

MARINE MAMMAL & TURTLE DIVISION, SWFSC BIWEEKLY REPORT ON FIELDWORK, PUBLICATIONS, RESEARCH RESULTS, AND EVENTS

15 September 2023

I. Fieldwork:

Green Turtle Ecological Research in Southern California, 29 August 2023 –

The SWFSC marine turtle research team partnered with colleagues from the West Coast Regional Office and U.S. Navy to conduct green turtle capture efforts in Seal Beach National Wildlife Refuge. One turtle was captured, an adult female measuring 88.6 cm curved carapace length and 69.2 kg in body weight (see photos). This individual was a recapture, first captured on 25 August 2015, slightly more than 8 years prior. This event marks one of the longest recapture intervals for a green turtle in Seal Beach and further supports individual fidelity to this coastal wetland foraging site. The team also equipped the turtle with an Argos-linked Fastloc-GPS transmitter to track its movements and habitat use in the refuge. Looking ahead, the next capture effort in Seal Beach will be in late September 2023. One final note of interest is the fact that the Refuge is now starting to showcase that green turtles are regular inhabitants within its boundaries, as reflected by the new refuge sign (see photo). Contact [Jeff Seminoff](#) for additional information.



Photos: The new entrance sign at Seal Beach National Wildlife Refuge highlights that the refuge is becoming renowned for its green turtle population (top). Cali Turner Tomaszewicz and Erin LaCasella landing a green turtle in Seal Beach National Wildlife Refuge. The team uses specialized turtle ‘tangle’ nets to capture turtles (middle). The all-women research team of Navy and SWC scientists bringing a captured green turtle from the boat to the shaded measurement area (bottom). NMFS Research Permit #18238.

Green Turtle Boat-Based UAS Project, San Diego Bay, California, 6 September 2023 – MMTD researchers Kerri Danil, Tomo Eguchi, Ariane Huddleston, Nick Kellar, LTJG Jesse Pierce, and Keiko Sherman (with technical support from Trevor Joyce) conducted an aerial survey of eastern Pacific green turtles (*Chelonia mydas*) using uncrewed aircraft systems (UAS) from the R/V *Alexa K* in southern San Diego Bay. This was the first attempt of boat-based UAS aerial surveys of green turtles in southern California. We conducted a total of 8 flights (approximately 2 hr 40 minutes in total) using quad-copters (DJI Mavic 3 Pro). A large male green turtle was detected during a flight and photos and video footage were recorded. Post-mission examination of images revealed that another green turtle was photographically captured during a flight. We plan to conduct UAS-based surveys of San Diego Bay green turtles in the future as a collaborative effort with the MMTD marine turtle programs. These data will be used to refine density and abundance estimates of green turtles in San Diego Bay. For more information, contact [Tomo Eguchi](#).

