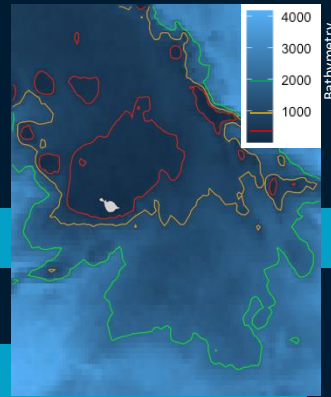




# Climate & Ecosystem Status Report

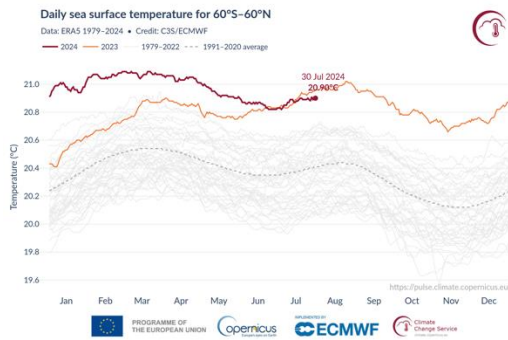
## Heard Island and McDonalds Islands Fishery

August 2024

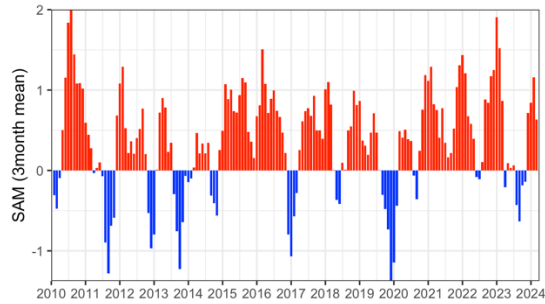


### Historical Period

### Climate Drivers

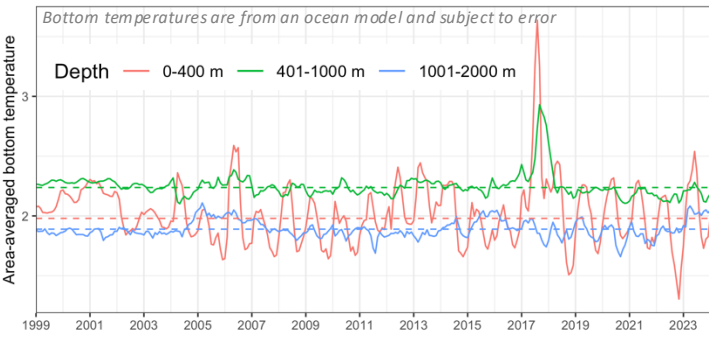


Global Sea Surface Temperature (SST) have remained at record highs from 2023 through 2024 ([link](#))<sup>1</sup>.



Southern Annular Mode<sup>2</sup> ([link](#)) indicates the north-south movement of westerly winds in the mid-high latitudes. Positive phases (westerlies move south) have become more common over time & are associated with increased sea ice extent.

### Regional Dynamics



Deeper waters in 2023/24 have been above average temperatures (1001-2000 m; blue lines) and close to average for intermediate depths (401-1000 m; green lines). Strong seasonal temperature fluctuations are seen in shallow waters (0-400 m; red lines), with summer 23/24 warmer than past years.

Monthly average bottom temperature at three depth bins<sup>1</sup> (see map). Horizontal lines are the long-term mean.

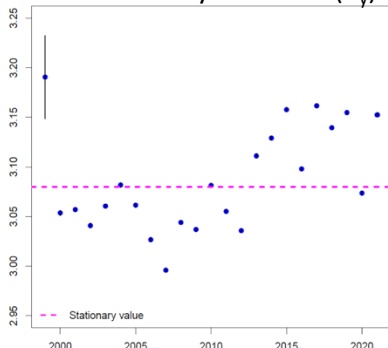
Low (high) temperatures can decrease (increase) Patagonian toothfish catchability<sup>3</sup>

### Observations

- Trips and catch rates have been standard.
- Catch sizes have been average, ranging 5-7 kg depending on the area.
- No Orcas seen; Minkes sighted; sperm whale depredation occurred.

### Ecosystem and Fishery

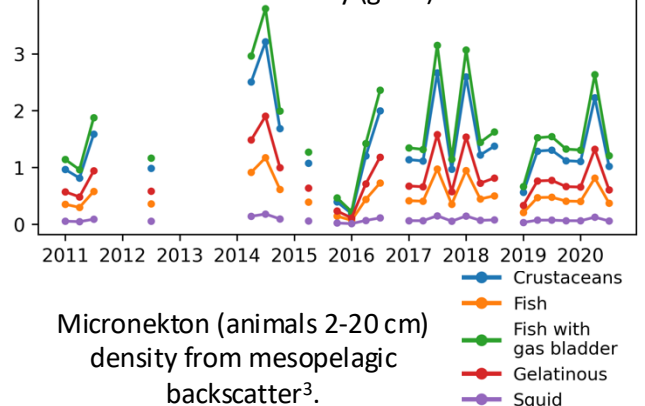
#### Toothfish body condition ( $b_y$ )



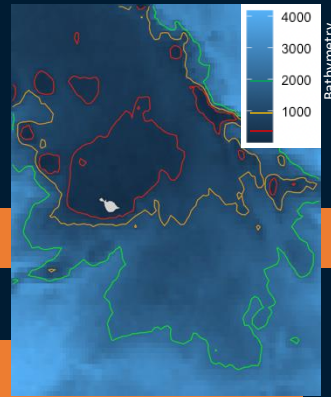
Toothfish body condition in recent years (<2021) has been above average (pink line)<sup>3</sup>.

