



2024 RESEARCH IMPACT REPORT



ACCOMPLISHMENTS AND ASPIRATIONS

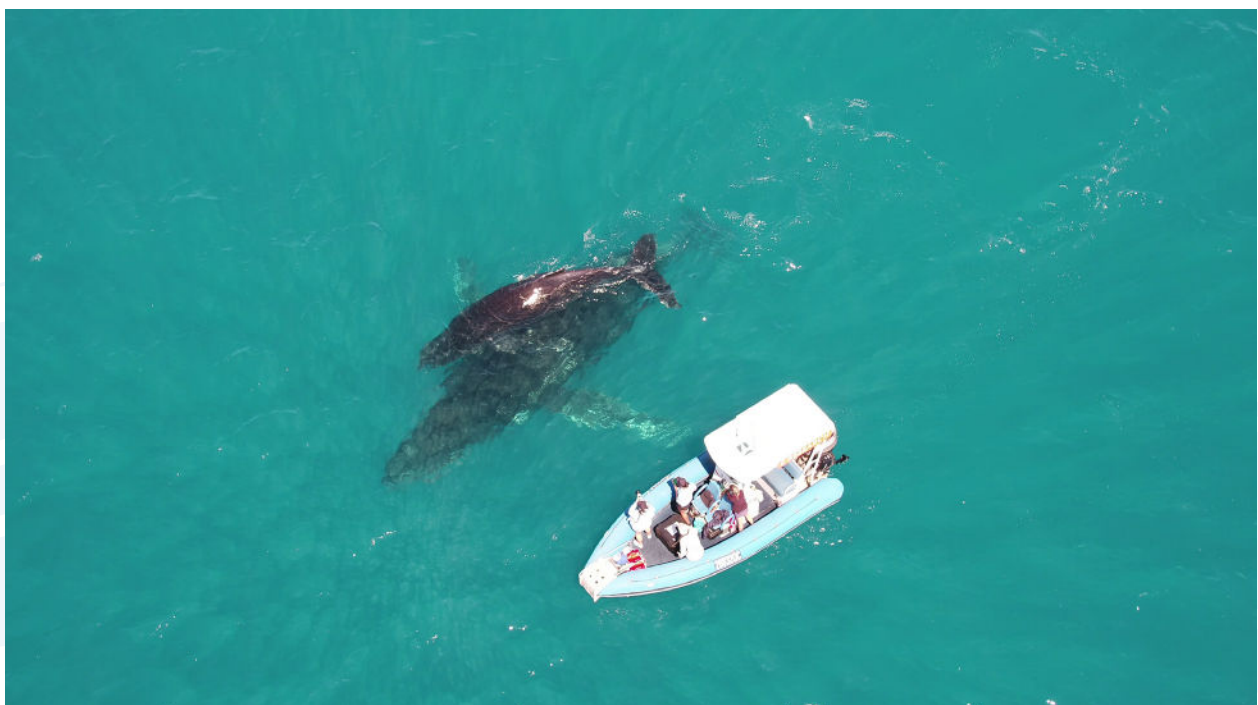
Since 1980, Pacific Whale Foundation has advanced marine mammal conservation through innovative research and publications that inform strategies to protect whales and dolphins. This report highlights our 2024 efforts addressing five key threats: bycatch and fishing interactions, vessel collisions, marine plastic pollution, unsustainable tourism and climate change.

2024 marked a year of resilience as our research program navigated personnel changes and re-prioritizing of research objectives. Here are key highlights:

- **Publications:** Published seven PWF-led peer-reviewed articles and technical reports, one book, and co-authored six additional peer-reviewed articles.
- **Cultural Integration:** This year, we expanded our commitment to cultural integration by incorporating an oli (chant) into our field efforts, written specifically for our Hawai'i research program by Kia'i Kanaloa.
- **New species encountered:** We recorded two Burmeister's porpoises off Isla de Chiloe, Chile, and encountered Risso's dolphins in Maui Nui, both firsts after decades of monitoring.
- **2025 Priorities:** Focusing on species at risk, including false killer whales in Hawai'i, southern right whales in Chile and Ecuador and Australian humpback dolphins in Hervey Bay.

