

Marine Heatwaves:

latest science on its negative impacts on biodiversity and people, and what we can do about it

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DRIVERS

The ocean's average temperature has increased by 1.5°C in the last century, and for the past 10 years average annual ocean temperatures have been the highest ever recorded. In addition to this long-term, persistent warming, discrete periods of extreme regional ocean warming called Marine Heatwaves (MHWs) are becoming more frequent.

Anthropogenically-driven climate change is causing ocean warming globally, and regionally MHWs are driven by unusual weather patterns and disruptions in ocean currents and mixing.

CURRENT AND FUTURE TRENDS

MHWs have increased by 50% over the past decade and now last longer (from weeks to years) and are more severe. They can affect small areas of coastline or span multiple oceans, and occur in surface and deep waters, across all latitudes, and in all types of marine ecosystems.

Projections suggest that by 2100 MHWs will occur 50 times as often as in pre-industrial times and increase 20-50 times in frequency and 10 times in intensity. These changes impact the entire ocean, and the Arctic and tropical regions are expected to be most affected.

MARINE HEATWAVES

MHW are extended periods of regional ocean warming. They have major impacts on marine life and human society.

EXTREME WEATHER

Warm waters increase tropical storms and hurricanes



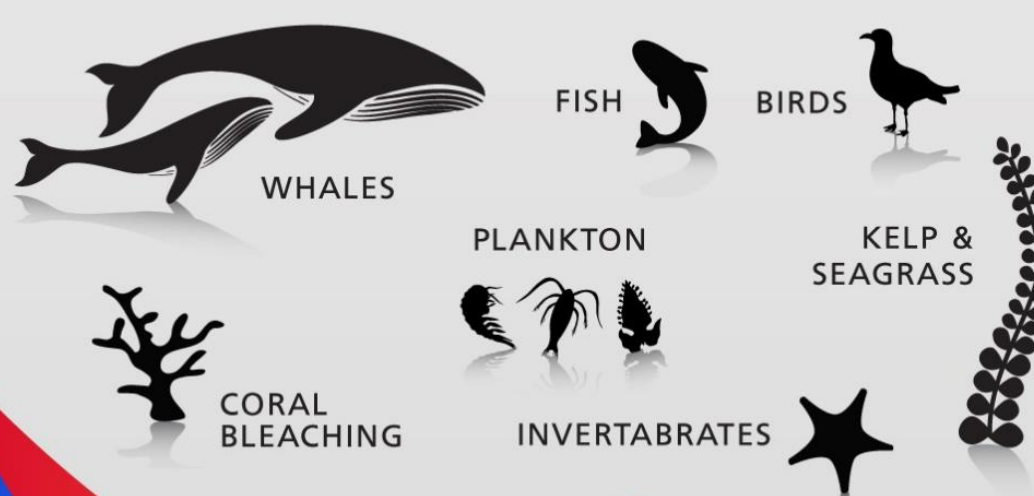
INCREASED OCEAN STRESSORS

- Stratification
- Acidification
- Deoxygenation



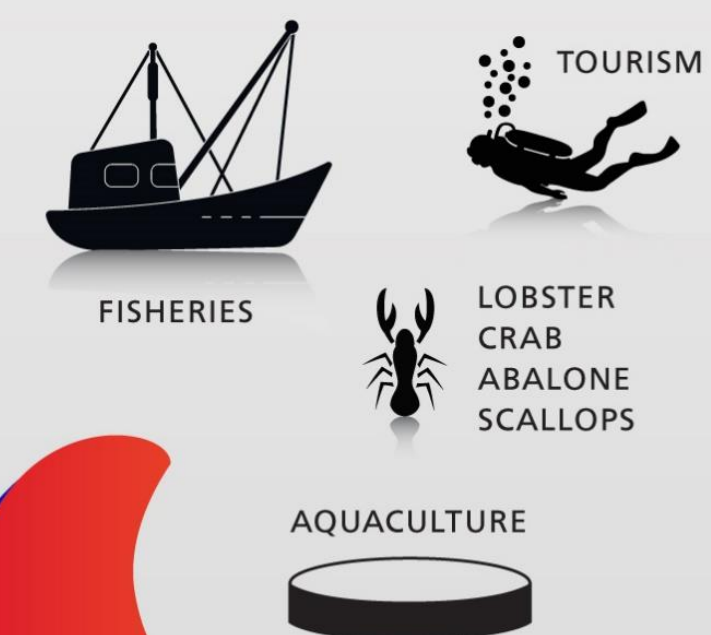
BIODIVERSITY & HABITAT LOSS

- Habitat compression
- Food web disruption
- Species migration
- Mass mortalities



ECONOMIC LOSS

Increased mortality of economically important species



10x intensity compared to pre-industrial times

50% increase in MHWs in the past 10 years

20-50 more MHWs by 2100

Fig. 1. Impacts of Marine Heatwaves on marine biodiversity and trends @IUCN

IMPACTS

- **Extreme weather events:** higher water temperatures associated with MHWs can cause extreme weather events such as tropical storms and hurricanes, and disrupt the water cycle; making floods, droughts and wildfires on land more likely.
- **Socio-economic impacts for coastal communities** by: negatively impacting aquaculture as farmed species can be susceptible to warm temperatures; causing fish kills or reduced productivity of economically important species; harming regional tourism.
- **Marine biodiversity:** MHWs have been associated with the mass mortality of marine invertebrates, regional mass extinction of kelp forest and seagrasses, and changes in species behaviour. MHWs have been linked to whale entanglements in fishing gear. Changing conditions can also help invasive alien species to spread, which can be devastating for marine food webs.

RECOMMENDATIONS AND SOLUTIONS

- Drastically reducing GHG emissions is a necessary measure to halt ocean warming and counteract ongoing extreme events such as MHWs. Alongside this global measure, local solutions should be implemented to address the issue at a regional or national level.
- Build research capacity and adequate monitoring systems to understand MHWs impacts.
- Build forecast systems to plan responses and mitigation activities.
- Inform and raise awareness across a broad range of stakeholders, ranging from scientists, policy makers, local governing bodies, private sector (fisheries, aquaculture, ecotourism), conservationists and civil society to identify and implement mitigation and adaptation strategies to MHWs.
- Design and implement management and adaptation strategies to address impacts and build ocean resilience at a regional level, national and subnational level.