

# Techniques to Monitor and Assess False Killer Whales, *Pseudorca crassidens*



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FALSE KILLER WHALE  
<https://us.whales.org/whalesdolphins/species-guide/false-killer-whale/>



# Differences

## Killer whale

- Largest dolphin species
- Larger in weight, size, and length
- Black and white coloration
- More predatory

## False Killer whale

- Third largest dolphin species
- Smaller in weight, size, and length
- Gray and black coloration
- Less predatory

False Killer Whale Fun Fact – Part II,  
<https://www.azoreswhalewatch.com/sighting/cetaceans/odontocetidolphins/pseudorcaassidens/false-killer-whale-fun-fact/>

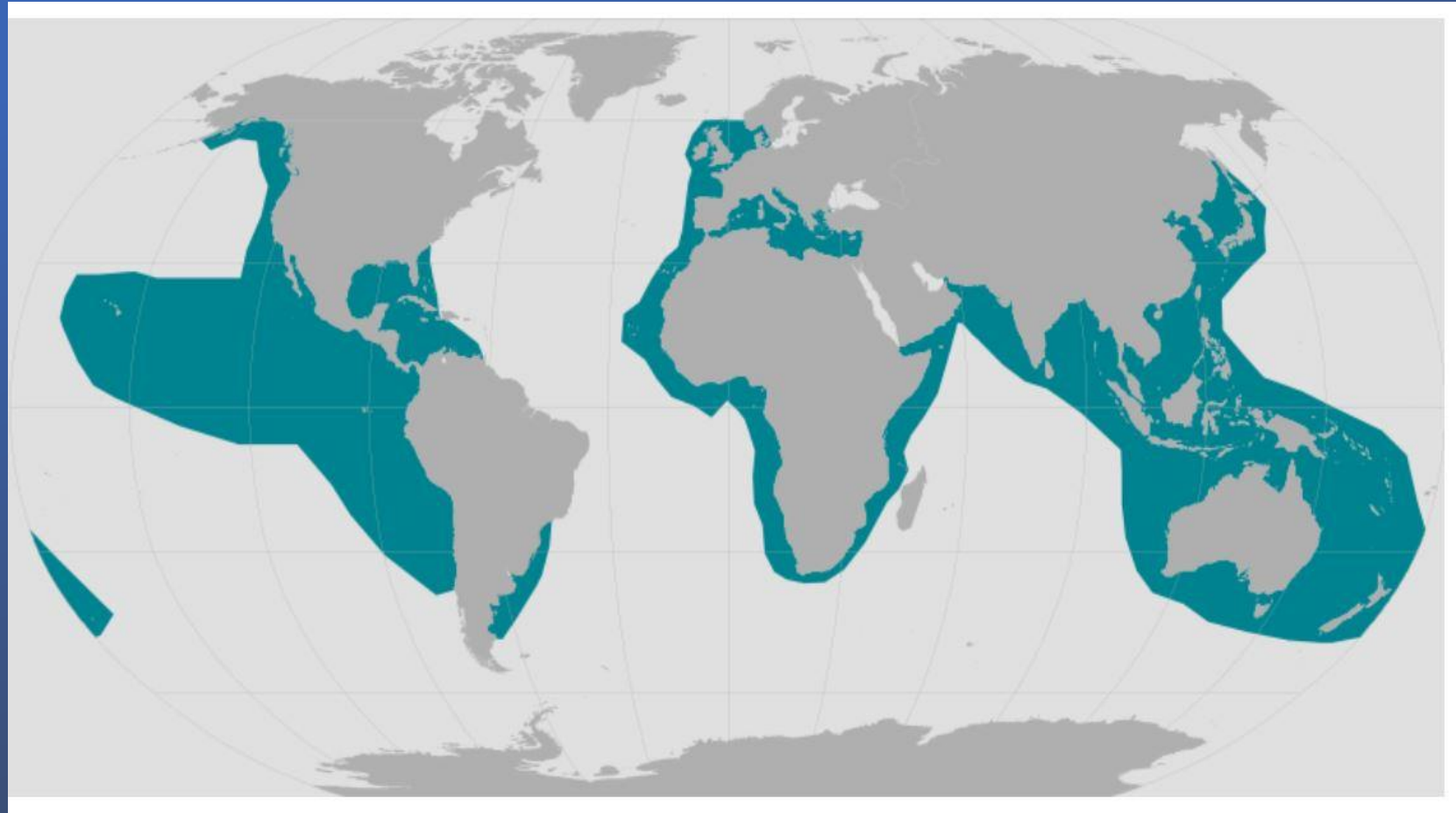
[Killer Whale & False Killer Whale - The Differences,](https://www.bing.com/videos/search?q=false+killer+whale+vs+orca&ru=%2fsearch%3fq%3dfalse%2bkiller%2bwhale%2bvs%2borca%26FORM%3dHDRSC1&view=detail&mm-scen=vvrc&mid=692AC189FF0D660F23CF692AC189FF0D660F23CF&FORM=WRVORC)  
<https://www.bing.com/videos/search?q=false+killer+whale+vs+orca&ru=%2fsearch%3fq%3dfalse%2bkiller%2bwhale%2bvs%2borca%26FORM%3dHDRSC1&view=detail&mm-scen=vvrc&mid=692AC189FF0D660F23CF692AC189FF0D660F23CF&FORM=WRVORC>

