

Counting on New Zealand's Māui dolphins

Cetacean Conservation and Genomic Laboratory (CCGL)

By Debbie Steel and Scott Baker, PhD

Māui dolphins and their sister subspecies, the Hector's dolphin, are endemic to coastal waters of New Zealand. Although similar in appearance, the two subspecies are reproductively isolated and can be identified by a set of genetic markers used routinely in our laboratory. Māui dolphins are currently found in only a small remnant of their former range along the west coast of New Zealand's North Island. The subspecies is considered critically endangered.

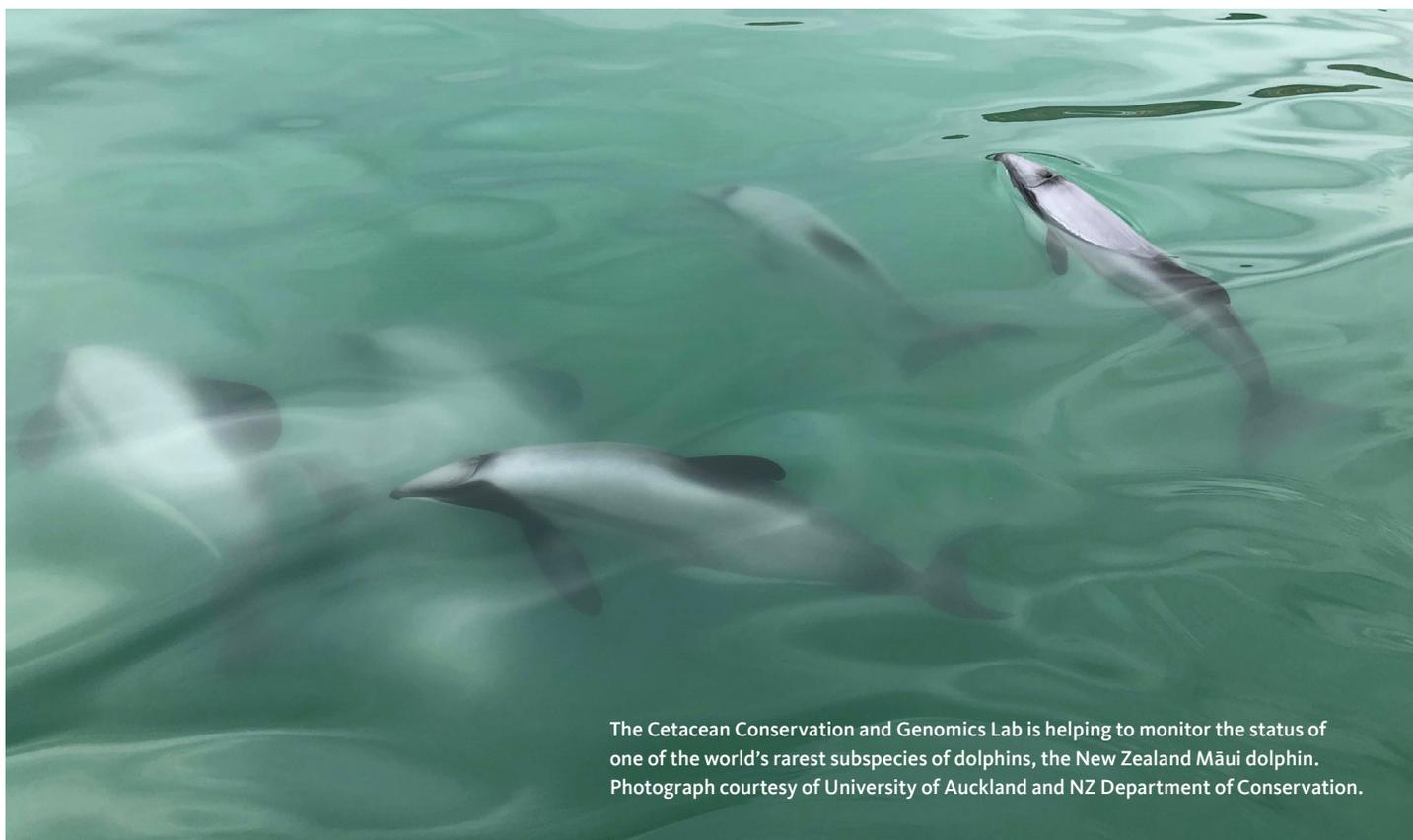
Previous assessments suggested a substantial decline in Māui dolphin abundance over the last several decades due to fisheries-related mortality. These studies led the New Zealand government to enact a series of fisheries restrictions throughout most of the current range of

Māui dolphins. More recently, mortality from disease, primarily toxoplasmosis and brucellosis, has emerged as a threat.

