82nd HIHWNMS
Sanctuary Advisory Council Meeting

Tuesday, September 15, 2020
9:00 am – 11:30 am

Public Comment: 10:50 am

Aloha & Welcome!

- You will begin in muted mode, but the session organizer can un-mute your connection at appropriate times & the "Chat" box will be open for submitting messages.
- **Primary Council Members:** When you initially join, you will not at first have the ability to show yourself via your camera, nor be heard via audio. Staff will switch your status to "Panelist" & then you will have full control of your camera & audio. Due to camera limits only folks speaking should share their camera.
- **All Other Attendees:** You will enter in muted mode & you will not be able to utilize your webcam. To get the attention of the organizer, please enter a note in the chat box.
- **All Participants:** If you have trouble accessing the webinar, or problems occur during the session & you can't enter it into the chat box, you can email sara.wood@noaa.gov or check out https://support.goto.com/webinar

NOAA National Oceanic and Atmospheric Administration U.S. Department of Commerce
National Marine Sanctuaries
Hawaiian Islands Humpback Whale
PIFSC Pacific Islands Fisheries Science Center
National Marine Sanctuary Foundation

9:00 AM – 9:20 AM

WELCOME/COUNCIL BUSINESS (*SOL)*

- Roll Call *(Kawika)*
- Review and approval of July 29, 2020 Meeting Minutes *(Maka‘ala Ka‘aumoana)*

APPROVE JULY 29, 2020 MEETING MINUTES

Sanctuary Advisory Council

NON-GOVERNMENT (Voting)

Thorne Abbott
Business Commerce

James Kelleher
Commercial Shipping

Kawika Winter
Conservation

Maya Walton
Education

Vacant
Fishing

Jayne LeFors
Hawai'i Island

Maxx Phillips
O'ahu Island

Barbara Maka'ala Ka'aumoana
Kaua'i Island

Solomon Pili Kaho'ohalahala
Lāna'i Island

Vacant
Maui Island

Malia Akutagawa
Moloka'i Island

Roxane Keli'ikipikāneokolohaka
Native Hawaiian

Chad Wiggins
Ocean Recreation

Jens Currie
Research

Greg Nielson
Tourism

Jim Coon
Whale Watching

Anabelle Padilla
Youth (non-voting)

GOVERNMENT (Non-Voting)

Mary Alice Evans
DBEDT – Office of Planning

Cameron Black
DBEDT Renewable Energy

Jeannine Rossa
Division of Aquatic Resources

Alec Wong
DOH

Sandra Rossetter
DOT – Harbors

Brad Wong
OHA (Voting)

Athline Clark
Papahānaumokuākea MNM

Brian Christy
NOAA OLE

Jeff Walters
NOAA Fisheries PIRO

Joshua DeMello
WESPAC (Voting)

Linda Speerstra
US Army Corps of Engineers

Maile Norman
US Coast Guard

Janice Fukawa
US Navy

Hawaiian Islands Humpback Whale National Marine Sanctuary Advisory Council

81st MEETING MINUTES
Wednesday, July 29, 2020 9:00 am – 11:30 am
Virtual meeting via GoToWebinar

Attendance

Primary SAC council members present: Conservation – Kawika Winter, Education – Maya Walton, Hawai'i Island – Jayne Lefors, Kaua'i Island – Maka'ala Ka'aumoana, Lāna'i Island – Sol Kaho'ohalahala, Moloka'i Island – Malia Akutagawa, O'ahu Island – Maxx Phillips, Research – Jens Currie, Tourism – Greg Nielson, Youth Member – Anabelle Padilla, Energy Office – Cameron Black, Office of Planning – Justine Nihipali, DAR – Jeannine Rossa, NOAA OLE – Brian Christy, NOAA NMFS PIRO - Jeffrey Walters, U.S. Navy - Janice Fukawa, U.S. Coast Guard – Maile Norman, WESPAC – Joshua DeMello and HIHWNMS Sanctuary Superintendent – Allen Tom

Alternate SAC council members present: Business/Commerce – Kevin Kelly, Conservation – Hoku Cody, Education – Robyn Ehrlich, Hawai'i Island – Bob Gladden, Kaua'i Island – Nina Monasevitch, Ocean Recreation – Shoko Ogata and Whale Watching – Sherry LeMaster

ONMS Staff: Cindy Among-Serrao, Ed Lyman, Kristina Kekuewa, Jean Souza, Amy Eldredge, Sara Wood, Patty Miller, May Foster, Bill Carrier and Jennifer Crawford

Members of the public: Nicole Davis, Robin Baird, Zachary Yamada, William Anonsen, Michelle Paularena, Jenny Tomko and Russel S

*****Webinar Technology Check-in for SAC members**

Council Business

- Council Chair, Sol Kaho'ohalahala called the meeting to order.
- Council officer elections were held for Chair, Vice Chair, and Secretary. A call for nominations were accepted ahead of the meeting via e-mail in addition to during this time in the agenda. Prior to our vote there was an additional nomination for Chair-Kawika Winter but the nomination was withdrawn prior to the meeting by the nominee, Chad Wiggins. Final council officer nominations were as follows: Chair-Sol Kaho'ohalahala, Vice Chair-Maka'ala Ka'aumoana and Secretary-Kawika Winter. SAC members voted and all the nominations were accepted unanimously.
- Review and approval of July 14, 2020 Meeting Minutes
  - Moloka'i Island representative-Malia Akutagawa recommended to amend the meeting minutes to fix typo of "Sate Co-Manager Jeannine Rossa" to "State".
  - A motion by Tourism representative-Greg Nielson to approve the July 14 meeting minutes with the suggested amendment.

SHOWING PAGE 1 FOR VISUAL REFERENCE.

DRAFT MEETING MINUTES CAN BE FOUND IN YOUR HANDOUTS SECTION OF CONTROL PANEL.

9:00 AM – 9:20 AM

- **Additional announcements from executive officers if any**
- **Brief review and summary of previous issues, action items, and status (Cindy)**

  - Completed:
    - Creation of a Native Hawaiian Culture subcommittee
    - Resolution supporting the expansion of the Flower Garden Banks National Marine Sanctuary
    - Resolution supporting the creation of a Chumash Heritage National Marine Sanctuary
    - Resolution to maintain the status quo for Papahānaumokuākea Marine National Monument and oppose changes in Executive Order 13921 to Promote American Seafood Competitiveness and Economic Growth

9:00 AM – 9:20 AM

- **Brief review and summary of previous issues, action items, and status (Cindy)**

  - In progress:
    - Future meeting topics such as:
      - toxoplasmosis impacts
      - cultural integration with sanctuary activities and strandings
      - 5G drone project
      - Navy activity report to include special opps report
      - plastic and marine debris/micro plastic impacts on the sanctuary
      - & more…

9:20 AM – 10:00 AM

EFFECTS OF NAVY SONAR ON WHALES AND DOLPHINS IN THE HAWAIIAN ISLANDS: SOME DATA, SOME SPECULATION, SOME GAPS (ROBIN BAIRD)

***There are two handouts in your control panel as additional resources for this presentation

- A pdf with a list of references and links
- The "Effects of sound on marine mammals" section of book

****QUESTIONS CAN BE SUBMITTED VIA THE QUESTION BOX & WILL BE ANSWERED AFTER THE PRESENTATION IF TIME PERMITS!**

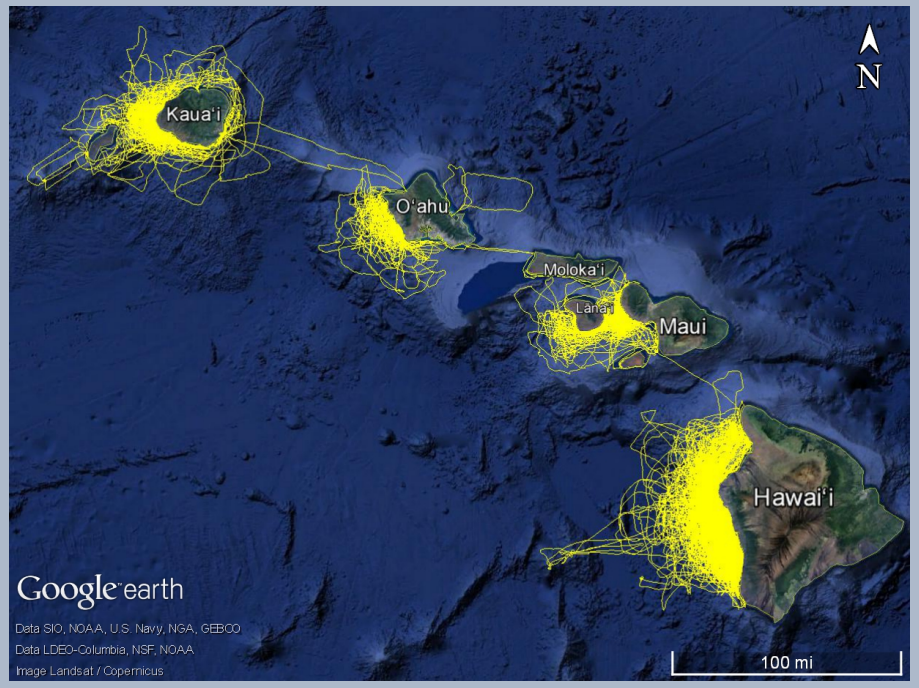
Effects of Navy sonar on whales and dolphins in the Hawaiian Islands: some data, some speculation, some gaps

Robin W. Baird
Cascadia Research Collective
rwbaird@cascadiaresearch.org

Presentation to the Hawaiian Islands Humpback Whale National Marine Sanctuary Sanctuary Advisory Council, 15 September 2020

Cascadia Research Collective Hawai‘i research program

- Long-term multi-species effort using a variety of methods (photo-ID, genetics, satellite tagging, drone use)
- Collaborative effort with researchers from NMFS, Navy, universities, other non-profits
- Photo-ID catalogs of 11 species of odontocetes and 2 species of mysticetes, satellite tag data from ~320 individuals of 12 species
- Questions include population structure & size, spatial use, responses to Navy sonar
- Primary funding by NOAA Fisheries, US Navy (Office of Naval Research, Living Marine Resources, Pacific Fleet) with support from a number of foundations and other organizations



Effort from 2000-2020

1,161 days (>8,000 h)

>147,000 km effort

>3,000 odontocete sightings

18 odontocete species

3 baleen whale species

Potential effects of noise on marine mammals

- None observable
- Interference with communication or foraging
  - Auditory masking (loss of acoustic “habitat”)
  - Temporary or permanent hearing damage
- Behavioral responses
  - Orientation, increased alertness, vocal changes
  - Effects on feeding, social activity, risk of predation
  - Habitat abandonment: temporary or permanent
- Physiological effects
- Death or stranding

Generally Increasing Severity

but

Generally Decreasing Occurrence

Modified from Southall 2020

Military mid-frequency active sonar (MFAS)

Highest source level
AN/SQS-53C

- Center frequencies 2.6 and 3.3 kHz
- Nominal source level 235 dB re: 1 µPA root mean square

Recording orcasound.net

Hull-mounted

Other source levels:

- Humpback whale ~174 dB
- Supertanker ~190 dB

Helicopter-dipping
AN/AQS-22, 4.1 kHz, source level 217 dB

DICASS sonobuoy
Directional Command-Activated Sonobuoy System

ROYAL SOCIETY OPEN SCIENCE

rsos.royalsocietypublishing.org

Diving behaviour of Cuvier's beaked whales exposed to two types of military sonar

Erin A. Falcone[1], Gregory S. Schorr[1], Stephanie L. Watwood[2], Stacy L. DeRuiter[3], Alexandre N. Zerbini[1,4,5], Russel D. Andrews[1,6], Ronald P. Morrissey[2] and David J. Moretti[2]

[1]Marine Ecology and Telemetry Research, 2420 Nellita Rd NW, Seabeck, WA 98380, USA
[2]Naval Undersea Warfare Center Division, Code 74, Newport, RI 02840, USA
[3]Department of Mathematics and Statistics, Calvin College, 1740 Knollcrest Circle SE, Grand Rapids, MI 49546, USA
[4]Marine Mammal Laboratory, Alaska Fisheries Science Center, NMFS-NOAA, 7600 Sand Point Way NE, Seattle, WA 98115, USA
[5]Cascadia Research Collective, 218 ½ W 4th Avenue, Olympia, WA 98501, USA
[6]College of Fisheries and Ocean Sciences, University of Alaska Fairbanks,

Research

Cite this article: Falcone EA, Schorr GS, Watwood SL, DeRuiter SL, Zerbini AN, Andrews RD, Morrissey RP, Moretti DJ. 2017 Diving behaviour of Cuvier's beaked whales exposed to two types of military sonar. *R. Soc. open sci.* **4**: 170629.
http://dx.doi.org/10.1098/rsos.170629

Received: 12 June 2017
Accepted: 2 August 2017

"Most responses intensified with proximity and were more pronounced during mid-power than high-power MFAS use at comparable distances within approximately 50 km, despite the significantly lower source level of mid-power MFAS."