Black vertical lines on blue dots shows error is very small.

#### Mean micronekton density ( $g\ m^{-2}$ )

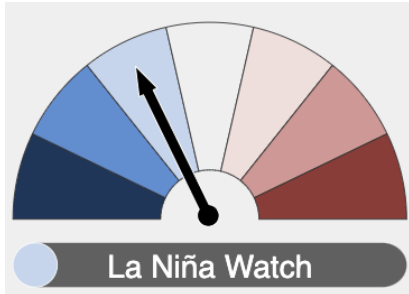


Micronekton (animals 2-20 cm) density from mesopelagic backscatter<sup>3</sup>.

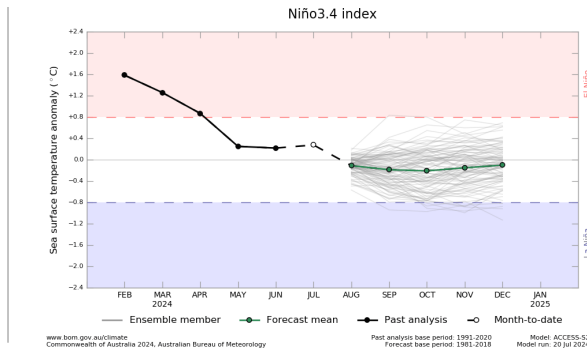


### Future Outlook for 2024

#### Climate Drivers



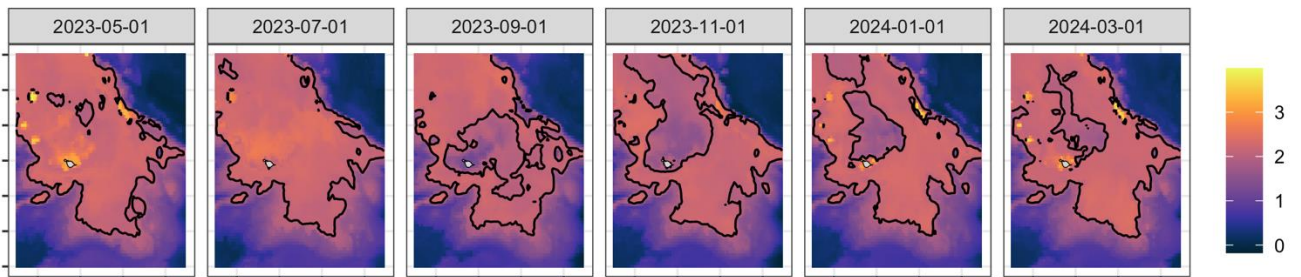
BOM Outlook is La Niña watch (50% chance of La Niña) ([link](#))<sup>4</sup>.



ENSO is likely to remain neutral until early spring. During La Niña, the Southern Annular Mode tends to shift to positive phases, where westerly winds move south and result in strong circumpolar westerlies. ([link](#))<sup>4</sup>.

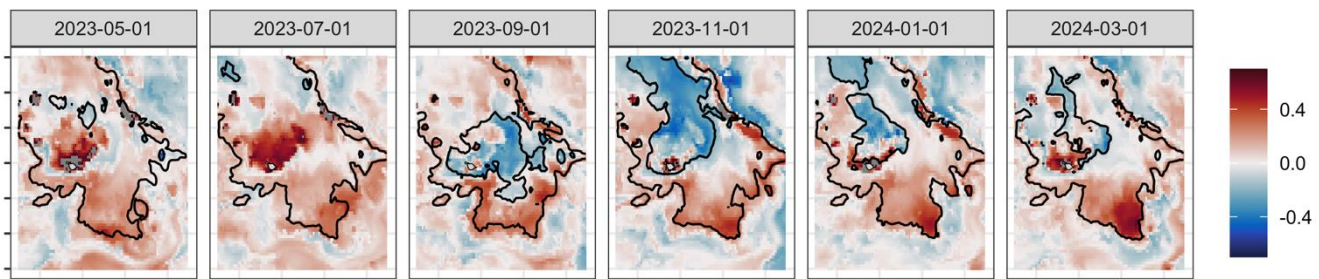
#### Regional Dynamics

**Bottom temperature (°C) showing the long-term average at 2.05 °C (black contour)<sup>1</sup>**



Low (high) temperatures can decrease (increase) toothfish CPUE at a lag of ~6months<sup>3</sup>. Over the past year, temperatures >2°C were present over most of the HIMI shelf. A cool pool formed around and to the north of the island (Sep-March). 2°C is the lower preferred temperature of Patagonian toothfish.

**Bottom temperature anomaly (°C) showing the same contour as above<sup>1</sup>**



Bottom temperatures were anomalously warm (>0.5 °C) across most of the southern HIMI shelf over the past year. Bottom temperatures are sourced from an ocean model and subject to error.