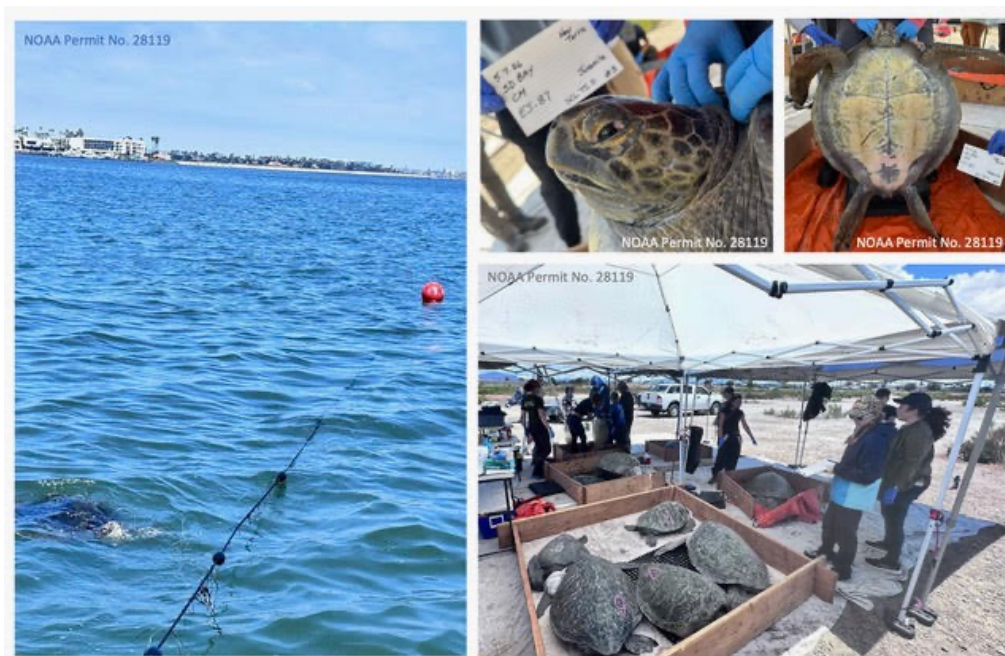


MARINE MAMMAL & TURTLE DIVISION, SWFSC BIWEEKLY REPORT ON FIELDWORK, PUBLICATIONS, RESEARCH RESULTS, AND EVENTS

22 May 2026

I. Fieldwork:

Green Turtle Biological Surveys in Southern California, 4-12 May 2026 – The SWFSC marine turtle research team continued the 2026 San Diego Bay Green Turtle Abundance Survey, completing weeks 2 and 3 of the survey. Goals of this survey are to: 1) collect data on green turtle habitat use and demography to better understand the biology of this population, and 2) develop accurate population size and trend estimates in San Diego Bay via capture-mark-recapture analysis. During the reporting period, four field days were completed, resulting in 20 captures of 19 turtles (including one individual captured twice). Additionally, a turtle originally captured during week 1 was recaptured, bringing the season total to date to 26 captures of 24 individuals, 11 of which represent new, first-time captures. Notably, the 12 turtles processed on 5 May mark the second-highest single-day capture total in the history of this project that began in 1990. While just shy of the all-time single-day record of 13 turtles (set on 27 April 2023), the combined weight of the animals on 5 May easily broke the historic record for the highest cumulative biomass captured in a single day, totaling approximately 1,059 kg (2,330 lbs). As usual, the SWFSC team was joined by its Navy partners as well as a collection of local students, volunteers, and other visitors from institutions such as Miramar College, UC San Diego, North Carolina State University, Unified Port of San Diego, and The Leatherback Project. Looking ahead, the 2026 Spring Survey will continue each Tuesday and Thursday through 9 June 2026. Contact [Jeff Seminoff](#) for additional information.



Photos: A green turtle in the capture net in San Diego Bay (left), photo-ID head image (top center) and plastron image (top right) and a scene of base camp while processing the 12 turtles caught on 5 May (bottom right).

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Light Station, California 30 March-29 May 2026 – On May 17th observers completed the seventh week of MMTD’s annual survey to estimate calf production of eastern North Pacific gray whales. During the sixth and seventh weeks, observers spent 92 hours on effort and counted three mother-calf pairs. The cumulative count for the season is 26 mother-calf pairs counted over 393 hours of effort. Observers for the sixth and seventh weeks of the survey included: Paul Fiedler, Karin Forney, Nick Kellar, Morgane Lauf, Aimée Lang, Karen Martien, Lexi Mena, and Hanna Miller (WCR).

