Our Seas:
Why climate change matters

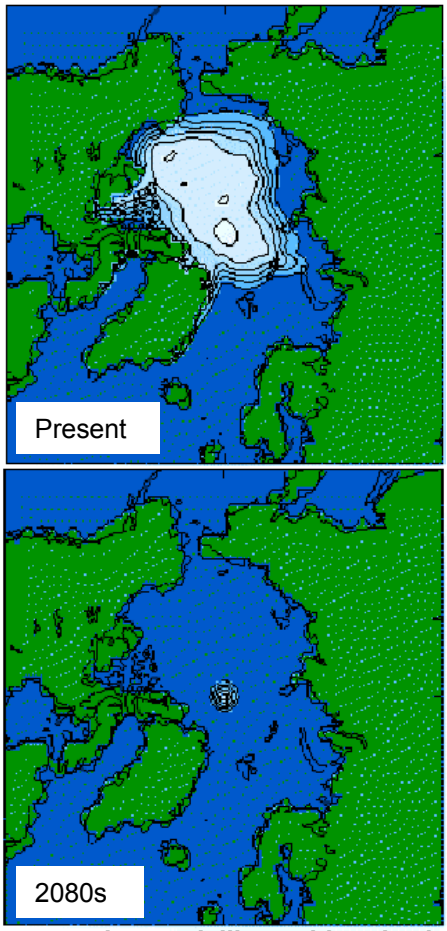
Climate change is affecting nearly every aspect of our marine ecosystems, from the very water itself to every type of biodiversity; this impact will continue and magnify over the coming decades and centuries. Marine wildlife is degraded by fishing, bycatch, habitat destruction, pollution and invasive species. Climate change has been impacting our seas for decades, but only recently have the effects been noticed. The dramatic changes underway due to climate change act in tandem with all the other pressures, and some exacerbate each other. Here we present the top issues in relation to climate change and marine ecosystems.

1) Increasing sea temperature:

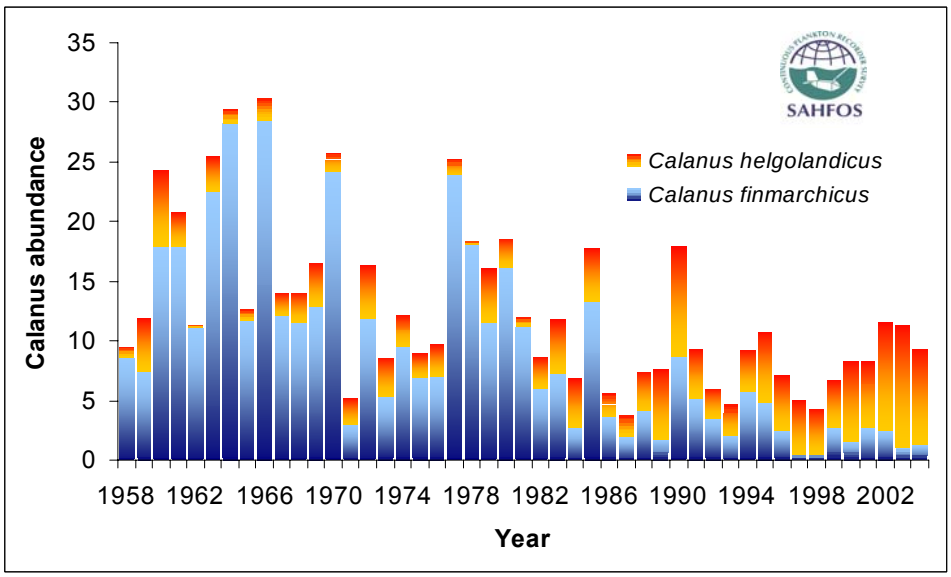
►Decreasing ice at the poles: In September 2005 the Arctic sea ice extent (area covered) was the least ever recorded by satellites. The Met Office in the UK predicts that by the 2080s there may be little or no summer sea ice at all, under the high emissions scenario.

►Range shifts: Altered distributions of species have been documented in temperate regions, associated with critical plankton productivity reductions of up to 50%. Extinctions are predicted.

