Long-term aerial surveys support diverse management and research of protected species off California

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NOAA – SWFSC: Our Mission

- Conduct research on whales, dolphins, porpoises, seals, sea lions, and marine turtles, primarily in the eastern North Pacific.

- Guided by the Marine Mammal Protection Act, Endangered Species Act, and the Magnuson-Stevens Reauthorization Act

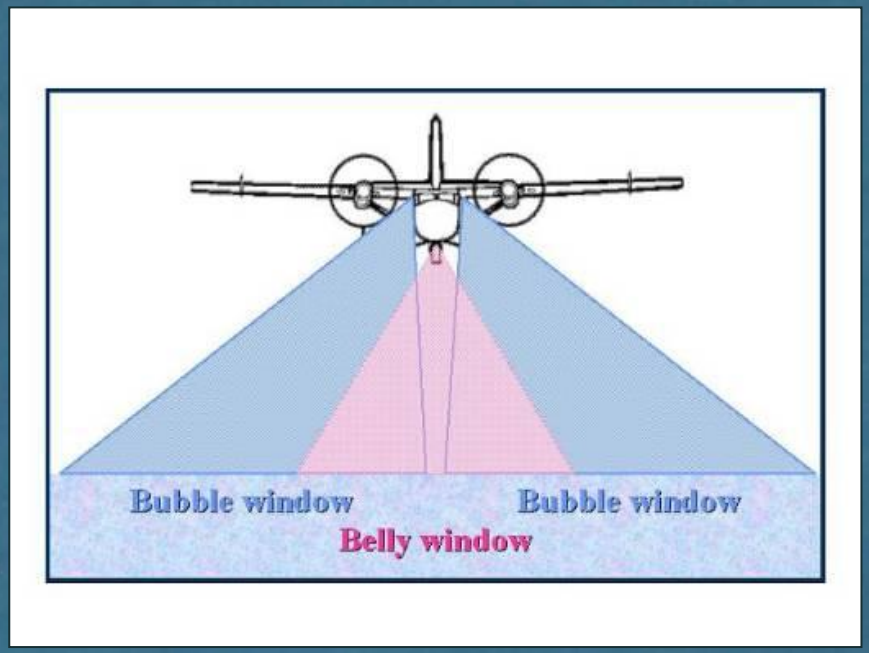
  - Investigate population structure
  - Estimate population size and trends in abundance
  - Assess and mitigate anthropogenic threats
  - Assess health of marine mammals and turtles
  - Designate critical habitat

- Field-based research is conducted from research vessels, shore stations, aircraft, and using unmanned technologies.

- Three aerial survey examples of longterm monitoring and research off California: harbor porpoise (*Phocoena phocoena*), leatherback