On 16 May, Karin Forney, Nick Kellar, Morgane Lauf, Aimée Lang, and Hanna Miller participated in the annual “Meet the Scientists Day” held at the Piedras Blancas Light Station. This event celebrates local science; it is open to the public and raises awareness about the site and its mission. Visitors have the opportunity to hear about our gray whale survey protocols, look through the “Big Eye” binoculars, and ask questions about gray whales and our work with NOAA. Following the tour, Aimée gave a presentation to the visitors on the work SWFSC does to monitor the status of the eastern North Pacific gray whale population Contact Aimée Lang for more information and see: <https://www.fisheries.noaa.gov/west-coast/sciencedata/gray-whales-eastern-north-pacific>



Photos: Left: Karin and Hanna on watch. Right and Bottom: Talking to visitors at the “Meet the Scientists Day” and Aimée Lang providing a gray whale science talk to the public.



Cetacean eDNA Sampling, San Diego, California 13 May 2026 – MMTD Scientists aboard the R/V *Alexa K* collected water samples along the coast of San Diego to quantify cetacean environmental DNA (eDNA). This study aims to quantify the spatial and temporal patterns of cetacean distribution and genetic variability along the coast in the Southern California Bight using environmental DNA (eDNA). Sampling occurs roughly every month at five stations between Mission Bay and Oceanside. For more information, please contact [Brittany Hancock-Hanser](#).

II. Manuscripts accepted for publication:

Patin, N., Pitz, K., Kimbrough, K., & Archer, F. I. (*retired*). (*In press*). Beyond biodiversity: Incorporating uncertainty into metabarcoding data for improved inference of ecological relationships. *Molecular Ecology Resources*.

Abstract – Metabarcoding sequence data from environmental DNA (eDNA) is rapidly expanding as a powerful method for biodiversity surveys. In order to interpret these data, tools are needed that account for the uncertainty associated with eDNA sampling, sequencing, and analysis. The data resulting from eDNA marker gene analysis differs from many traditional methods of biodiversity surveys because it is highly complex, sparse, and compositional. Methodological biases produce uncertainty at every step of the sampling and sequencing process. Thus, it is critical that users have a way of interpreting eDNA results that accounts for their compositional nature and models the uncertainty resulting from factors like patchy sampling, PCR amplification biases, and variable sequencing depth. Here we introduce MAMBO: Metabarcoding Analysis using Modeled Bayesian Occurrences. MAMBO simulates in silico replication and models the uncertainty surrounding the sequencing and analysis process. Further, it uses these modeled sequence count data to correlate two sets of marker genes with a Bayesian regression, facilitating the linkage of different groups targeted by these assays. Compared with correlational network analyses, MAMBO overcomes many of the limitations to robust statistical analyses of eDNA marker gene data and provides an opportunity for new insight into ecological patterns over space and time.

III. Papers published:

Hill, M. C., Mahaffy, S. D., McCullough, J. L. K., Harmon, A., & Baird, R. W. (2026). Killer whales in the central tropical Pacific: Occurrence, resightings, morphology, and acoustics. *Marine Mammal Science*, 42(3), e70197. <https://doi.org/10.1111/mms.70197>.

Abstract – Compared to their well-studied coastal temperate counterparts, killer whales (*Orcinus orca*) in tropical-subtropical and oceanic areas are under-documented. We used sighting, photo-identification, and acoustic data of killer whales in the central tropical Pacific (CTP), collected from multiple platforms between 2002 and 2023, to assess their temporal and spatial distribution, group dynamics and behavior, movements, pigmentation and dorsal fin morphology, and vocalizations. Killer whales were rarely encountered but occur year-round in the CTP, primarily in waters deeper than 1,000 m. Photo-identification of 113 individuals included multi-year resightings of individuals off the main Hawaiian Islands but found no matches to eastern tropical Pacific catalogs. CTP killer whales share characteristics with other tropical-subtropical killer whale populations

including pigmentation and morphology, small group sizes (range 1–12, Mdn = 5), and diverse prey choices (e.g., other cetaceans, bony fishes, and sharks). Acoustic recordings, collected during shipboard sightings, were dominated by echolocation clicks and high-frequency modulated whistles and provide the first detailed characterization of CTP killer whale vocalizations. This is the most expansive study of CTP killer whales to date, and it underscores the importance of continued collaboration between research groups and the local community in order to better understand rarely sighted species.

