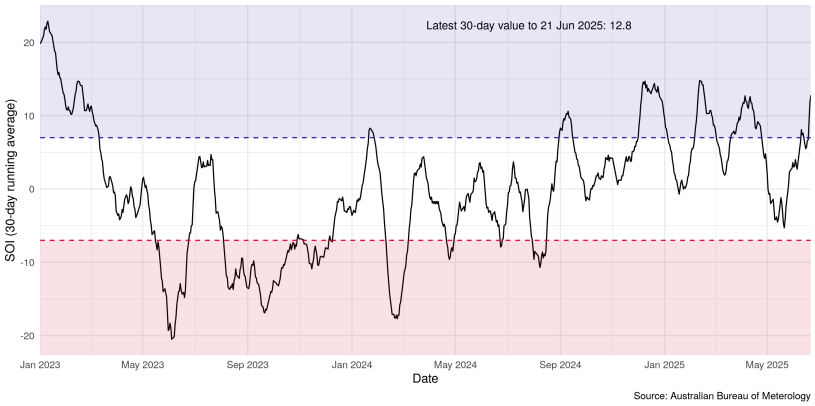
Eastern and Tuna Billfish Fishery

July 21, 2025

Historical Period

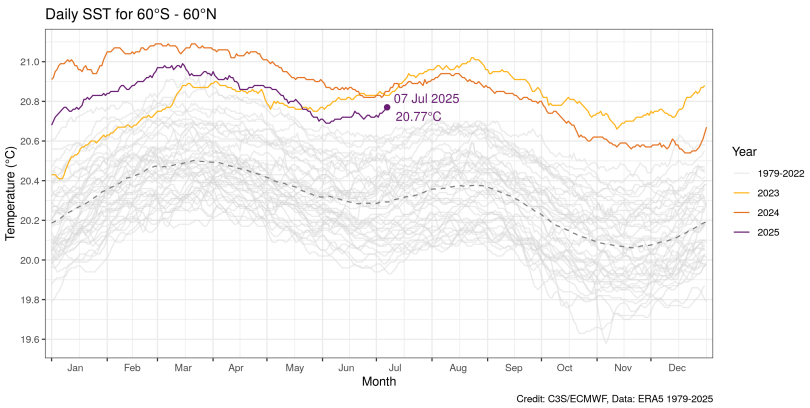
Climate Drivers: Southern Oscillation Index (SOI)



SOI reflects atmospheric conditions of ENSO by comparing air pressure between Tahiti and Darwin; sustained values below −7 indicate El Niño, while values above +7 indicate La Niña. ENSO is currently neutral and has been neutral since April 2024 (*BOM*)[1].

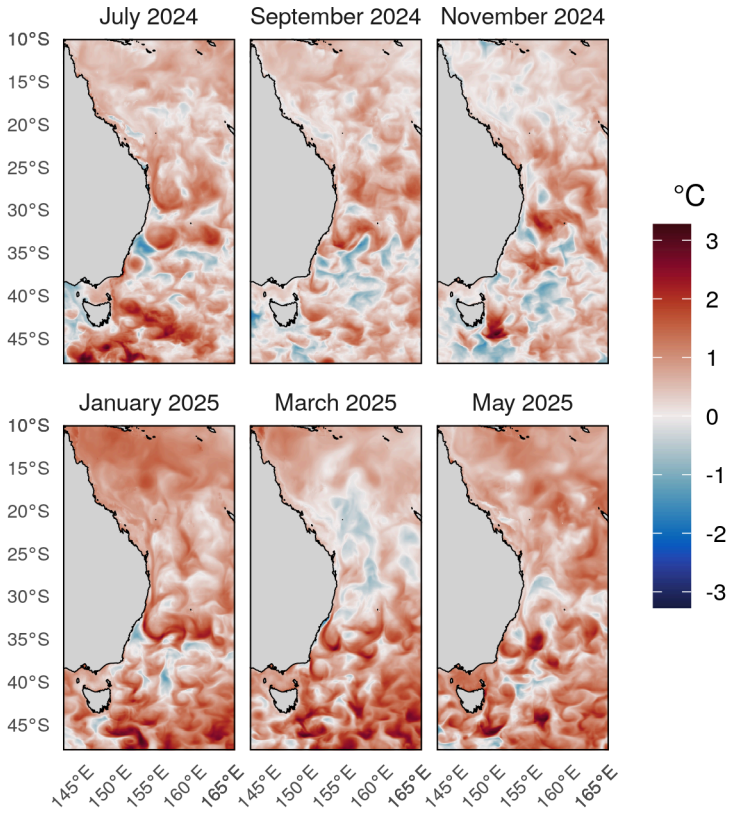
ENSO influences catch rates of YFT, BET, ALB, & STM in the Western Central Pacific[2]. Catches are typically higher during El Niño.

