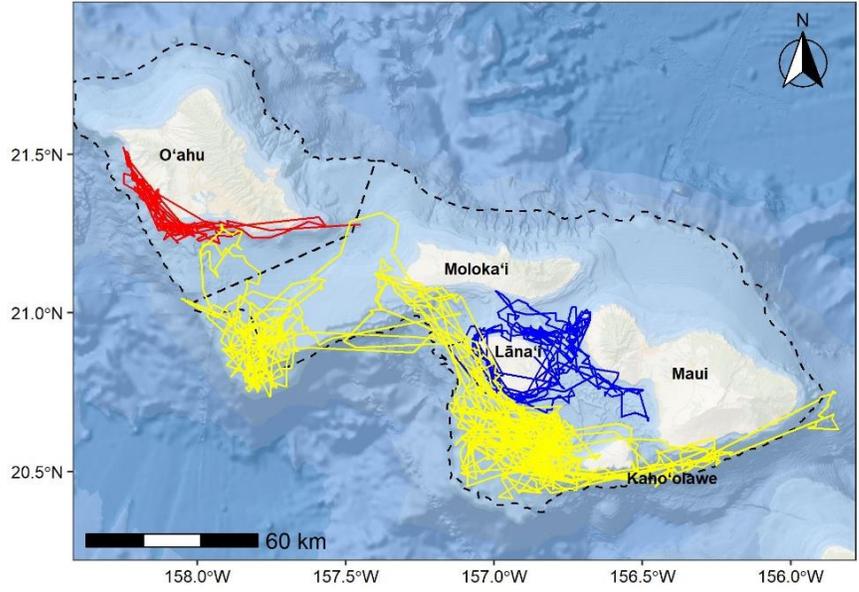


# Stock Structure, Residency, and Inter-Island Movements of Common Bottlenose Dolphins between O'ahu and Maui Nui



Annette E. Harnish<sup>1,4</sup>, Robin W. Baird<sup>1</sup>, Jens J. Currie<sup>2</sup>, Stephanie H. Stack<sup>2</sup>, Tori Cullins<sup>3</sup>, Lynn Opritou, Antoinette M. Gorgone<sup>1</sup>, John B. Kirkpatrick<sup>4</sup>  
<sup>1</sup>Cascadia Research Collective, Olympia, Washington, USA, aharnish@cascadiaresearch.org; <sup>2</sup>Pacific Whale Foundation, Wailuku, Hawai'i, USA; <sup>3</sup>Wild Dolphin Foundation, Wai'anae, Hawai'i, USA; <sup>4</sup>The Evergreen State College, Olympia, Washington, USA



**Above:** Satellite-tag tracklines from six common bottlenose dolphins, showing the extensive range of some individuals from the O'ahu population, as compared to members of the Maui Nui (encompassing the islands of Maui, Lāna'i, Kaho'olawe, and Moloka'i) population, which crosses current stock boundaries (black dashed line). The existence of separate stocks is supported by both genetic and photo-ID data (Baird et al., 2009; Martien et al., 2011), and there is evidence that the Maui Nui stock is currently in decline (Van Cise et al., 2021). Red indicates the single tagged individual only known to spend time off O'ahu, blue indicates individuals only known to spend time off Maui Nui (n=2), and yellow indicates those known to use both areas (n=3).

**Permits/Acknowledgements:** Research was conducted under permits 926, 731-1509, 731-1774, 15330, and 20605 issued to R.W. Baird, and 13427 and 18101 issued to PWF. Funding for CRC's efforts to study Hawaiian common bottlenose dolphins was provided by several groups, including the PIFSC, the State of Hawai'i, the NOAA Bycatch Reduction Engineering Program, Dolphin Quest, and the SWFSC. Funding for PWF's research program was provided by PacWhale Eco-Adventures, the members of PWF, and a number of individual donors. We thank the many staff, interns, community scientists and volunteers who contributed to PWF's and CRC's odontocete projects over the years. Genetic analysis of biopsy samples was carried out at the Southwest Fisheries Science Center under the supervision of Karen Martien. Special thanks to Sabre Mahaffy, Enrico Corsi, and Michaela Kratofil for assisting in several aspects of this project.