Sources of information from Hawai‘i

- Studies using the acoustic array at the Pacific Missile Range Facility (PMRF) to track vocalizing individuals and MFAS

Aquatic Mammals 2019, *45*(6), 661-674, DOI 10.1578/AM.45.6.2019.661

Changes in the Spatial Distribution of Acoustically Derived Minke Whale (*Balaenoptera acutorostrata*) Tracks in Response to Navy Training

Catriona M. Harris,[1] Stephen W. Martin,[2] Cameron Martin,[3] Tyler A. Helble,[3] E. Elizabeth Henderson,[3] Charles G. M. Paxton,[1] and Len Thomas[1]

[1]*Centre for Research into Ecological and Environmental Modelling, Buchanan Gardens, University of St Andrews, St Andrews, Fife KY16 9LZ, UK*
E-mail: catriona.harris@st-andrews.ac.uk
[2]*National Marine Mammal Foundation, 2240 Shelter Island Drive, Suite 200, San Diego, CA 92106, USA*
[3]*Naval Information Warfare Center Pacific, 53560 Hull Street, San Diego, CA 92152, USA*

Aquatic Mammals 2016, *42*(4), 507-518, DOI 10.1578/AM.42.4.2016.507

Impacts of U.S. Navy Training Events on Blainville's Beaked Whale (*Mesoplodon densirostris*) Foraging Dives in Hawaiian Waters

Roanne Manzano-Roth,[1] E. Elizabeth Henderson,[1] Stephen W. Martin,[2] Cameron Martin,[2] and Brian M. Matsuyama[2]

[1]*SPAWAR Systems Center Pacific, 53560 Hull Street, San Diego, CA 92152, USA*
E-mail: Roanne.Manzano@navy.mil
[2]*National Marine Mammal Foundation, 2240 Shelter Island Drive, #200, San Diego, CA 92106, USA*

Quantifying the response of Blainville's beaked whales to Naval sonar exercises in Hawaii

Eiren K. Jacobson, E. Elizabeth Henderson, Cornelia S. Oedekoven, David L. Miller, Stephanie L. Watwood, David J. Moretti, Len Thomas

eiren.jacobson@st-andrews.ac.uk | @eirenkate

Naval Information Warfare Center PACIFIC

NAVSEA NAVAL SEA SYSTEMS COMMAND

Jacobson et al. Beaked Whale Risk Hawaii: eirenjacobson.github.io/JacobsonEtAl_WMMC2019.pdf

Sources of information from Hawai‘i

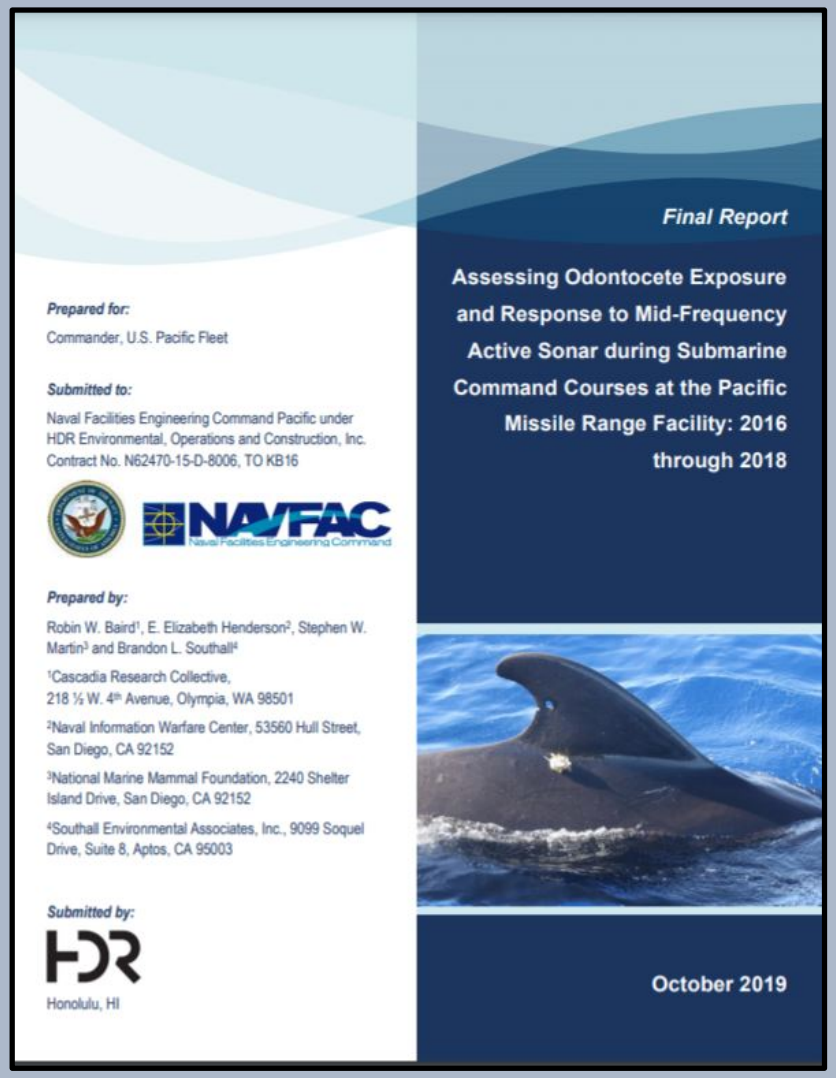
- Studies using a combination of tag data and sonar data from the acoustic array at PMRF

Aquatic Mammals 2019, *45*(6), 612-631 DOI 10.1578/AM.45.6.2019.612

Quantifying the Behavior of Humpback Whales (*Megaptera novaeangliae*) and Potential Responses to Sonar

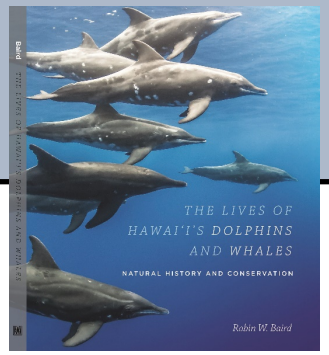
E. Elizabeth Henderson,[1] Jessica Aschettino,[2] Mark Deakos,[3] Gabriela Alongi,[4] and Tara Leota[5]

[1]*NIWC Pacific, 53560 Hull Street, San Diego, CA 92152, USA*
E-mail: ehenders@spawar.navy.mil
[2]*HDR, 4144 Hermitage Point, Virginia Beach, VA 23455, USA*
[3]*HDR, 305 S. High Street, Suite 101, Wailuku, HI 96793, USA*
[4]*National Marine Mammal Foundation, 2240 Shelter Island Drive, Suite 200, San Diego, CA 92106, USA*
[5]*Kaua‘i Sea Rider Adventures, PO Box 643, Kalaheo, Kaua‘i, HI 96741, USA*



Sources of information from Hawai‘i

- Stranding events coincident in time & space with Navy MFAS use



Hawaiian Melon-headed Whale *(Peponacephala electra)*
Mass Stranding Event of July 3-4, 2004

Brandon L. Southall, Robert Braun, Frances M.D. Gulland, Ashley D. Heard, Robin W. Baird, Sarah M. Wilkin, and Teri K. Rowles

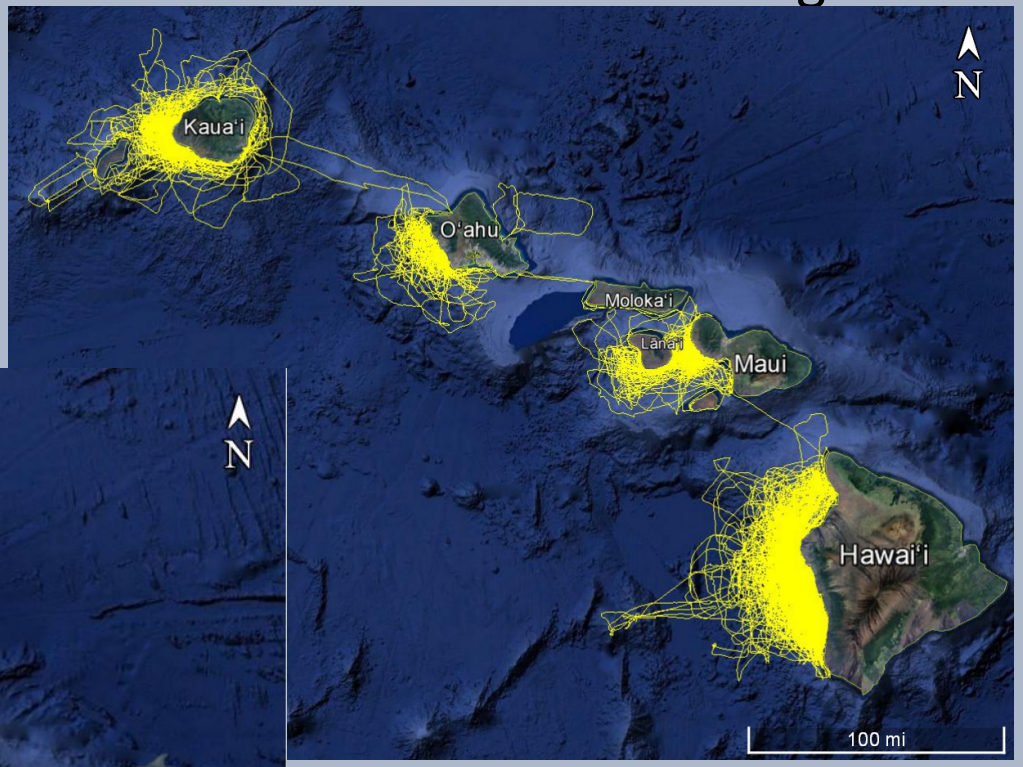
U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

NOAA Technical Memorandum NMFS-OPR-31
April 2006

A dwarf sperm that live stranded at the mouth of the Kilauea Stream, Kaua'i, August 27, 2009, the same morning that a U.S. Navy Submarine Commanders Course had started about 50 km to the northwest. The individual, an adult male, had a full stomach, and the necropsy showed it was in good condition with no obvious abnormalities. Photo by Kim Steutermann Rogers.

