

# Participatory science and directed survey methods

ID #713

## A case study with odontocetes in the Maui Nui region of the Hawaiian Islands



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Habitat and Dist. A

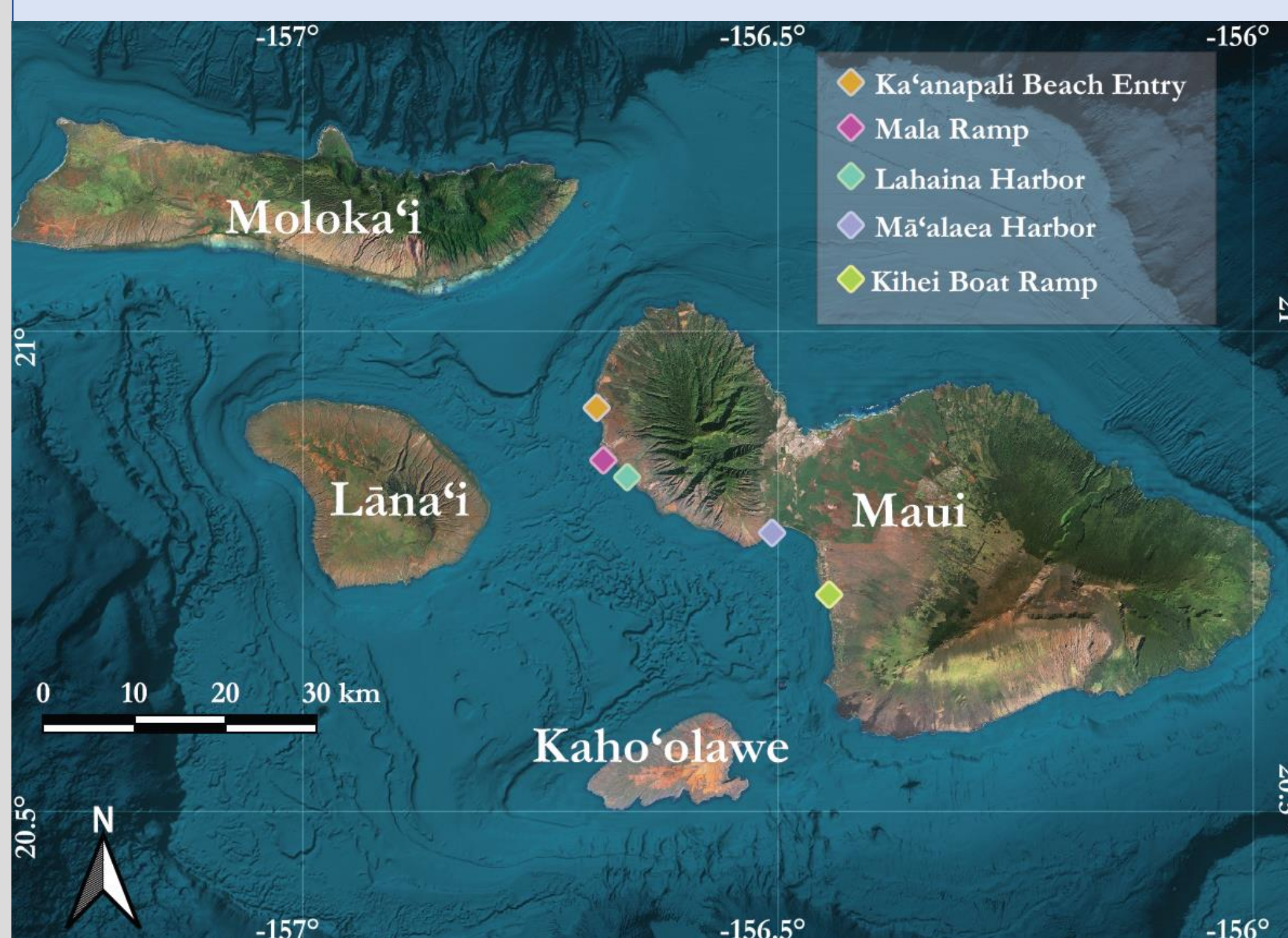
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### INTRODUCTION

- We implemented a “participatory science” (aka citizen science) project around the Maui Nui basin of the Hawaiian Islands, with vessel operators reporting opportunistic dolphin sightings.
- Water depths at each sighting location were compared to data collected via standard dolphin surveys by Cascadia Research Collective.
- A dual-method approach increases confidence in understanding the interspecific distribution of dolphins in an understudied, insular region of the Hawaiian Islands.

