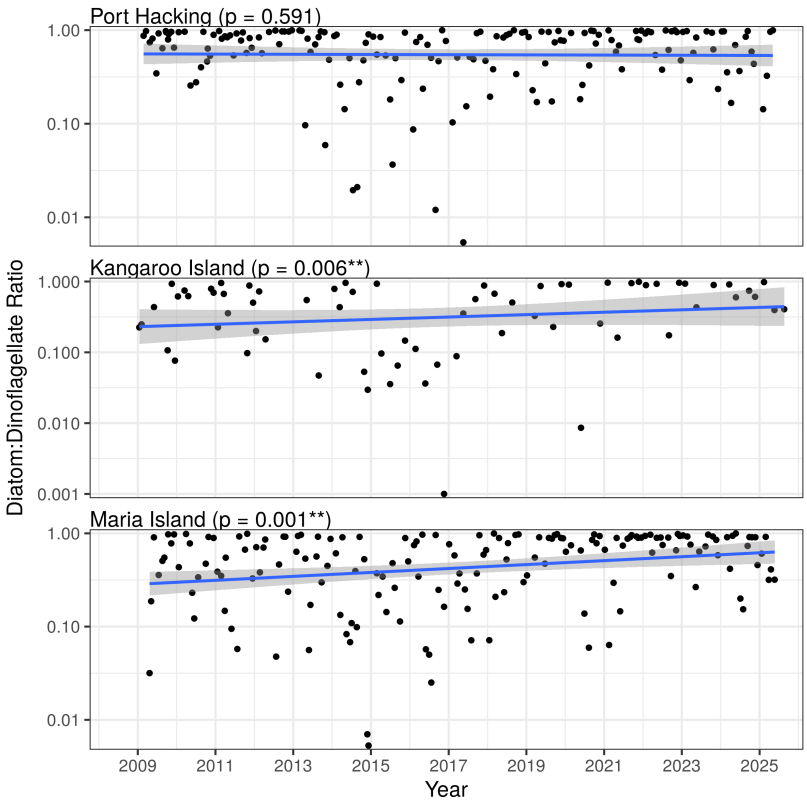


Credit: IMOS, Annotation: (max number of profiles for month)/(max number of instruments for month)

Average temperature at depth bins for each month over the past year, as sampled by instruments deployed on fishing vessels (*IMOS FishSOOP*)[5]. Bonney, Bass strait, and south-east (Sydney to southern TAS) regions are shown.

Warmer water near the surface and cooler water at depth is most notable during summer and breaks down over winter - a process known as seasonal stratification.

Ecosystem: Diatoms



Diatoms are part of the base of the food web for many fished species. Over the past 15 years, the ratio of diatoms (fish food) to dinoflagellates (not fish food) has generally increased off TAS while remaining relatively stable in NSW and QLD, as measured at the IMOS National Reference Stations[6] (*IMOS BOO*).

Observations

Observations are drawn from fishery stakeholder discussions at AFMA's resource assessment group (RAG) and management advisory committee (MAC) meetings. Further details are provided in meeting minutes on AFMA's website.

2025 observations

- A large warm-core eddy off southern NSW (~Ulladulla) brought very warm water to the region and catch was reduced (~May-June). Catch picked up again in November after the eddy moved south.
- Rec fishery reported great bait & tuna availability off southern NSW.
- Jack mackeral spawning occurrs earlier than in the past, in association with warmer temperatures.
- For operators fishing in South Australian state waters, fishers actively avoided areas affected by Harmful Algal Blooms while SPF operators were unaffected.

2024 observations

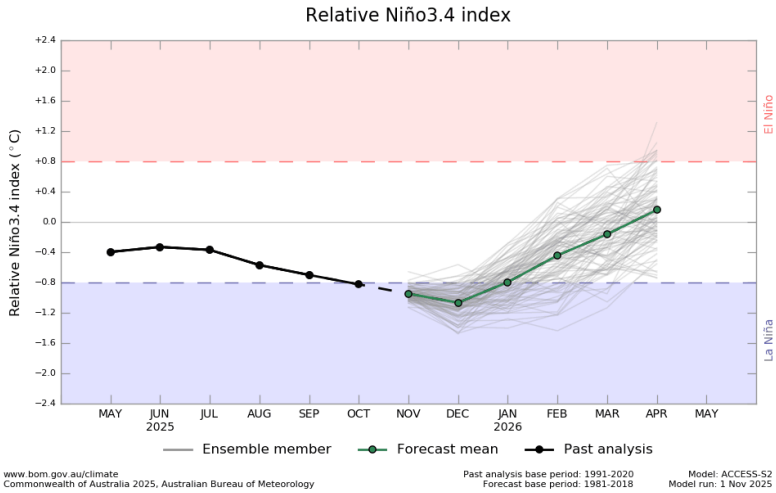
- Spawning off the east coast appears to be earlier in the season.
- Blue mackerel observed to migrate south earlier in the season.
- Large numbers of sardine observed and caught off the east coast.
- Sardines (mostly small size) were observed in deeper waters and on the bottom in summer 2024.