The following table summarizes the survey days, survey effort, species count, and sightings count for the different regions included in the study.

Region	Survey Days	Survey Effort (km)	Species Count	Sightings Count
Hawai'i	28	4587.31	9	115
Australia	27	3061.9	5	182
Ecuador	55	3441.5	8	249
Chile	13	947.5	8	41



REGIONAL HIGHLIGHTS AND IMPACTS

1. HAWAI'I

Our paper, “Pantropical spotted dolphin abundance estimates in Maui Nui, Hawai’i,” published in *Frontiers in Mammal Science*, provided the first management-useful abundance estimates for this population, revealing a small, vulnerable population needing monitoring due to multiple threats. The findings were submitted to NOAA for the proposed 2025 MMPA List of Fisheries, aiding accurate categorization of fishery interactions with marine mammals. We also presented the study at the Society for Marine Mammalogy Biennial Meeting, offering insights on long-term photo-ID data analysis for researchers and project managers.

We also began a statewide humpback whale abundance estimate using over 20 years of data from 20+ collaborators. This project addresses knowledge gaps about population trends following climate anomalies impacting the Hawai’i population and will support the management of humpback whales using Hawai’i breeding grounds.



We are collaborating on research into Hawai’i’s endangered false killer whale population, using drone photogrammetry, suction-cup bio-log video tagging, and long-term population data. This work has revealed significant health fluctuations and energetic demands, highlighting the impact of prey scarcity and fisheries interactions on their survival. Our findings contribute essential data for improving conservation strategies and guiding management actions. Collaboration with partners and long-term data sharing have been key to the success of this research.



2. AUSTRALIA

Over the past 3 years, we have been assessing the scar rates of 570 East Australian humpback whales using drone imagery to understand non-lethal impacts from rope entanglement and vessel interactions. Our findings revealed that 9-24% of whales showed signs of previous fisheries interactions, with calves being the most affected (22-44%). These scars were likely sustained in Australian waters during the southerly migration. Vessel interaction scars were lower, at 2-5%. These results highlight the significant threat of entanglement, particularly to calves, and underscore the need for targeted conservation efforts to research potential sources including fisheries gear and the government's shark control program.

Between August 2022 and July 2024, we conducted line transect surveys in Hervey Bay to assess the abundance and distribution of Indo-Pacific bottlenose and Australian humpback dolphins, covering over 2,800 km. We recorded 134 sightings of Indo-Pacific bottlenose dolphins, which will help determine their abundance in 2025. Although we had only 15 sightings of Australian humpback dolphins, these data, along with 52 opportunistic sightings, allowed us to model their habitat preferences. Our findings identified core habitat areas for Australian humpback dolphins in waters less than 6 meters deep. This information will guide our 2025 research, focusing on abundance estimation and population health assessment of Australian humpback dolphins using mark-recapture models and drone imagery.



Research activities conducted under research permits and following animal ethics approval.

3. ECUADOR

In Ecuador, we made significant strides in understanding and conserving large cetaceans in the region. We collected data on eight different species, including sperm whales, Bryde's whales, humpback whales, spotted dolphins, long-beaked common dolphins, common bottlenose dolphins (coastal and oceanic ecotypes), and pilot whales. We collected 69 biopsy samples for genetic analysis of humpback whales, of which 47 contributed to the The Southern Ocean Persistent Organic Pollutants Program led by Griffith University. We also collected 17 biopsies from Bryde's whales, with findings under review for publication. Satellite tagging efforts on pilot and humpback whales provided critical data on their movements and behavior to be used for evidence-based conservation strategies in the region.