Pods of 10-50  
Highly social  
Near threatened

Hawaii

- Endangered
- 150 individuals left

Small size  
Slow life history  
Narrow geographic range  
Higher trophic level



False Killer Whale, <https://www.fisheries.noaa.gov/species/false-killer-whale>

False Killer Whale, <https://www.activewild.com/false-killer-whale-facts/>

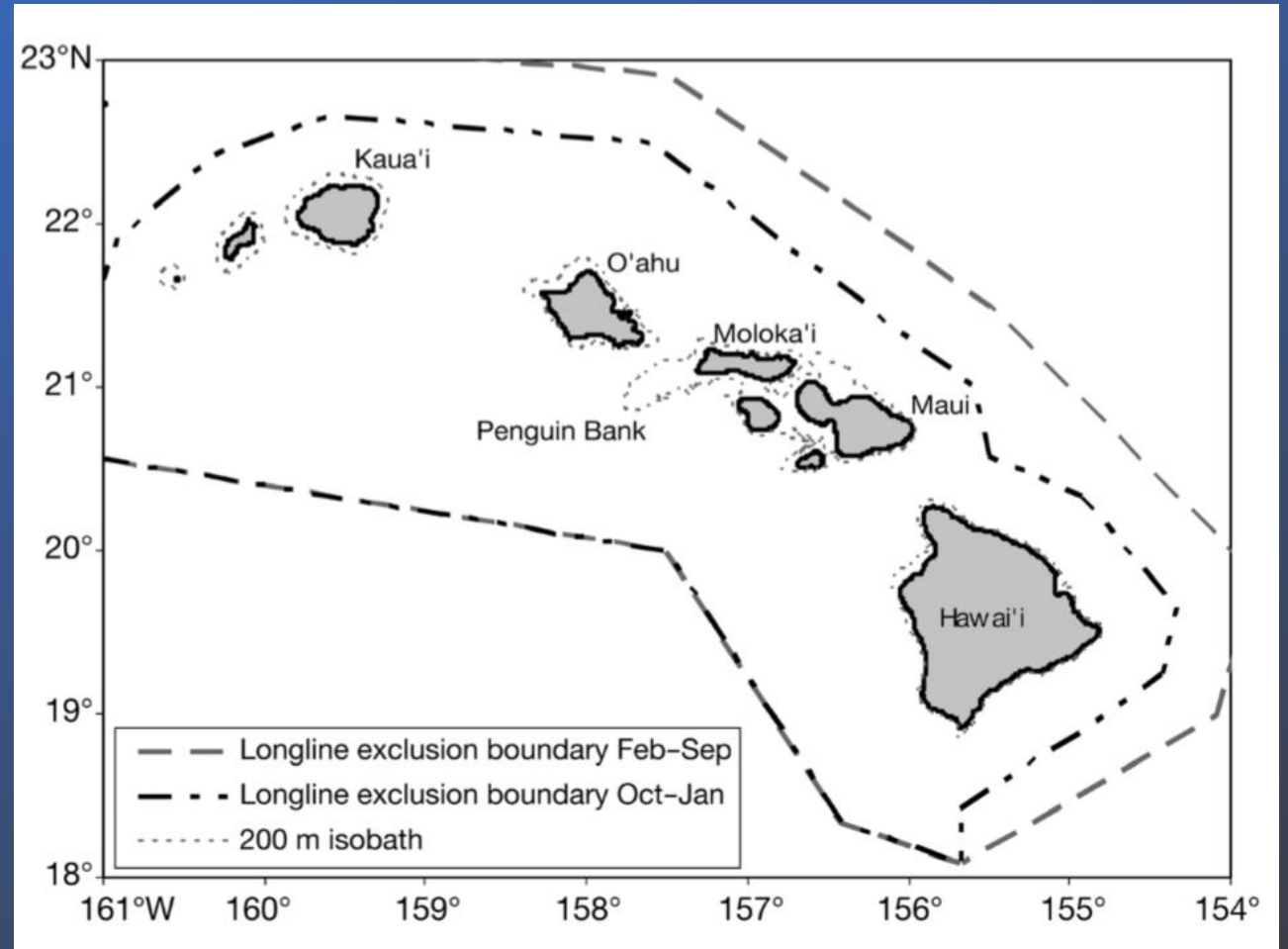
False Killer Whale, <https://www.iucnredlist.org/species/18596/145357488>