Sources of information from Hawai‘i

- Comparisons of species composition and abundance from high- and low-MFAS use areas



Effort from 2000-2020

1,161 days (>8,000 h)
>147,000 km effort
>3,000 odontocete sightings
18 odontocete species
3 baleen whale species

Sources of information from elsewhere

Behavioral response studies (Controlled Exposure Experiments)

- Cuvier's beaked & short-finned pilot whales –North Carolina
- Blainville's beaked whales – Bahamas
- Humpback, minke, killer, long-finned pilot, sperm & northern bottlenose whales - Norway
- Cuvier's beaked, Baird's beaked, & blue whales, common, bottlenose & Risso's dolphins - California

Strandings or behavioral changes concurrent with MFAS use

- Cuvier's beaked whales – Greece, Bahamas, CNMI
- Blainville's beaked whales – Bahamas, Canary Islands
- Short-finned pilot whales – North Carolina
- Pygmy killer whale - Taiwan
- Dwarf sperm whale – North Carolina
- Killer whales – Washington state

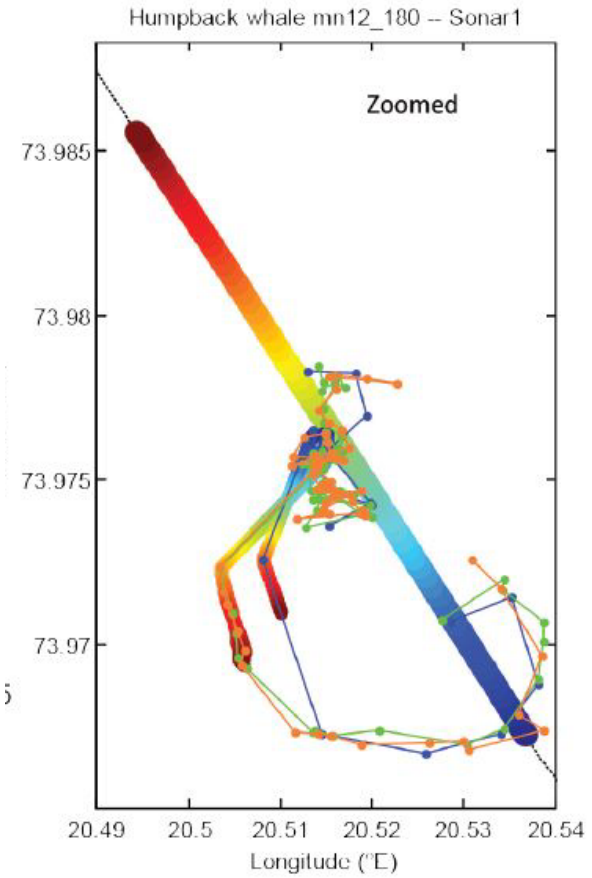
research-repository.st-andrews.ac.uk/handle/10023/9942

Aquatic Mammals 2015, *41*(4), 469-502, DOI 10.1578/AM.41.4.2015.469

Severity of Expert-Identified Behavioural Responses of Humpback Whale, Minke Whale, and Northern Bottlenose Whale to Naval Sonar

Lise D. Sivle,[1] Petter H. Kvadsheim,[2] Charlotte Curé,[7] Saana Isojunno,[3] Paul J. Wensveen,[3] Frans-Peter A. Lam,[4] Fleur Visser,[5,6] Lars Kleivane,[2] Peter L. Tyack,[3] Catriona M. Harris,[8] and Patrick J. O. Miller[3]

- Most common response was avoidance, some changes in diving behavior
- Responses less severe than minke whale or northern bottlenose whale exposed to same source, and less responsive than killer whales, sperm whales, long-finned pilot whales



Aquatic Mammals 2019, *45*(6), 612-631 DOI 10.1578/AM.45.6.2019.612

Quantifying the Behavior of Humpback Whales (*Megaptera novaeangliae*) and Potential Responses to Sonar

E. Elizabeth Henderson,[1] Jessica Aschettino,[2] Mark Deakos,[3] Gabriela Alongi,[4] and Tara Leota[5]

Table 5. Propagation-modeled received levels of MFAS (estimated over 1 s and averaged in µPa) at the surface for each satellite tagged whale along with the distances to the closest ship

Tag ID	RL mean (dB re 1 µPa)	RL median (dB re 1 µPa)	RL max (dB re 1 µPa)	cSEL (dB re 1 µPa2s)	Mean distance (km)	Min/max distance (km)
173784	99.9	126.0	133.2	141.6	121.6	109/134
173786	129.1	136.9	151.4	162.8	59.8	27/107
173787	146.3	153.7	158.4	165.2	33.7	17/101
173788	109.2	104.3	137.4	138.8	202.0	62/253
173789	116.7	116.0	146.1	151.5	67.1	36/96

- Exposure during Submarine Command Course
- Small sample size (n=5)
- Distances from MFAS 17-253 km

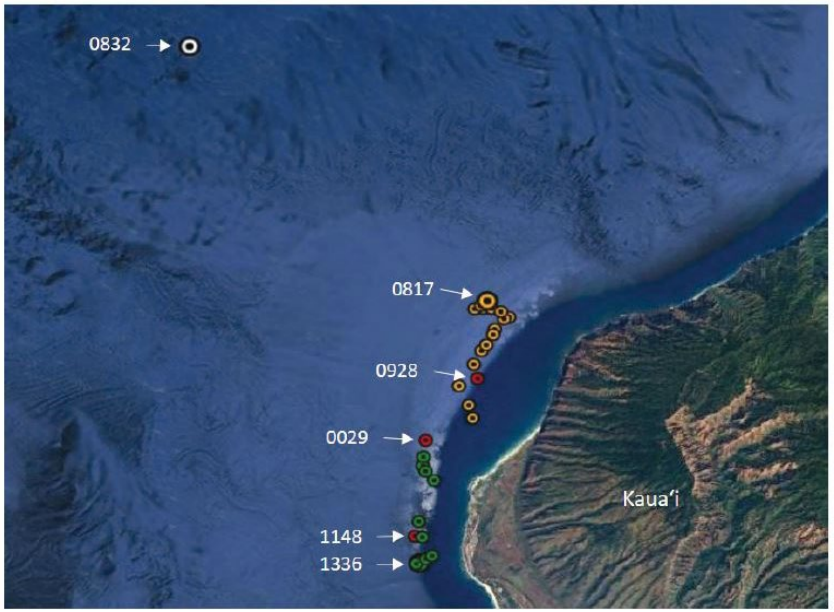


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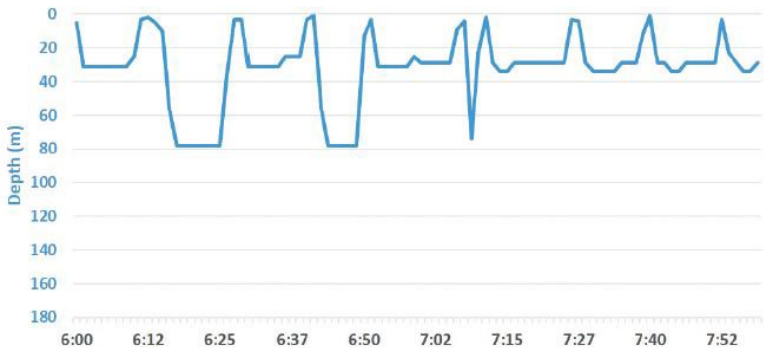
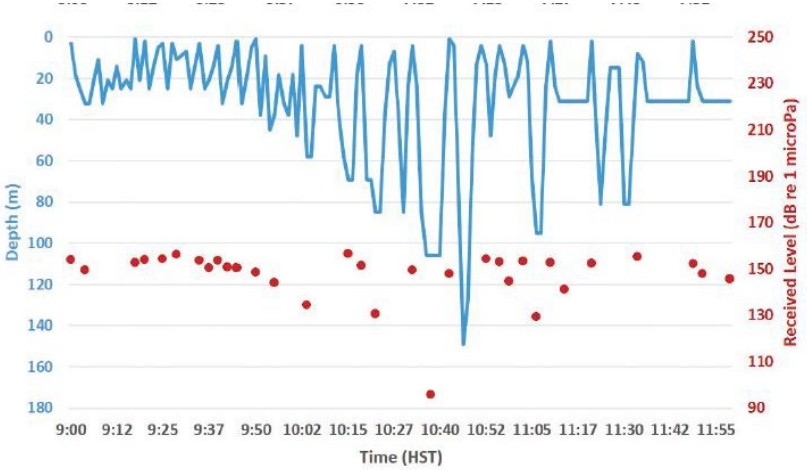
Table 6. Dive variables for which MFAS was a significant predictor and the associated coefficient estimate, standard error, *t* value, and *p* value from the GLMs for whale 173787

Whale 173787	Without MFAS	With MFAS	Coef.	SE	*t* value	*p* value
Dive count	138.0	15.0	--	--	--	--
Dive duration (min)	9.9	7.5	-0.27	0.13	-2.1	0.04
Descent rate (m/min)	3.9	6.1	-0.74	0.34	-2.2	0.03
Bottom distance (m)	8.0	37.6	1.55	0.32	4.9	< 0.001
Dive depth SD (m)	3.5	16.7	1.57	0.30	5.3	< 0.001
Maximum depth (m)	34.7	55.5	0.47	0.16	2.9	0.005

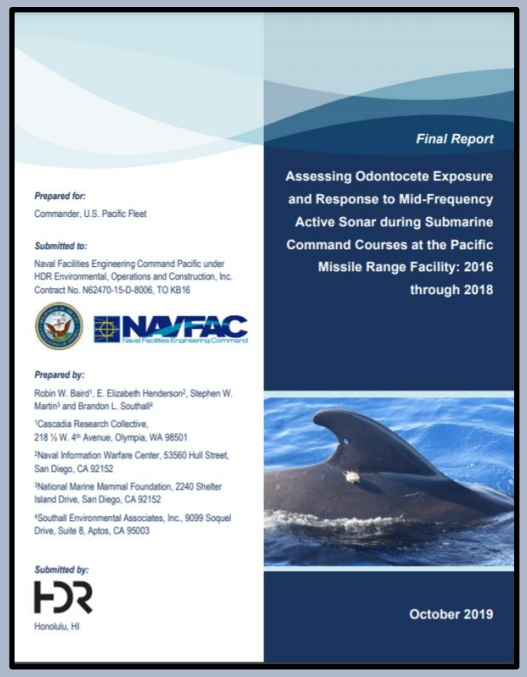


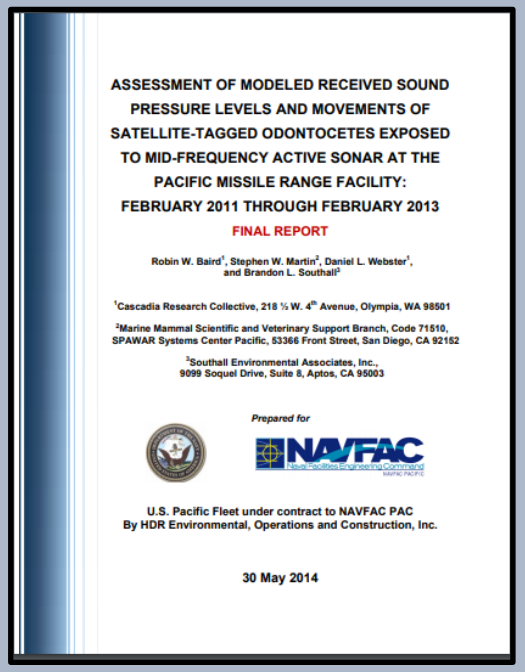
No MFAS exposure

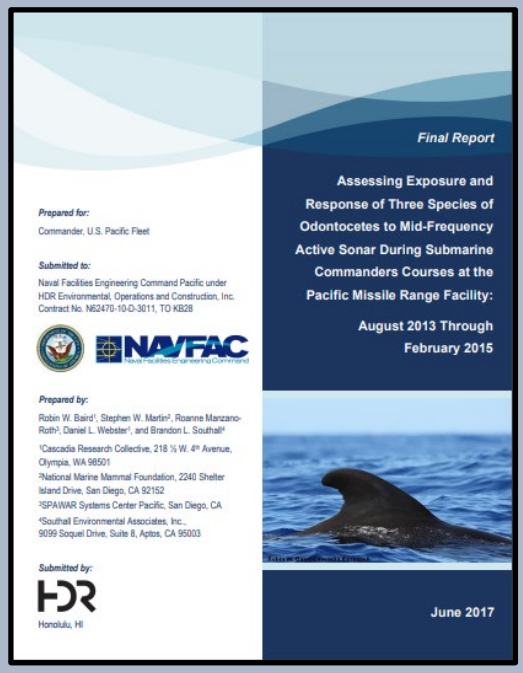


MFAS exposure

Assessing changes in spatial use and diving behavior of odontocetes exposed to MFAS off Kaua‘i