►Coral bleaching in the tropics: The 1997/98 El Nino Southern Oscillation bleaching event caused wide-scale reef damage and mortality. Since then, bleaching has become more common and reefs are suffering as a result. In 2005, regional monitoring systems recorded that waters in the Caribbean were hotter for longer than had ever previously been measured. This resulted in dramatic bleaching throughout the region, from Colombia to the Florida Keys. Only that year's record-breaking hurricane activity limited additional bleaching, by cooling surface waters.



Summer sea ice modelling, with a rise in global average temperatures of around 3.7ºC (ESRES A1F1, Hadley Centre 2005).



Decrease in abundance of zooplankton, *Calanus* species, in the NE Atlantic and a shift from the cold water species (*C. finmarchicus.)* to a warm water species (*C. helgolandicus*). From SAHFOS, 2006.

Virgin Islands bleaching, September 2005

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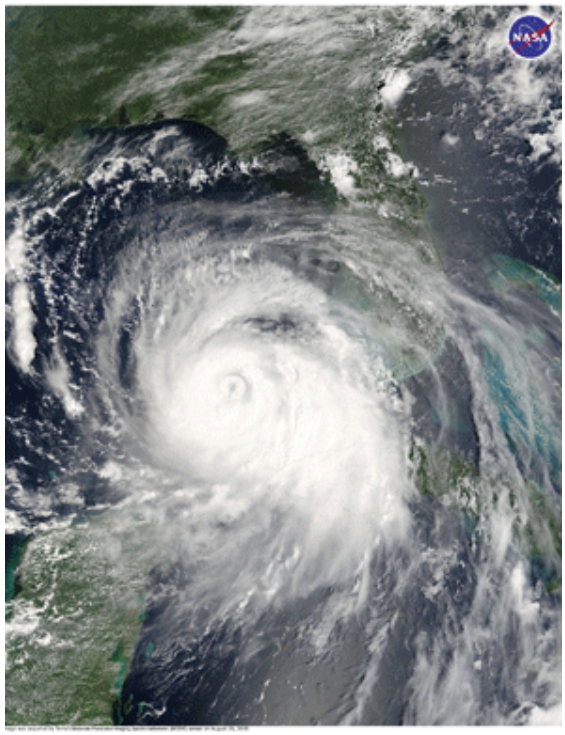
2) Decreasing marine pH – the other carbon dioxide problem:

Half the world's industrial carbon dioxide (CO_2) has already dissolved into the oceans in the past few decades, buffering the impacts of climate change. However, this additional CO_2 forms carbonic acid in sea water and has already resulted in increased acidity in the seas. By 2050, it is predicted that the seas will be more acidic than at any time in the last 20 million years. This has dramatic implications: more acidic conditions make it more difficult for organisms to form their calcium based shells and skeletons. Particularly vulnerable species include corals and some plankton, which form the basis of many of the world's marine ecosystems.



Hurricane Katrina

3) Impacts on fish:

Fish are predicted to be affected by climate change. Changes in the distribution of some species are already reported, with further changes anticipated. The productivity of some fish stocks is predicted to increase, while others are set to decrease. The impacts of climate change are already under way in some areas and are amplified by the primary pressure of over-fishing. Over-fishing leads to declining stocks and also removes the larger, older individuals which are better suited to tolerating environmental variation. These combined impacts are considerable, and of major concern to the future of our fisheries and the people who rely upon this important food source.

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New challenges for marine turtles

4) Methane hydrates:

Methane crystals in the marine and coastal environment pose a potentially huge additional contribution to climate change. Methane is 20 times more potent as a greenhouse gas than CO_2 and huge amounts exist within our seas. Releases from marine and coastal reserves could cause abrupt changes to the climate. Some methane is thought to be escaping from melting coastal permafrost already.

5) Rising Sea Level:

Coastline will change as water levels rise, inundating regions, and in some areas, whole nations. This will result in millions of climate refugees. Elsewhere, sea level rise will worsen the effects of storm surge and may allow for the introduction of pollutants from coastal industry and waste sites into coastal waters. Habitats and species will face additional challenges, for example, marine turtles will lose more of their already limited nesting beach habitat. Tigers in the Indian Sundarbans are also at risk of losing precious habitat to sea level rise.

WWF STRIVES FOR DRAMATIC AND URGENT CUTS IN GREENHOUSE GAS EMMISSIONS

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