2023 observations

- Jack mackerel in high abundance, with a potential distribution shift observed.
- Blue mackerel prefer warmer water, while jack mackerel prefer cooler water.
- Increased redbait abundance is thought to be linked to upwelling.

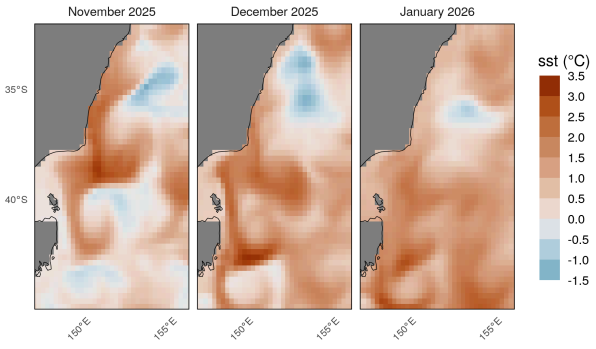
Future Outlook

Climate Drivers: Nino3.4

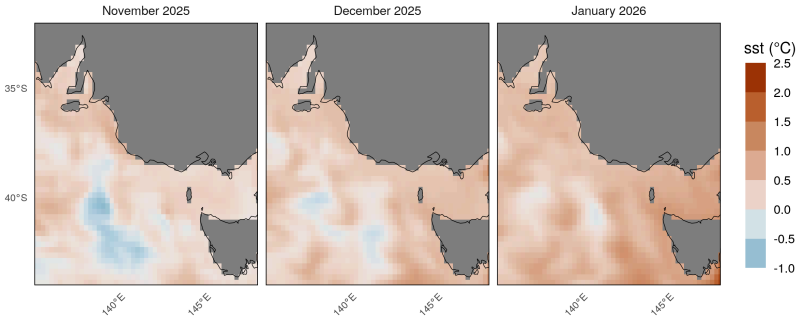


ENSO is currently neutral, with La Niña levels forecast to be met before returning to neutral levels (*BOM ENSO*)[7].

Regional Dynamics: SST Anomaly



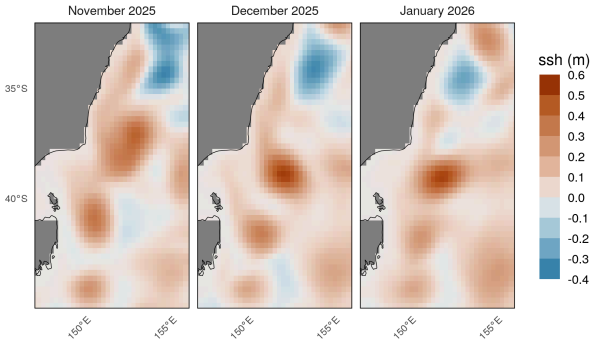
Model: ACCESS-S (sourced from the Bureau of Metereology)



Model: ACCESS-S (sourced from the Bureau of Metereology)

Forecasts of SST anomalies for the next three months indicate anomalously warm conditions across the region, with elevated temperatures particularly notable for the east coast (*BOM OceanT*)[8]. Forecasts are updated regularly.

Regional Dynamics: SSH Anomaly



Model: ACCESS-S (sourced from the Bureau of Metereology)

Forecasts of Sea Surface Height (SSH) anomalies for the next three months indicate eddies. Warm core eddies have positive SSH values. Exact location of forecast eddies is uncertain and forecasts are updated regularly. Short-term forecasts (e.g. 7 days) also forecast eddy locations: https://www.bom.gov.au/oceanography/forecasts/index.shtml

Sources:

(1) https://www.bom.gov.au/climate/enso/indices.shtml?bookmark=nino3.4

(2) https://pulse.climate.copernicus.eu/.

(3) Copernicus Marine Service.

(4) https://www.marineheatwaves.org/tracker.html.

(5) https://imos.org.au/facility/ships-of-opportunity.

(6) https://shiny.csiro.au/BioOceanObserver/.

(7) http://www.bom.gov.au/climate/ocean/outlooks/?index=nino34

(8) http://www.bom.gov.au/oceanography/oceantemp/sst-outlook-map.shtml.