**Updated Hawaii Pelagic False Killer Whale Management Area & Resulting Abundance, PBR, and MSI Estimates**

Hawaii pelagic false killer whales have been assessed based on the U.S. Exclusive Economic Zone (EEZ) around the Hawaiian Islands for many years given both abundance and mortality data were available only within the EEZ. With the development of a new species distribution model (SDM; Bradford et al. 2020) providing spatially-explicit abundance data that spans the central North Pacific (from the equator to 43°N, and from 175°E to 132°W), we can now consider management of this stock beyond the EEZ. Use of the full extent of the central Pacific SDM model is inappropriate given the potential for more than one stock of false killer whale to occur within this space (Martien et al. 2014) and the significant uncertainty about population range outside of surveyed areas.

Using available biological data for pelagic false killer whales, we have developed an updated management area for the Hawaii pelagic stock that better captures the known range of animals in this population. The new area is defined by a minimum convex polygon (MCP) surrounding locations of known or assumed Hawaii pelagic false killer whales (survey sighting, genetic sample, satellite telemetry, and observed longline bycatch), incorporating a 35km buffer outside of those locations to account for animal movement and group structure. The buffer distance was chosen based on the maximum spread of subgroups documented during the Hawaiian Islands Cetacean and Ecosystem Assessment Survey of 2010, when data collection protocols were specifically designed to account for all subgroups in a group (Bradford et al. 2014). Although the population identity of survey sightings and observed bycatch without genetic samples is assumed based on location, the overall space is bounded in large part by telemetry and genetic sample locations, particularly to the east and south. The new assessment area is shown by the green line in the map below (Figure 1). The new space definition has been reviewed by the Pacific Scientific Review Group and will be implemented within the 2023 Stock Assessment Report.

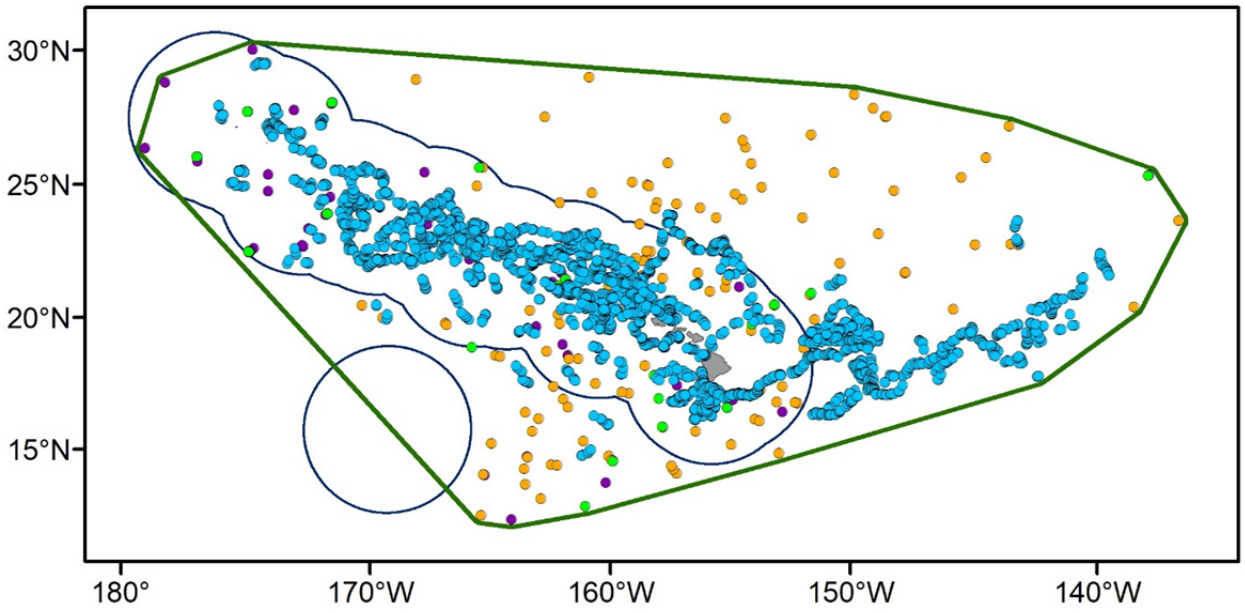


Figure 1. Management area for Hawaii pelagic false killer whales (green line). The area is defined by an MCP surrounding all available satellite telemetry (blue), genetic sample (green),

survey sighting (purple), and observed bycatch (orange) locations known or assumed to be part of the Hawaii pelagic stock, including a 35 km buffer.

The density and abundance of false killer whales within the management area was extracted from the SDM, resulting in an overall abundance estimate of 5,528 (CV = 0.35) whales. PBR is computed using a recovery factor ($F_r$) of 0.4, reflecting significant uncertainty in total mortality and serious injury by foreign fleets outside of the U.S. EEZ. The PSRG expressed significant concern about the impact of such take on the overall population. Without data available to estimate that take, the uncertainty is reflected with a lower $F_r$, consistent with the Guidelines for Assessing Marine Mammal Stocks (NMFS 2023). **The resulting PBR is 33 whales.**

Mortality and serious injury (MSI) of false killer whales was estimated within the new management area following the standard methods presented in McCracken (2010, 2019) and McCracken & Cooper (2022). **The 2017-2021 MSI estimate for this area is 47 false killer whales.**

**Literature cited**


Bradford, A.L., E.A. Becker, E.M. Oleson, K.A. Forney, J.E. Moore, and J. Barlow. 2020. Abundance estimates for false killer whales in Hawaiian waters and the broader central Pacific. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-104.

Bradford, A.L., K.A. Forney, E.M. Oleson, and J. Barlow. 2014. Accounting for subgroup structure in line-transect abundance estimates of false killer whales (*Pseudorca crassidens*) in Hawaiian waters. PLoS ONE 9(2): e90464.

Martien, K.K., S.J. Chivers, R.W. Baird, E. Archer, A.M. Gorgonne, B.L. Hancock, D. Matilla, D.J. McSweeney, E.M. Oleson, C.L. Palmer, V. Pease, K.M. Robertson, J. Robbins, G.S. Schorr, M. Schultz, D.L. Webster, and B.L. Taylor. 2014. Genetic differentiation of Hawaiian false killer whale (*Pseudorca crassidens*) discordant patterns at nuclear and mitochondrial markers suggest complex evolutionary history. Journal of Heredity 105(5):611-626.

McCracken, M.L. 2010. Adjustments to false killer whale and short-finned pilot whale bycatch estimates. NMFS, Pacific Islands Fisheries Science Center Working paper WP-10-007.

McCracken ML. 2019. Sampling the Hawaii deep-set longline fishery and point estimators of bycatch. NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-89.

McCracken, ML and B. Cooper. 2022. Assessment of incidental interactions with marine mammals in the Hawaii longline deep- and shallow-set set fisheries from 2016 to 2020. Pacific Islands Fisheries Science Center Internal Report PIFSC-DR-22-17.

NMFS. 2023. Guidelines for Preparing Stock Assessment Reports Pursuant to the Marine Mammal Protection Act. Protected Resources Policy Directive Marine Mammal protection Act 02-204.