

Increased use of San Francisco Bay Habitat by Gray Whales Coincides with an Unusual Mortality Event

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30 March 2021, Tim Markowitz

The Marine Mammal Center

San Francisco State University
Estuary & Ocean Science Center



Gray Whales

- Arctic Summer Feeding Grounds
- Baja Winter Breeding Grounds
- Unusual Mortality Event
 - UME Declared by NOAA 2019
- Stopover in SF Bay during Long Migration
 - Increased Numbers During UME

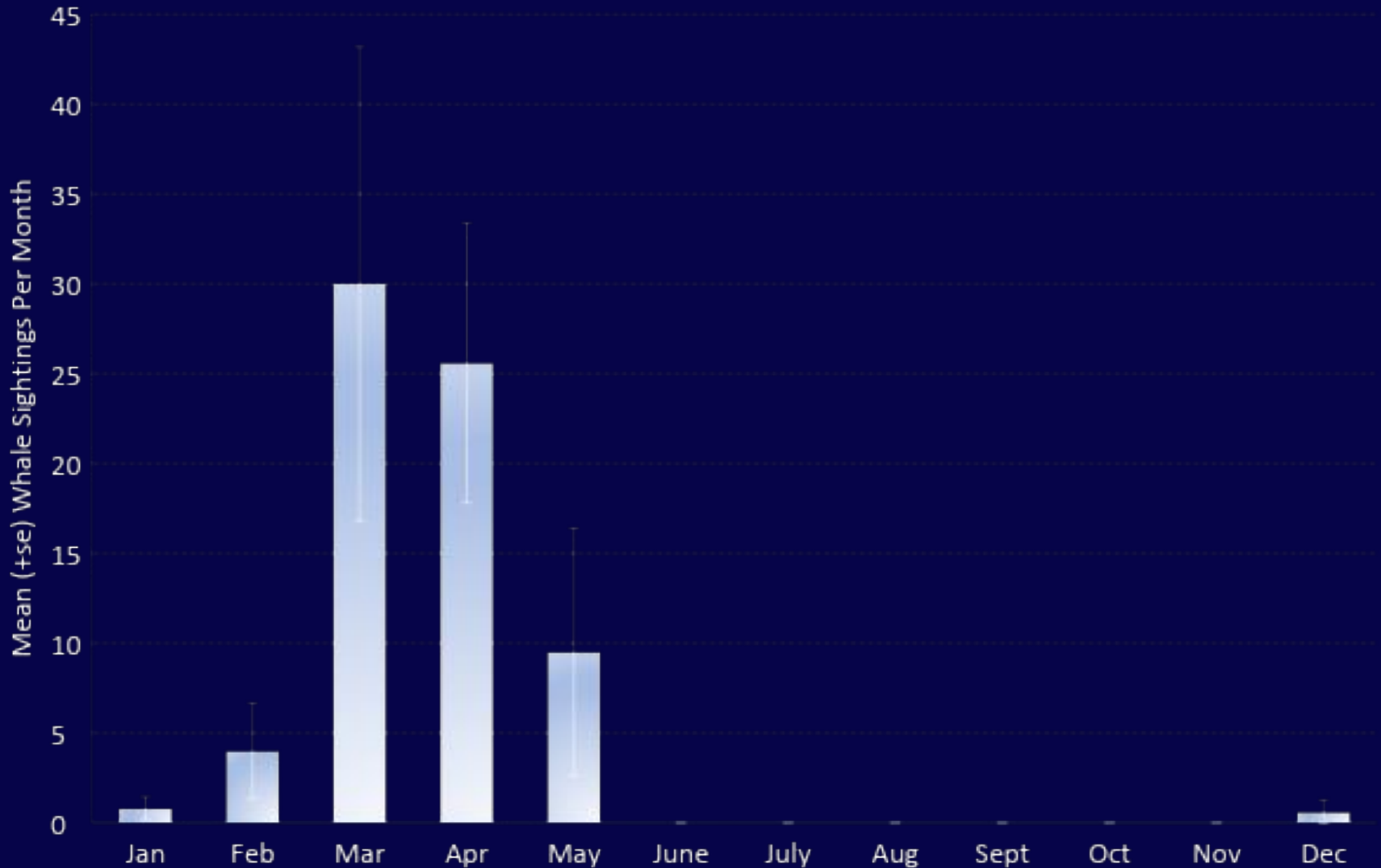


Methods

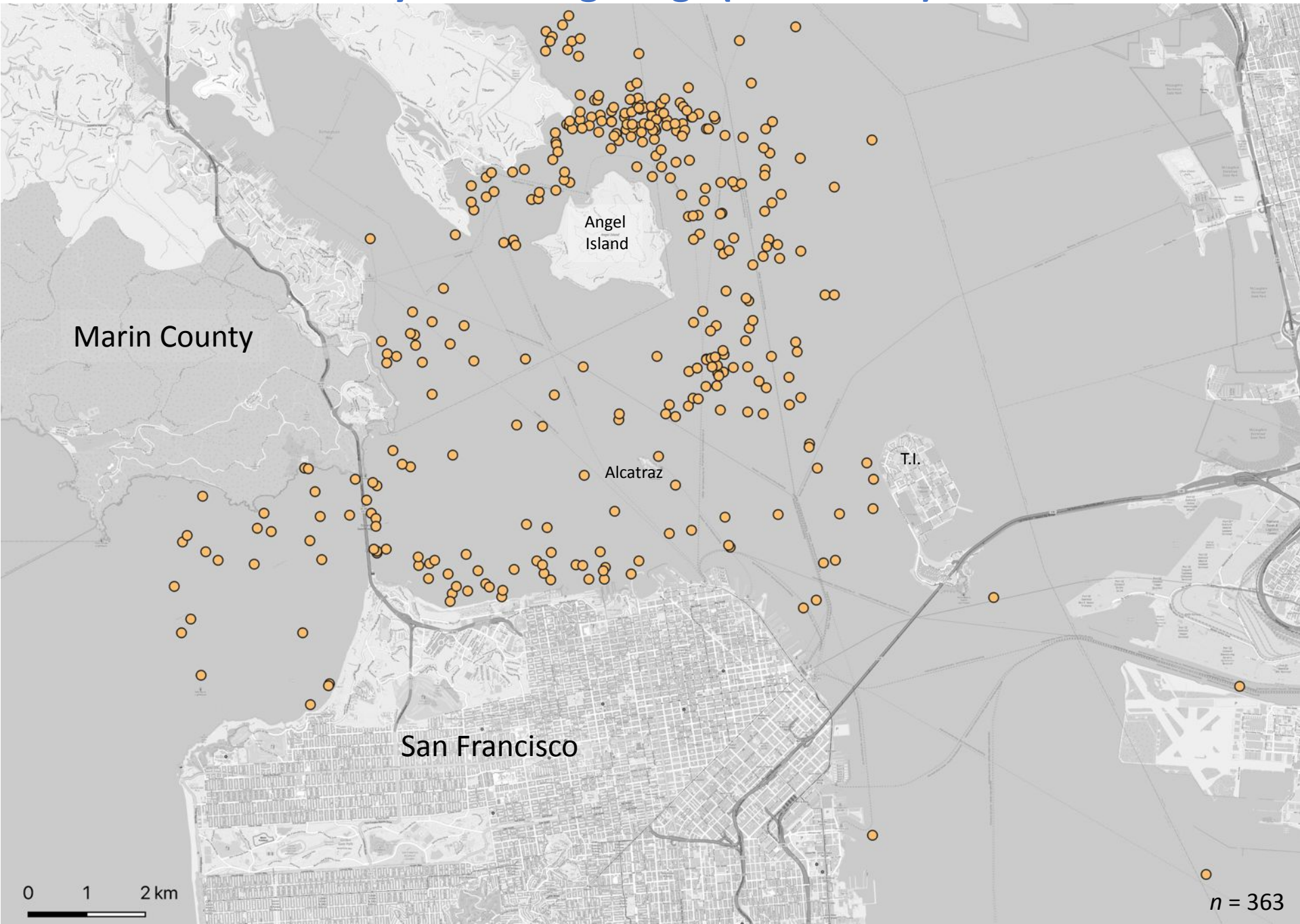
- Vessel and Shore-Based Surveys
 - Photo-Identification
 - Sightings and Photo Records from Collaborators
- 2016-2021:
 $n = 363$ sightings in SF Bay



SF Bay Whale Sightings by Month (2016-2021)



Gray Whale Sightings (2016-2021)