We analyzed data collected in 2023 and found that plastic waste made up the majority of marine debris on beaches in Puerto Lopez, with plastic ropes and fragments accounting for the majority of plastics. This poses ingestion and entanglement risk to marine life, especially cetaceans, where bycatch in fishing gear is common. We shared these findings with local government and the community, promoted the reduction of single-use plastics through the distribution of 110 Eco Bags, and contributed to the Macro-debris Sampling in the Pacific 2024 project, providing valuable data for coastal conservation efforts.

A major milestone was our role in acquiring a disentanglement kit and organizing the two-day Marine Megafauna Entanglement Response workshop. We hosted this event, which trained 24 participants, including local fishermen, sailors, captains, and park guards from seven coastal protected areas. This workshop strengthened the region's ability to safely respond to marine megafauna entanglements, significantly enhancing conservation efforts along Ecuador's coast.

Conservation efforts focused on education, community engagement, and capacity building. The children's book *Elena la Ballena* was re-edited with a fresh design to teach kids about humpback whale migration, threats, and ecological importance, with 562 copies distributed across nine schools. Additionally, 16 talks and workshops reached 455 participants, raising awareness about marine conservation.



4. CHILE

In partnership with the Chilean NGO Centro de Conservación Cetacea, we successfully conducted the 21st field season of the Alfaguara (blue whale) Project. We encountered 20 cetacean groups, including blue whales, fin whales, southern right whales, humpback whales, killer whales, Chilean and Peale's dolphins, and for the first time, Burmeister's porpoise. This marked the third consecutive year recording the critically endangered southern right whales in this region.

Through the International Whaling Commission (IWC) Southern Hemisphere Blue Whale Catalogue, we completed matching blue whale photos from 1992 to 2019, collaborating with research groups in southern and northern Chile and the Eastern Tropical Pacific. This effort confirmed blue whale migration from southern Chile (Isla Chiloe) to the Eastern Tropical Pacific, and additional matches within southern and northern Chile, indicating strong site fidelity to key feeding areas. Preliminary mark-recapture modeling of Chilean blue whale abundance was presented to the IWC Scientific Committee, which expressed concern about a 36% decline in blue whale numbers in the southern feeding ground over the past 14 years.

We began collaborating with NOAA's Northwest Fisheries Science Center to use satellite images to monitor the critically endangered southern right whale population off Isla de Chiloe and the Gulf of Penas, providing survey coverage in areas not easily accessible by boat. Additionally, genetic and hormone analyses are underway on samples collected from 2023 stranded southern right whales, in partnership with the University of Auckland and the University of California.



MAJOR THREATS

Our research continues to address the most pressing threats to cetaceans:

1. Bycatch and Fishing Interactions: One area of research focus in Chile is the significant overlap between salmon farming in Chilean Patagonia and cetacean populations, including risks from fishing interactions such as entanglement. In collaboration with Centro de Conservación Cetacea and Ecoceanos, we are assessing the impacts of salmon farming on marine mammals and examining the implications for salmon exports to the U.S. under the Marine Mammal Protection Act. In 2024, four whale deaths near intensive salmon farming sites and the entanglement of a Critically Endangered southern right whale calf highlight the urgent need for intervention.

In Hawai'i, we are researching the impact of bycatch and competition with commercial fisheries, in collaboration with the Marine Mammal Research Program at the University of Hawai'i, on the endangered main Hawaiian Islands insular population of false killer whales. A third of the population shows signs of fishing gear interactions, which, combined with declining prey, threatens their health and survival. Our work uses cutting-edge technology to assess the impacts on individual and population health, with the goal of promoting their long-term survival.

2. Vessel Collisions: We continue to investigate the impacts of vessel collisions and entanglement on humpback whales. In Australia, we are assessing scarring and body condition of humpback whales to compare with other populations. This research informs better management practices to address vessel collisions and other threats to humpback whale populations.



