Sea Grant VIRGINIA BRIDGE ocean science education DATA Series

The Great Humpback Comeback!

Lesson Time : 45 minutes
Grade Level : 9-12
Vocabulary: abundance, population dynamics, moratorium, breeding group, entanglement

Summary
Once hunted almost to extinction, western South Atlantic humpback whales – the population that swims between South America and Antarctica – have bounced back to nearly pre-whaling levels. In this activity, students will graph population counts from two breeding grounds and answer some questions about the past, present, and future of whale populations.

Objectives

- Using NOAA data, students will graph changes in humpback whale populations
- Using percentages, students will calculate how close today's whale population is to the estimated historic population
- Using rate of change, students will determine how long it should take for the modern population to reach pre-harvest levels
- Students will strategize and propose solutions to other threats facing humpbacks such as ship strikes, entanglement, declining food resources, and underwater sound

Introduction

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The humpback whale takes its common name from the distinctive hump on its back. Its long pectoral fins inspired its scientific name, Megaptera, which means "big-winged." Humpback whales are a favorite of whale watchers—they are often active at the water surface, for example, jumping out of the water and slapping the surface with their pectoral fins or tails.

Humpback whales live in oceans around the world. They travel incredible distances every year and have one of the longest migrations of any mammal on the planet. Some populations swim 5,000 miles from tropical breeding grounds to colder, productive feeding grounds. Humpback whales

feed on krill (small shrimp-like crustaceans) and small fishes by straining huge volumes of ocean water through their baleen plates.

Commercial whaling severely reduced humpback whale numbers around the globe and the United States listed all humpback whales as endangered under the Endangered Species Conservation Act in 1970, and then under the Endangered Species Act in 1973. Before a moratorium on commercial whaling in 1985, all populations of humpback whales were greatly reduced, some by more than 95 percent.

But there's reason for hope. Whale hunting, which began in the western South Atlantic around 1830, caused the humpback population there to plummet to a low of 440 by 1958. With commercial whaling first curbed and then eventually banned in 1986, the population began to recover. In October of 2019, scientists released updated population counts estimating that around 25,000 humpbacks now live in the western South Atlantic.

This rebound appears to be part of a global trend for humpbacks. Of 14 known populations — seven in the Southern Hemisphere and seven in the Northern Hemisphere — 10 have shown signs of recovery. The species is increasing in abundance in much of its range and in September 2016, the ESA listing for the humpback whale was revised to identify 14 Distinct Population Segments (DPS), listing 4 as endangered, and removing 10 from the list due to successful recovery.

Data Activity

The Marine Mammal Laboratory (MML), a division of the Alaska Fisheries Science Center, conducts research on whales, seals, sea lions and porpoises. Scientists working with the MML published a paper in late 2019 outlining the recovery of humpback populations in the western South Atlantic.

While the study published whale counts from several sites, in this exercise students will graph the data compiled from two breeding grounds and then answer the questions below.

Bridge DATA: The Great Humpback Comeback!
Western South Atlantic Humpback Whale Population Estimates