Silva, I. F., Kaufman, G. D., Rankin, R. W., & Maldini, D. (2013). Presence and distribution of Hawaiian false killer whales (*Pseudorca crassidens*) in Maui County waters: a historical perspective. *Aquatic Mammals*, 39(4), 409-414.



## Threats

- Fishery interaction
  - Longlines
- Competition with fisheries
  - Tuna, billfish
- Contaminants
  - Accumulation of food web
- Small population size
  - Genetic diversity

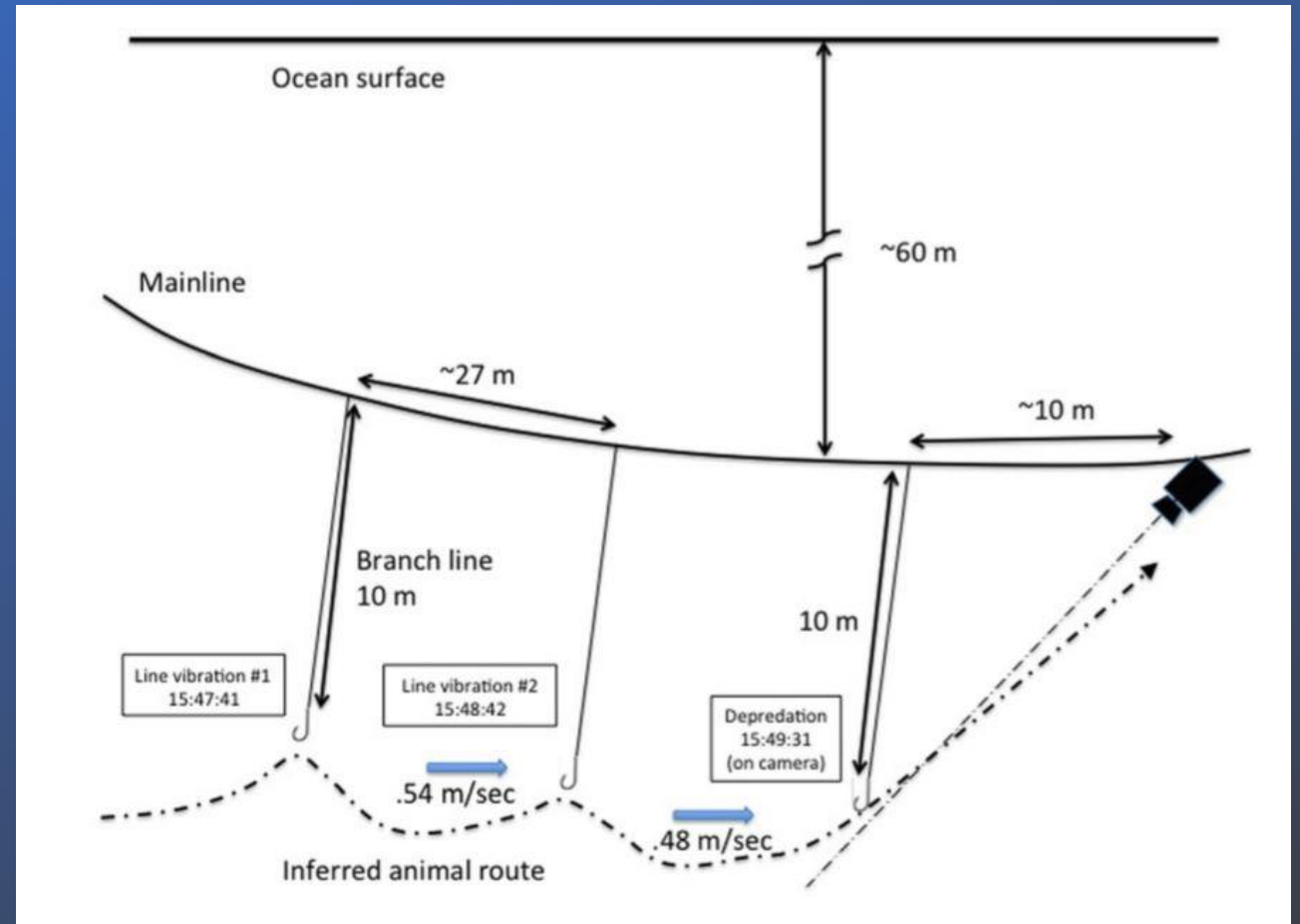


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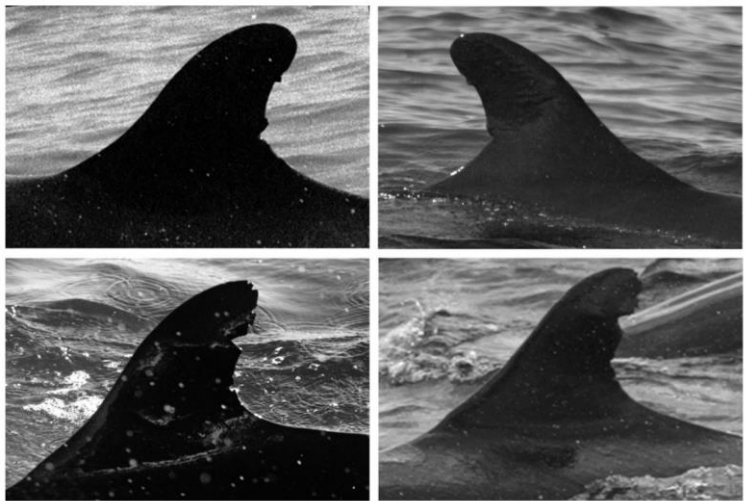


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Thode, A., Wild, L., Straley, J., Barnes, D., Bayless, A., O'Connell, V., ... & Martin, S. (2016). Using line acceleration to measure false killer whale (*Pseudorca