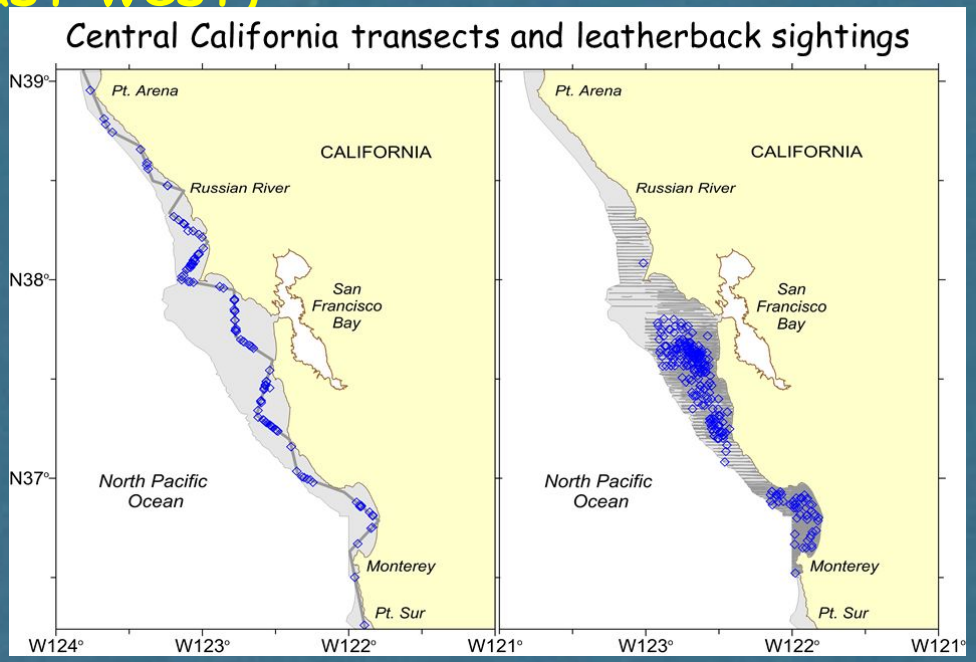
Methods: Aerial Surveys, 1986-2021

- Line-transect methods with 3 observers and a data recorder
- Good weather conditions (Beaufort sea states 0-2, clear skies) during summer/fall
- Record cetaceans, turtles, other species

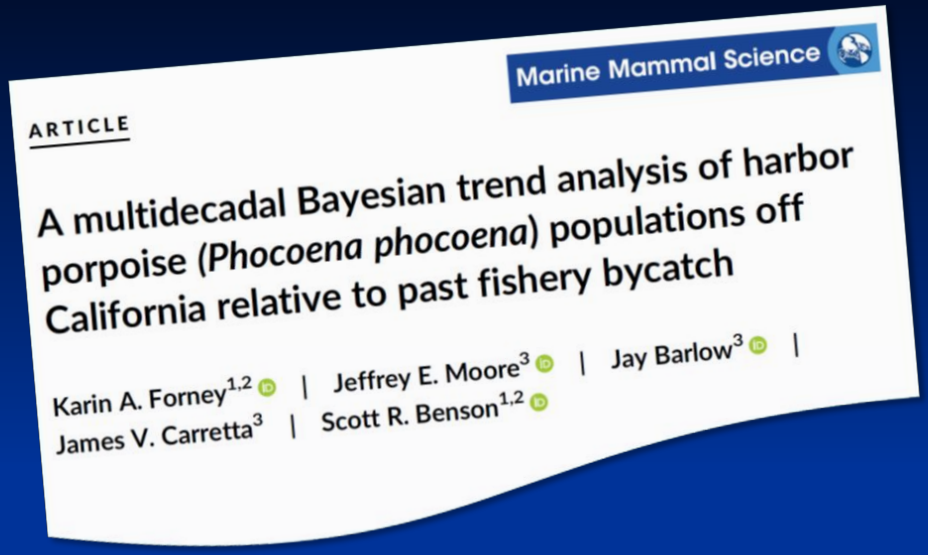


Two primary transect designs (zigzag, east-west)

Forney et al. 1991, Fishery Bulletin



Harbor porpoise population trends, 1986-2017


Marine Mammal Science

ARTICLE

A multidecadal Bayesian trend analysis of harbor porpoise (*Phocoena phocoena*) populations off California relative to past fishery bycatch

Karin A. Forney[1,2] | Jeffrey E. Moore[3] | Jay Barlow[3] | James V. Carretta[3] | Scott R. Benson[1,2]

- Four genetically distinct populations off California
- Varied history of bycatch in coastal gillnets beginning in 1930s and peaking during 1980s
- Patchwork of regulations (to protect seabirds, otters) from 1986-2002
- Population-level impacts unknown


Photo: Bill Keener/TMMC

Harbor Porpoise Trends, 1986-2017

Forney et al. 2020, Marine Mammal Science

NOAA FISHERIES

Harbor porpoise habitat up to 200 meters deep, roughly indicated by teal line

Oregon / California border

California Harbor Porpoises rebounded once gillnetting stopped

Three of the four harbor porpoise populations off the California Coast rebounded quickly following the end of inshore use of set-gillnets for species such as white seabass and halibut. The gillnetting took place close to shore where harbor porpoises are common.