### METHODS



Reference map of the Maui Nui region. Harbors shown where participation in the dolphin sighting project was solicited.

#### Participatory Science (PS) project + Cascadia Research Collective (CRC) surveys:

- Operators of fishing and tour vessels with the PS project texted information on dolphin encounters, including (1) time of day, (2) GPS coordinates, (3) species identification and (4) photos from Jun.-Nov. 2015.
- CRC surveys collected similar data on dolphins from 2000-2003 and 2012 within Maui Nui (Baird *et al.* 2013)



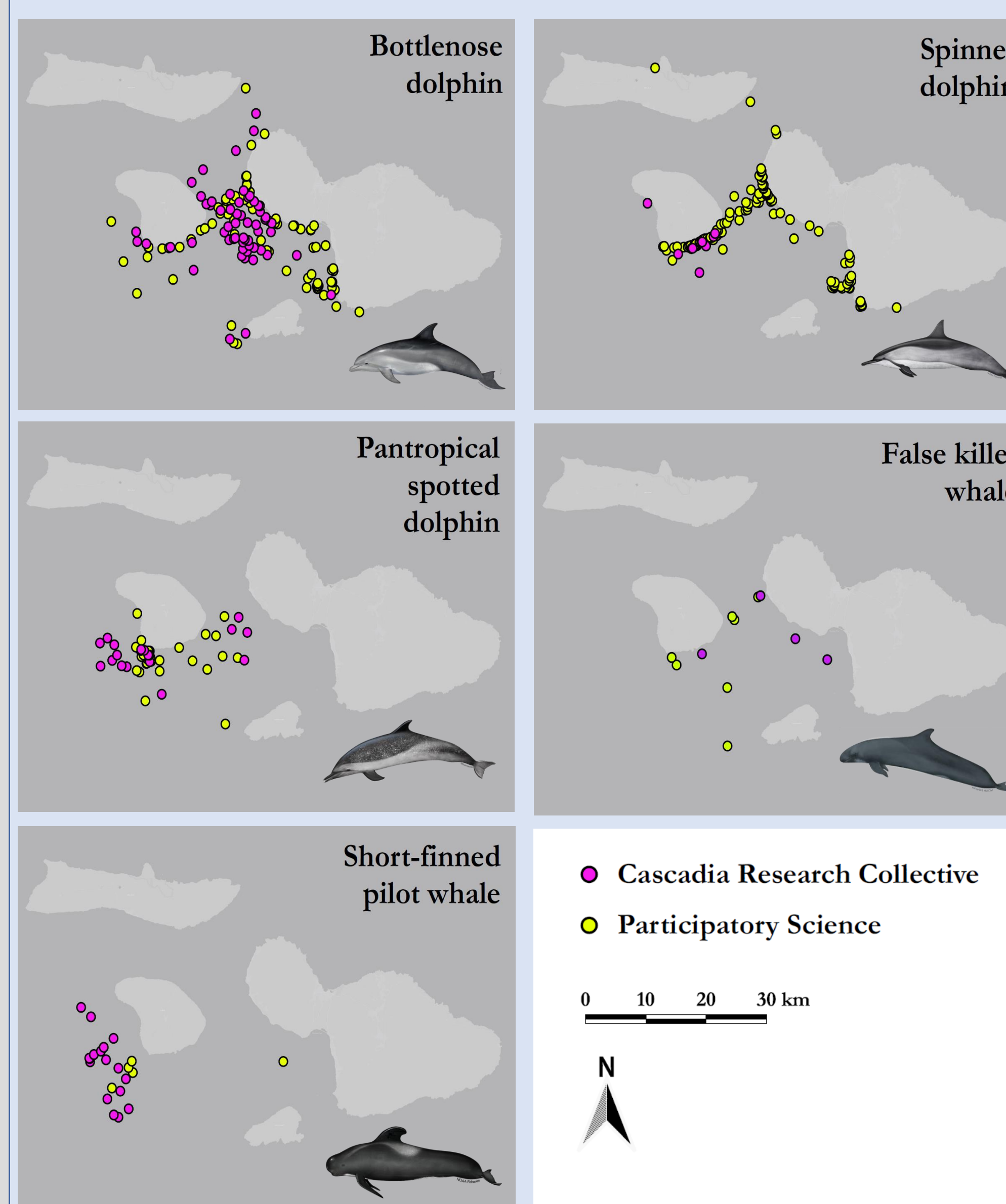
- Depths at each sighting location from CRC surveys were compared with those from the PS project using an unpaired two-sample Wilcoxon rank sum test. Pooled median depths of observations were also examined.

