Prevalence of fishery-related scarring on the mouthlines of common bottlenose dolphins around the main Hawaiian Islands

Cascadia Research Collective

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Why is this important?

Four small insular stocks of bottlenose dolphins *(Tursiops truncatus)* are found around the main Hawaiian Islands (Figure 1)[1] and large numbers of commercial and recreational fishermen overlap their ranges.

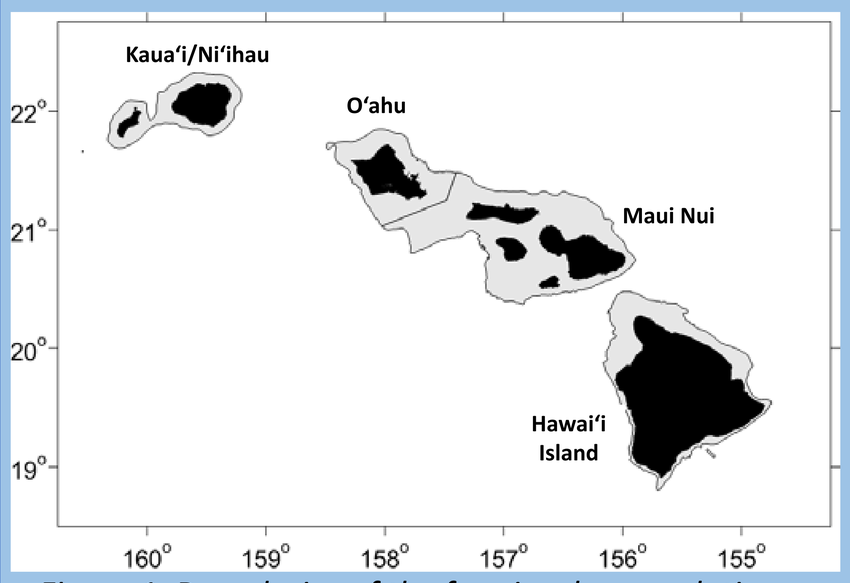

Figure 1. Boundaries of the four insular populations (Kaua'i/Ni'ihau, O'ahu, 4-Islands (Maui Nui), Hawai'i)

There are no observer programs in any of these fisheries, but there are anecdotal records of hooked dolphins (Figure 2) and reports of individuals depredating catch. Strandings are rare, so there is limited ability to assess cause of death.

Figure 2. A bottlenose dolphin with an embedded hook and trailing line off Hawai'i Island, with the hook encrusted with stalked barnacles

For more information see www.cascadiaresearch.org/projects/hawaii

What we did

Examined mouthline photographs of 592 known individuals from bottlenose dolphin catalog spanning 1987-2018

Figure 3. Individual with mouthline notch and scarring consistent with a fishery interaction

Quantified mouthline notches and scarring (Figure 3) and scored markings for consistency with fishery interactions[2]

Noted markings on the head, dorsal fin leading edge, and peduncle (Figure 4), where injuries can occur when hooked dolphins struggle against gear, as has been documented for false killer whales[2,3]

Figure 4. Dolphin with injuries consistent with a line wrap around the peduncle

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References

[1]Baird, R.W. 2016. The lives of Hawai'i's dolphins and whales: natural history and conservation. University of Hawai'i Press. Honolulu, Hawai'i.

[2]Baird et al. 2015. False killer whales and fishery interactions in Hawaiian waters: evidence for sex bias and variation among populations and social groups. Marine Mammal Science 31:579-690.

[3]Baird et al. 2017. Updated evidence of interactions between false killer whales and fisheries around the main Hawaiian Islands: assessment of mouthline and dorsal fin injuries. PSRG-2017-16.

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What we found

Of 592 individuals, 17 (2.9%, all adults, both males and females) had mouthline injuries that were consistent with fishery interactions.

Of the 17, three had additional line markings on the head, two had line injuries on the leading edge of the dorsal fin, and one had line injuries on the peduncle (Figure 4).

Rates of fishery-related injuries vary by area* with highest rates off Maui.

Stock	# examined	# with fishery-related injuries			
		Male	Female	Unk.	Total (%)
Kaua'i/Ni'ihau	232	0	0	2	2 (0.8)
O'ahu	101	0	0	2	2 (1.9)
Maui Nui	45	0	4	3	7 (15.5)
Hawai'i	213	2	1	3	6 (2.8)

*Chi-square, $p<0.0001$

Conclusions

Almost 3% of individual dolphins around the islands have evidence of surviving prior fishery interactions, with rates significantly higher off Maui Nui, suggesting depredation behavior is highest for that stock.

This methodology can document non-lethal interactions when observer programs are absent and strandings are rare, but scars fade with time, suggesting it under-represents the proportion of individuals that depredate.

All individuals with evidence of prior interactions were adults; it is possible that depredation by calves or juveniles may be more likely to result in death.