3. Marine Plastic Pollution: Our beach surveys in Ecuador have provided valuable data on marine plastic pollution, helping local managers and regional partners develop strategies for reducing waste. Additionally, we are investigating the presence of pollutants in whales, which will inform mitigation practices aimed at protecting cetaceans from plastic pollution.

4. Unsustainable Tourism: Spinner dolphins in Hawai'i face unique threats due to daytime resting patterns that coincide with high human activity areas. Our ongoing surveys in Maui Nui aim to track the population's trends in abundance and distribution, providing key data to guide conservation strategies and ensure sustainable tourism practices.

5. Climate Change: Climate change poses an ongoing threat to marine mammal populations, as shifting prey availability and environmental stressors continue to impact species like humpback whales and false killer whales. Our research in Hawai'i on humpback whale abundance trends and false killer whale body condition aims to determine how climate change affects these populations' health and survival. By using innovative tools such as drone-based photogrammetry and suction-cup video tagging, we can assess how changing environmental conditions are impacting the feeding ecology and overall health of these whales. Moreover, our collaboration in Chile continues to monitor how climate change is affecting cetacean species in the region, including the critically endangered southern right whale population.

LOOKING AHEAD TO 2025

As we move into 2025, our research program will continue to focus on key priorities that will advance our understanding of marine mammal populations in the regions we study and contribute meaningfully to their conservation. These priorities are as follows:

- **Sustained Staff and Fieldwork Across Regions:** Consistent staffing and fieldwork in Hawai'i, Australia, Ecuador, and Chile are vital for preserving our long-term datasets and advancing research that drives conservation action.
- **Focused Research on At-Risk and Understudied Species/Populations:** A central priority will be to deepen our understanding of species and populations that are at risk or have been understudied.
- **Partnerships:** We will continue fostering strong collaborations with key research partners to address shared goals for the conservation of whales and dolphins.
- **Cultural Integration and Hawaiian Perspectives:** We are committed to including Hawaiian perspectives in our research, taking steps towards integrating cultural values and traditional knowledge, where appropriate, and working collaboratively with our Native Hawaiian advisors.
- **Publications and Data Sharing:** Publishing and sharing our data with the scientific community and relevant stakeholders will remain a priority, enhancing the visibility and application of both our current and past research efforts.

Our efforts will focus on a range of studies that will deepen our understanding of marine mammal populations and their ecosystems. We will explore the distribution and abundance of key species, such as Australian humpback dolphins in Hervey Bay and humpback whales in Hawai'i and address the ongoing challenges faced by critically endangered species like the Chile-Peru southern right whale. Additionally, we will share insights into the body condition and health of false killer whales in Hawai'i, as well as the habitat preferences of dolphins across different regions. New research on the role of dolphins in supplying nutrients to coral reefs in Hawai'i and the accumulation patterns of beach debris in Ecuador will also be explored.

Our research accomplishments in 2024 were made possible by the support of our partners, donors, and dedicated team members. Special thanks to our collaborators worldwide, who share our commitment to advancing marine conservation.