crassidens*) click and whistle source levels during pelagic longline depredation. *The Journal of the Acoustical Society of America*, 140(5), 3941-3951.

# Photo Identification

- Body scars
- Notches on dorsal fin
- Dorsal fin misconfigurations
- Dorsal fin shape and size



- Mark-recapture
- Abundance
- Site-fidelity
- Code for marked individuals based on distinct features
- 1 = not
- 2 = slightly
- 3 = average
- 4 = very
- $P = \frac{N}{\pi}$
- P = overall abundance
- N = number of individuals
- $\pi$  = distinctive individuals



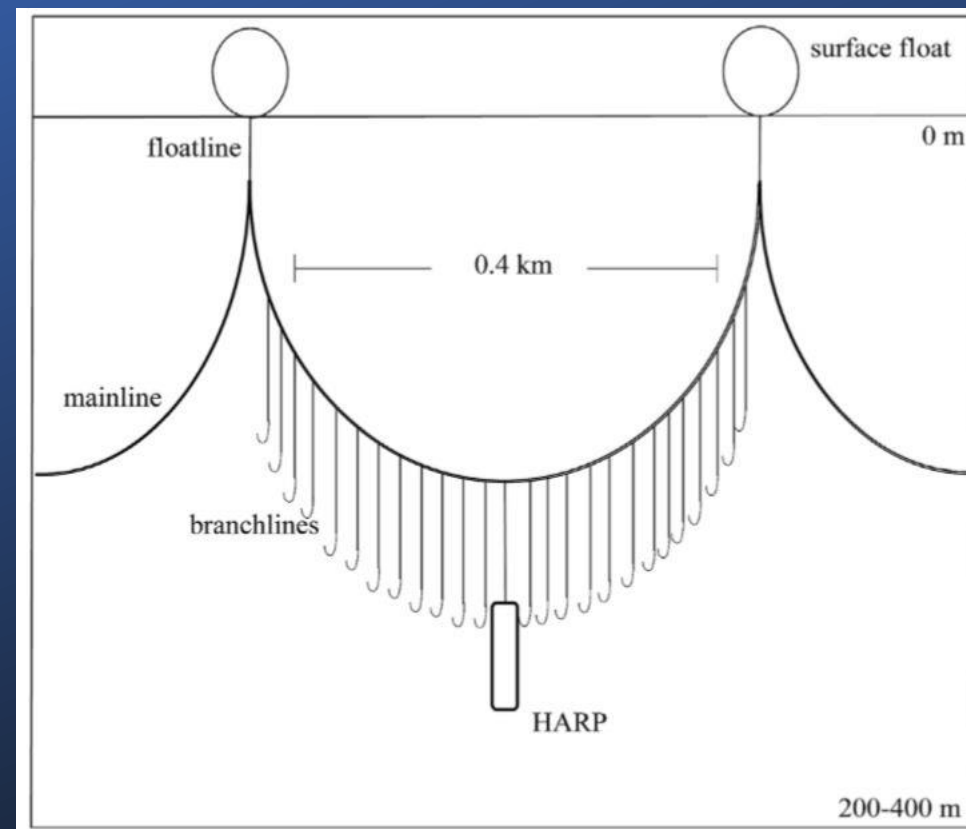
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Baird, R. W. (2009). *A review of false killer whales in Hawaiian waters: biology, status, and risk factors* (p. 40). Olympia: Cascadia Research Collective.

