

Natasha, Amelia, & Miranda

Noise Pollution & Whales

1. Define the challenge (Basic introduction to the topic)-Amelia (have the introduction be interrupted by loud noise) *

We often think of the oceans as these quiet pristine landscapes but the truth is that they are becoming increasingly noisy places.

The ambient background noise of the ocean is currently about 40 air dB which is around the level of a quiet conversation, so not too terrible.

The noise level of a large boat propeller is about 180dB, the equivalent of 120 dB which is about the noise level of a loud car stereo.

The sonar the Navy tests register around 200-

Source (

As the diets of many whales can vary by species or environment, the impacts of fisheries on these organisms has been immense. A study in 2009 done by Dr. John Ford found that killer whales, for example, depend on a large population of Chinook salmon for sustenance. They demonstrated that the decline in killer whale populations was directly correlated with similar declines in the population of the salmon. Not only are fisheries depleting the available food resources for whales, but these mammals have also been impacted by bycatch, an event where non-target marine organisms are caught inadvertently during commercial fishing.

Though bycatch has a large impact on all non-targeted marine species, it is estimated that at least 300,000 cetaceans are accidentally caught because of bycatch every year. Whales are also being tangled in fishing gear, such as nets, and due to such physical restriction has resulted in several of their deaths. For example, in April 2019, a humpback whale washed up off the coast of the United Kingdom and its death was attributed to the fishing gear it had been wrapped in for months, which most likely caused the whale to drown.

While all of these issues and several more, such as water contamination, whaling in the 19th and 20th centuries, and climate change, have a compounding effect on whale populations and their survival, noise pollution, however, is of primary concern as it has the most direct effect on the lives of these talkative organisms.

Sources:

- i. <http://wildwhales.org/threats/>
- ii. <https://www.nbcnews.com/news/us-news/ferry-strikes-whale-near-seattle-n1011211>
- iii. <https://www.fisheries.noaa.gov/insight/understanding-vessel-strikes>
- iv. <https://www.fisheries.noaa.gov/insight/understanding-bycatch#what-is-noaa-fisheries-doing-to-address-marine-mammal-bycatch?>
- v. <https://iwc.int/bycatch>
- vi. <https://www.bbc.com/news/uk-scotland-edinburgh-east-fife-48051954>
- vii. https://wwf.panda.org/knowledge_hub/endangered_species/cetaceans/threats/

Evidence supporting the challenge (research evidence)-tash

In 2002, a series of navy sonar activities testing midrange frequency sonar off the coast of the Canary Islands resulted in mass strandings of 14 whales. For the first time, scientists were able

present in vital organs. SCUBA divers may experience a sickness called "the bends" if they ascend from deep water to shallow water too quickly. It can result in bubbles in your blood that are filled with nitrogen that makes your bones and joints ache so bad you want to 'bend' over. Just like SCUBA divers experience this, so do whales. The injuries these whales sustained are directly related to the navy testing activities and this was one of the first studies to prove justly so.

Other studies found that whales avoid boats or are completely displaced by them, often leaving valuable habitats because of stress levels.

Another study explored the noise levels associated with oil frackers and with humpback whales that inhabit the waters close to oil frackers. Off the coast of Brazil, there is a large aggregation of oil platforms that are directly in critical humpback habitats. Over a span of 2 years, 527 hours of acoustic samples of humpback whales and environmental noise were recorded on 69 separate days. During 10 of those recording sessions, humpback whale sounds and sounds coming from oil platforms were detected simultaneously, with oil platform sound frequency at the same or higher pitch than the whale noises. This could lead to masking of important communication calls such as mating, finding food, or detection of a predator by the humpback whales.

4. Case study examples- tash

A study conducted by scientists in the Bay of Fundy investigated the frequencies of baleen whale communication and their associated stress levels before and after the events of 9/11. The reduced ship traffic in the Bay of Fundy following the incident resulted in a reduction in noise by 6 decibels and 150 hz. Scientists were able to collee feion(,)10(g7()-3(i)10(n)-4()-3/)10(e)-5(8Aog)-4(

entire marine systems. A 2017 study by Dr. Robert McCauley found that noise pollution could contribute to a bottom-up trophic cascade as a softer blast than is caused by a seismic gun killed 90% of the phytoplankton in a 3/4 mile radius. As phytoplankton make up the base of the marine food web, excessive depletions of these populations worldwide have the potential to remove food sources for all whales. Phytoplankton serve as a food source for zooplankton, such as krill and copepods. A decrease in phy

<https://web.whoi.edu/big/how-marine-construction-impacts-more-than-just-the-seabed/>

showing promising results. Another design change being looked into is to change the design of the airgun so the blast is directed almost perfectly vertical as to reduce noise pollution out horizontally.

For sonar testing it becomes trickier. While the navy has been taken to court numerous times by Environmental organizations for breach of environmental policies, the outcomes are not consistent. This is because the issue of balancing national security and marine safeguarding appear to be at odds. In 2008 a Supreme Court Ruling claimed that the Navy could not comply with Environmental Regulations such as NEPA, if the compliance was a threat to national security. Many environmentalists have claimed that they don't want the navy to stop sonar testing all together but change the noise level in training operations and move the training to less significant areas of importance to whales. Currently in the United States the Navy is required to turn off sonar systems if animals are in the area and are banned from using pulses higher than 180 decibels within 22.5 kilometres (14 miles) from coasts, especially coastlines belonging to 'biologically important' areas. But some environmentalists are skeptical that this protocol is being met and are pushing for more strict operation policies.

Overall many international bodies such as the UN, International Maritime Organization, and the EU have all agreed that anthropogenic noise pollution (caused by humans) is a problem and are calling for and funding more research into the problem. However international regulations and laws surrounding noise pollution are still lacking. Pressing for more concrete stringent laws and regulations for noise pollution reduction needs to occur to properly correct this issue.

<http://web.a.ebscohost.com.proxy.seattleu.edu/ehost/pdfviewer/pdfviewer?vid=4&sid=9977f820-9866-4b21-a269-64e3b3f2e4c5%40sessionmgr4008>

<https://awionline.org/content/ocean-noise>

Closing thoughts

Although the current situation of whales worldwide may sound dire and too large of a problem to correct, there is a large body of people trying to change current practices that are contributing to this anthropogenic ocean noise pollution. Scientists and politicians are working together in some countries, such as Canada and the United States, to change maritime laws that would require ships to slow down or change routes to avoid critical habitat areas. There is also an increasing amount of research going in to clean energy, which would allow us to lessen our dependence on fossil fuels and thus reduce seismic testing. Current legislation requires now that the United States Navy must prove that there are no marine mammals in a given area if they are to use sonar. There are several things that you can do to help decrease the impacts of

noise pollution, such as purchasing seafood from fisheries that are committed to following protocol that reduce their ocean noise pollution or relying less on fossil fuels which come from noisy ocean oil rigs. With the cooperation of fisheries, oil companies, and global legislation, anthropogenic ocean noise pollution and its effects can be reversed, allowing the ocean to once again become a quiet place filled with the songs of whales.