Gray Whales are Benthic Feeders

- Only Baleen Whale that Feeds on Seafloor
 - Shortest baleen
- Suspected feeding in 2019

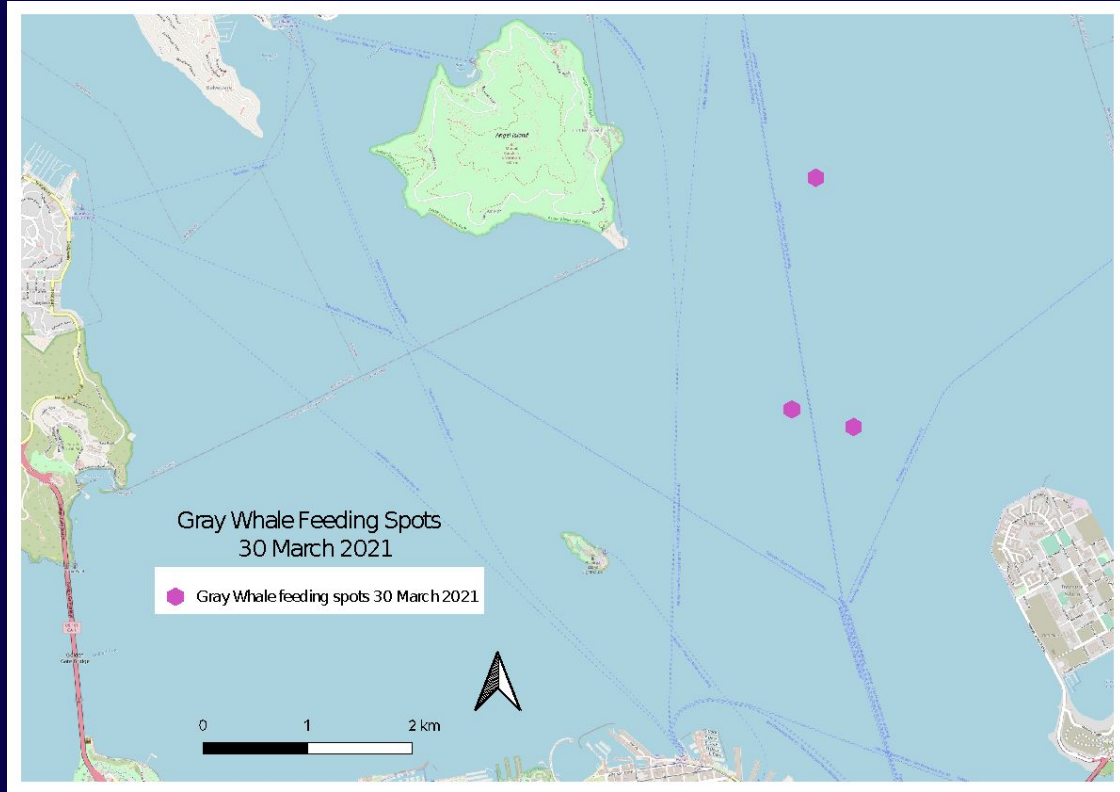


Gray Whale Feeding in SF Bay Confirmed in 2021

- Mud Plumes Seen Repeatedly for Three Diving Gray Whales
 - Located between Angel, Alcatraz and Treasure Islands
 - Dive times = 5-8 min
 - Water Depth = 12-20m (40-65 ft)
- Post-mortem analysis confirmed full stomach for 2 whales in SF Bay during 2021



30 March, Tim Markowitz



Gray Whale Photo-Identification

- Photo-ID Challenging... but Possible
 - Fluke matching and Left/Right side markings
 - Often a collaborative effort
 - our research team
 - whale tour operators
 - citizen scientists
 - other members of the public



Both Photo-ID records from Golden Gate Strait just West of GG Bridge, May 2021

Photo-ID Matching Between Distant Locations

- Long-range photo matching by collaborators along the coast
 - SF Bay March 15
 - SF Whale Tours
 - Salish Sea, April 27
 - Island Adventures
 - With help from Cascadia Research Collective



Erin Johns Gless

13 hrs · 🌐

Cool! Ted Cheeseman, Alisa Schulman-Janiger, Alisa Lemire Brooks!
Seen in Penn Cove yesterday.