Participatory science is a successful, cost-effective tool for understanding dolphin distribution patterns, especially when such projects:

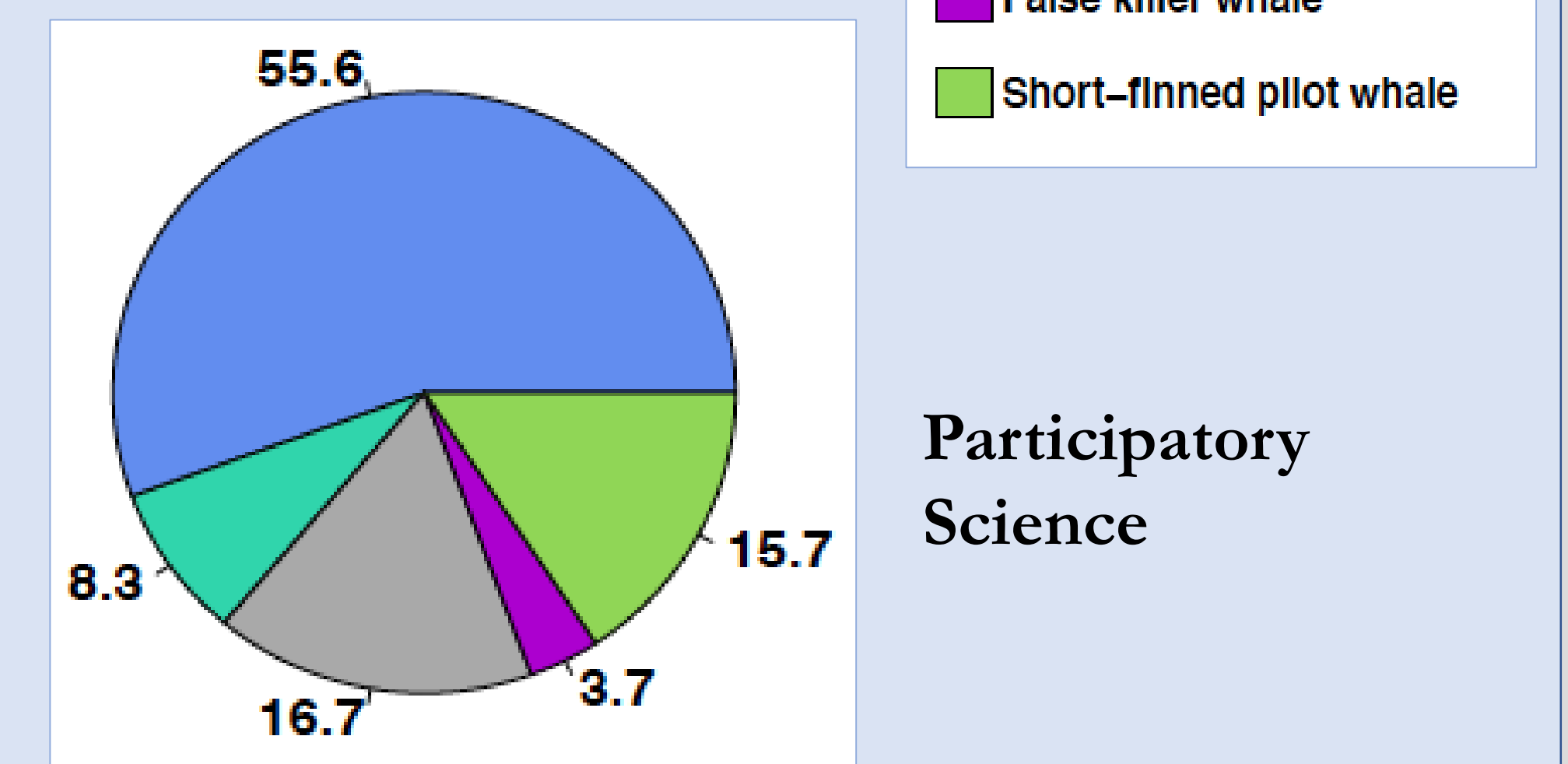
