SEYMOUR Marine Discovery Center SANTA CRUZ

Blue Whale Skeleton at the Seymour Marine Discovery Center at Long Marine Laboratory

Arching 87 feet in length and rising 18 feet above the ground, the blue whale skeleton at the Seymour Center is a sight to behold. The skeleton, dubbed “Ms. Blue” by center volunteers, has a colorful history at Long Marine Lab. She was first assembled in 1985 and has been a centerpiece of the lab’s education program ever since. Prior to that, Ms. Blue’s life and death are an enigma.

For reasons still unknown, a dead blue whale washed ashore at Fiddlers Cove near Pescadero on September 6, 1979. After several days of jurisdictional uncertainty, biologists and students from UC Santa Cruz began the long and fragrant task of “flensing,” removing the blubber and flesh from the whale. The process took nearly a month.

Transported by helicopter and truck to the marine lab, the skeleton lay in a grassy field just downwind of lab buildings for over a year before being buried. Burying allowed nature’s decomposers to clean away the remaining tissue and oil that saturated the bones. In the summer of 1985, the bones were unearthed and reconstruction began. Frank Perry, a local geologist and museum specialist, was hired to clean the bones and mount them for display. Working with lab staff and specialists from the Santa Barbara Museum of Natural History and the California Academy of Science, they constructed a steel framework to support the bones and recreate the proper arch of the spine. The job was completed in late 1986.

In 1999, time came to dismantle Ms. Blue and move her to the present Seymour Center. This seemed a perfect opportunity to perform a major refurbishing. During the original recovery process in 1979, some bones were lost to the tides, crushed under the 100-ton weight of the carcass, or stolen from the beach by souvenir hunters. Dr. Dave Casper, UC Santa Cruz veterinarian, stepped forward to re-create the 60 lost bones and complete the skeleton.

Casper painstakingly created molds of the missing parts from bones loaned by other institutions or from similar ones in the existing skeleton. He then cast each piece out of two-part polyurethane foam. Each new bone was primed and

painted. The rest of the skeleton was also repainted.

Not only does Ms. Blue have new bones, but the steel framework supporting her has been raised to a height of 18 feet. The flipper bones, originally pinned close to the body, are now deployed away from the ribs in a swimming position. The effect is breathtaking. Standing beside the 18-foot jaw bones, even a grown man looks small.

The following is the text from the keynote speech by Dr. David Casper on the occasion of the dedication of the blue whale skeleton at the Seymour Center at Long Marine Lab, February 25, 2001.

I'm so happy to celebrate the completion of the whale skeleton with you today. When this whole idea of casting bones and remounting the skeleton began, my first response was, "How hard can it be anyway?"...I'm much wiser now.

Blue whale skeletons are not commonly displayed. There are only four displayed in North America.

- Santa Barbara County Museum has a 72-foot specimen
- New Bedford Whaling Museum mounted a 66-foot specimen.
- North Carolina State Museum has a 65-foot specimen.
- Until recently there was a fourth at the California Academy of Sciences.
- Worldwide, there are mounted blue whale skeletons displayed in South Africa, New Zealand, and Australia.
- To my knowledge, at 87 feet, the Long Marine Lab whale is the largest displayed whale skeleton in the world.

To accomplish this project, we actually borrowed a blue whale skeleton from the National Park Service. I had intended to use those bones to cast replacements for our missing bones. Their whale was 76 feet long. When the skeletons were placed side by side it was obvious that our bones were much larger so my original plan had to be adjusted.

I did use the last 12 vertebrae and chevron bones from their whale to cast replacement bones, where the size difference was not as obvious. I had to use different techniques for the rest of the replacements.

In the end, I cast 60 replacement bones out of 176 in the whale. Although it seems like a large percentage of the skeleton, most of the bones were relatively small. By weight or by mass, 90% of our skeleton is real bone. There is a graphic on the wall showing bones are real and which are reproductions.

In the center of our skeleton, several large vertebrae were missing. Because they were of similar size and shape, I chose the most appropriate of our vertebrae and built one very large mold. I then made nine copies of that bone. It is not apparent, looking at the finished whale, which bones are the reproductions.

Because we noticed during assembly that people wanted to touch and feel the real bones, the bone from which the casts were made was held back and not re-mounted in the skeleton. I cast an extra replacement so that the original bone could be displayed in the visitor center. The original bone, silicone mold, and a fiberglass reproduction are displayed here today.