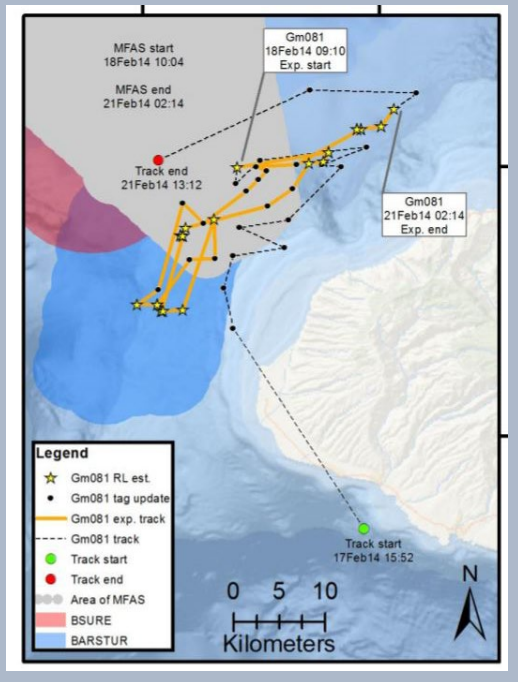
- Short-finned pilot whales n=13
- Rough-toothed dolphins n=7
- Common bottlenose dolphins n=3
- Melon-headed whale n=2
- False killer whale n=1

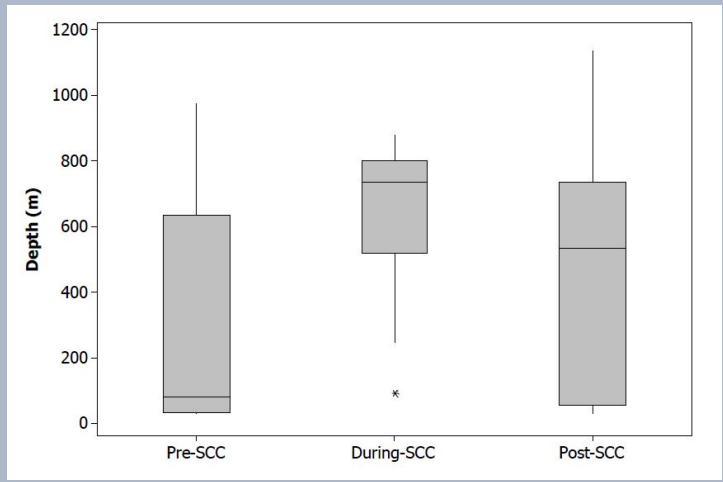
- Pilot whales & rough-toothed & bottlenose dolphins resident
- High use areas of all three overlap with PMRF
- Pelagic pilot whales also tagged
- False killers from NWHI population

www.cascadiaresearch.org/hawaiian-cetacean-studies/publications

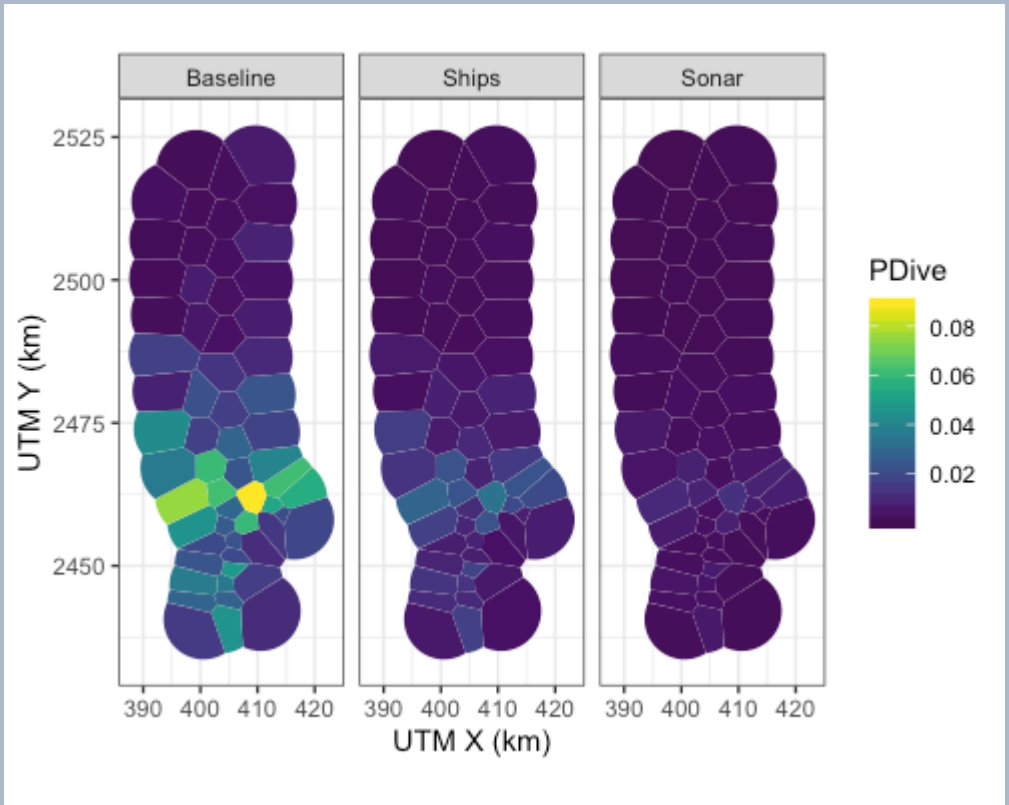
Assessing changes in spatial use and diving behavior of odontocetes exposed to MFAS off Kaua‘i

- Some individuals move away from PMRF prior to MFAS start
- Resident pilot whales and a bottlenose dolphin have shown no large-scale movements away from high exposure (~168-169 dB) areas
- Changes in pilot whale diving behavior documented
- Some rough-toothed dolphins moved from area of low to higher exposure (~155 dB)
- False killer whale moved from area of low (~91 dB) to higher exposure (~160 dB)





Short-finned pilot whale GmTag081



Quantifying the response of Blainville's beaked whales to Naval sonar exercises in Hawaii

Eiren K. Jacobson, E. Elizabeth Henderson, Cornelia S. Oedekoven, David L. Miller, Stephanie L. Watwood, David J. Moretti, Len Thomas

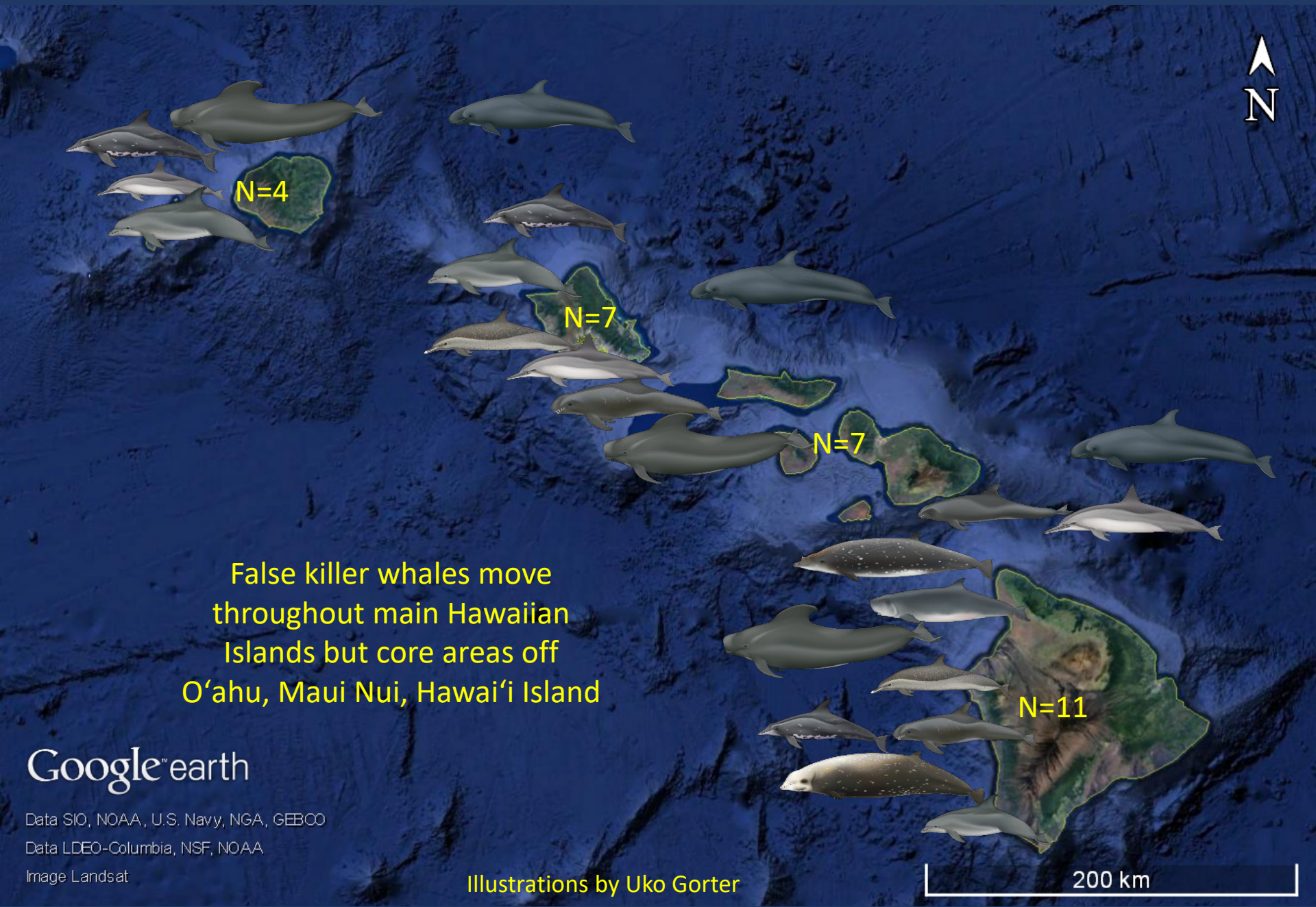
eiren.jacobson@st-andrews.ac.uk | @eirenkate

Jacobson et al. Beaked Whale Risk Hawaii: eirenjacobson.github.io/JacobsonEtAl_WMMC2019.pdf