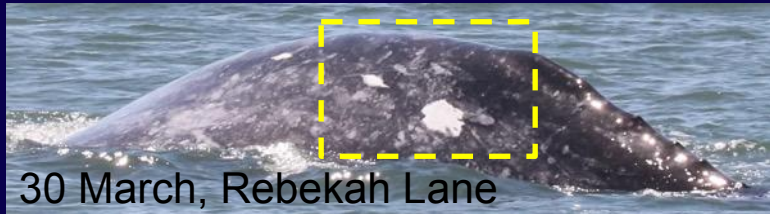
Island Adventures Whale Watching 📍

13 hrs · 🌐

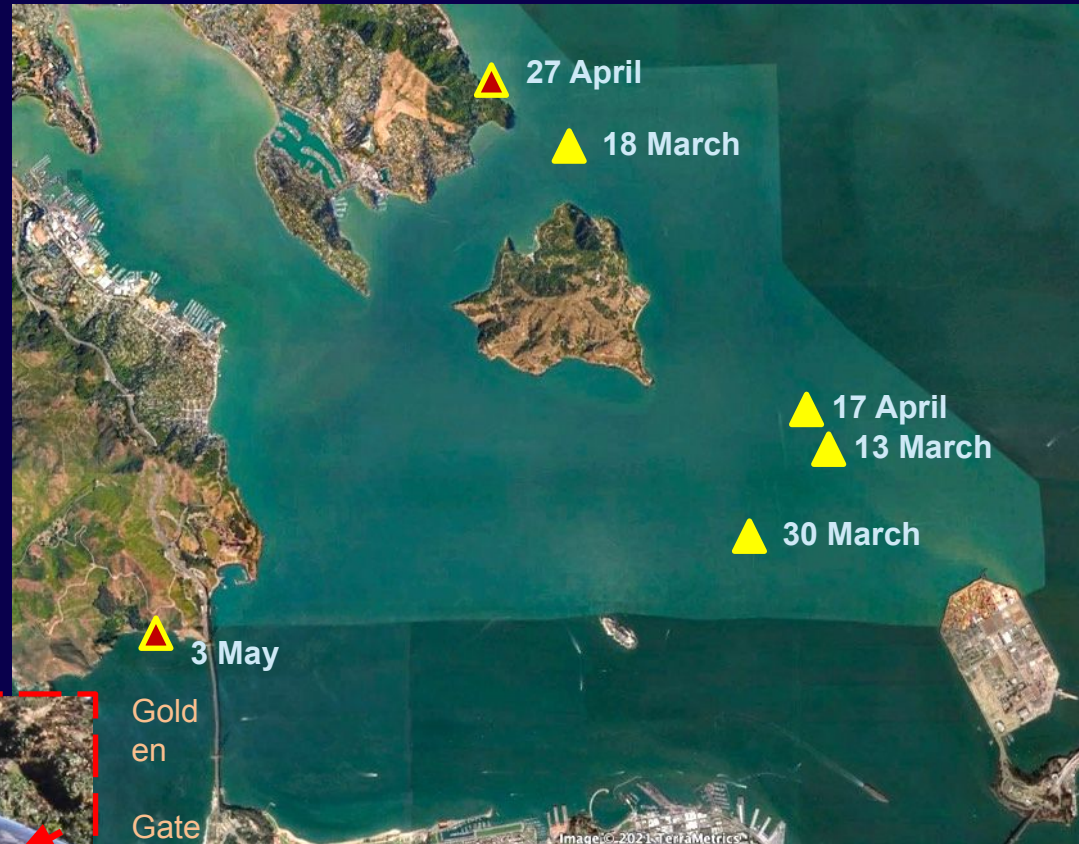
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Guests on Saturday's Anacortes tour spotted a gray whale we have never seen before in the Salish Sea. After a bit of digging, we found out that this whale does not yet have an official ID number, but was photographed in San Francisco Bay on March 16th. There are an estimated 25,000 gray whales along the west coast, so making this match is truly extraordinary! Thanks to [Cascadia Research Collective](#) and [San Francisco Whale Tours](#) for helping to make this connection!