Mounting the finished skeleton was an engineering and aesthetic challenge. During those days outside on a ladder or perched in a forklift, visitors would often come up and talk about their remembrances of this whale. One Santa Cruz police officer stopped his cruiser as we worked and told us that, as a boy, his father had taken him to see the whale when it was first on the beach at Pescadero. 10 years later, when the skeleton was mounted at the marine lab, he visited the whale skeleton with his school class. Our whale was a special memory for him and he was happy to see it going up again. He was not alone. The size and grandeur strike everyone who sees this whale.

But rather than talk about what it took to cast replacement bones and mount the skeleton, I would like to talk about this whale's life.

Much of what we know about blue whales comes from studies conducted during the days of whaling. Further information has been put together by biologists such as UCSC's own Don Croll using transect surveys, satellite tags, and plankton tows. Using all of the sources of information available to us, what can we know about the life of this particular whale?

We might first ask how old she was when she died.

When she first washed up Tom Dohl, in a newspaper interview, estimated that

she was 50 years old. It turns out that was a really good guess. Blue whales can live to 80 years or more. We did not have the soft tissue evidence from her varies or ear plugs with which to age her accurately, but we do know that, at the time of her death, she was still growing.

Blue whales become sexually mature at about 79 feet and 4 to 10 years of age. This whale, at 87, feet was certainly mature. The stage of ossification of her skeleton taken together with her immense size make 50 years a good estimate. At full maturity she might have exceeded 90 feet in length.

If she was 50 in 1979, she was born in 1929. Her lifetime spanned the most dramatic and terrible period in blue whale history. When she was born, the slaughter of whales was at its highest. In 1930, when she was in her first year of life, the Antarctic take of blues whales was 30,000 in one season! To put that in perspective, the estimated total pre-whaling blue whale population in the Antarctic was 200,000. By the time blue whales were protected in 1965, 350,000 blue whales had been killed and it was thought that less than 1000 survived.

In the North Pacific the blue whale population was always lower. The total pre-whaling blue whale population was only 6000. The Norwegians sent factory-whaling ships to Baja in the decade before her birth. They took a total of 1300 whales. During her lifetime, a total of over 9500 blue whales were taken in the North Pacific. By 1970 we think she was one of only 2000 blue whales in the entire North Pacific.

She would have been born in the Sea of Cortez between December and March. A yearly event in the US / Mexico population is the migration of whales south along the West Coast of Baja in the fall and north again in the spring. Many whales with calves are found in the Sea of Cortez during the winter. She nursed and grew from 25 feet and three tons at birth to 50 feet and 23 tons in six months. She doubled her weight in the first week of life. She was weaned in the North Pacific in June or July. By the age of ten she was producing a calf every two to three years. In some years she may have traveled farther south during winter to the Eastern Tropical Pacific off Costa Rica and Ecuador.

Her death off the coast of California in summer was a harbinger of change for North Pacific Blue Whales. We now think that something was starting to happen, far out at sea, to their food supply, the krill. Blue whales have always migrated both south and north along the Baja coast. However, up to the time she died, they tended to avoid the U.S. coast in summer and fed farther out at sea.
She died at the start of a ten-year period when blue whale sightings along the west coast doubled. This increase is too large and happened in too short a time

to be accounted for by reproduction alone.

UCSC's Don Croll believes that decade long shifts in the productivity of the entire Pacific Basin may decrease krill production and drive whales inshore to feed. Perhaps that's why she was close to shore when she died.

It was September when she died. She would have been starting her fall migration back towards Baja. She was not pregnant, so she had likely weaned a calf that summer. It was neither an El Niño nor a La Nina year. By July that year, at the end of her lactation, she would have lost 50 tons producing a 23-ton calf. The dorsal spinous processes on her back would have been visible as she lost weight. She would have needed to eat three to four tons of krill a day for the summer to make up the loss.

We don't know why she died. Her body was too decomposed.

She's home now, the symbol of our marine lab.

I was touched by the policeman's remembrance of her as a child.

Think how many thousands of children have yet to stand before her, experience awe, and make a memory that will last a lifetime.

Thank you for coming today.

David R. Casper DVM University of California Santa Cruz Long Marine Laboratory