

# KEEP AN EYE ON ME: USING UNDERWATER PHOTOS AND VIDEO FROM CITIZEN SCIENCE TO EVALUATE PREVALENCE OF INJURY IN PYGMY KILLER WHALES IN HAWAI'I

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## Why is this interesting?

- Pygmy killer whales are a poorly-known species. In Hawai'i they are often found in areas of high vessel traffic. Assessing injuries and body condition has often been limited by what can be seen from the surface, however given their surface behavior and tendency to avoid boats that can be challenging.
  - While there has been evidence of interactions with fishing gear (in photographs and stranded animals), there have been no observations of them doing so (likely due to their feeding primarily at night).
- Photos contributed from the public can help fill gaps in sighting histories, and the recent increase in the use of inexpensive high-resolution underwater cameras provide key clues in assessing consistency with fishery interaction and overall health.



## How do we use underwater media?

- Underwater photos and video primarily from contributions off O'ahu and Hawai'i were used to examine the origin (anthropogenic or natural), type (using 10 predefined categories), and prevalence of external injuries in 55 pygmy killer whales known to be resident to the islands.
- Out of 39 encounters (2006-2018) with 2,343 good quality underwater photos, 124 injuries were recorded and all individuals had at least one injury (mean=3.2, SD=1.2).

Injury Type and Probable Origin*	Females (n=18)	Males (n=31)	Juveniles (n=6)	Injuries Visible in Surface Photos (n=55)	Individuals (n=55)
<b>Natural Injuries*</b>	<b>18</b>	<b>31</b>	<b>6</b>	<b>38%</b>	<b>100%</b>
Rake Marks	13	29	5	35%	85%
Cookie Cutter Scars	16	28	6	38%	91%
Shark Bite	0	3	0	3%	5%
Linear Scars	9	21	0	25%	55%
<b>Anthropogenic Injuries*</b>	<b>13</b>	<b>19</b>	<b>2</b>	<b>29%</b>	<b>62%</b>
Indentation	3	10	0	11%	24%
Line Injury <sup>^</sup>	1	1	0	100%	4%
Mouthline Scarring <sup>^</sup>	11	13	1	20%	45%
Prop/Ship Strike	0	1	0	0%	2%
Bullet Wound	0	2	0	0%	4%
Unknown	6	7	2	5%	27%

<sup>^</sup>Injuries appear consistent with fishery interactions.

## Implications

- Over half of individuals (72% females; 61% males) have evidence of anthropogenic injuries, of these 49% appear consistent with fishery interactions.
- Only 29% of anthropogenic injuries are visible in surface photos, demonstrating they greatly under-represent the proportion of individuals with injuries.
  - Underwater citizen science contributions, particularly when combined with surface photos often necessary for identification, can increase documentation of injuries otherwise not visible.
- Obtaining additional underwater and surface imagery would allow for a better assessment of injuries from both natural and anthropogenic sources.

For more information and a complete list of publications see [www.cascadiaresearch.org/projects/hawaii](http://www.cascadiaresearch.org/projects/hawaii)

Thanks to citizen scientists who have contributed underwater videos/photography presented above.

Background photo credit © Kimberly Jeffries.

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HIFa006 (top) has a probable fishing line injury, visible in both surface and underwater photos, as well as mouthline scarring, suggesting prior hooking. Her calf HIFa547 (bottom) also has a line-related dorsal injury consistent with fishery interactions, but no mouthline scarring.

## Injury Examples