PEER-REVIEWED ARTICLES

- Attard, C.R.M., Sandoval-Castillo, J., Lang, A.R., Vernazzani, B.G., Torres, L.G., Baldwin, R., Jenner, K.C.S., Gill, P.C., Burton, C.L.K., Barcelo, A., Sironi, M., Jenner, M.N.M., Morrice, M.G., Beheregaray, L.B., and Moller, L.M. 2024. **Global conservation genomics of blue whales calls into question subspecies taxonomy and refines knowledge of population structure.** *Animal Conservation*, 1-13. <https://doi.org/10.1111/acv.12935>.
- Avila, I., & Castro, C. 2024. **A novel hypopigmentation for southeast Pacific humpback whales.** *J. Cetacean Res. Manage.*, 25, 71-77. <https://doi.org/10.47536/jcrm.v25i1.933>
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- Castro, C.A., García-Cegarra, A.M., Uceda-Vega, P., Aguilar, L., Kelez, S., Buchan, S.J., Félix, F., Stack, S.H., & Van Waerebeek, K. 2024. **New northernmost distribution records of the Eastern South Pacific southern right whale (*Eubalaena australis*), including the first cases from Ecuador and northern Peru.** *PLoS ONE* 19(11): e0312528. <https://doi.org/10.1371/journal.pone.0312528>.
- Cheeseman, T., Barlow, J., Acebes, J.M., Audley, K., Bejder, L., Birdsall, C., Bracamontes, O.S., Bradford, A.L., Byington, J., Calambokidis, J., Cartwright, R., Cedarleaf, J., Chavez, A.J.G., Currie, J.J., De Castro, R.C., De Weerd, J., Doe, N., Doniol-Valcroze, T., Dracott, K., Filatova, O., Finn, R., Flynn, K.R., Ford, J., Frisch-Jordán, A., Gabriele, C., Goodwin, B., Hayslip, C., Hilderling, J., Hill, M.C., Jacobsen, J.K., Jiménez-López, M.E., Jones, M., Kobayashi, N., Lammers, M., Lyman, E., Malleison, M., Mamaev, E., Loustalot, P.M., Masterman, A., Matkin, C.O., McMillan, C., Moore, J., Moran, J., Neilson, J.L., Newell, H., Okabe, H., Olio, M., Ortega-Ortiz, C.D., Pack, A.A., Palacios, D.M., Pearson, H., Quintana-Rizzo, E., Ramírez Barragán, R., Ransome, N., Rosales-Nanduca, H., Sharpe, F., Shaw, T., Southerland, K., Stack, S., Staniland, I., Straley, J., Szabo, A., Teerlink, S., Titova, O., Urban-Ramirez, J., van Aswegen, M., Vinicius, M., von Ziegesar, O., Witteveen, B., Wray, J., Yano, K., Yegin, I., Zwiefelhofer, D., and Clapham, P. 2024. **Bellwethers of change: population modelling of North Pacific humpback whales from 2002 through 2021 reveals shift from recovery to climate response.** *Royal Society Open Science*, 11231462231462. <http://doi.org/10.1098/rsos.231462>.
- Félix, F., Castro, C., Van Bresse, M.F., Barragán, L., Platt, M., Van Waerebeek, K. 2024. **From coastal to offshore: The case of an inshore bottlenose dolphin that joined an offshore pod.** *Marine Mammal Science*. <https://doi.org/10.1111/mms.13223>
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TECHNICAL REPORTS

- Galletti Vernazzani, B., Olson, P.A., and Salgado, C.P. 2024. **Progress report on Southern Hemisphere Blue Whale Catalogue: Period April 2023-February 2024.** Paper SC/69B/SH/01 presented to IWC Scientific Committee, April 2024 (unpublished – Do not cite without authors' permission).
- Galletti Vernazzani, B. 2024. **IWC Chile-Peru Southern Right Whale Conservation Management Plan – Progress Report March 2024.** Paper SC/69B/CMP/02 presented to IWC Scientific Committee, April 2024 (unpublished – Do not cite without authors' permission).
- Galletti Vernazzani, B., Castro, C., Cabrera, E., Felix, F., Ulloa, M., Sironi, M., and Brownell Jr., R.L. 2024. **Two dead calves of Critically Endangered Chile-Peru Southern Right Whale (*Eubalaena australis*) stranded in 2023 with evidence on human interactions.** Paper SC/69B/CMP/11Rev2 presented to IWC Scientific Committee, April 2024 (unpublished – Do not cite without authors' permission).
- Galletti Vernazzani, B. 2024. **Update from the Conservation Committee Working Group on Cetaceans and Ecosystem Functioning – March 2024.** Paper SC/69B/EM/01 presented to IWC Scientific Committee, April 2024 (unpublished – Do not cite without authors' permission).
- Schall, V., Vermeulen, R., Andrews-Goff, V., Buchan, S.J., Burkhardt, E., Carroll, E., Charlton, C., Galletti, D., Mcpherson, C., Mccauley, R., Miller, L., Shabangu, S., and Ward, P. 2024. **Report of the ICG on southern right whale acoustics.** Paper SC/69B/SH/13 presented to IWC Scientific Committee, April 2024 (unpublished – Do not cite without authors' permission).

