

# Boat Collisions with Whales: A Growing Threat to Marine Conservation

## Introduction:

Whales play a crucial role in maintaining the health and balance of marine ecosystems. These marine creatures are known for their impressive size, often weighing over 200 tons and spanning lengths of up to 100 feet. However, their immense size does not exempt them from the perils they face when sharing their habitats with maritime traffic.



Image from Craig Hayslip, Oregon State University Marine Mammal Institute

Boat collisions with whales are an alarming and distressing issue plaguing our ocean today. These unfortunate incidents pose a significant threat to the survival of whale populations. According to research carried out by Friend of the Sea, boat collisions kill over 20 000 whales each year.

## Why do ship strikes occur?

Ship strikes with whales occur due to a combination of factors, including:

- Significant increase in maritime traffic: according to data from the International Maritime Organization (IMO), approximately **80%** of global trade by volume is transported by ships. As maritime traffic increases, more vessels traverse the same waters that whales inhabit, increasing the likelihood of collisions.
- High-density shipping routes: Shipping routes often intersect with crucial habitats, feeding grounds, or migration pathways, increasing the likelihood of encounters between vessels and whales.
- Fast-moving vessels: Ships and boats, especially those engaged in commercial shipping or recreational activities, often travel at high speeds. This makes it harder for operators to detect and react to the presence of whales in their path.
- Acoustic masking: Vessels produce noise underwater, including engine noise and propeller cavitation. This noise can interfere with the acoustic communication and echolocation abilities of whales, making it difficult for them to detect approaching vessels and avoid collisions.
- Whale behavior: Whales may spend significant time near the water's surface while feeding, socializing, or resting, putting them at greater risk of being struck by passing ships.
- Poor visibility: Weather conditions, such as fog, rain, or low light, can reduce visibility for both vessel operators and whales. Limited visibility makes it harder to spot whales from a distance, increasing the chances of a collision.

## High risk areas

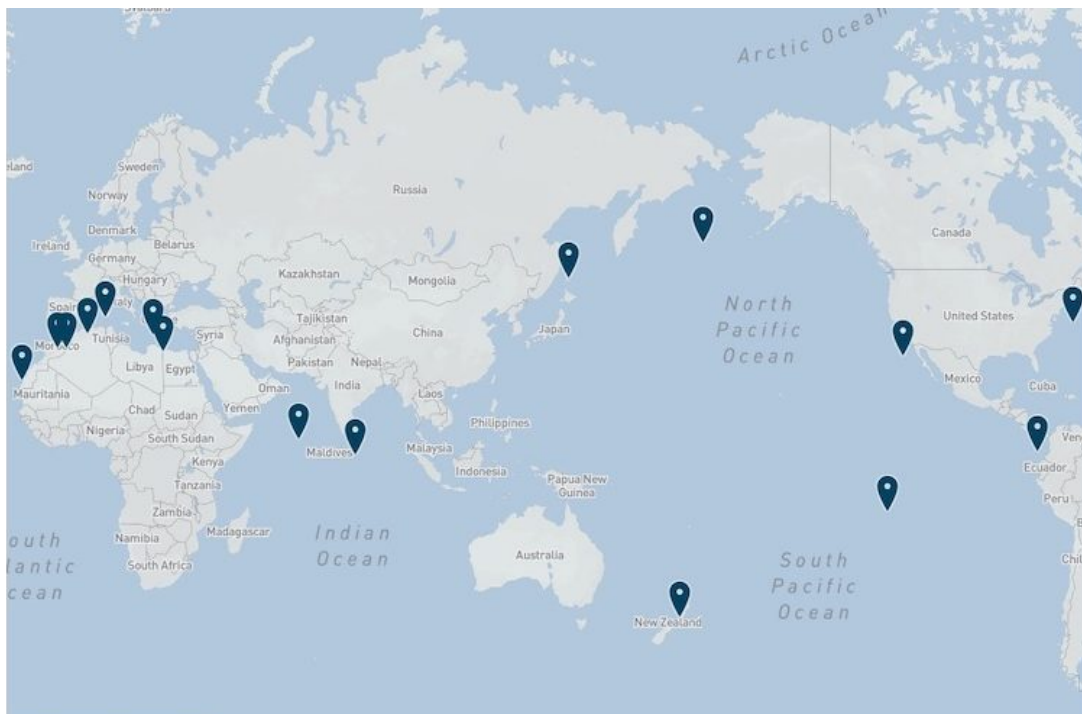


Image from Benioff Ocean Initiative

## High risk whale species

Boat strikes pose a threat to all whales and marine life as a whole. However, some populations are more at risk due to behavioral and physical reasons:

The **North Atlantic right whale** is critically endangered and faces a high risk of boat strikes. These whales have a slow swimming speed and spend much of their time near the surface, making them especially susceptible to vessel collisions.



Their population is concentrated along the eastern coast of North America, where they encounter busy shipping lanes and fishing grounds.

**Blue whales**, the largest creatures on Earth, are highly susceptible to boat strikes. They undertake long migrations and often traverse areas with heavy maritime



traffic, such as shipping lanes. Their slow swimming speeds and surface feeding behavior put them at increased risk.