**Citations:**  
 Baird, et al., (2009). Population structure of island-associated dolphins: Evidence from photo-identification of common bottlenose dolphins (*Tursiops truncatus*) in the main Hawaiian Islands. *Marine Mammal Science*, 25(2), 251-274.  
 Harnish et al., (2022). Residency and Movement Patterns of Common Bottlenose Dolphins (*Tursiops truncatus*) off O'ahu and Maui Nui Carry Implications for Current Stock Boundaries. Document PSRG\_2022\_15 submitted to the Pacific Scientific Review Group, NOAA Fisheries.  
 Martien et al., (2011). Population structure of island-associated dolphins: Evidence from mitochondrial and microsatellite markers for common bottlenose dolphins (*Tursiops truncatus*) around the main Hawaiian Islands. *Marine Mammal Science*, 28(3), E208-E232.  
 Van Cise et al., (2021). Mark-Recapture Estimates Suggest Declines in Abundance of Common Bottlenose Dolphin Stocks in the Main Hawaiian Islands. *Endangered Species Research*, 45, 37-53.

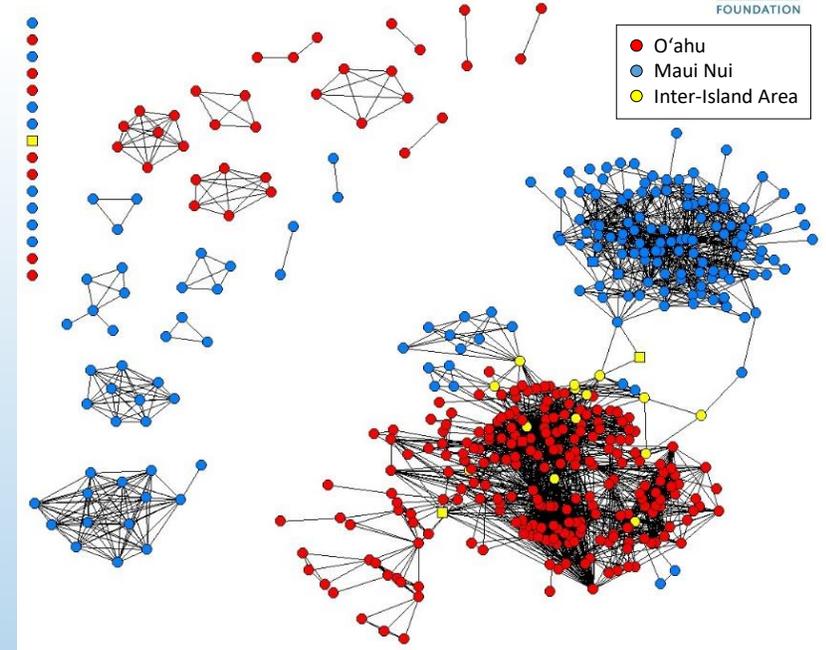
**Geographic overlaps between the O'ahu and Maui Nui stocks are driven by a small subset of individuals from O'ahu that occasionally move between island areas.**

**These movements cross current stock boundaries, but social connections between stocks are limited.**



**Below:** Within-area re-sighting and interchange indices for the O'ahu and Maui Nui island areas (see Harnish et al., 2022 for details of calculations). The interchange index between island areas is an order of magnitude below both within-area re-sighting indices. This indicates that movement between island areas does occur, but at much lower levels than within island areas.

Island Area	O'ahu	Maui Nui
O'ahu	1.07	0.28
Maui Nui	-	2.33



**Above:** Social network of O'ahu and Maui Nui bottlenose dolphins based on photo-identification data from 1996-2018, showing that individuals who use both island areas (n=17) cluster more closely within the O'ahu population than the Maui Nui population. Tagged individuals (n=6; see map at left) are indicated by square nodes.



**Above:** Example of photo-ID documented inter-island area movements for individual HITt0775. From left to right, sightings were off O'ahu (2012), O'ahu (2014), and Lāna'i (2020).