Wild Whale Research Foundation,  
<https://www.wildwhaleresearch.org/2010/12/false-killer-whales-id-photo-2/>

# Acoustic monitoring

- Highly vocal
  - Whistles
  - Echolocation clicks
- Longlines for bait
- Acoustic recorders
  - Effective and easy to use
  - Rate of occurrence
  - Timing
  - Movement around gear





# Line Transect

## Uses

- Group size
- Abundance
- Distribution

## Problems

- Animals move
- Some underwater
- May count the same animal twice

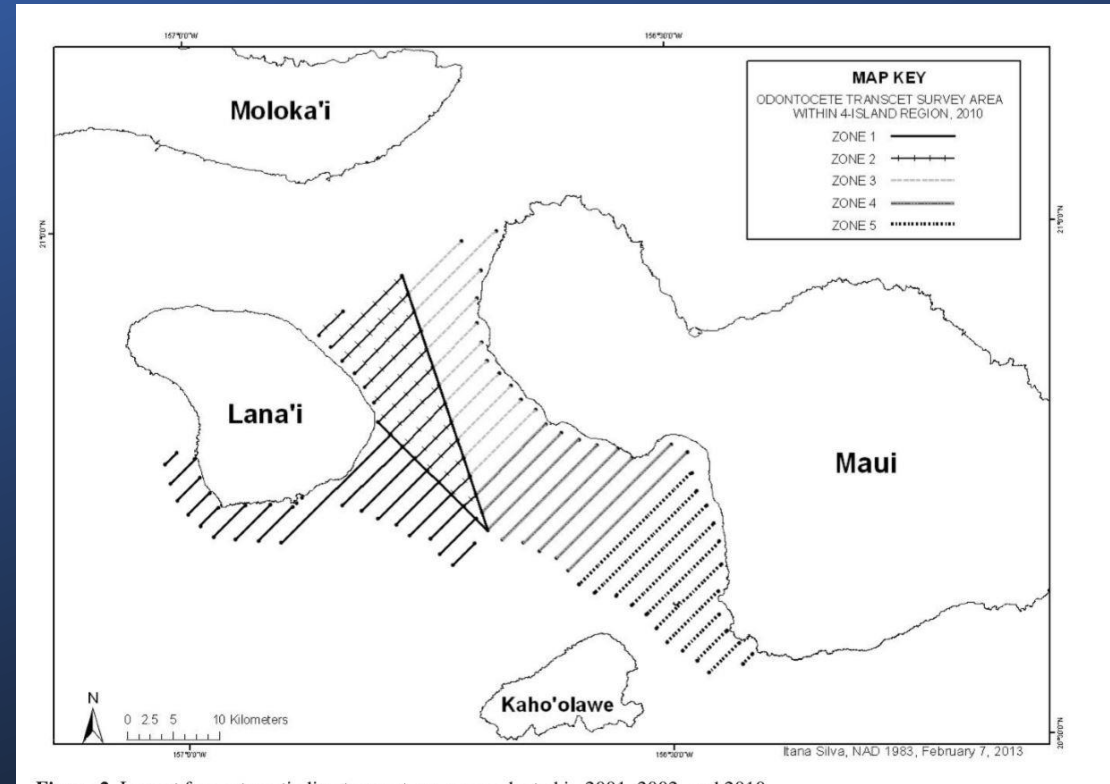
## Methods

- Boat with binoculars or sight
- Ariel survey

**Table 2.** Distribution of false killer whale sightings made in the eastern tropical Pacific (ETP) and central North Pacific (CNP) from 1986 to 2010 according to Beaufort sea state.