Northern California / Southern Oregon Population

Not affected by historic gillnetting
Current population about 12,000 animals

San Francisco / Russian River Population

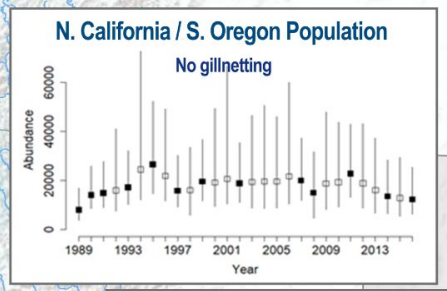
Affected by historic gillnetting
Current population about 8,000 animals

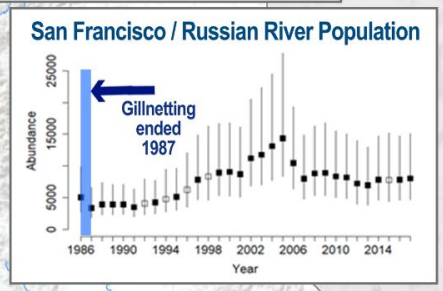
Monterey Bay Population

Affected by historic gillnetting
Current population about 4,000 animals

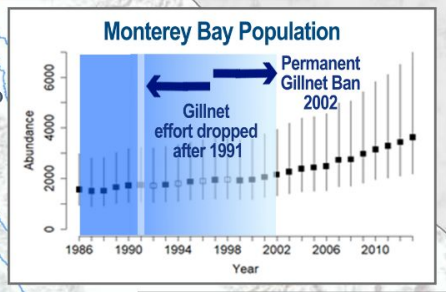
Morro Bay Population

Heavily affected by historic gillnetting
Current population about 4,000 animals

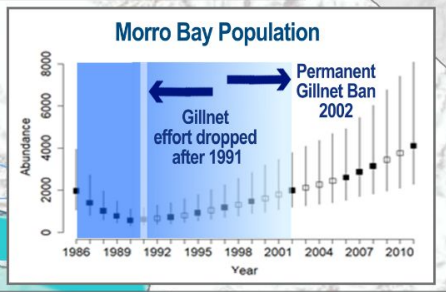




San Francisco

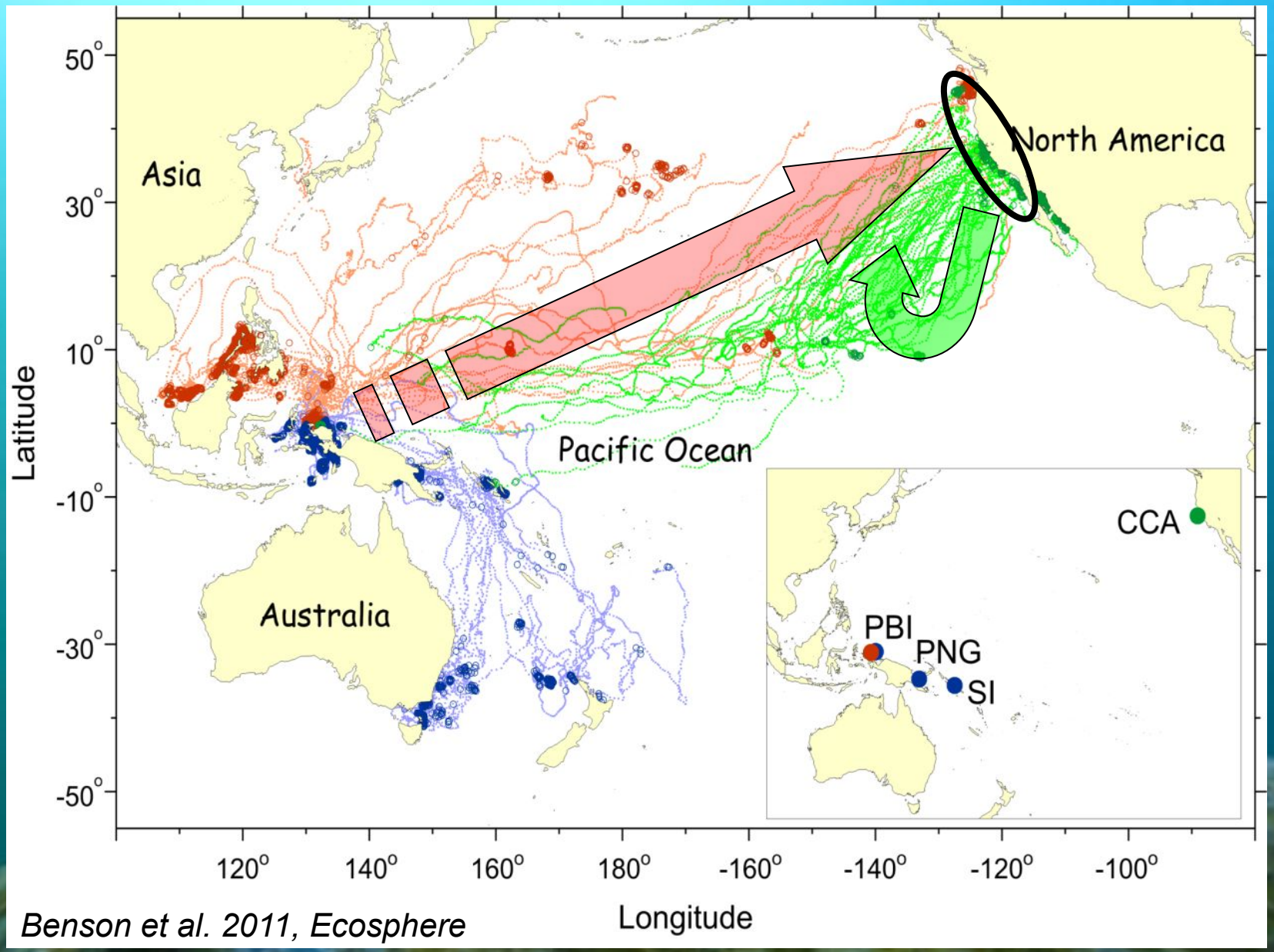