Prolonged Stopover and Mortality

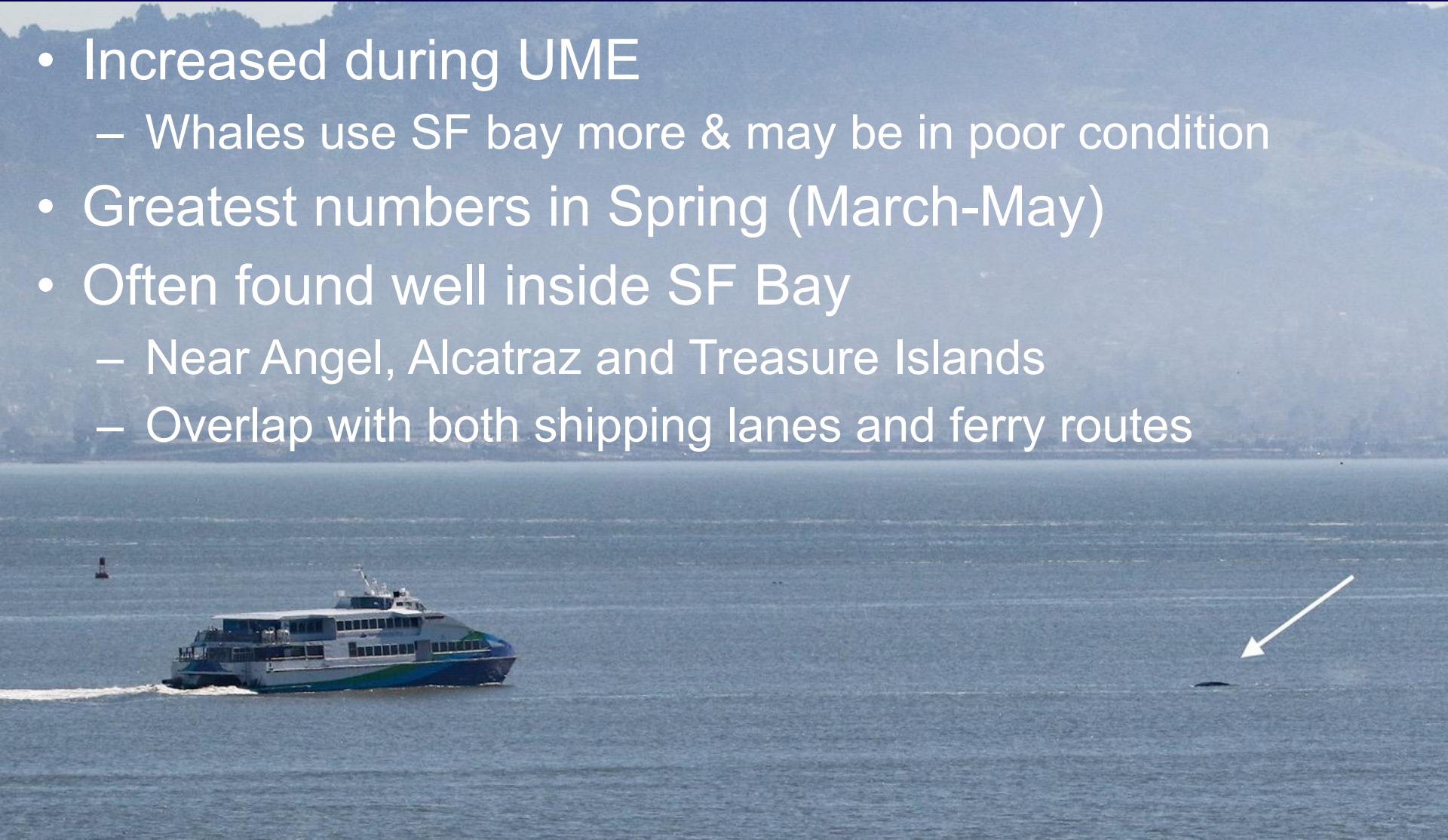


- Photo-ID confirmed one individual in SF Bay over 46-day period
 - Presumed residency
 - Longest period for gray whale in SF Bay