Knaub, J. L., Dolan, B. A., Unitt, P., **Brownell, R. L., Jr.**, Meredith, T. L., & Porter, M. E. (2026). Preserving an imperiled porpoise through pixels: Digitization of a vaquita (*Phocoena sinus*) skeleton, the world's most endangered marine mammal. *Marine Mammal Science*, 42(3), e70162. <https://doi.org/10.1111/mms.70162>.

Restrepo, J., Nisthar, D., Heng, H., Bentley, L., Curtice, C., DeLand, S., Fujioka, E., Halpin, P., Poulin, S., Richardson, A., **Seminoff, J.**, Valverde, R., & Dunn, D. (2026). Ecological insights and management implications of the global migratory connectivity of green turtles. *Diversity and Distributions*, 32(5), e70196. <https://doi.org/10.1111/ddi.70196>

Abstract – Migratory connectivity describes the seasonal movement of animals between breeding and non-breeding habitats. Telemetry technologies have greatly improved our ability to observe animal movement and assess migratory connectivity for marine megavertebrates. Green turtles are widely distributed, highly migratory, with distinct long-term fidelity to foraging and nesting habitats. Despite extensive data, there is no global synthesis describing green turtles' movement, limiting a holistic understanding of their behaviour and management. Based on three decades of published literature, we present the first global model of migratory connectivity for green turtles. Research on the subject has increased rapidly between 1990 and 2022. This review explores 113 studies. From these, we extracted 474 unique sites where green turtles were observed and identified migratory connections from nesting sites to dispersed sites, some over 5,000 km apart. This long-distance connectivity exposes populations to threats across disparate locations. The model provides ecological insights into regional differences in life histories, identifies geographic and demographic gaps in sampling, and provides baseline information on connectivity to support transboundary management of green turtle populations. The study highlights the need for larger collaborative efforts to aggregate knowledge on green turtle spatial use to inform effective management measures to protect this threatened species.

Archer, F. I. (retired), Steel, D., Southall, B. L., Fregosi, S., Calambokidis, J., Durban, J. W., Fearnbach, H., & Baker, C. S. (2026). Estimating genetic diversity of abundant oceanic dolphins through repeated environmental DNA sampling. *Frontiers in Marine Science*, 13, 1756593. <https://doi.org/10.3389/fmars.2026.1756593>

Abstract – **Introduction:** Estimating the genetic diversity of cetaceans at sea, particularly abundant social delphinids, can be difficult with traditional biopsy sampling of individuals. Environmental DNA (eDNA) metabarcoding has been shown to be a powerful tool for the identification of species assemblages and estimation of genetic diversity, especially in aquatic environments.

Methods: We collected 126 samples of seawater from within the immediate vicinity of schools of dolphins during 15 encounters with the four most common delphinid taxa in

the waters around Santa Catalina Island, California, USA: long-beaked common dolphins (*Delphinus delphis bairdii*, n = 8), short-beaked common dolphins (*D. d. delphis*, n = 3), common bottlenose dolphins (*Tursiops truncatus*, n = 2), and Risso's dolphins (*Grampus griseus*, n = 2). Next-generation sequencing was used to assign Amplicon Sequence Variants (ASVs) of mitochondrial DNA to species using GenBank and a region-specific reference database.

Results: A total of 240 ASVs were resolved for the four species. ASV richness and the effective number of ASVs, or true diversity, measured as Hill numbers of order 1, were consistent with known characteristics of the four species. Despite collecting up to 12 samples from a single group, a rarefaction analysis indicated that the population diversity was not fully represented for the more abundant species (genus *Delphinus*), but were closely approximated for *G. griseus*.

Discussion: This study demonstrates the application of eDNA for estimating population genetic diversity of abundant species and makes recommendations for improving future studies to better capture this diversity in wild delphinid populations. This provides a more solid foundation for studies using eDNA to monitor these species, which often include those in close proximity to anthropogenic threats.

IV. Research findings:

Osipova, E., **Dutton, P. H.**, Bentley, B. P., Alvarez-Costes, S., Phillips, K. F., Adkins, J., Agyekumhene, A., Allman, P., Barragán-Rocha, A. R., Chacon-Chaverri, D., Duffy, J. J., Formia, A., **Frey, A.**, Gaos, A. R., Hamilton, R., **Horne, J. B.**, Honarvar, S., **LaCasella, E. L.**, Lontoh, D., ... Komoroske, L. M. (*Submitted*). Genomic indicators of risk and resilience in global leatherback turtle populations. *Nature Ecology & Evolution*.