Climate Drivers: Sea Surface Temperature (SST)



Global Sea Surface Temperatures (SST) have remained at record highs in 2025 (*Copernicus*)[3].

Regional Dynamics: SST Anomaly

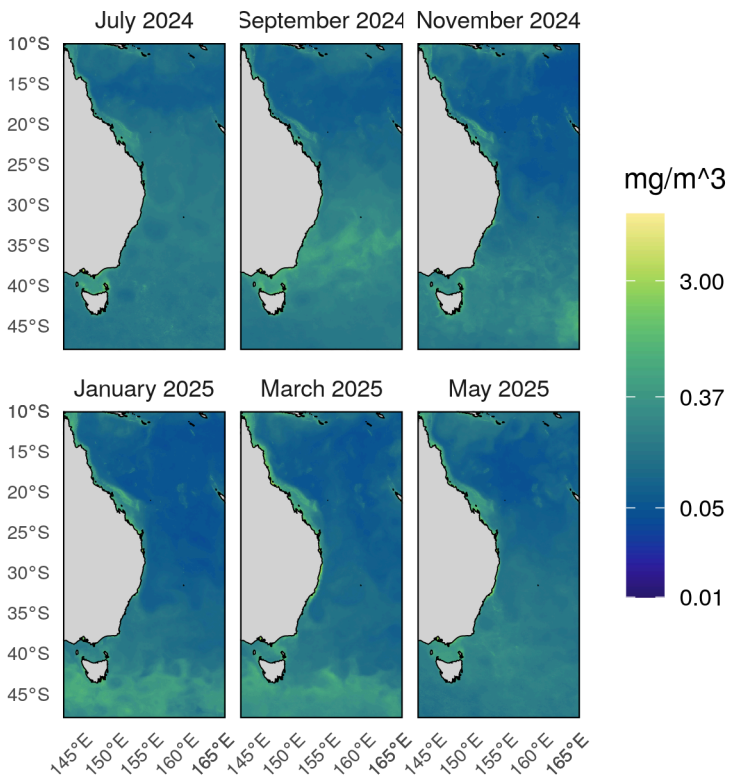


Source: CMEMS

Bi-monthly maps of SST anomalies show the east coast of Australia has largely been anomalously warm for the last year[4]. Some average and cooler-than-average waters were seen off the central-east coast during March 2025. Anomalies are relative to 1993-2016. Patches of anomalously cool water south of Sydney reflect the dynamic eddy field that is characteristic of this region. In this region, eddy activity has intensified and extended further south over time[5].

Moderate marine heatwaves (MHW), regions of anomalously warm water, occurred across most of the region from Nov-Jan, with MHWs continuing in the southern part of the region until May (*MHWtracker*)[6]. The impacts to the ETBF are unknown.

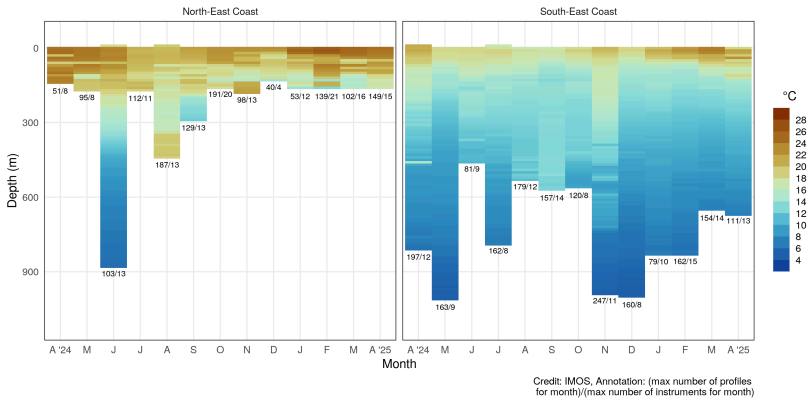
Regional Dynamics: Chlorophyll-a



Source: CMEMS

Bi-monthly maps of surface chlorophyll-a (log scale; mg/m3)[4]. Surface chl-a is a proxy for ecosystem productivity. Elevated surface chl-a persists in southern regions and off QLD shelf-waters throughout the year. Peaks in surface chl-a are notable during spring and summer months.

