

# Climate impacts on south-east Australian fisheries



Climate change is already impacting south-east Australia's oceans with consequences for marine ecosystems and the fisheries they support. Because of climate change, these waters are, on average, getting warmer, more acidic, and more layered. Levels of dissolved oxygen are decreasing, sea-levels are rising, major ocean currents are changing, and extreme weather events are becoming more severe.

## Ocean warming

South-east Australia is a global hotspot for ocean warming. Sea surface temperatures (SST) have increased by 1.2°C since 1950, and a further 0.3-1.2°C increase is expected by 2040.

Marine heatwaves have become more frequent and intense, causing widespread damage to ecosystems and fish communities. Heatwave conditions may be a regular occurrence for more than 300 days of the year by 2040.

## Changing currents

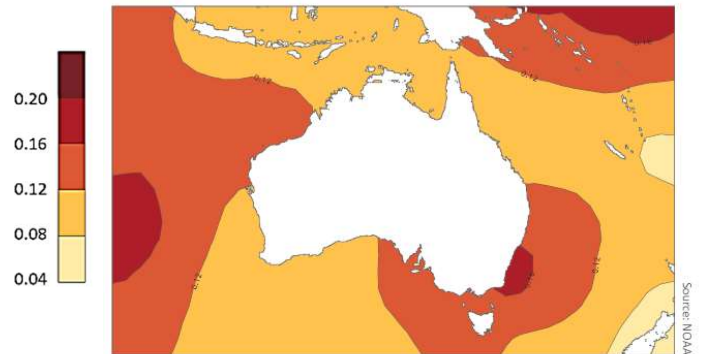
The East Australia Current (EAC) heavily influences marine ecosystems off Australia's east coast. For decades, the EAC current has been strengthening, becoming more intense and pushing warmer water further south. This intensification has added to recent marine heatwaves in south-eastern Australia and influenced the southward migration of many marine species.

## Changing ocean chemistry

The chemistry of the ocean is changing as well. South-east Australian waters have already seen a 26–30 per cent increase in acidification and a further 30 per cent increase in acidity is projected by 2040. Oxygen levels, which are closely linked with water temperature, have already declined by 2 per cent in south-east waters and a further 5 per cent decrease is possible by 2040.



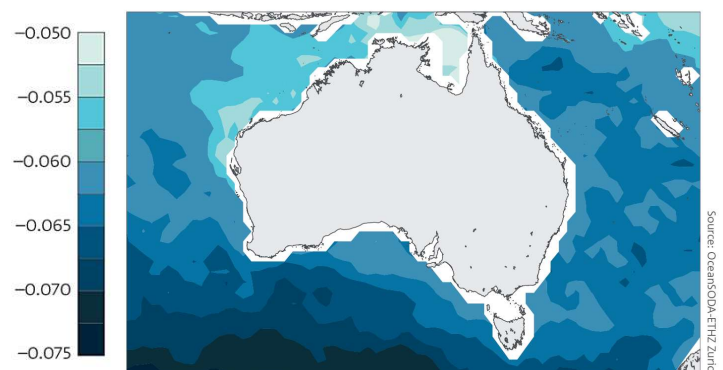
Australian Government  
Australian Fisheries  
Management Authority



Trend in SST from 1950–2021 (degrees Celsius per decade). Source: CSIRO



Days per year exceeding top 10 per cent of historical temperatures. Source: CSIRO.



Change of annual mean pH between 1982 and 2020. Source CSIRO.

# Projected impacts on key species

The changes occurring in south-east Australian waters are affecting the abundance, distribution, seasonality (phenology), and condition of marine species. Because some species are more sensitive to the impacts of climate change than others, these responses vary significantly between species.

The Commonwealth Scientific and Industrial Research Organisation (CSIRO) have assessed the sensitivity of Commonwealth fish stocks to climate impacts and modelled stock responses to climate change through to 2040. They found that all AFMA fisheries contain valuable species sensitive to climate change.

Further analysis of stocks in the Southern and Eastern Scalefish and Shark Fishery (SESSF) using the Atlantis ecosystem model shows that climate change is already contributing to declines in several stocks, including jackass morwong, blue warehou and gemfish.

## CSIRO stock projections for some key species

### Blue grenadier

Highly sensitive to climate change. Abundance projected to decline by 30-40 per cent by 2040.

### Jackass morwong

Already impacted. Further declines in abundance possible, particularly at northern edge of distribution.

### Flathead

Abundance may increase by 5 per cent or more.

### Gummy shark

Moderately sensitive to climate change. May increase up to 5 per cent.

### Squid

Gould's squid and southern calamari both have low sensitivity to climate change but likely to become more variable.



Further information on the stock projections produced by CSIRO can be found in the [regional report for Southern Australia](#), the CSIRO report '[Decadal scale projection of changes in Australian fisheries stocks under climate change](#)', and the CSIRO report '[Summary of Commonwealth Fishery Climate Sensitivity](#)'.