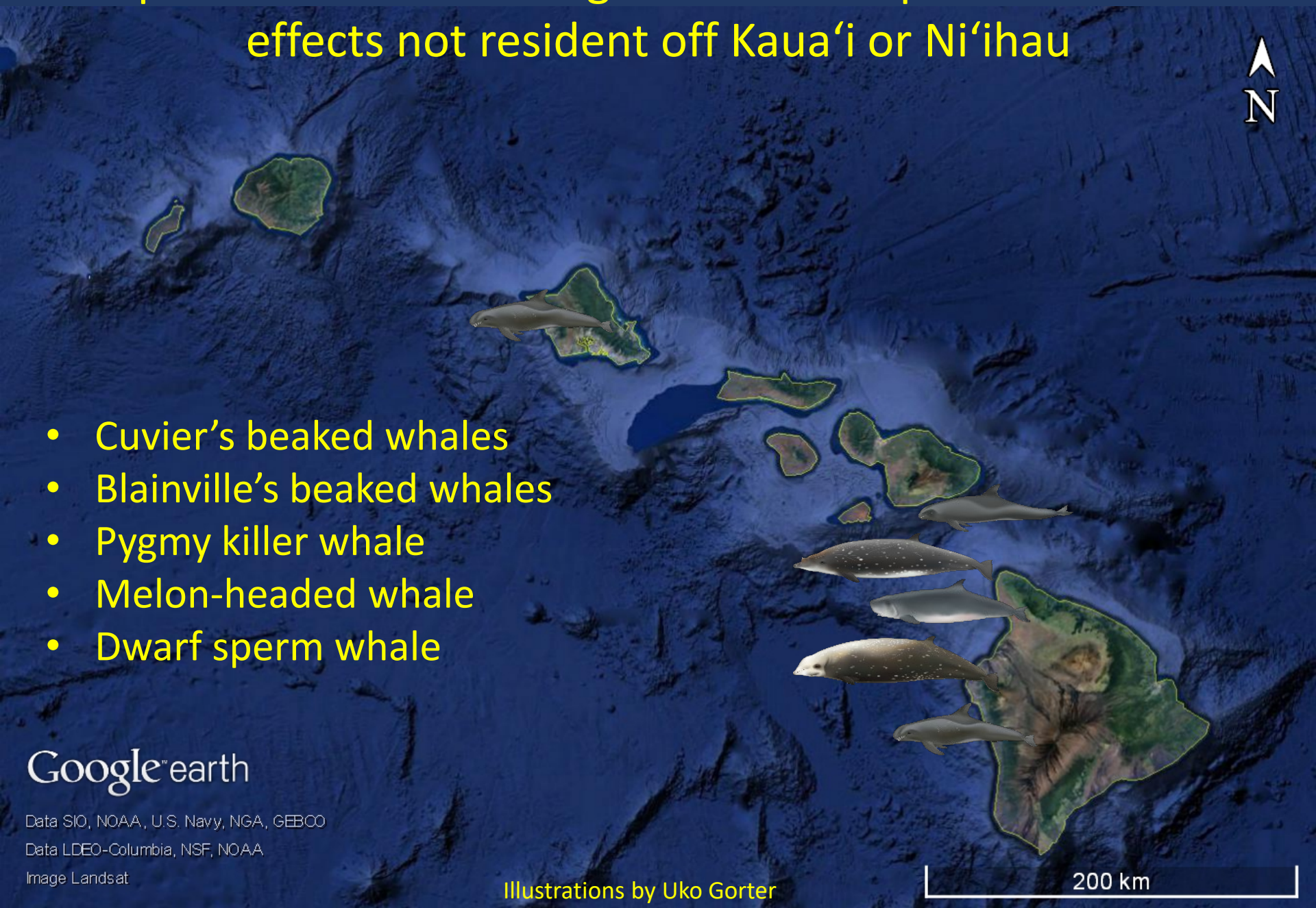
- Naval activity results in 64% reduction in probability of beaked whale detection relative to baseline

- Sonar received level of 150 dB re 1 µPa results in a 78% reduction relative to when Naval activity is present, but a **92% reduction relative to pre-activity period**

Number of resident odontocete species by island area



Species known or thought to be susceptible to MFAS effects not resident off Kaua‘i or Ni‘ihau



- Cuvier’s beaked whales
- Blainville’s beaked whales
- Pygmy killer whale
- Melon-headed whale
- Dwarf sperm whale

Mortality

Two primary mechanisms recognized:

- Gas and fat embolisms* caused by a behavioral response, particularly in long-diving species (e.g., beaked whales)
- Behavioral response to avoid sound resulting in animals stranding**

*www.cascadiaresearch.org/files/publications/BernaldodeQuirosetal2019.pdf

**www.cascadiaresearch.org/files/Projects/Hawaii/Southall_et_al_Peponocephala.pdf

Difficulties assessing MFAS-related mortality in Hawaiian waters

- Large proportion of animals that die are not found (~75% for California coastal bottlenose dolphins, ~95-98% of main Hawaiian Islands insular false killer whales)
- Assessing decompression sickness requires sampling animals shortly after death
- Limited access to MFAS data and incomplete data records in Navy's SPORTS database

www.cascadiaresearch.org/files/publications/BernaldodeQuirosetal2019.pdf

digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1533&context=usdeptcommercepub

Conclusions

- Sensitivity to sonar varies by species
- Responses to sonar varies by context (e.g., distance to source, source location relative to land, hull-mounted v. helicopter-dipping) and by prior exposure history
- MFAS used in Hawai‘i for ~50 years, current high-power systems for ~35 years, thus possible many changes occurred prior to any monitoring/research
- Incomplete or inaccessible data on when, where, and what type of MFAS is used in Hawaiian waters, making it impossible to conclusively rule out MFAS as a cause for many stranding events
- Population estimates and trend data lacking for many of the insular populations of species most likely to be susceptible (i.e., beaked whales, dwarf sperm whales, melon-headed whales, pygmy killer whales)

rwbaird@cascadiaresearch.org

www.cascadiaresearch.org/hawaiian-cetacean-studies/publications

10:00 AM – 10:10 AM

10 MINUTE BREAK

10:10 AM – 10:50 AM

PRESENTATION & DISCUSSION ON VOLUNTARY VESSEL GUIDELINES IN HAWAIʻI (JENS CURRIE)

***QUESTIONS CAN BE SUBMITTED VIA THE QUESTION BOX & WILL BE ANSWERED AFTER THE PRESENTATION IF TIME PERMITS!

Vessel presence and whale behavior:

Is the best available science applicable to Hawai'i?

Currie *et al.*, 2020 – Submitted to Frontiers in Marine Science for review

Jens Currie

PWF Chief Scientist
SAC Research Chair

Virtual SAC Meeting - September 2020

Contact: jenscurrie@pacificwhale.org

PACIFIC WHALE FOUNDATION

What does the **latest science** show?

BEST PRACTICES

Vessel Speed

Keep vessel speeds at 13 knots or less.

Reduce vessel speed to 6 knots or less when whales are within 400 yards.

Post a dedicated observer looking for whales while underway.

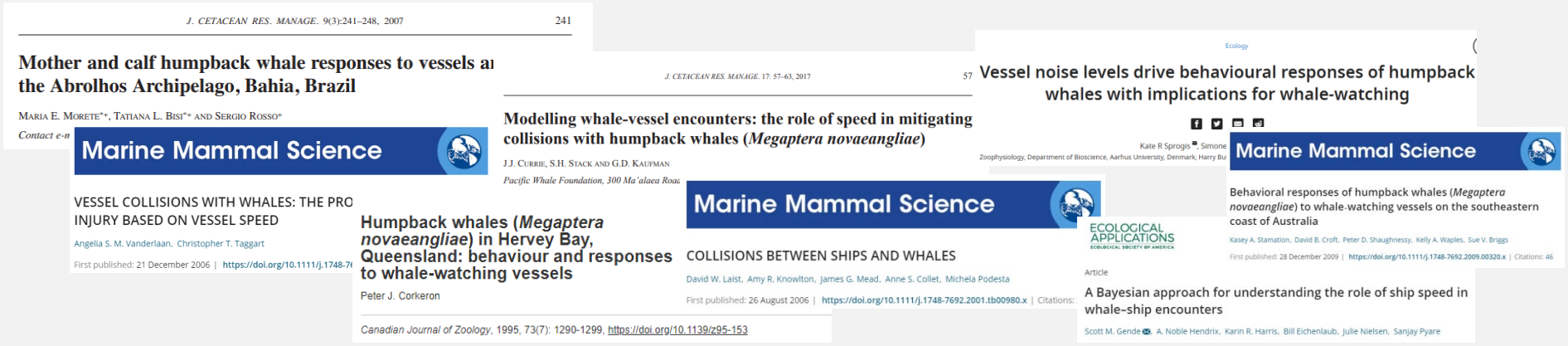
Whale watching

Limit viewing of groups containing whale calves to 30 minutes or less.

When approaching whales, operate only parallel and to the side rear of whale's direction of travel.

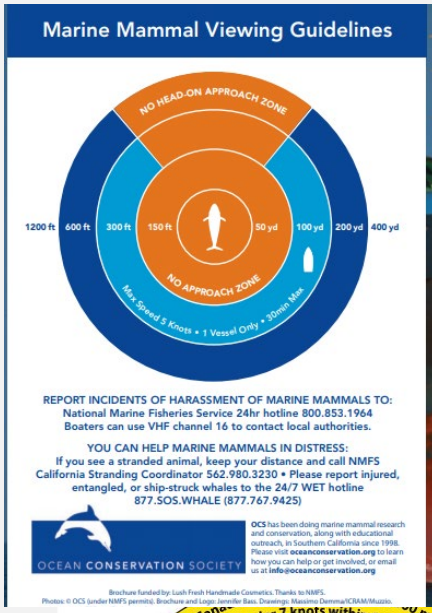
Limit the number of vessels to 3 or less per whale or group of whales.

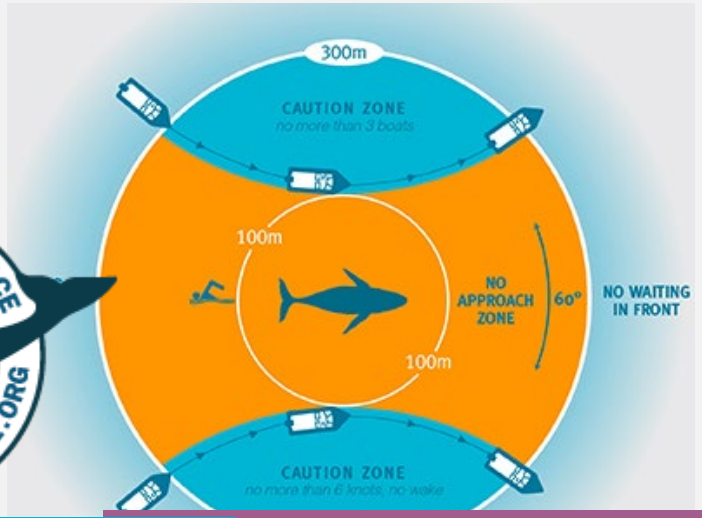
Do not approach beyond 100 yards.

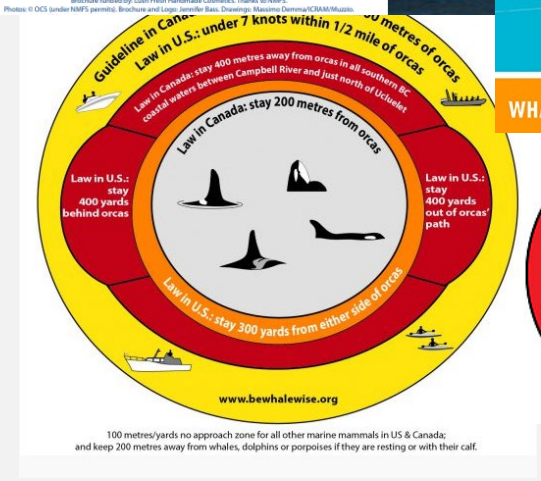


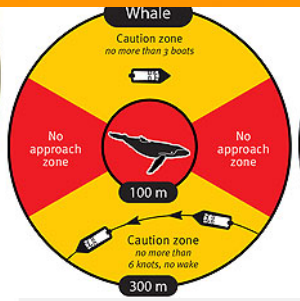
Development of guidelines and regulations