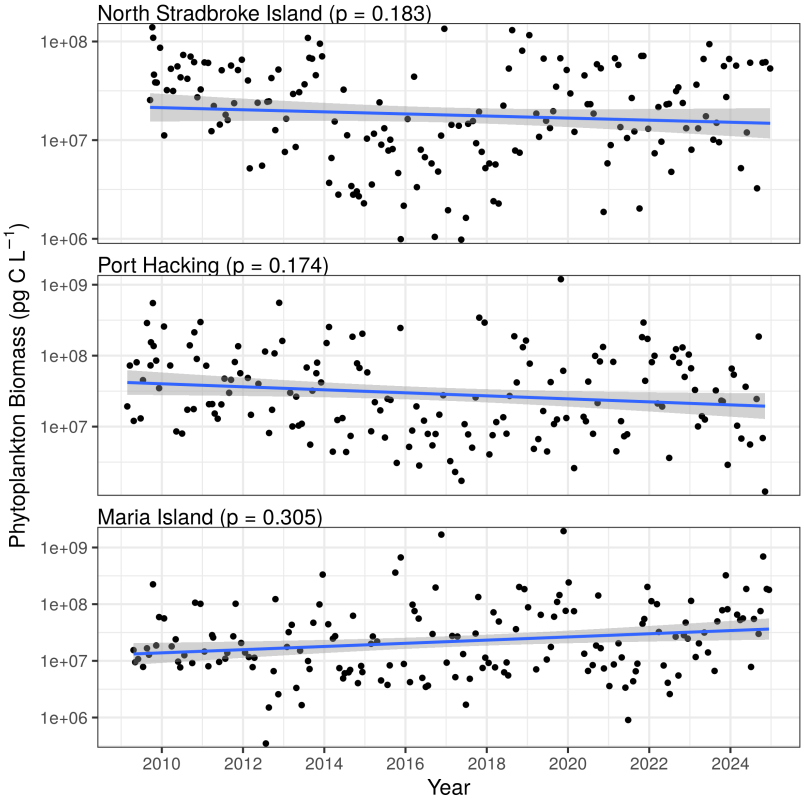
Regional Dynamics: FishSOOP Temperature-Depth Profiles



Average temperature at depth bins for each month over the past year, as sampled by instruments deployed on fishing vessels. North-east coast is from Fraser Island to Sydney, and South-east coast is from Sydney to southern Tasmania and includes all vessels using stationary and mobile gears.

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. It is most notable in the south where there are deeper observations below the mixed layer.

Ecosystem: Phytoplankton Biomass



Ecosystem productivity, as measured by phytoplankton biomass at IMOS National Reference Stations, show long-term increases off Tasmania and small declines off North Stradbroke Island and Port Hacking (Sydney)[7] (*IMOS BOO*).

Observations

2025 observations

- End of 2024 had very high YFT commercial catch. Industry noted that YFT catches are often high after El Niño.
- Recreational sector targeting striped marlin in North-east Tasmania for the first time.
- Recreational sector noted an increase in catch of small blue marlin further south. This is rare as these sizes usually remain in the tropics.
- Recreational sector noted no notable black marlin recruitment events. This has happened in the past.

