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A Whale of a Tale

Husband and Wife Student Team Study Whales For Love and Knowledge

Becky Woodward is a mechanical engineer with a passion for animals. She is also one of the fortunate few who have found fulfillment by combining her professional and personal interests, and in the process is doing some wavebreaking research. Specifically, Woodward is studying the biomechanics of whales as she works toward a Ph.D. at the University of Maine, Orono.

It could also be said that whales brought Becky and her husband Jeremy Winn together, since they met while both were working at the Coastal Ecosystem Research Foundation (CERF), a non-profit organization in British Columbia that combines marine mammal science with eco-tourism. The organization was examining the gray whale population in the area and asked Woodward to study their swimming dynamics. This meshed well with her ME master's work at Colorado State University, Ft. Collins, where she studied the biomechanics of racehorses.

"I looked at the forces on their legs with the goal of preventing racetrack breakdown," said Woodward, who didn't have to be asked twice to join the CERF study since she had already been taken with the majesty of whales.

A Close Encounter

An avid kayaker, she had been paddling with a group of friends off the coast of Washington State a year earlier hoping to see some killer whales reported to be in the area. They were not disappointed.



The married student research team of Becky Woodward and Jeremy Winn, with their 15-foot inflatable boat in which they hunt whales more than twice its size.

"Within 45 minutes of being on the water we saw an armada of boats following the killer whales. We were able to just sit there and the whales swam by us," she said. Then the pod turned and one whale, with a dorsal fin rising six feet above the surface, headed towards Woodward's kayak. "I was sure he was going to turn," she said. But he didn't turn. Instead he dove under her boat. "The dorsal fin missed the bottom of my kayak by a couple of inches, and I could see the white saddle patch behind his fin ghosting by

gray, each of which has a different body type and feeding habits.

Woodward decided to focus on baleen whales because of her early experiences in British Columbia. "The humpback and gray whales have always been my favorites because they are among the most acrobatic and maneuverable," she says. "How a 40-ton whale launches itself completely out of the water is what sparked my interest."

Swimming Styles

Little is known about the underwater activities of whales. Although they must surface to breathe, whales spend only about two percent of their time at the surface. Woodward's goal is to fill this knowledge void by studying whales' "swimming styles to determine whether their diving and underwater maneuvering differs depending upon their body configurations." It is her hope that such knowledge can be applied to preventing whales from getting caught in commercial fishing gear and from being struck by ships, both of which endanger their survival.

From an engineering standpoint, Woodward also hopes to apply what she learns about whales, "who are supremely adapted to the watery world, to submersible design for our own undersea travel."

To conduct their research Becky and Jeremy borrowed a sophisticated, \$10,000 digital acoustic recording tag (DTAG) from the Woods Hole Oceanographic Institution. It records depth, temperature, roll, pitch, heading, and sounds. The researchers approach the target whale in their 15-foot, inflatable boat, powered by a 35 hp engine, and with an apparatus fashioned from a 35-foot telescoping pole donated by the local power company, they gingerly place the tag on the whale's back.



Jeremy Winn greets a friendly gray whale off the coast of British Columbia.

underneath me" said Woodward.

Most people would find that a harrowing experience, but Woodward says her hands were shaking not out of fear, but from excitement. "It was really cool. I was sold on whales from that moment on."

She was so sold that she worked at CERF for two summers, and it was during the summer of 2000 that she met Jeremy, who was a kayak tour guide. Shortly thereafter they moved to Maine to continue their academic studies and their love affair with whales. Becky began working toward a doctorate with a focus on the biomechanics of whales. Jeremy, who is studying marine biology, is both husband and research partner. "We make a pretty good team," says Woodward. "He's got the biology and I've got the engineering."

Their work involves a comparative study of several species of baleen whales (which have no teeth and filter food from the water): blue, right, humpback, and

It is attached by suction cups and set to release within two to four hours. They follow the whale by listening for beeps from the DTAG as the whale surfaces, and they retrieve it when it releases and bobs to the surface with its recorded data.

So far they have not lost the tag, but there was one tense occasion when it didn't release as scheduled and they had to return to shore without it due to weather and impending darkness. Fortunately, they were able to locate the tag the following day.

Woodward and Winn have spent the past two summers gathering data off the coasts of California, Newfoundland and British Columbia. So far they have tagged five whales from which they have recorded 160 dives and obtained over 18 hours of data. This coming summer they plan to return to the sea to collect even more data.

As for when she thinks they will complete their research, Woodward says, "I'm not sure. It depends upon how cooperative the whales are."

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