

IMPACT OF CLIMATE CHANGE ON WHALES

Effects of climate change on the ocean and cryosphere have caused habitat degradation & loss for many whale species.

- Increase in global average ocean temperatures may cause geographical shifts in distribution of some whale species. This may also reduce habitats for whale species that require cold water ocean environments. Warmer sea surface temperatures may affect reproductive success of some whale species (e.g., sperm whales).
- Sea level rise can indirectly affect some whale species that depend on coastal regions for food and breeding (e.g., gray whales, humpback whales).
Whale species that adapted to polar regions are dependent on ice cover and will be negatively impacted by climate change (e.g., bowhead whales, beluga whales, narwhals)
- Antarctic regions support around one fifth of all whale species. Loss of winter sea ice in the Southern Ocean may be the cause of decline of krill populations by almost 80% since the 1970s. 8 species of baleen whales found in the Antarctic almost exclusively feed on krill. Krill populations also support other food webs necessary for other whale species. Loss of their primary food source may affect the breeding success of some whale species (right whales, blue whales).
- Climate change induced ocean acidification is likely to affect certain marine species (e.g., squid) that serve as prey for some whale species (e.g., beaked whales, sperm whales).
- Climate change has the potential to increase pathogen growth & disease transmission. Heat stress may increase susceptibility of some whale species. Warmer waters may support certain pathogens or toxic algal blooms. This will negatively affect whale populations.

Source: Elliott, W. and Simmonds, M. 2007. Whales in Hot Water? The Impact of a Changing Climate on Whales, Dolphins and Porpoises: A call for action. WWF-International, Gland Switzerland / WDCS, Chippenham, UK.

WORLD WHALE DAY 19 FEBRUARY 2024

WHALES & CLIMATE CHANGE MITIGATION

Great whales (baleen whales and toothed sperm whales) play an essential role in the ocean's biological carbon pump, cycling the carbon between the ocean and atmosphere.

- Fecal waste generated by these whale species support phytoplankton that pass on the nutrients and carbon up to the top of the food chain (whales & other marine mammals).
- When a whale dies, it sinks to the ocean floor and becomes food for many species and thus sequesters carbon deep underwater.
- Migration of whale species from nutrient-rich feeding grounds to nutrient-poor breeding grounds also promotes carbon sequestration to the deep depths of the ocean.
- Whales are active carbon sinks. Protecting whale populations is a more efficient, permanent and risk averse solution for carbon sequestration, compared to proposed geoengineering solutions (e.g., artificial sea floor fertilization, direct injection of carbon to the ocean depths).

Source: Pearson et al. “Whales in the Carbon Cycle: Can Recovery Remove Carbon Dioxide?” *Trends in Ecology & Evolution* 38, no. 3 (December 15, 2022): 238–49. DOI: 10.1016/j.tree.2022.10.012.