Point Conception

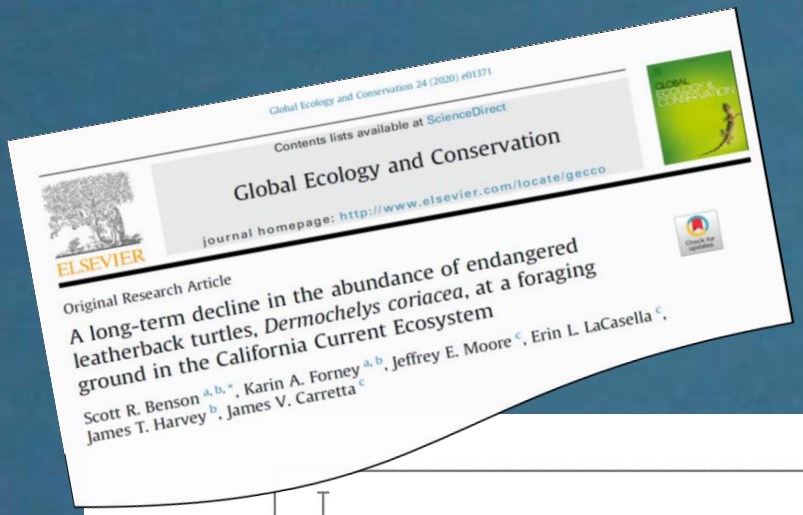


Graphic by Merlin Alix Smith and Michael Milstein

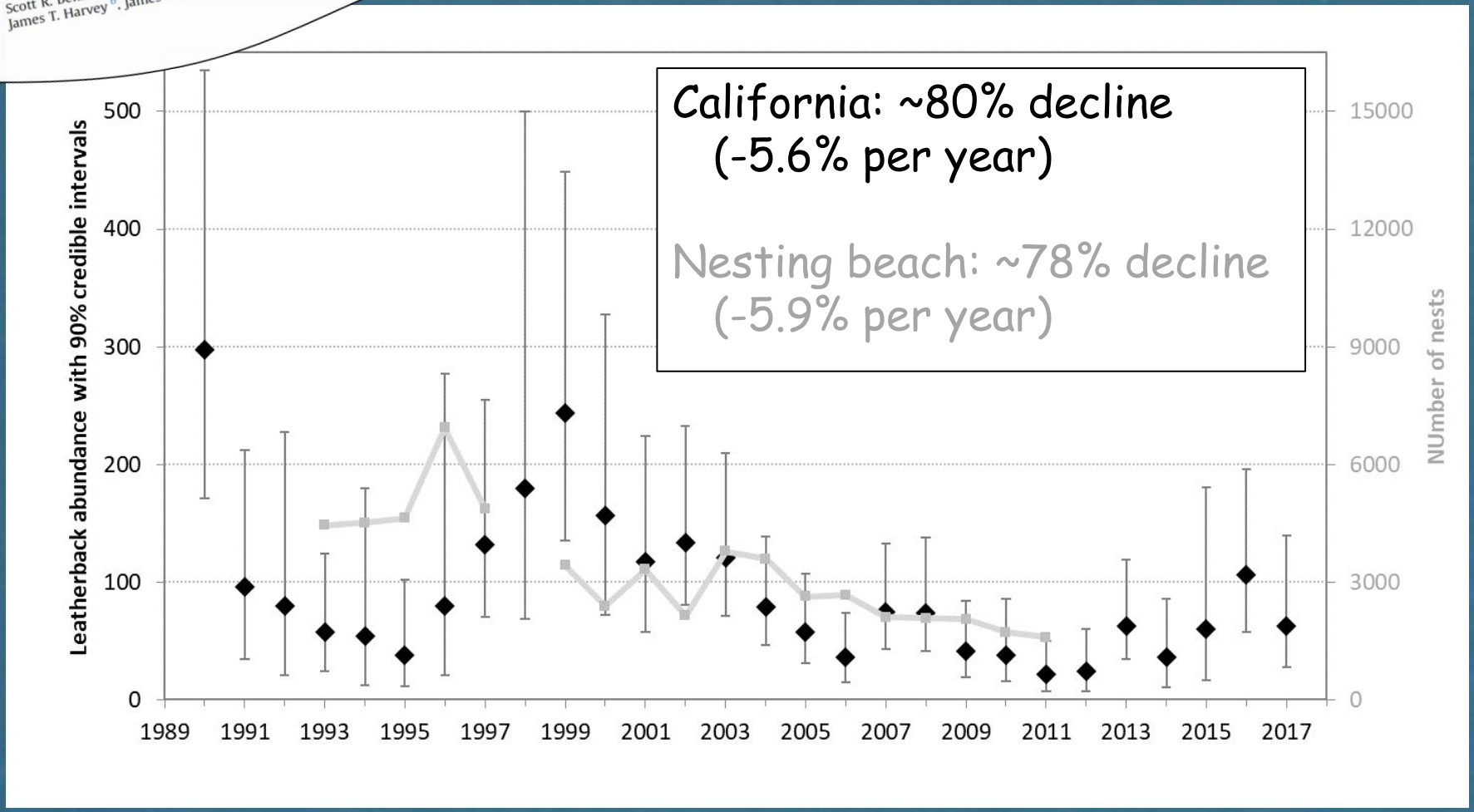
"US West Coast" leatherbacks



Benson et al. 2011, Ecosphere

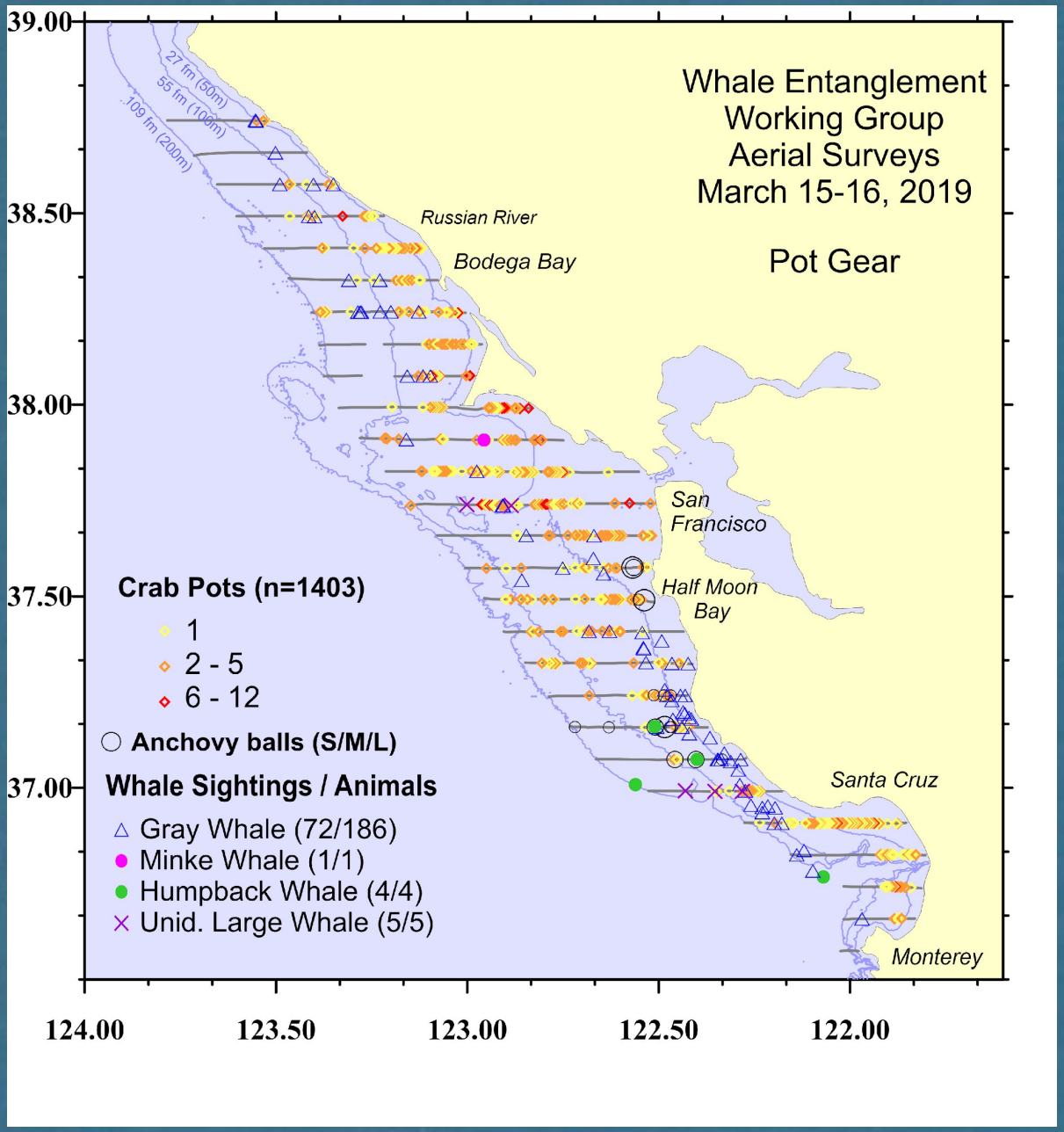


Abundance of foraging leatherbacks off central California, 1990-2017



Since 2018: Aerial surveys to assess and mitigate whale and turtle entanglement risk in fixed gear fisheries

https://wildlife.ca.gov/Conservation/Marine/Whale-Safe-Fisheries



Thank you!

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Photo: Bill Keener, TMMC

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