BOOKS

- Castro, C. & Mena, B. 2024. ***El Viaje de Elena la Ballena Jorobada*.** Pacific Whale Foundation, 28 pp.

CONFERENCE PRESENTATIONS

- Barber-Meyer, S., Olson, G., & Currie, J. 2024. **Understanding the implications of choices made in collecting and analyzing long-term photo-identification data: a case study of pantropical spotted dolphin abundance estimates in Maui Nui, Hawai'i.** Oral presentation at the Society for Marine Mammalogy Conference, Perth, Australia, November 2024.
- Castro, C., Felix, F., Barragan, L., Platt, M., Chocho, V., Macias, R., Van Waerebeek, K. 2024. **Reducing the incidental capture of cetaceans on the coast of Ecuador: Analysis of interaction with fisheries, lessons learned, and future strategies, 2001-2024.** Oral presentation given by S. Barber-Meyer at the Society for Marine Mammalogy Conference, Perth, Australia, November 2024.
- Currie, J., Stirling, B., Olson, G., Stack, S., Barber-Meyer, S., Kobayashi, N., Higa, S., Ueda, K., Fahlman, A., Pontzer, H., Allen, A., Gough, W., vanAswegen, M., Evans, L., Bejder, L. 2024. **The energy dilemma: how the energetic demands of false killer whales and reduced prey availability may be contributing to fishery depredation.** Oral presentation at the Society for Marine Mammalogy Conference, Perth, Australia, November 2024.
- Fetterman, T., Stack, S., Barber-Meyer, S. M., & McGovern, B. 2024. **Assessing humpback whale scarring rates in East Australia using aerial imagery: insights into fisheries and vessel collision impacts.** Oral presentation at the Society for Marine Mammalogy Conference, Perth, Australia, November 2024.
- McGovern, B., Barber-Meyer, S. M., & Stack, S. 2024. **Assessing threats to dolphin populations in Hervey Bay, Australia: insights from distribution data of two sympatric species.** Poster presentation at the Society for Marine Mammalogy Conference, Perth, Australia, November 2024.

WEBINARS

- *Currents of Curiosity: Pacific Whale Foundation Research.* Webinar, October 2024.
- *Inland Ocean Coalition: Pacific Whale Foundation Research.* Webinar, November 2024.

COLLABORATORS

HAWAII

- Dr. Adam Pack, Marine Mammal Laboratory, University of Hawai'i at Hilo
- Ed Lyman, Hawaiian Islands Humpback Whale National Marine Sanctuary
- Dr. Elizabeth Madin, Hawai'i Institute of Marine Biology, University of Hawai'i at Manoa
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The research activities described here are conducted under the appropriate state and federal permits. In Hawai'i, the activities described are authorized under NMFS research permit #27099 issued to PWF, #21476 issued to Dr. Lars Bejder, and #19655 issued to Dr. Adam Pack. In Australia, our activities are conducted under a scientific research permit and a marine park permit authorized by the Queensland Department of Environment and Science. In Ecuador, we operate under a research permit issued by Machalilla National Park. In Chile, we operate with research permits issued by the Undersecretariat of Fisheries and Aquaculture.

Drone operators hold additional certifications; in Hawai'i the drone pilots hold FAA Part 107 authorization and in Australia, drone operators hold a CASA remote pilot license and operate under a CASA operating certificate. All images in this document were taken under the relevant permits and following animal ethics approval.

For more information on Pacific Whale Foundation's research program, visit pacificwhale.org/research or email research@pacificwhale.org



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