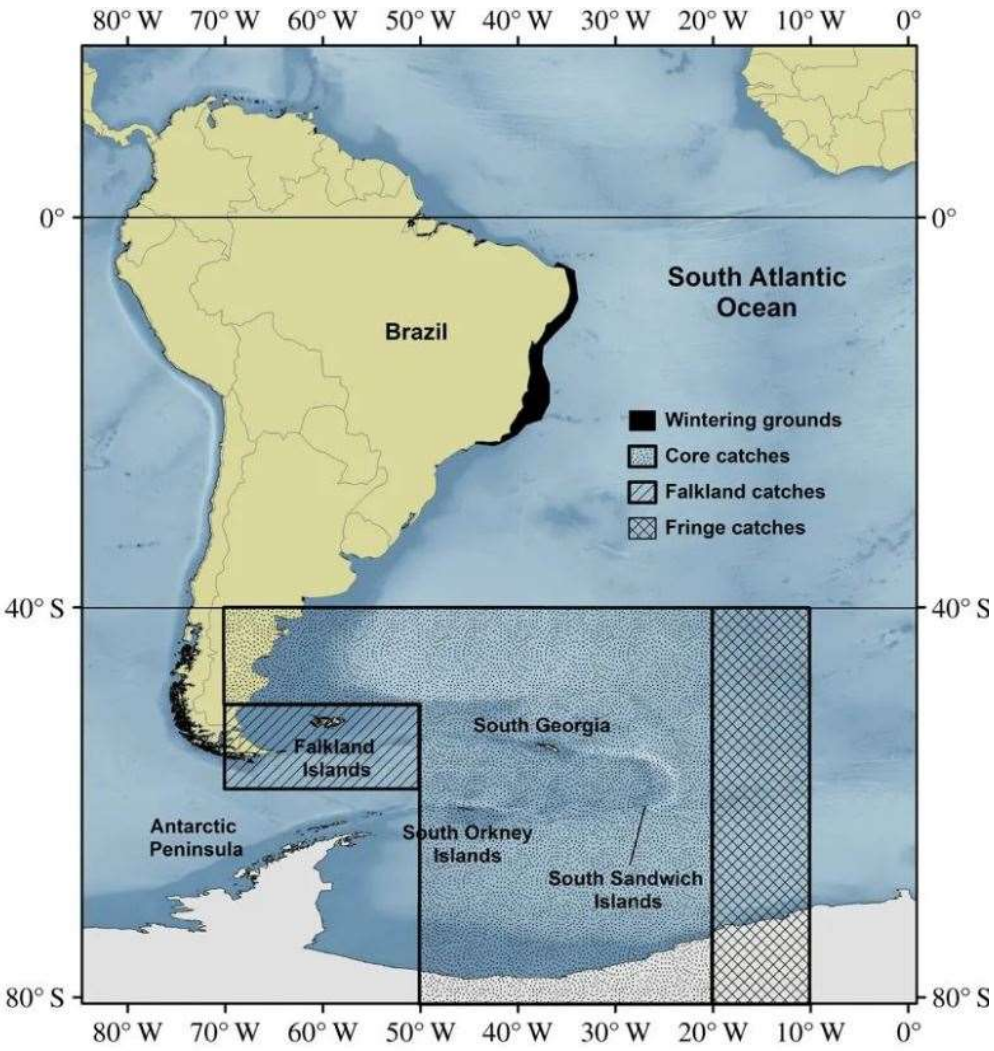
Breeding Ground 1: Central Coast of Brazil

Observation Year	2008	2011	2015
Population Estimate	7689	8652	12,123

Breeding Ground 2: Southern Coast of Chile

Observation Year	2002	2003	2004	2005	2008	2011
Population Estimate	3026	2999	3763	4113	5399	8832

Map of Winter Breeding Ground Locations



Zerbini Alexandre N., Adams Grant, Best John, Clapham Phillip J., Jackson Jennifer A. and Punt Andre E. 2019. Assessing the recovery of an Antarctic predator from historical exploitation. *R. Soc. Open Sci.* 6190368 http://doi.org/10.1098/rsos.190368

Discussion Questions

What do the data show about humpback whale populations in the western South Atlantic?

How do the breeding grounds compare to each other? Is this what you expected to see?

Why or why not?

Scientists estimate that the current population of western South Atlantic humpbacks is around 25,000 individuals. They estimate that the pre-whaling population was around 27,000 individuals. What percentage of the pre-whaling population is the current population?

Based on your graph, how long do you think it would take to reach pre-whaling population levels? *Hint: Perform a "rate of change" calculation*.

Increasing populations give scientists reason to hope for a full recovery, but humpbacks still face threats from entanglement in fishing gear, vessel strikes, underwater noise, and decline in krill populations. If you were a legislator, how would you work with scientists to develop a plan to help protect the humpback whale from one or more of these threats?