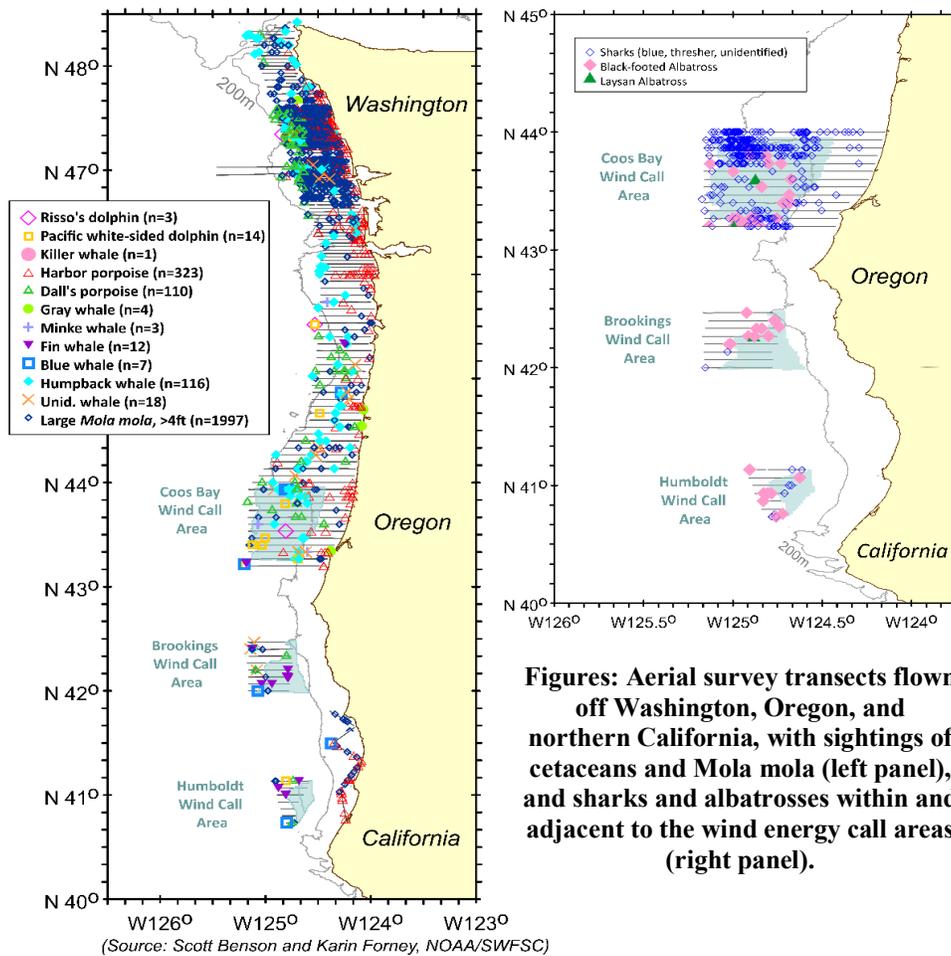


An eastern Pacific green turtle photographed during a UAS aerial survey in San Diego Bay, CA. NMFS Research Permit # 18238.

Pacific Northwest and BOEM Call Areas Aerial Surveys, 15 August - 10 September 2023 – Scott Benson (MMTD/MTEAP) and Karin Forney (MMTD/CMAP), along with aerial observers Katherine Whitaker, Sierra Fullmer and Vicky Vasquez (Upwell Turtles) completed aerial surveys of Pacific Northwest waters in support of leatherback turtle capture and tagging, and within three BOEM wind energy call areas off southern Oregon and northern California. Surveys were conducted aboard a chartered Partenavia P-68 aircraft (16-21 August) and a NOAA Twin Otter (N57RF, 25 August 25-10 September) piloted by piloted by LCDR Denise Miller, ENS Davis Benningfield, LT Chis Licitra, and LT Chelsea Parrish (22 August-10 September). The previously identified suitable leatherback habitat (characterized by abundant sea nettles and large ocean sunfish, *Mola mola*) persisted throughout the study period within a region between Gray’s Harbor and Cape Elizabeth, WA, although no leatherback turtles were encountered. The vessel-based team, including Scott Benson, Garrett Lemons and Andy Maurer (MMTD/MTEAP), George Shillinger, Heather Harris, and John Guillote (Upwell) and Captain John Douglas (Moss Landing Marine Laboratories/San Jose State University), ceased operations on 6 September due to unfavorable weather for the remainder of the project period. Aerial surveys continued through 10 September to provide coverage of three wind energy call areas (Coos Bay, Brookings, and Humboldt). Sighting conditions were remarkably good with low sea state conditions (unusual for regions known for persistent wind) although low clouds prevented complete coverage of some call areas. Diverse cetacean species, as well as numerous sharks and albatrosses, were observed during the aerial surveys (see figure below).