Beaufort	ETP	CNP
3	12	9
4	17	6
5	10	5
6	0	3

Perpendicular trackline distances associated with these sightings were used to model the detection function of false killer whale subgroups.  
doi:10.1371/journal.pone.0090464.t002

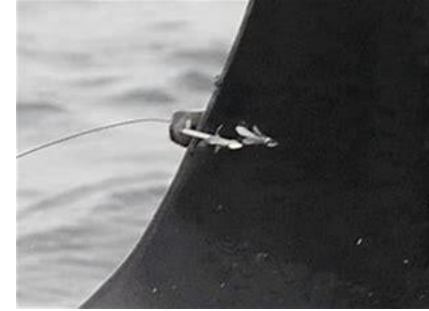


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Bradford, A. L., Forney, K. A., Oleson, E. M., & Barlow, J. (2014). Accounting for subgroup structure in line-transect abundance estimates of false killer whales (*Pseudorca crassidens*) in Hawaiian waters. *PLoS One*, 9(2).



# Satellite Tags



Marianas Cetacean Surveys 2013: Updates on Our Satellite Tagged False Killer Whales (July 12 – 27), <https://pifscblog.wordpress.com/2013/07/30/marianas-cetacean-surveys-2013-updates-on-our-satellite-tagged-false-killer-whales-july-12-27/>

Marianas Cetacean Surveys 2013: Rota Summary (July 4 – 10), <https://pifscblog.wordpress.com/2013/07/15/marianas-cetacean-surveys-2013-rota-summary-july-4-10/>  
NOAA Study To Satellite Tag Killer Whales Angers Canadian Conservationists; 'Risk Isn't Worth It' ,

[https://www.underwatertimes.com/news.php?article\\_id=10432978651](https://www.underwatertimes.com/news.php?article_id=10432978651)

Median (range) distance from shore (km)	Median (range) depth (m)	No. of days associated with island of Hawai'i after tagging	Min. distance travelled (km)	Max. distance moved (km)
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## Uses

- Location of animal

## Disadvantages

- Animal needs to surface to collect data
- Expensive
- Need to attach to animal

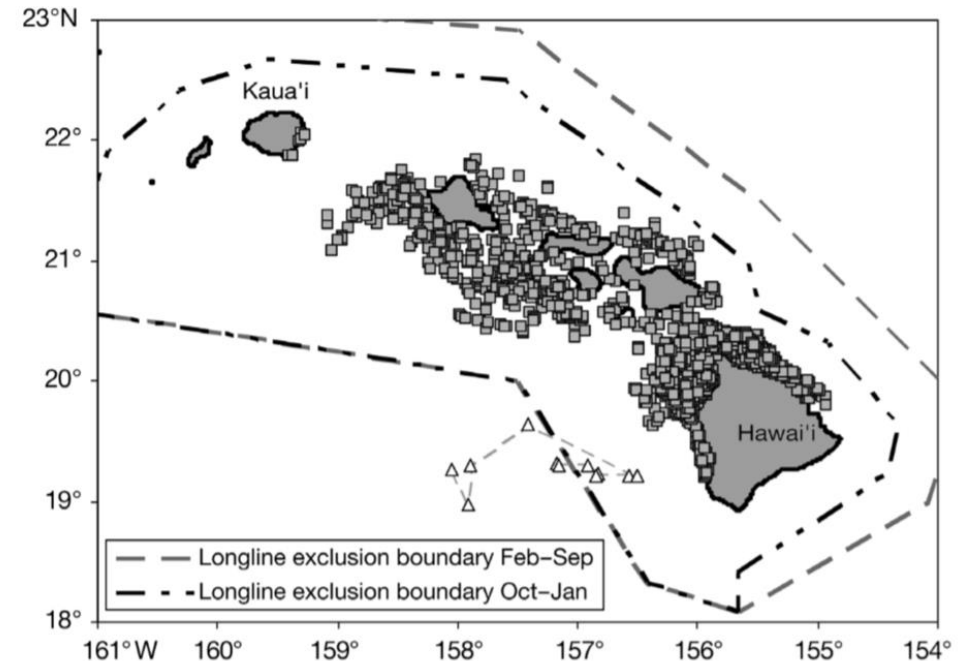


Fig. 2. *Pseudorca crassidens*. Locations of all satellite-tagged false killer whales after filtering. (■) Locations of individuals from the insular population; (Δ) individual from the offshore population (with consecutive points joined with dashed line). See Fig. 4 for detail of the offshore individual movements in relation to bathymetry