As part of an ongoing effort to monitor trends in Māui dolphins, we have been working with the New Zealand Department of Conservation and Dr. Rochelle Constantine at the University of Auckland to improve estimates of abundance using DNA profiling for individual identification. For this we collect small biopsy samples during boat-based surveys conducted within the known range of Māui dolphins. These surveys are conducted across two years, at five-year intervals (beginning 2010–11) and build on surveys begun in 2001 by Scott and his graduate students at the University of Auckland.

Using DNA extracted from the biopsy sample, we generate a DNA profile for each individual sampled and then compare this to a DNA register of profiles from all samples collected previously. We then use this individual recapture information to generate an abundance estimate and to model the changes in abundance across the five-year intervals.

Using these methods, we estimated that there were 55 individuals alive in 2010–11 and 63 individuals alive in 2015–16. Although this small increase in estimated abundance seems promising, it is not sufficient to conclude that the population is increasing. A third paired-year survey is needed to improve confidence in the trend.



The Cetacean Conservation and Genomics Lab is helping to monitor the status of one of the world's rarest subspecies of dolphins, the New Zealand Māui dolphin. Photograph courtesy of University of Auckland and NZ Department of Conservation.

In February of this year, a team of researchers and rangers conducted the first year of this third paired survey. During surveys broadly covering the range of Māui dolphins, the team encountered 26 groups and collected 50 biopsy samples. DNA from these samples were subsequently sent to our lab for profiling, allowing us to identify 30 individual Māui dolphins. After matching the profiles of the 30 Māui dolphins to our DNA register, we found that 15 of the individuals had been sampled during previous surveys. One male was first

sampled as an adult in 2001, confirming that he is now at least 20 years old.

The DNA profiling also allowed us to identify two Hector's dolphins among the samples collected in 2020, a female and a male. Although it came as a surprise to us when former MMI PhD student Rebecca Hamner first identified two Hector's dolphins in the 2010–11 surveys, we have now documented four living Hector's dolphins in the Māui range. Some of these individuals appear to be "vagrants" that are identified in only one survey, but the female sampled

in 2020 was sampled previously in 2010 and again in 2015. Given this 10-year residency, we have searched the DNA register for evidence of interbreeding between the two subspecies but, to date, have found no evidence of individuals with a mixed heritage.

Planning is now underway for the 2021 surveys. With this second year, we hope to get a real sense of the trend in the critically endangered population of Māui dolphins and maybe find some evidence of genetic interchange with their more abundant sister subspecies. **MMI**

Whales Return to South Georgia Island

Scott Baker

"I see them in hundreds and thousands,"

reported Norwegian whaler, Carl Anton Larsen, on establishing the first whaling station on South Georgia in 1904.

Following the advent of modern commercial whaling in the early 20th century, more than 2,000,000 whales were killed in the Southern Hemisphere alone. The center of this slaughter was South Georgia Island, a key summer feeding ground for humpback, blue, and fin whales.

Over a period of 60 years, records show that more than 176,000 whales were killed and processed at the many whaling stations established after Larsen's pioneering venture. When the whalers had finished, the local abundance of whales had vanished.

It has now been more than 50 years since the last whale was taken from the waters of South Georgia. Have the whales begun to return to South Georgia, or were they truly extirpated?

To help answer this question, I joined other scientists and crew from the UK, the US, Canada, Brazil, New Zealand, and Tonga, aboard the R/V *Braveheart*, a former Japanese fisheries research vessel under charter by the British Antarctic Survey.

For more than three weeks in January 2020, we surveyed the waters around South Georgia to collect sighting records, acoustic records, photographs for individual identification, and biopsy samples for genetic and biochemical analyses.

The expedition was a great adventure and a remarkable success. After two days flying, I arrived at our port of departure in the Falkland Islands (Islas Malvinas). After four more days steaming aboard the *Braveheart*, we arrived to an abundance of humpback and blue whales, two of the species that had disappeared from South Georgia.

For me, the highlight of the surveys was the opportunity to collect the first biopsy samples from living blue whales in the waters off South Georgia. The genetic information

of living whales can be compared with the DNA from the bones of blue whales that are still scattered around the shoreline of South Georgia (see "Reconstructing the Past" by Angie Sremba in MMI's 2016 newsletter).

Much remains to be learned from these results but we now have an answer to our question about whether whales are returning to this former center of whaling: *Yes!*



PHOTO: Scott Baker on the bow of the R/V *Braveheart* collecting a biopsy sample of a blue whale offshore of South Georgia Island. Photo courtesy of Paul Ensor and the British Antarctic Survey.