The combined aerial surveys are part of a 3-year project funded by BOEM to assess the distribution of leatherback turtles and other marine species in the Pacific Northwest and in several wind energy call areas. The vessel-based operations were separately funded by our collaborator, Upwell. Despite the lack of leatherback sightings, the team demonstrated capacity

for future leatherback capture/tagging operations by successfully relocating the specialized R/V *Sheila B* from Moss Landing, CA to Westport, WA and operating in an area of consistent leatherback turtle habitat for multiple days. For more information, please contact [Scott Benson](#).



Figures: Aerial survey transects flown off Washington, Oregon, and northern California, with sightings of cetaceans and *Mola mola* (left panel), and sharks and albatrosses within and adjacent to the wind energy call areas (right panel).

II. Manuscripts accepted for publication:

III. Papers published:

Nigenda-Morales, S.F., Lin, M., Nuñez-Valencia, P.G., Kyriazis, C.C., Beichman, A.C., Robinson, J.A., Ragsdale, A.P., Urbán R., J., **Archer, F.I.**, Vilorio-Gómora, L., Pérez-Álvarez, M.J., Poulin, E., Lohmueller, K.E., Moreno-Estrada, A., & Wayne, R.K. (2023). The genomic footprint of whaling and isolation in fin whale populations. *Nature Communications* 14, 5465. <https://doi.org/10.1038/s41467-023-40052-z>

Abstract – Twentieth century industrial whaling pushed several species to the brink of extinction, with fin whales being the most impacted. However, a small, resident population in the Gulf of California was not targeted by whaling. Here, we analyzed 50 whole-genomes from the Eastern North Pacific (ENP) and Gulf of California (GOC) fin whale populations to investigate their demographic history and the genomic effects of natural and human-induced bottlenecks. We show that the two populations diverged

~16,000 years ago, after which the ENP population expanded and then suffered a 99% reduction in effective size during the whaling period. In contrast, the GOC population remained small and isolated, receiving less than one migrant per generation. However, this low level of migration has been crucial for maintaining its viability. Our study exposes the severity of whaling, emphasizes the importance of migration, and demonstrates the use of genome-based analyses and simulations to inform conservation strategies.

Charlton, C., Christiansen, F., Ward, R., Mackay, A.I., Andrews-Goff, V., Zerbini, A.N., Childerhouse, S., Guggenheimer, S., O'Shannessy, B., & **Brownell, R.L., Jr.** (2023). Evaluating short to medium term effects of implantable satellite tags on southern right whales *Eubalaena australis*. *Diseases of Aquatic Organisms* 155, 125-140. <https://doi.org/10.3354/dao03730>

Abstract – Improving our understanding of the effects of satellite tags on large whales is a critical step in ongoing tag development to minimise potential health effects whilst addressing important research questions that enhance conservation management policy. In 2014, satellite tags were deployed on 9 female southern right whales *Eubalaena australis* accompanied by a calf off Australia. Photo-identification resights (n = 48) of 4 photo-identified individuals were recorded 1 to 2894 d (1–8 yr) post-tagging. Short-term (<22 d) effects observed included localised and regional swelling, depression at the tag site, blubber extrusion, skin loss and pigmentation colour change. Broad swelling observable from lateral but not aerial imagery (~1.2 m diameter or 9% of body length) and depression at the tag site persisted up to 1446 d post-tagging for one individual, indicating a persistent foreign-body response or infection. Two tagged individuals returned 4 yr post-tagging in 2018 with a calf, and the medium-term effects were evaluated by comparing body condition of tagged whales with non-tagged whales. These females calved in a typical 4 yr interval, suggesting no apparent immediate impact of tagging on reproduction for these individuals, but longer-term monitoring is needed. There was no observable difference in the body condition between the 2 tagged and non-tagged females. Ongoing monitoring post-tagging is required to build on the sample size and statistical power. We demonstrate the value of long-term monitoring programs and a collaborative approach for evaluating effects from satellite-tagging cetaceans to support species management.