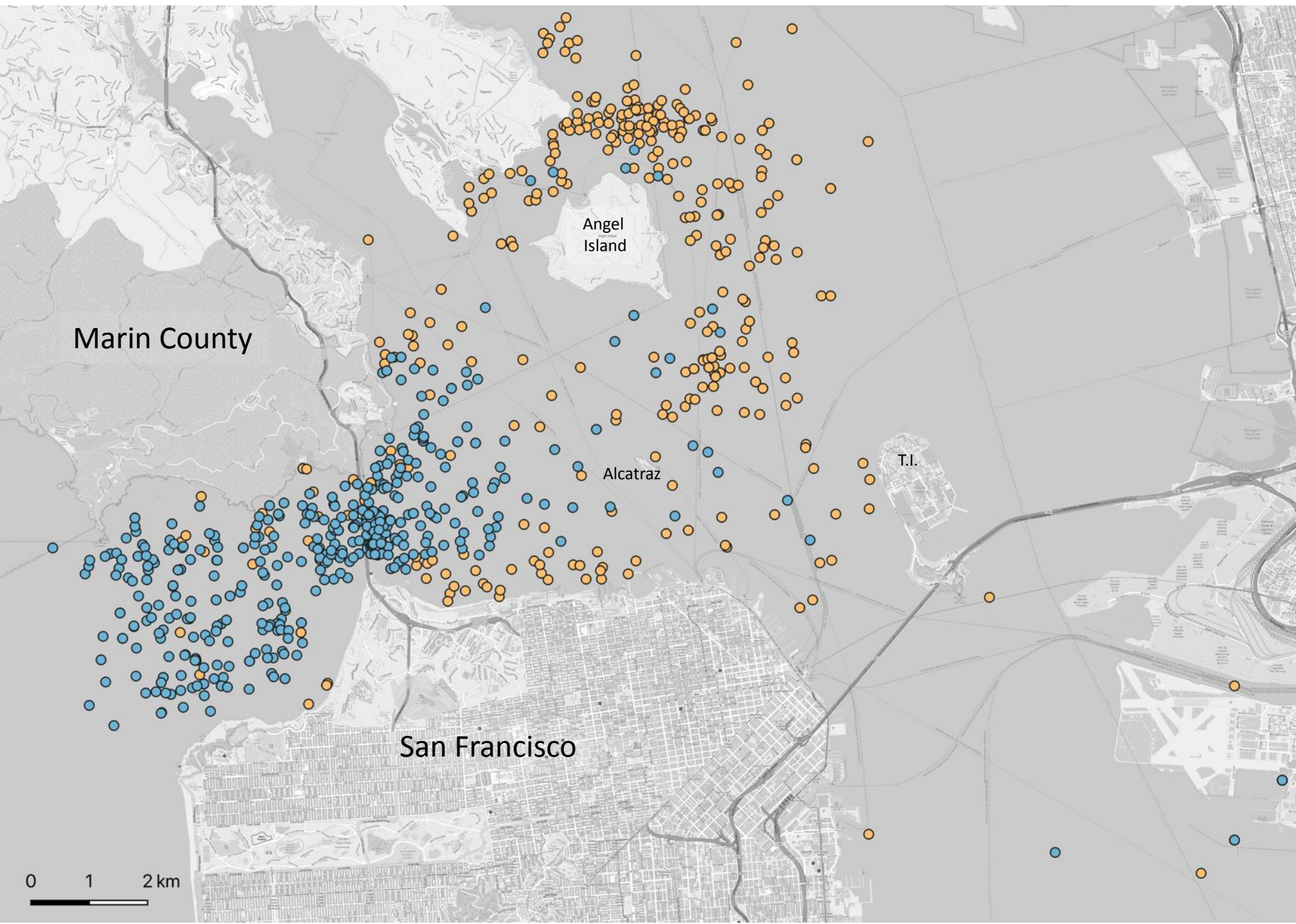


Vessel Strike Risk for Gray Whales in SF Bay

- Increased during UME
 - Whales use SF bay more & may be in poor condition
- Greatest numbers in Spring (March-May)
- Often found well inside SF Bay
 - Near Angel, Alcatraz and Treasure Islands
 - Overlap with both shipping lanes and ferry routes



Humpback Whales and Gray Whales Use Different Area in San Francisco Bay (2016-2021)