**Humpback whales** are known for their acrobatic behaviors and long migrations. Certain populations cross through regions with high vessel traffic, increasing their



chances of encountering boats. Despite their agility, humpback whales can be difficult to spot due to their relatively small dorsal fins, making them more vulnerable to accidental collisions.

## Environmental consequences:

One of the most immediate and severe consequences is the potential for injury or mortality. Boat strikes can cause significant trauma, internal injuries, broken bones, and lacerations to the whales. Such injuries may result in immediate death or lead to long-term health issues, impairing their ability to feed, migrate, and reproduce.



The cumulative impact of boat strikes can lead to population declines, particularly for species that are already endangered. The loss of individuals due to strikes disrupts the balance within populations, impeding breeding success and reducing genetic diversity.

Image from Boris Horvat

Boat strikes also have broader ecological implications. Whales play crucial roles in marine ecosystems as top predators and nutrient cyclers. Collisions disrupt the balance of these ecosystems, affecting the availability of food resources and altering nutrient cycling processes. Such disruptions can have cascading effects on other species within the ecosystem, leading to shifts in predator-prey dynamics and overall ecosystem stability.

## Current Approaches and Solutions:

### Regulatory Measures:

Implementing various strategies can effectively regulate maritime traffic and minimize the risk of vessel strikes. For instance, enforcing speed restrictions in areas frequented by whales enables vessels to slow down and give whales more time to detect and avoid ships.

Additionally, designating whale protection zones plays a significant role in diverting or modifying shipping lanes to steer clear of critical habitats and migration routes.

Enhancing vessel communication, including regular updates with whale protection organizations and research institutions, facilitates the exchange of crucial information regarding whale sightings and migration patterns. Furthermore, the enforcement of regulations and penalties, both at local and international levels, serves as a deterrent against non-compliance.

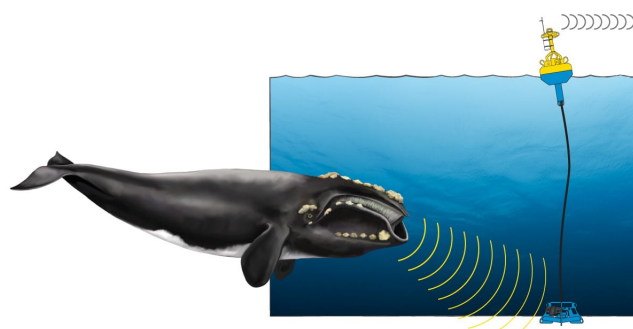
Collaboration among countries, international organizations, and scientific institutions is pivotal in developing consistent guidelines and sharing best practices.

Through the implementation of these measures, we can strive for safer maritime practices and the preservation of whale populations.

## Technological Innovations:

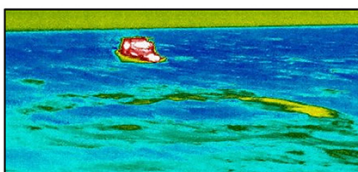
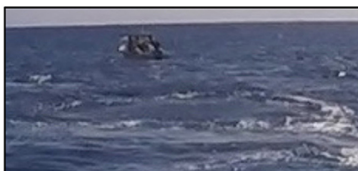
Several innovative technologies have been developed to help avoid whale strikes:

The **Whale Alert App** is an application developed by a collaboration of researchers, government agencies, and conservation organizations. It provides real-time whale presence and alert information to mariners, helping them navigate around areas with high whale density. The app utilizes acoustic and satellite data to track whale movements and provides notifications and recommended routes to avoid potential collisions.



**Whale Detection Buoys:** Specialized buoys equipped with hydrophones and underwater listening devices are deployed in strategic locations to detect whale vocalizations. These buoys can relay real-time acoustic data to ships or shore-based stations, providing information about whale presence.

**Automatic Identification System (AIS):** AIS is a tracking system used on vessels to exchange information with other ships and shore-based stations. By integrating AIS with whale detection systems, such as underwater hydrophones or acoustic monitoring devices, ships can receive alerts when whales are detected nearby. This allows for timely course adjustments and collision avoidance.



**Thermal Imaging Cameras:** Thermal imaging cameras mounted on ships can detect the heat signatures of marine mammals, including whales, even in low visibility conditions such as fog or darkness. By capturing thermal images, vessels can identify and avoid approaching whales, reducing the risk of collisions.

Image by Frontiers in Marine Science

**Vessel Noise Reduction Technologies:** Underwater noise generated by ships can interfere with whale communication and increase the chances of collisions. To address this, researchers and engineers have been working on developing quieter ship designs, propellers, and hull coatings to minimize vessel noise emissions. By reducing the noise footprint, whales have a better chance of detecting approaching vessels and can avoid potential collisions.

**Satellite Tracking and Predictive Models:** Satellite tracking technologies, coupled with advanced modeling techniques, enable scientists to monitor whale movements, migration patterns, and critical habitats. This information is used to develop predictive models that can forecast the presence of whales in specific areas and help mariners plan their routes to avoid encounters.

While progress has been made in addressing boat collisions with whales, further efforts are required to achieve comprehensive solutions.

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