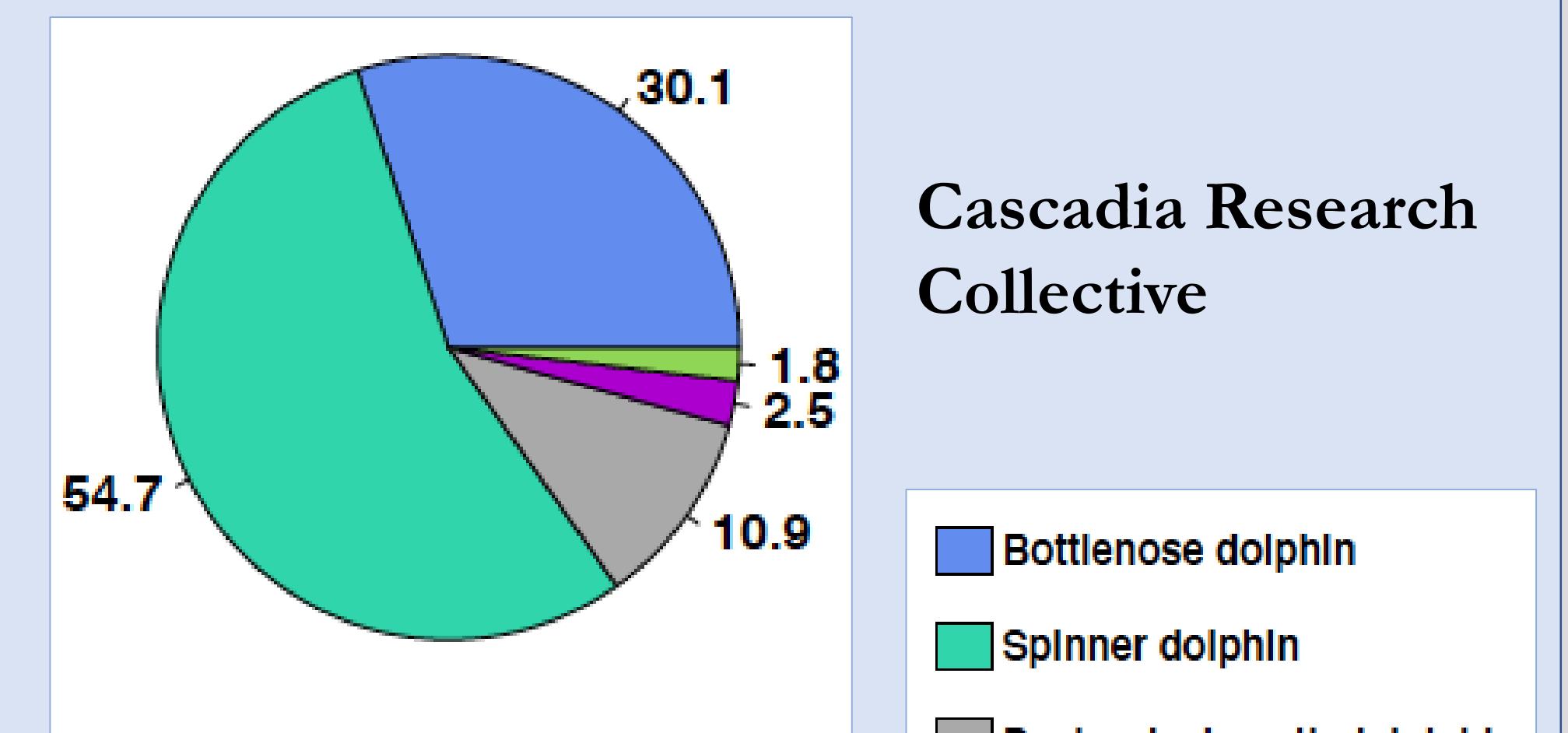
- ✓ Are supplemented by standardized survey methods
- ✓ Leverage the knowledge of vessel operators
- ✓ Quantify the effort and geographical extent of observations