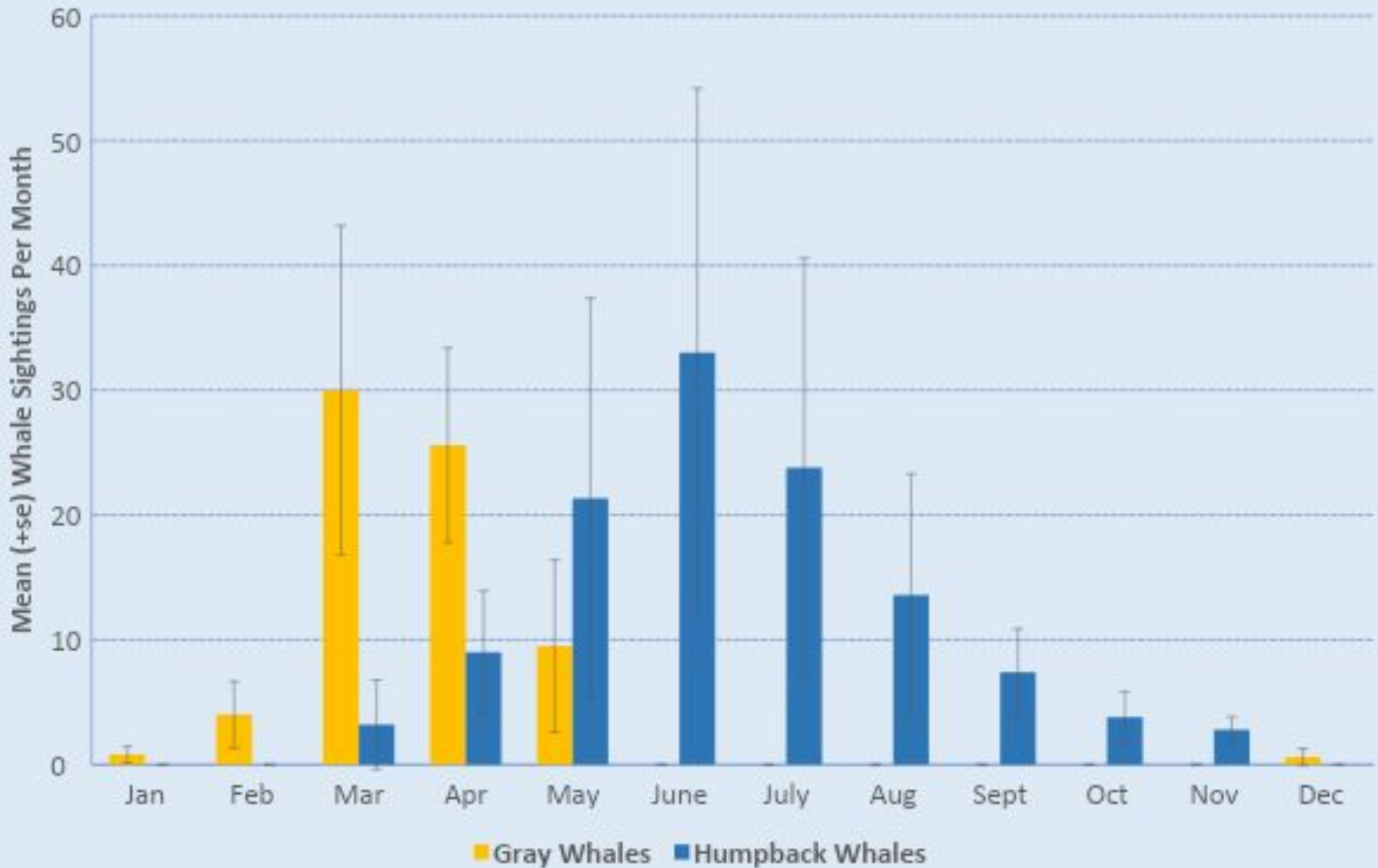
Cause for Concern

- Overlap with Vessel Traffic
- Gray whales generally less active at surface than humpback whales
 - Can be difficult for vessel operators to spot
- Post-mortem analyses confirmed both ship strike and poor body condition as causes of death



15 March 2019
Bill Keener

SF Bay Whale Sightings by Month (2016-2021)



Discussion

- Large numbers of gray whale sightings in SF Bay were documented during previous UME (Oliver et al. 2001)
 - Included many mortalities in SF Bay
- Observations from the past few years suggest increased use of SF Bay habitat by gray whales during periods of nutritional stress
 - Photo-ID Confirmed prolonged residency in the Bay
 - Not all gray whales may make the entire migration from Baja to the Arctic
 - Active feeding by whales in the Bay suggests some food availability and warrants further research

Thank You

- Greater Farallones National Marine Sanctuary
- American Cetacean Society, S.F. Bay Chapter
- California Academy of Sciences
- Cascadia Research Collective
- Oceanic Society
- SF Whale Tours
- Citizen Scientists

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