# Aerial Surveys



## Uses

- Abundance and distribution
- Behaviors
  - Feeding

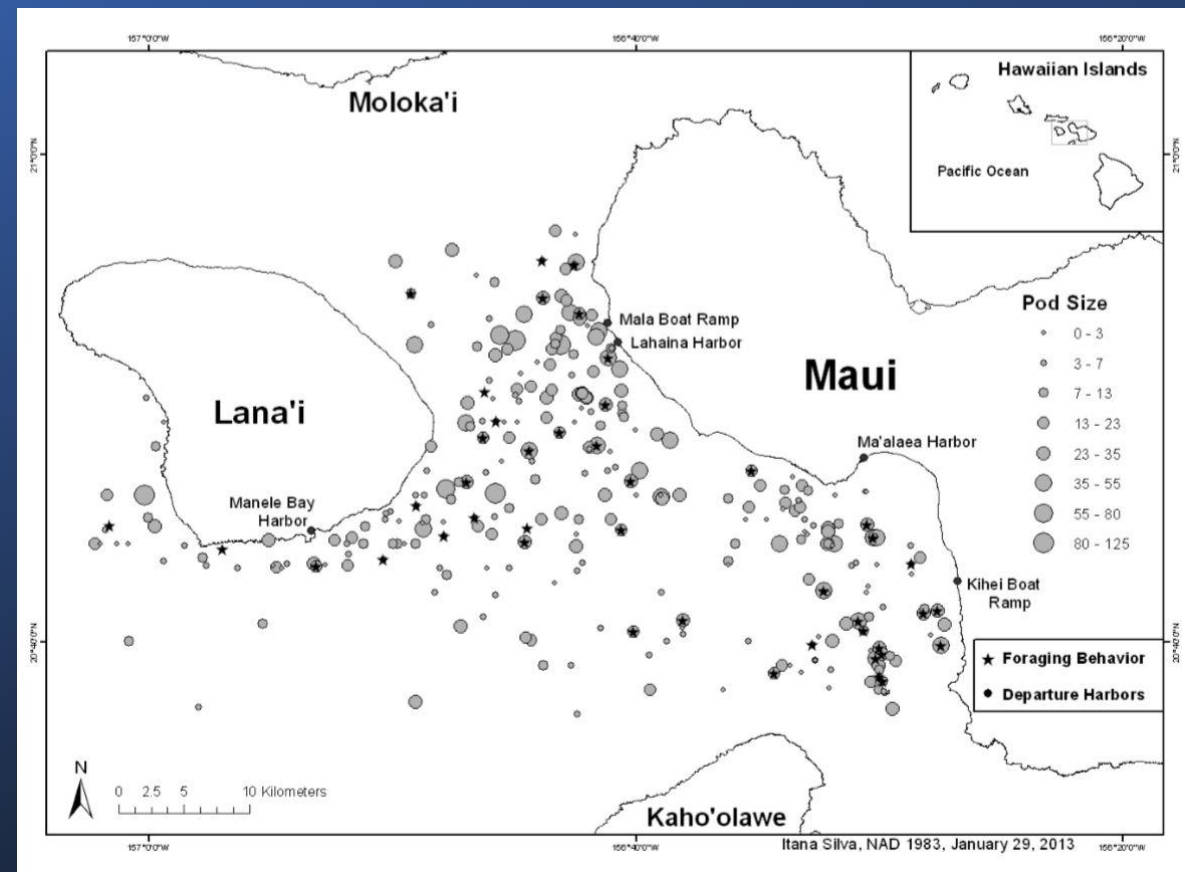
## Disadvantages

- Weather dependent
- May be hard to see animal



Reeves, R. R., Leatherwood, S., & Baird, R. W. (2009). Evidence of a Possible Decline since 1989 in False Killer Whales (*Pseudorca crassidens*) around the Main Hawaiian Islands<sup>1</sup>. *Pacific Science*, 63(2), 253-261.