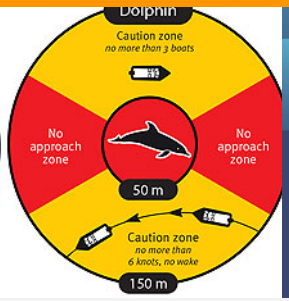
BE WHALE AWARE/WISE

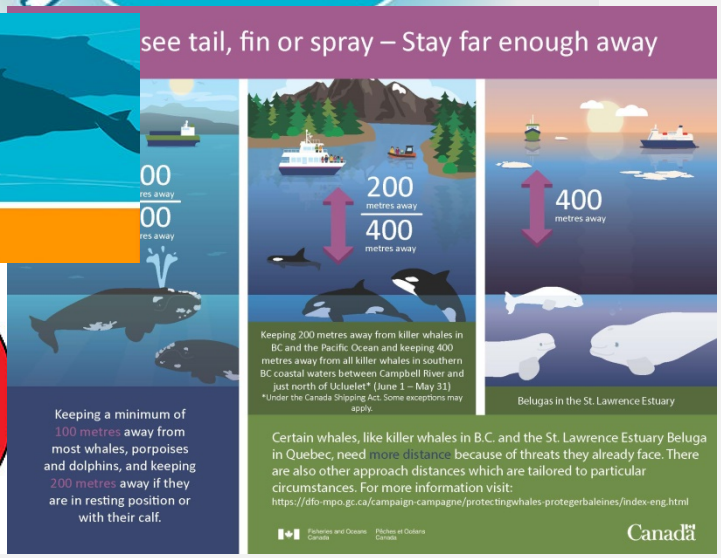










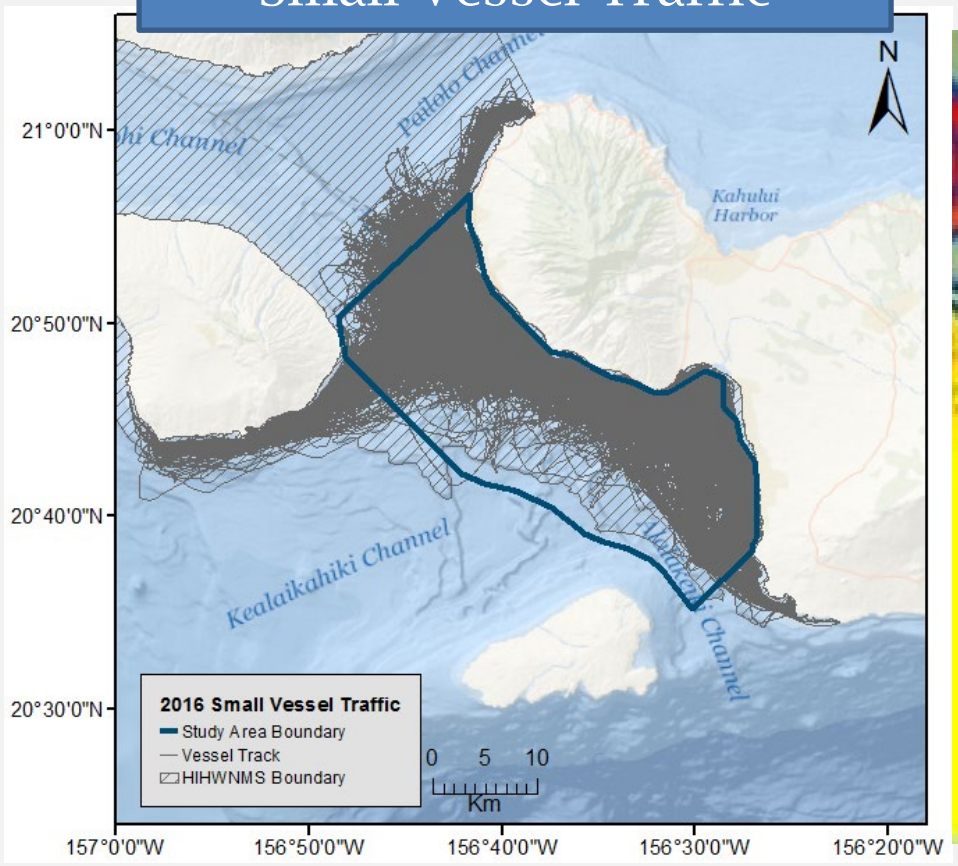


What is happening in Hawai‘i?

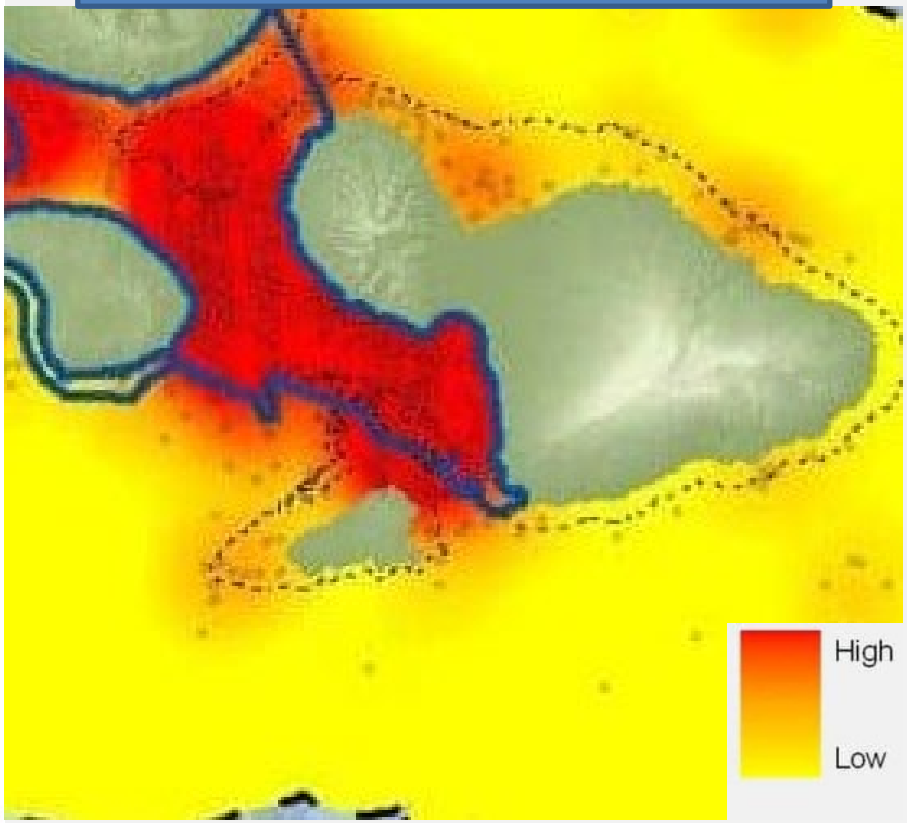
WHALES AND VESSELS

There is a high potential for whale-vessel interactions in Hawai‘i.

Small Vessel Traffic



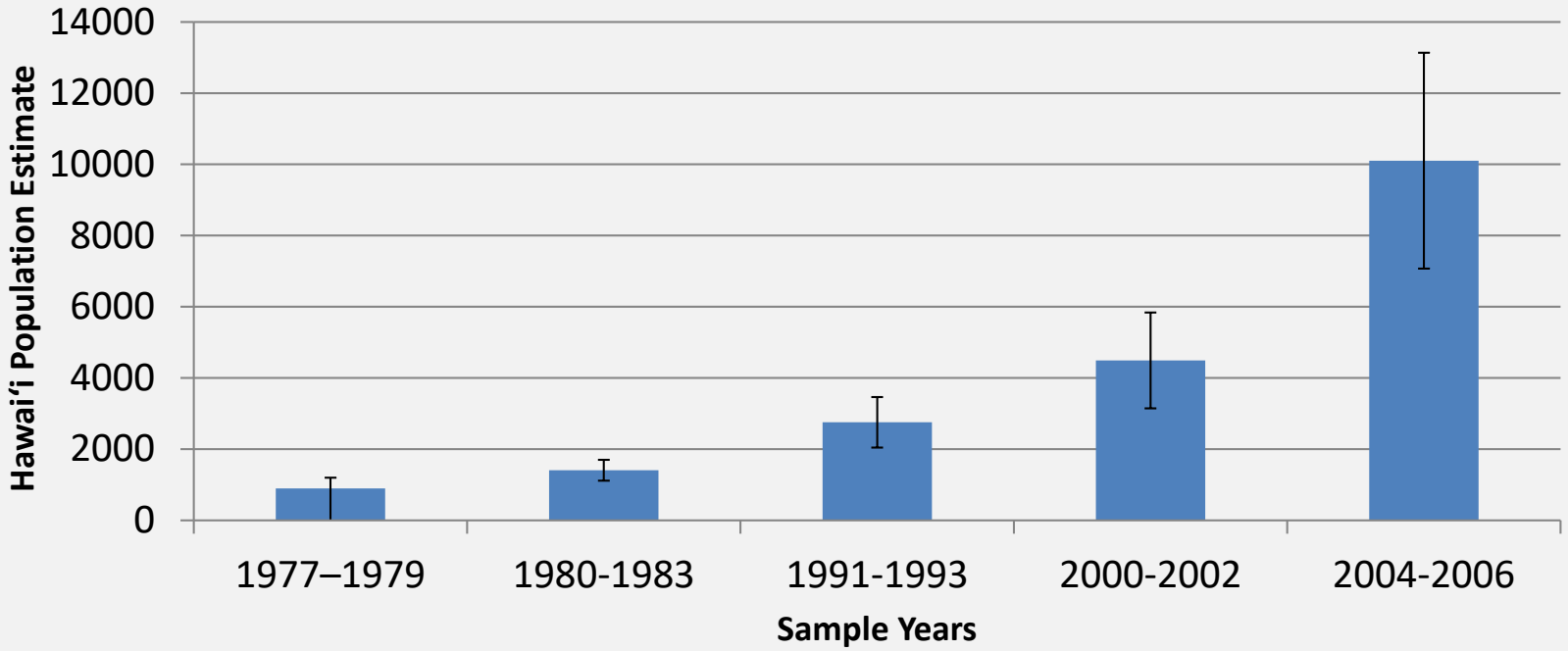
Humpback Whale Density



Figures from Currie *et al.*, 2018 and Mobley *et al.*, 2001

Hawai‘i DPS of humpback whales

FIVEFOLD INCREASE



Darling *et al.* 1983; Baker and Herman 1987; Cerchio 1998; Mobley *et al.*, 2001; Urban *et al.*, 1999

More sustainable whale watching

THE IMPACTS OF ADDITIONAL GUIDELINES

We need to use the best available science to:

- Protect humpback whales;
- Ensure sustainable whale watching practices;
- Minimize unintended vessel collisions and disturbance.

Hawai‘i humpback whale regulations:

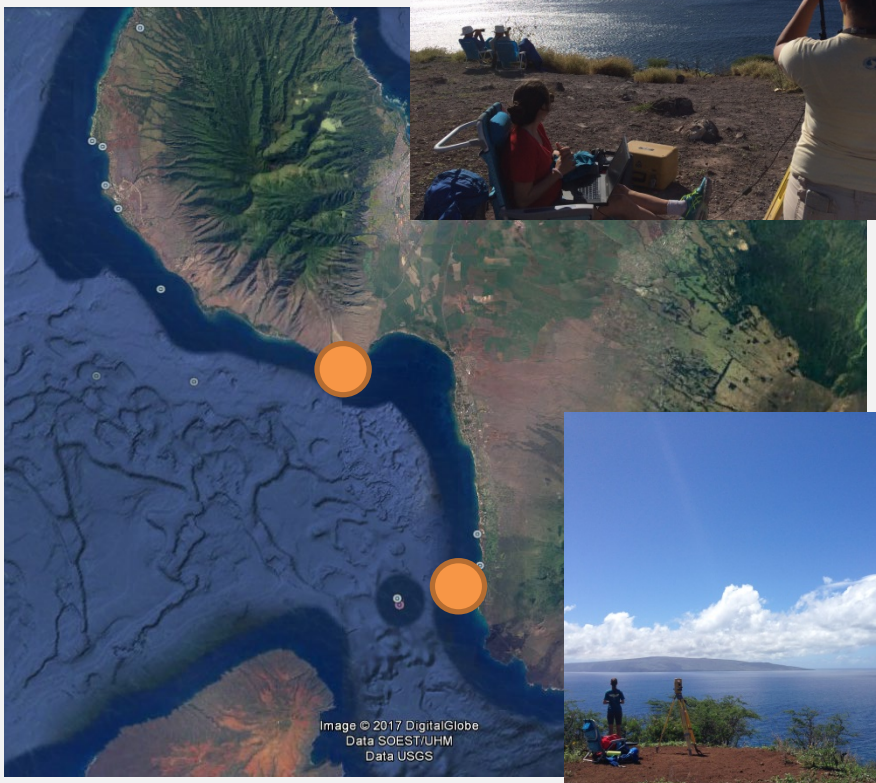
- No approaching within 100 yards;
- No thrill crafts and parasail vessels off South and West Maui during whale season;
- No placing vessels in the path of whales.