IV. Research findings:

V. Press:

VI. Local events - meetings or events hosted virtually:

North Atlantic Right Whale Tagging Workshop, Herndon, VA, 12-14 September 2023 – Dave Weller is an invited participant at this expert workshop hosted by the Marine Mammal Commission, NOAA Fisheries and the Office of Naval Research in coordination with Fisheries and Oceans Canada. His plenary talk on the opening day was titled “*History of Tagging North Atlantic Right Whales: Gradualism and Punctuated Equilibria in the Evolution of Attaching Tags to Whales*”. The overarching objectives of this workshop are: (a) review key knowledge gaps and data needs regarding the movements, life history, and ecology of North Atlantic right whales, (b) review the history of satellite telemetry and evaluate progress in tag attachment

technologies and follow-up studies and (c) generate knowledge to inform planning and permitting decisions regarding potential tagging of North Atlantic right whales, as well as other endangered baleen whales.

VII. Travel - meetings attended virtually:

VIII. Awards, grants, and recognition:

IX. Other of note:

Stranding summary for the weeks of 30 August -12 September 2023

Cetaceans: 0

Pinnipeds: 3 (1 response)

- 31 August 2023: Kerri Danil responded to a freshly dead 122 cm male California sea lion at Oceanside Harbor. An 18" diameter shark bite wound was present. Skin, blubber, and a swab of the bite wound were taken to determine what species of shark interacted with this animal. Genetic analysis of the swab will be performed by SWFSC's Fisheries Resource Division.

Turtles: 2

- 5 September 2023: SWFSC received a report of a dead green turtle floating on the east side of Mission Bay near Playa 2. MMTD's Erin LaCasella with the help of Rory Driskell (OPR) responded to a report. The animal was retrieved and brought back to SWFSC (photo at right). The large male green turtle had a curved carapace width of 74.6 cm, looked very healthy, and had been previously tagged. Unfortunately, the turtle's carapace and tail were severely damaged due to a boat strike. A necropsy will be performed in the coming weeks and samples will be collected for genetic, stable isotope, and skeletochronology analyses.
- 8 September 2023: On 8 September, MMTD's Erin LaCasella and Cali Turner responded to a report of a dead green turtle floating at the Naval Base in Point Loma. The animal was retrieved and brought back to SWFSC. Unfortunately, the juvenile green turtle's carapace was severely damaged and measurements could not be taken. Samples were collected for genetic, stable isotope, and skeletochronology analyses.



MMTD welcomes Lexi (Alexandria) Mena – Lexi decided at 3 years old that she was moving to the ocean after seeing her first killer whale at Marineland, Canada. While she didn't quite get the roommate she was hoping for, she moved to San Diego in 2010 from Niagara Falls, NY (go Bills!) to pursue her bachelor's degree from the University of San Diego. During her time there she participated in research related to foraging ecology, hormone secretion, and parasitism of California killifish.

After graduation, she was an AmeriCorps Discovery Fellow at the Ocean Discovery Institute providing hands-on ocean science instruction to elementary school students and the City Heights community. Lexi was then hired as a Pathology and Research Associate at SeaWorld San Diego where she performed necropsy exams on various species from very small fish to large whales, organized the massive sample inventory, collected research samples for and collaborated on projects from around the world resulting in co-authorship on scientific papers and participated in their rescue, rehabilitation, and release program seeing many of her patients return to the wild.



Having a bit of a life crisis after the pandemic, she left her marine mammals for smaller furry mammals becoming a kennel manager and vet assistant at Frosted Face Foundation, a senior dog and cat rescue committed to finding loving families and providing quality veterinary care for the animal's golden years. While she enjoyed her time at the rescue, she really missed the marine and research realms. She's so excited to be starting in the genetics labs and contributing to our mission!

Lexi enjoys traveling, reading, all things ocean, and spending time with her small zoo of three senior rescue dogs, Theo, Wayne, and Elvis, a revolving door of foster dogs, and a bearded dragon, Norbert.

X. Where-about of Division Director:

La Jolla