Species	No. (%) of Sightings	Group Size Median (range)
Pantropical spotted dolphin, <i>Stenella attenuata</i>	8 (26.7)	89 (4–500)
Bottlenose dolphin, <i>Tursiops truncatus</i>	6 (20.0)	3 (1–5)
False killer whale, <i>Pseudorca crassidens</i>	5 (16.7)	27 (2–470)
Spinner dolphin, <i>Stenella longirostris</i>	3 (10.0)	2 (1–3)
Short-finned pilot whale, <i>Globicephala macrorhynchus</i>	2 (6.7)	26 (20–32)
Rough-toothed dolphin, <i>Steno bredanensis</i>	2 (6.7)	33 (16–50)
Sperm whale, <i>Physeter macrocephalus</i>	2 (6.7)	2.5 (2–3)
Pygmy killer whale, <i>Feresa attenuata</i>	1 (3.3)	15
Melon-headed whale, <i>Peponocephala electra</i>	1 (3.3)	400





# Pictures and Websites

- FALSE KILLER WHALE, <https://us.whales.org/whalesdolphins/species-guide/false-killer-whale/>
- False Killer Whale, <https://www.fisheries.noaa.gov/species/false-killer-whale>
- False Killer Whale, <https://www.activewild.com/false-killer-whale-facts/>
- False Killer Whale, <https://www.iucnredlist.org/species/18596/145357488>
- Killer Whale & False Killer Whale - The Differences, <https://www.bing.com/videos/search?q=false+killer+whale+vs+orca&ru=%2fsearch%3fq%3dfalse%2bkiller%2bwhale%2bvs%2borca%26FORM%3dHDRSC1&view=detail&mmscn=vwrc&mid=692AC189FF0D660F23CF692AC189FF0D660F23CF&FORM=WRVORC>
- Wild Whale Research Foundation, <https://www.wildwhaleresearch.org/2010/12/false-killer-whales-id-photo-2/>
- False Killer Whale Fun Fact – Part II, <https://www.azoreswhalewatch.com/sightings/cetaceans/odontocetidolphins/pseudorcacrassidens/false-killer-whale-fun-fact/>
- **Marianas Cetacean Surveys 2013: Updates on Our Satellite Tagged False Killer Whales (July 12 – 27)**, <https://pifscblog.wordpress.com/2013/07/30/marianas-cetacean-surveys-2013-updates-on-our-satellite-tagged-false-killer-whales-july-12-27/>
- **Marianas Cetacean Surveys 2013: Rota Summary (July 4 – 10)**, <https://pifscblog.wordpress.com/2013/07/15/marianas-cetacean-surveys-2013-rota-summary-july-4-10/>
- **NOAA Study To Satellite Tag Killer Whales Angers Canadian Conservationists; 'Risk Isn't Worth It'** , [https://www.underwatertimes.com/news.php?article\\_id=10432978651](https://www.underwatertimes.com/news.php?article_id=10432978651)
- Whales navigate Northwest Passage for first time in nearly 10,000 years, <http://desdemonadespair.net/2011/09/whales-navigate-northwest-passage-for.html>
- **North Atlantic Right Whale Conservation Program**, <https://www.seewinter.com/research/right-whale-research/>

# Scientific Articles

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- Baird, R. W., Gorgone, A. M., Webster, D. L., McSweeney, D. J., Durban, J. W., Ligon, A. D., ... & Deakos, M. H. (2005). False killer whales around the main Hawaiian Islands: an assessment of inter-island movements and population size using individual photo-identification. *Contract Report JJ133F04SE0120 prepared for the Pacific Islands Fisheries Science Center, National Marine Fisheries Service, 2570.*
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- Bayless, A. R., Oleson, E. M., Baumann-Pickering, S., Simonis, A. E., Marchetti, J., Martin, S., & Wiggins, S. M. (2017). Acoustically monitoring the Hawai 'i longline fishery for interactions with false killer whales. *Fisheries research, 190*, 122-131.
- Bradford, A. L., Forney, K. A., Oleson, E. M., & Barlow, J. (2014). Accounting for subgroup structure in line-transect abundance estimates of false killer whales (*Pseudorca crassidens*) in Hawaiian waters. *PLoS One, 9*(2).
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