Abstract – Understanding the drivers of genomic health and their consequences for population viability is often overlooked but potentially important to effective conservation amidst the biodiversity crisis of the Anthropocene. Leatherback turtle (*Dermochelys coriacea*) populations have declined globally due to anthropogenic factors, with some populations losing over 90% of their abundance over the past 30-50 years. While conservation efforts have been successful in stabilizing some populations, others continue to decline, and the reasons for these differential trajectories remain unclear. To assess how recent demographic factors, such as population size and decline, influence population genomic health, we combined population monitoring information with medium depth whole-genome and reduced representation resequencing data from globally representative populations. We found that small-stable populations have lower genomic diversity and higher inbreeding than large-declining populations, reflecting prolonged small population sizes and limited gene flow. Yet, small-stable populations also show evidence of deleterious allele purging, suggesting genetic resilience. This, combined with lack of detectable genomic erosion over the study period, provides hope for potential recovery of healthy leatherback populations provided that anthropogenic threats are effectively mitigated. However, potential time lags and possible recent increases in inbreeding among close relatives in recently declined populations warrant continued monitoring and assessment. Genomic and abundance- based metrics were less aligned following rapid population declines, emphasizing the different timescales of the evolutionary and demographic processes they reflect, respectively, and the strength in their complementary, integrative use for extinction risk assessments. This also supports

that it is not too late to turn the tide for recently declined leatherback populations and that continued investment in conservation efforts and threat reductions is warranted. Collectively, our results highlight how recent and historical demography shapes current genomic health and recovery potential in leatherback turtles, aids understanding of current risks and informs future conservation and management strategies.

V. Press:

VI. Local events - meetings or events hosted in-person or virtually:

VII. Travel - meetings attended in-person or virtually:

Underwater Glider User Group (UG2) Meeting, St. Petersburg, FL, 18-20 May 2026 – Shannon Rankin is joining members of ESD (Jen Walsh, Tony Cossio, Kourtney Burger) and other collaborators (PIFSC, OSU, etc) at the UG2 meeting in St. Petersburg, Florida (May 18-20) and will give a presentation on our recent collaborative glider sea trial off Hawai'i: "NOAA Fisheries Glider Challenge: Accelerating the Use of Passive Acoustic-Equipped Gliders to Monitor and Assess Cetacean Populations in the Pacific".

Meeting of the Protected Resources Board, Silver Spring, MD, 19-21 May 2026 – Dave Weller attended this meeting. The Protected Resources (PR) Board raises national awareness of protected resources issues, develops solutions for science and management challenges, and enhances communication across NOAA Fisheries programs to improve nationwide operations. By integrating science and management programs, the Board addresses critical issues regarding the conservation and recovery of protected species. The PR Board is comprised of the Director and Deputy of the Office of Protected Resources (OPR), the Assistant Regional Administrators (ARAs) for Protected Resources, the OPR Division Chiefs, the Director and Deputy of the Office of Science and Technology (OST), the Science Leads for Protected Resources in each Science Center, and the OST Division Chief for Assessment and Monitoring. The OPR Director serves as the Board Chair.

VIII. Awards, grants, and recognition:

IX. Other of note:

Ocean Discovery Institute, San Diego, CA, 4 May 2026 – Brittany Hanser gave an in-person presentation titled “Gray Whales in the North Pacific: Biology and Monitoring” that discussed gray whale biology, characteristics, the migration and acoustics. This talk was part of the ODI “Migration Song” project that also includes a musical component for the students. For more information, contact [Brittany Hanser](#).

Stranding summary for the weeks of 05 - 18 May 2026

Cetaceans: 2

- 5 May - a gray whale carcass was reported floating off Solana Beach. The West Coast Region coordinated with lifeguards to tow the carcass offshore

- 15 May - a 260 cm long adult male pygmy sperm whale in a state of moderate decomposition was reported in Imperial Beach. Keiko Sherman, Lexi Mena, Anna Cahill, Cali Turner, and Jim Carretta responded and conducted a beach necropsy. A small bundle of braided multi filament line was found in the main stomach but did not appear to have been the cause of death. In addition to life history and histology samples, a variety of tissues samples were collected for an SIO collaborator to be evaluated for microplastic contents.

Pinnipeds: 13 (one response)

- 17 May - Brittany Hancock-Hanser and Jessica Ruth responded to a freshly dead male yearling Guadalupe fur seal on Mission Beach. The animal weighed 15 kg, and was 97.2 cm long. The animal was frozen for future necropsy.

Turtles: 0

X. Where-about of Division Director:

Silver Spring, MD (18-21 May)