

Understanding the Distribution Patterns of Rough-Toothed Dolphins

(*Steno bredanensis*) around Kaua'i and Ni'i'hau

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Rough-toothed dolphin use of Kaua'i & Ni'i'hau waters appears to vary **seasonally**, with greater use of the **submarine canyon** during spring and summer, which may be tied to **greater SSH and current velocity**

Fig. 1 – Dolphin core region between Kaua'i and Ni'i'hau, with 51% overlap with PMRF and 46% overlap with canyon. Isobaths shown at 200m intervals to 2,200m. Median depth of locations = 1,074m.

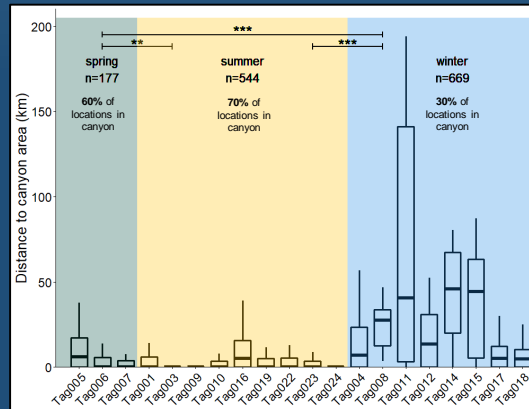
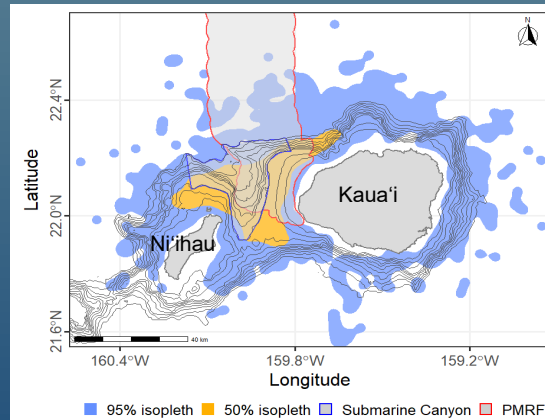
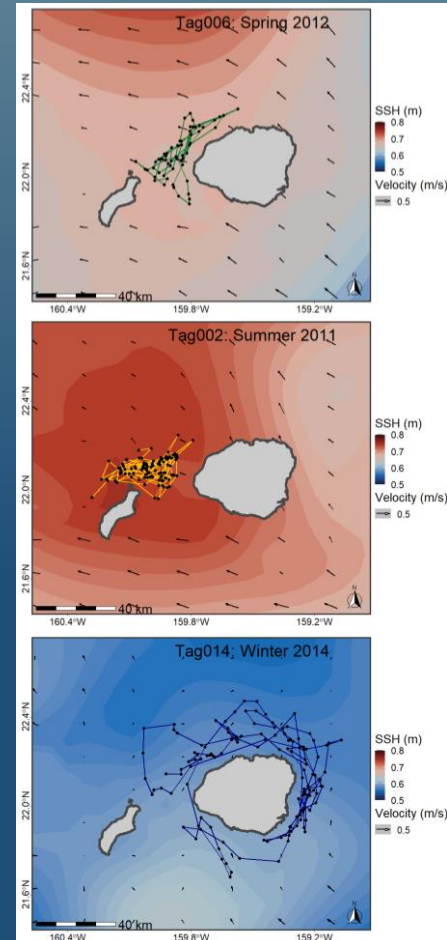


Fig. 2 – Mean distance to canyon from dolphin locations for all tag deployments. Tags arranged in order of decreasing day length and grouped by season. Rough-toothed dolphins are farthest from the canyon during winter and closest (and within canyon area more often) during summer. Significant at ***=0.001, **=0.01.

Fig. 3 – Dolphin tracks during spring (May-Jul), summer (Aug-Sept), and winter (Feb-Mar). Significantly lower SSH at locations during winter vs. spring ($p < 0.001$) and vs. summer ($p < 0.001$). Significantly greater current magnitude during summer vs. winter ($p < 0.001$).



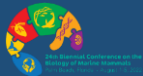
IMPORTANCE

- There is a small, insular population of rough-toothed dolphins (*Steno bredanensis*) around Kaua'i & Ni'i'hau
- Steep slopes b/w islands form a submarine canyon, which overlaps with the U.S. Navy's Pacific Missile Range Facility (PMRF)
- Due to the potential enhanced productivity in the canyon, as shown through dynamic oceanographic variables, the region may be important to *Steno*, possibly exposing animals more often to Navy activities



METHODS

- 20 remotely-deployed LIMPET satellite-tags between 2011 and 2021
- Fit to state-space model, 4hr predicted interval
- Kernel density estimations of 50% and 95% isopleths (**Fig. 1**)
- Sampled geospatial and temporal data (e.g., season, distance to canyon) for each time step and oceanographic data (SSH, current velocity) at 0.08° resolution across deployments
- Preliminary assessments of dolphin locations relative to geospatial data using Wilcoxon ranked sum tests (**Fig. 2,3**)



For more information on this species in Hawaiian waters, see <https://cascadiaresearch.org/hawaii-species/rough-toothed-dolphins-hawaii/>

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