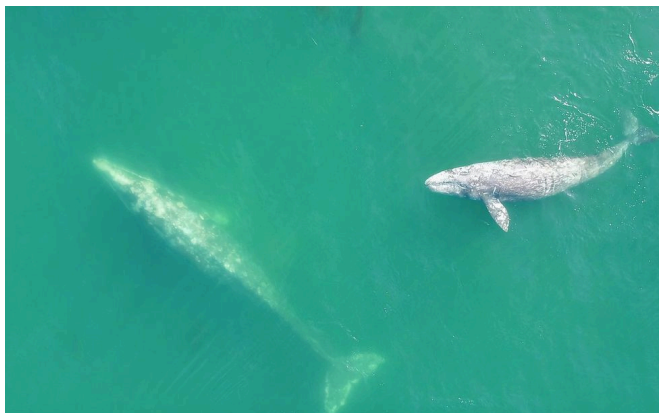
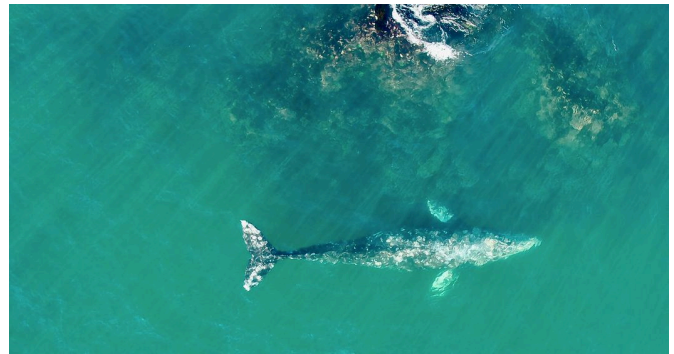
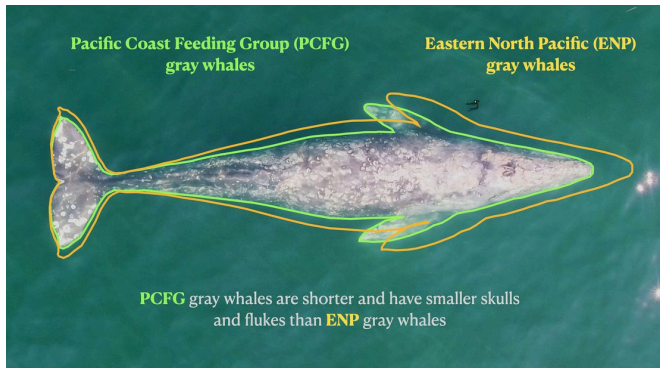


Whale Size: New insight into gray whales along Pacific Northwest Coast

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Gray whales that spend their summers feeding off the coast of Oregon are shorter than their counterparts who travel north to the Arctic for food, new research from Oregon State University's Marine Mammal Institute shows.

Both males and female gray whales in the subgroup known as the Pacific Coast Feeding Group are smaller than those in the larger group of Eastern North Pacific whales. The females average 3 feet (about 1 meter) shorter and males average 1.5 feet (half a meter) shorter, said the study's lead author, K.C. Bierlich, a postdoctoral scholar in the institute's Geospatial Ecology of Marine Megafauna Laboratory.

"That is a significant difference in size. We also found that the Pacific Coast Feeding Group whales had slightly smaller skulls and flukes," he said. "It's a surprising finding – we have not thought about these whales being different in this way before."

The findings, published in the journal *Biology Letters*, raise new questions about the health, behavior and management of the Pacific Coast Feeding Group, said study coauthor Leigh Torres, an associate professor at Oregon State who leads the GEMM Lab.

Most of the roughly 16,000 gray whales in the Eastern North Pacific population cruise past Oregon's coast as they migrate south between October and December to their winter breeding grounds in Mexico and again in March as they return to feeding grounds in the Bering and Chukchi seas between Alaska and Russia, where they spend the summer.

But whales in the Pacific Coast Feeding Group, which number 212, spend their summer months feeding in coastal waters of Oregon, as well as northern California, Washington and southern Canada.

Since 2015, Torres and her research team have been studying the health and habits of the Pacific Coast Feeding Group, also known as Oregon's "summer resident" gray whales, because of their unique ecology and elevated exposure to human activities in some locations, including boat traffic, noise and pollution.

The work includes using photographs to identify individuals, nets to capture fecal samples and drones to capture aerial images for measuring the body size of individual whales. These methods provide researchers with a lot of information about the whales' health and environment in a noninvasive manner.

"What is really unique about our data on the Pacific Coast Feeding Group is that we know these whales really well," Bierlich said. "We see the same whales every year and can identify individuals based on unique markings, use sighting history from photo identification to estimate their age, collect fecal samples to determine their sex and use drone imagery to measure their length, skull and fluke size."

"A big question our research group has been debating for a while is why these whales come here instead of going farther north like the larger group," he said.

Bierlich, whose research interests include using non-invasive tools such as drones to study whale health and behavior, saw an opportunity to compare the Pacific Coast Feeding Group and the Eastern North Pacific whales. He used a combination of historic whaling records, data from stranded animals, observations from airplanes and information collected through modern noninvasive techniques including drones and began to see differences between the two groups.

"When we look at the growth curves for the two populations, we see that they grow at the same rate, but reach different final lengths," he said.

"That raises some interesting questions: Is this size difference normal for this group of whales and they are a healthy population, but just differently shaped? Or is this difference a sign that they are stressed, unhealthy or not getting enough to eat?

Reduced size and length are common adaptations for animals when resources are limited, Bierlich noted, but the difference also could be attributed to an adaptation to the conditions of the region.

“These whales live in a very shallow environment, feeding in the kelp forest near shore, so the differences could be a reflection of their environment,” he said. “Their smaller body size and shorter skulls and flukes could potentially help them feed more effectively in this habitat compared to the deeper waters where the Eastern North Pacific whales feed.”

The findings may also have implications for future population management.

“Being smaller means these gray whales may have less energetic storage available to support reproduction or response to disturbance and injuries,” Torres said. “More research is needed to understand what may be driving the size differences between the two populations.”

In the United States, the Pacific Coast Feeding Group is managed as part of the larger Eastern North Pacific Group. The differences in size could raise questions about whether the Pacific Coast whales should be managed separately.

“With only 212 Pacific Coast Feeding Group whales, these whales might require different management strategies compared to the 16,000 whales in the Eastern North Pacific,” Bierlich said.

Additional coauthors include Oregon State’s Ally Kane, Lisa Hildebrand, Clara Bird, Alejandro Fernández Ajó, Josh Stewart, Ines Hildebrand and James Sumich and Duke University’s Joshua Hewitt. The Marine Mammal Institute is part of Oregon State’s College of Agricultural Sciences and is based at Hatfield Marine Science Center in Newport.

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