### RESULTS

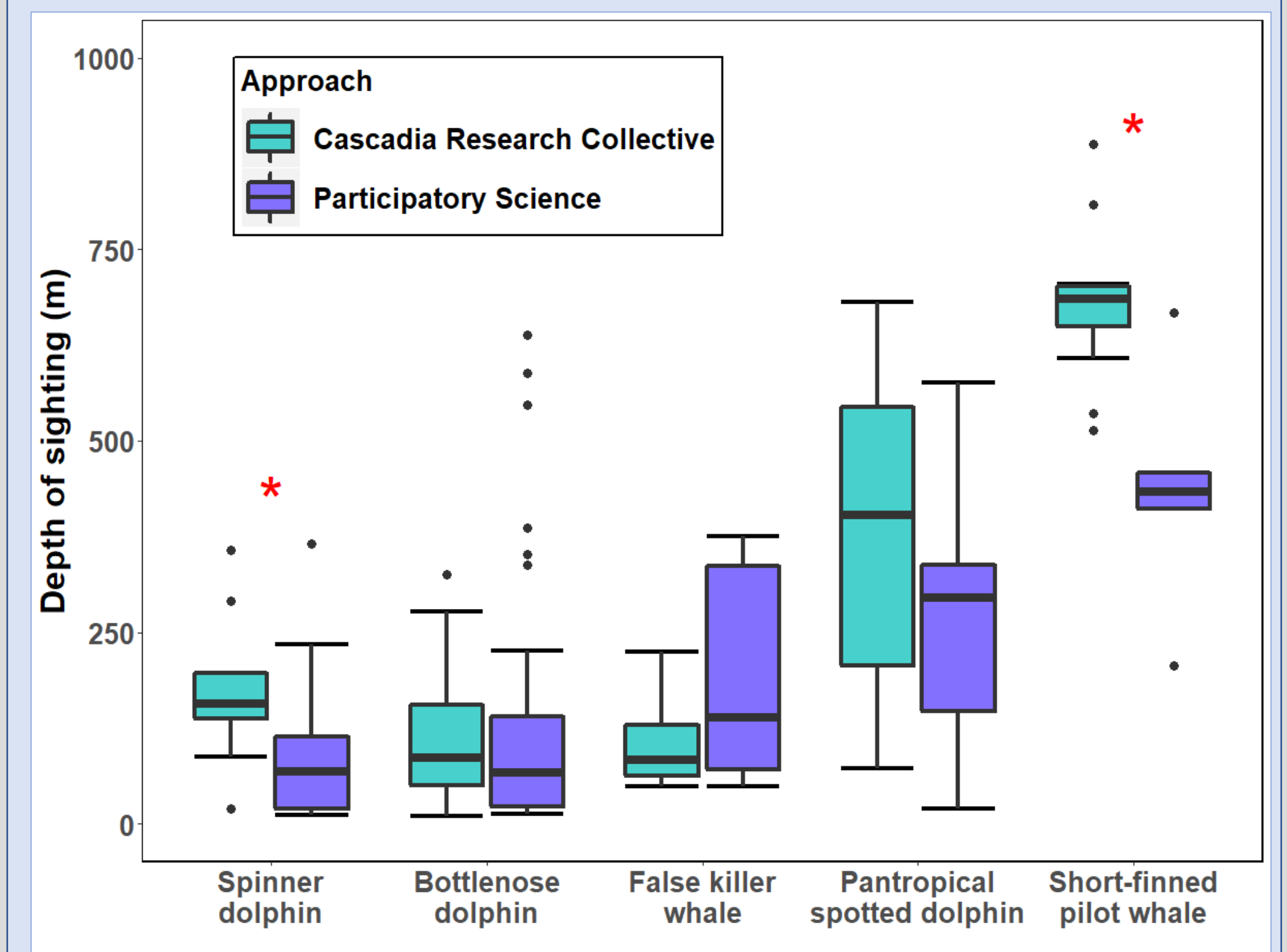
Map of dolphin sightings from CRC surveys (n=108) and PS project (n=276, 37 volunteers providing sightings) in the Maui Nui region.



Sighting proportions of dolphin species from CRC surveys and the PS project. Percentages represent the proportion of observations of each species.



IQR of depth of sightings (m) by survey type. Middle lines represent the median value. \* indicates significant difference between Hodges-Lehmann estimators at p=0.05 based on Wilcoxon rank sum tests.



- No significant differences for spotted or bottlenose dolphins or false killer whales
- Significant depth difference for spinner dolphins and pilot whales, with CRC surveys observing both species in deeper waters
- Across methods, pilot whales in deepest waters, spotted dolphins in intermediate waters, and the other 3 species in similar, shallow waters of ~80 m

Acknowledgements: Many thanks to all the boat captains and crew who contributed to the PS project as well as CRC staff and volunteers who participated in survey efforts around the Maui Nui region. Funding was provided by the Hawaiian Islands Humpback Whale National Marine Sanctuary, the Hawai'i Ocean Project, Hawai'i Wildlife Fund, U.S. Navy Pacific Fleet and the Southwest Fisheries Science Center.

Baird, R.W., et al. 2013. *Aquat. Mamm.* 39:253-269.

Howe, M., et al. 2020. *J. Cetacean Res. Manage.* (accepted).