2024 observations

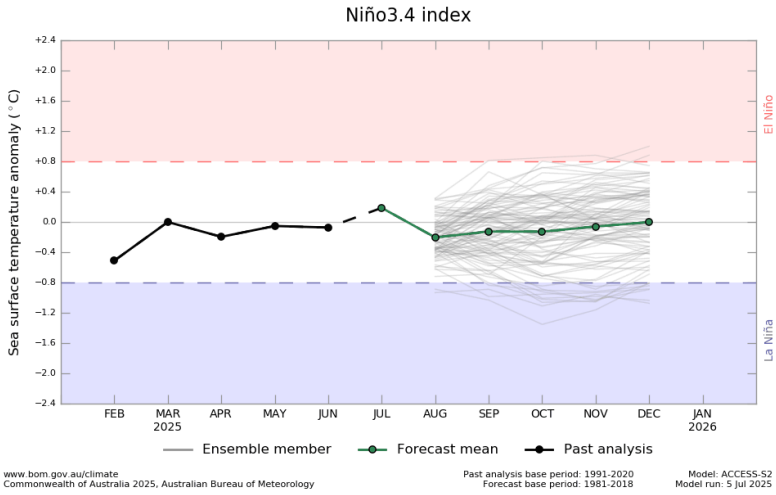
- Juvenile black marlin recruitment event observed in recreational sector.
- Albacore tuna appeared later.
- Yellowfin tuna arrived with pulse of warmer water in June, which coincided with southern bluefin season.
- Strong southern bluefin tuna season.Lots of spearfish caught off Sydney in winter.

2023 observations

- Catches higher during El Niño.
- Recreational fishing sector noted a recruitment event is occurring due to juvenile species being caught.
- Bigeye is usually fished at different depths especially before El Niño.
- High sea temperatures during La Niña thought to be good conditions for spawning.

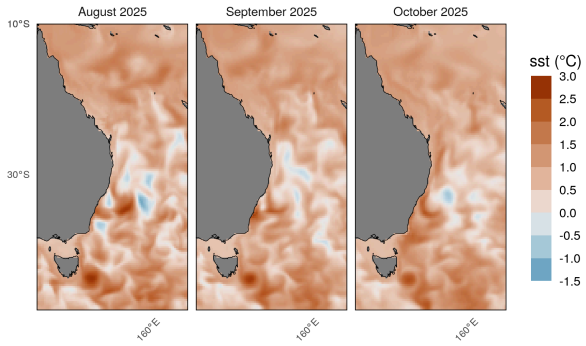
Future Outlook

Climate Drivers: Nino3.4



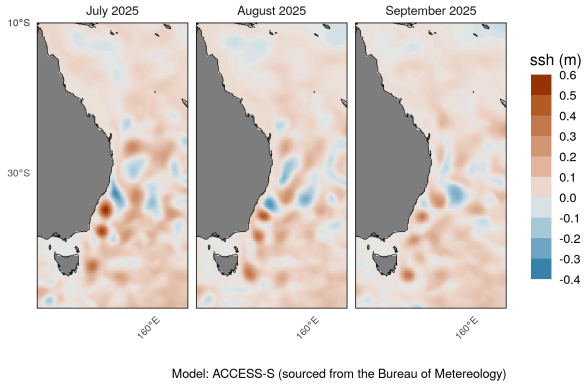
ENSO is currently neutral and forecast to remain neutral until December. (*BOM ENSO*)[8].

Regional Dynamics: SST Anomaly



Forecasts of SST anomalies for the next three months indicate anomalously warm conditions across most of the region (*BOM OceanT*)[9]. Some patches of cooler than average water is forecast off NSW. Forecasts are updated regularly.

Regional Dynamics: SSH Anomaly



Forecasts of SSH anomalies for the next three months can indicate eddies. Exact location of eddies is uncertain and forecasts are updated regularly[10].

Mesoscale ocean features, like eddies, are important foraging hotspots for tunas. Regions with more eddy activity can have higher YFT catch.

Sources:

(1) http://www.bom.gov.au/climate/enso/#tabs=Pacific-Ocean&pacific=SOI.
(2) Hartog et al., 2023: FRDC Project No 2017/004.
(3) https://pulse.climate.copernicus.eu/.
(4) Copernicus Marine Service.
(5) https://www.nature.com/articles/s41558-021-01006-9.
(6) https://www.marineheatwaves.org/tracker.html.
(7) https://shiny.csiro.au/BioOceanObserver/.
(8) http://www.bom.gov.au/climate/ocean/outlooks/?index=nino34.
(9) http://www.bom.gov.au/oceanography/oceantemp/sst-outlook-map.shtml.
(10) https://access-s.clide.cloud/