How are **whales** acting around **vessels?**

DOES THIS CHANGE WITH ADDITIONAL GUIDELINES?

Objective: To determine if whales change their behavior before, during, and after vessel(s) are present.

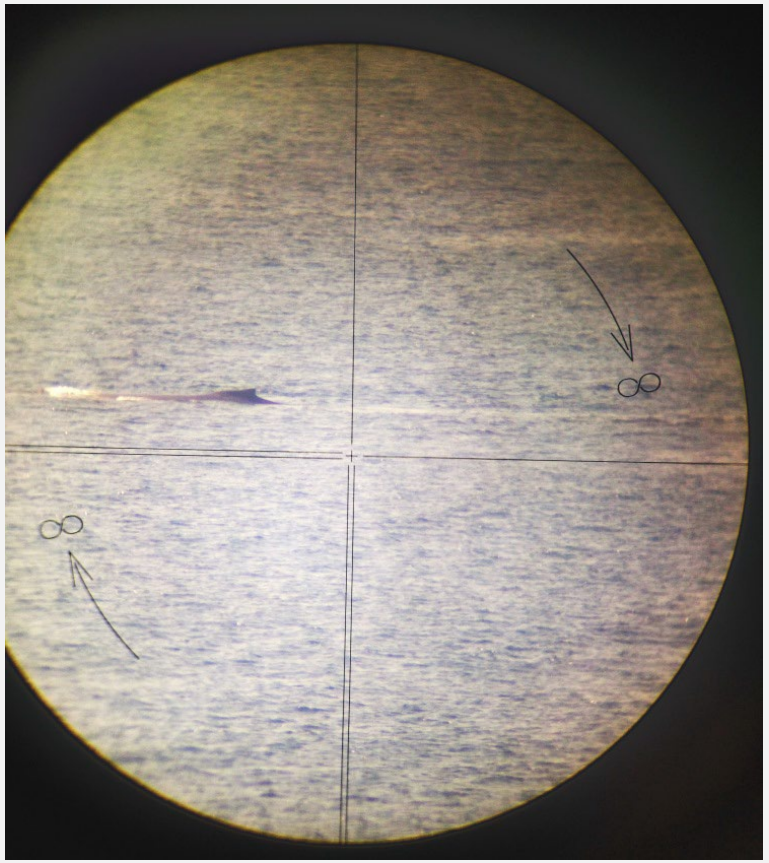
- Land-based observations remove the potential effects of a research vessel.
- Theodolite surveys conducted at two sites from 2015-2018:
  - Papawai Point
  - Puʻu Olai



Time specific data collection

BEHAVIOR CHANGES OVER TIME

Groups were tracked for a minimum of 15 minutes and maximum of 2 hours before, during and after a vessel approached.



Recorded data on:

- Location of group
- Number of blows and dives
- Vessel presence
- Vessel count
- Vessel distance to group

Group and vessel data collection

INFLUENCING FACTORS

Group information:

- Composition
- Group size

Vessel information:

- Type (*tourism vs. recreational*)
- Vessel approach (*Hawai‘i regulation vs. additional guidelines*)
- Encounter type (***B**efore-**D**uring-**A**fter*)

NMFS Research Permit # 16479

Group behaviors investigated

DO VESSELS CHANGE:

Swim speed:

- Group swim speed in km/h.

Dive time:

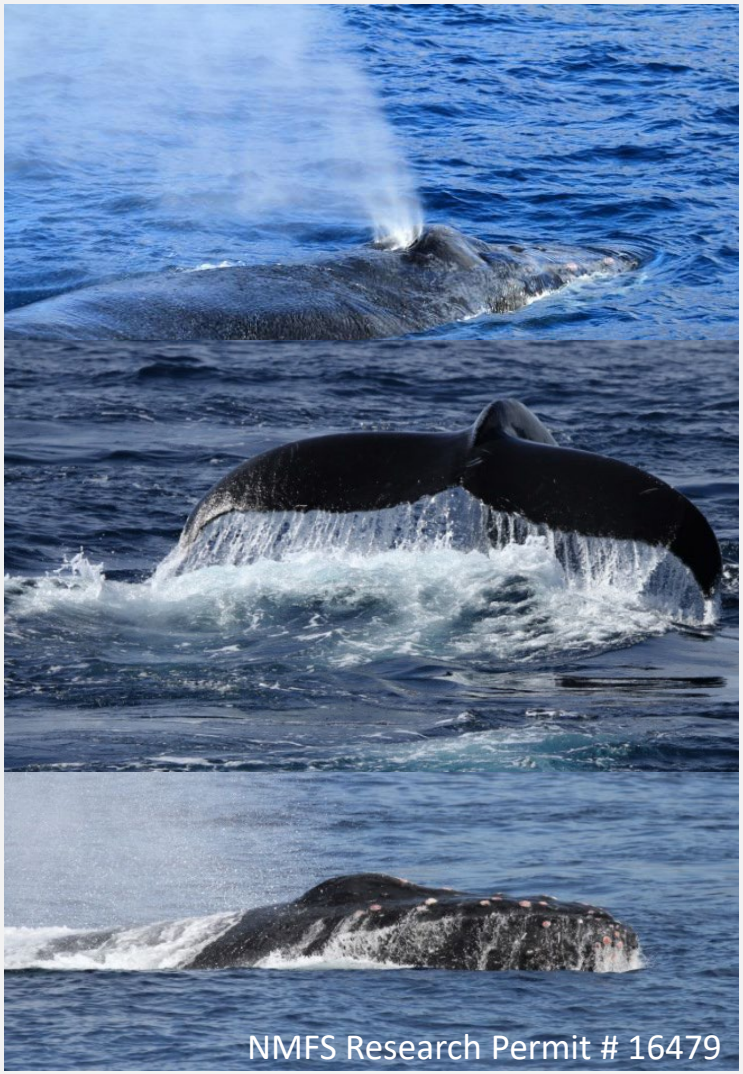
- Duration of dive in minutes.

Respiration rate:

- Number of blows/minute.

Path directness:

- Overall group direction.
  - (0 - circular path; 100 - straight line)



Summary of Survey Effort

A total of 73 days were spent tracking humpback whales from 2015-2018.

We recorded data on:

- 316 groups
- 943 whales
- 472 vessels

Used General Additive Models (GAMs) to test for significant changes in behavior.

NMFS Research Permit # 16479

Changes in swim speed

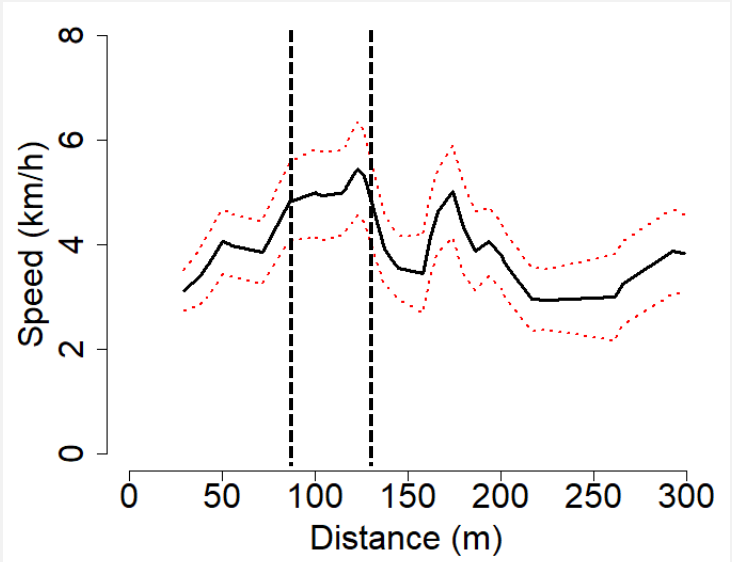
General Additive Model:

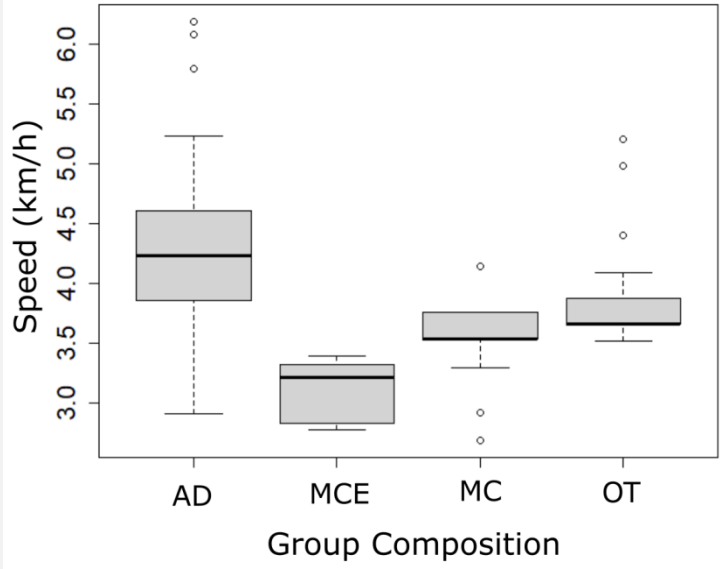
Swim speed ~ Group composition + Distance to group + *day*

GCV = 3.63; Deviance explained = 14.1%

Fastest swim speeds were predicted when vessels operated around the 100 yard approach limit.

Slowest swim speeds observed with calf groups.





Changes in respiration rate

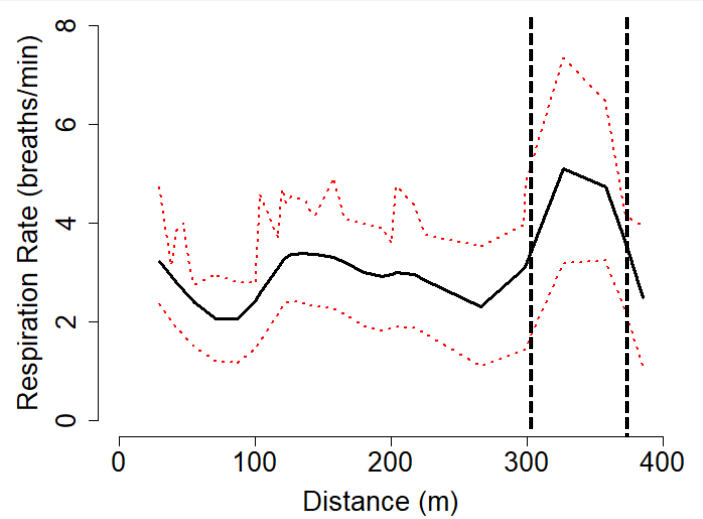
General Additive Model:

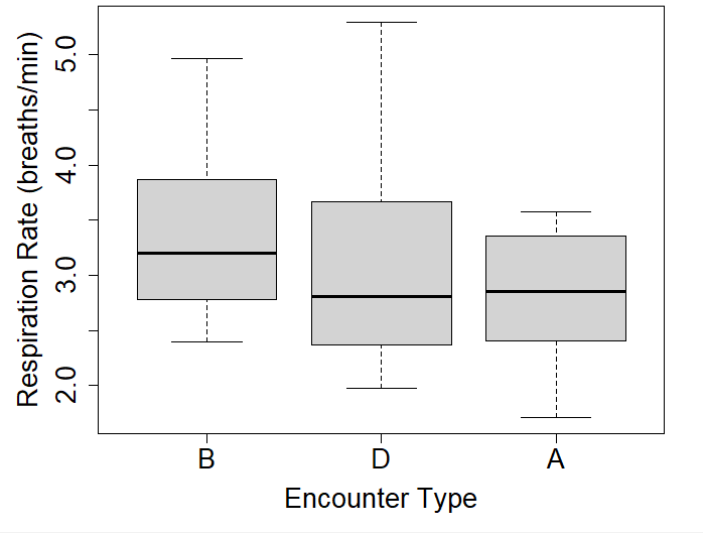
Blows ~ Encounter type + Distance to group + *day*

GCV = 2.36; Deviance explained = 27.8%

Respirations rates were highest at 300-375 meters.

Respiration rates remained low even after vessels left the area.





Currie *et al.*, 2020 – Submitted to Frontiers in Marine Science

Changes in travel direction

General Additive Model:

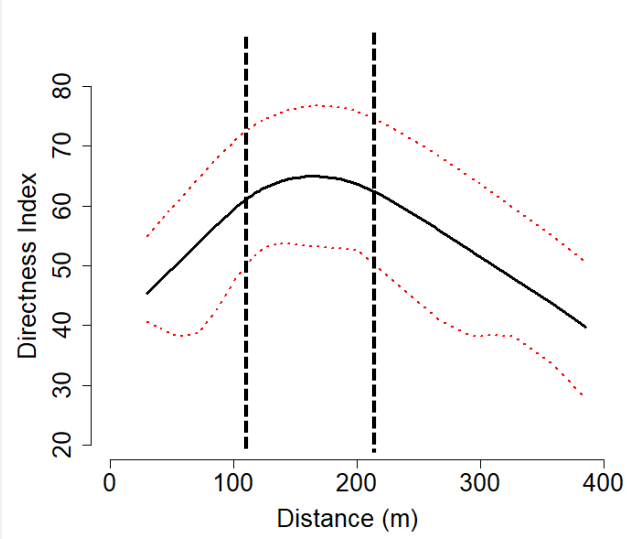
Directness ~ Encounter type + Distance to Group + Vessel Approach + *Day*

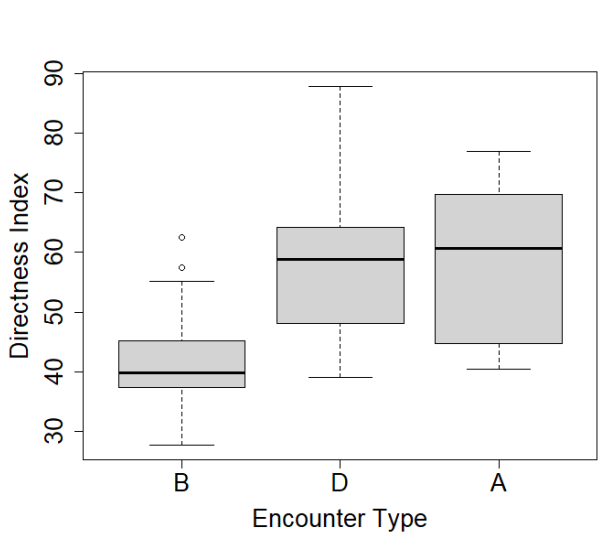
GCV = 407.57; Deviance explained = 37.4%

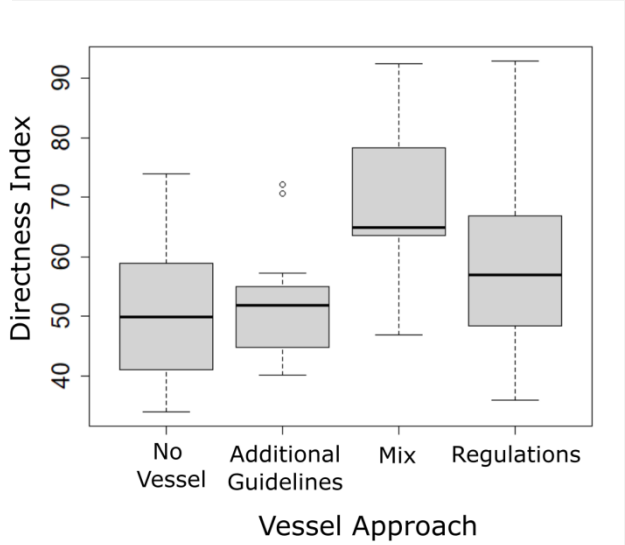
Whales swam in the straightest line between 115-215 meters.

Direction of travel remained straight even after vessels left.

Vessels following additional approach guidelines resulted in travel direction most similar to when vessels were absent.







Changes in dive time

General Additive Model:

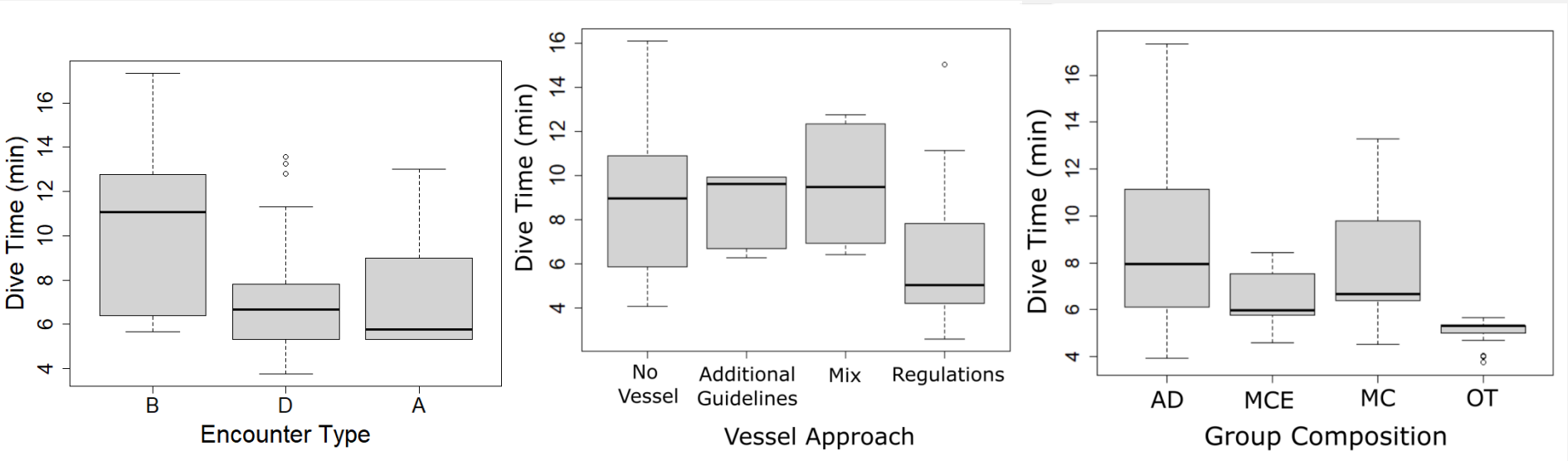
Dive time ~ Encounter type + Group composition + Vessel approach + *Pod*

GCV = 24.17; Deviance explained = 29.0%

Whales took shorter dive times during an encounter, with dive time remaining low after vessels left.

Vessels following additional approach guidelines resulted in dive times most similar to when vessels were absent.

Calf groups took short dives than non-calf groups.



Changes in **behavior**

WHAT IS ACTUALLY HAPPENING?

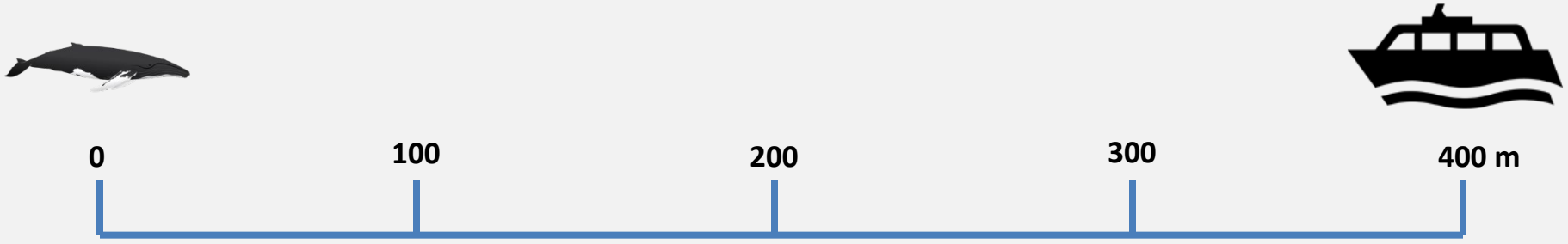
Behaviors

Dive Time ↑

Swim Speed ↓

Respiration Rate ↑

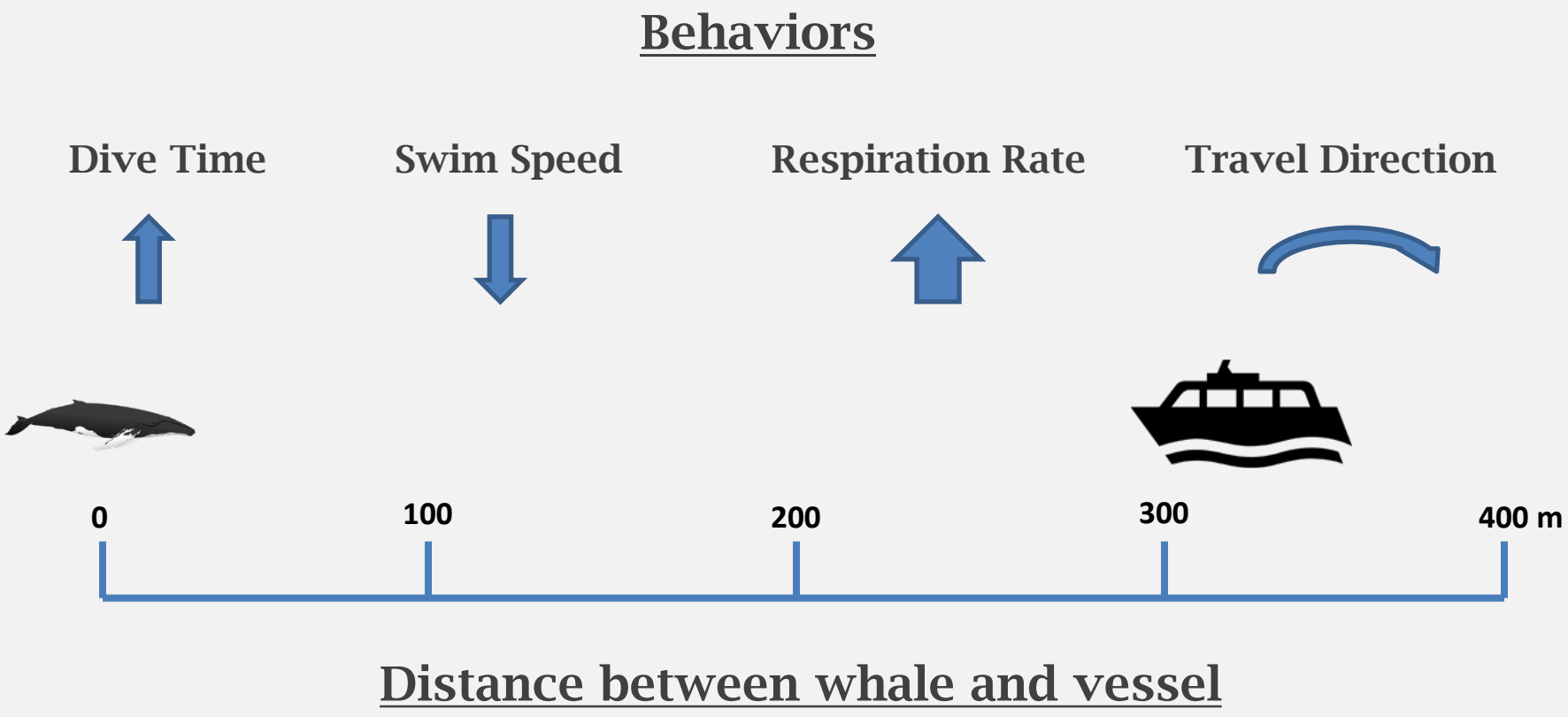
Travel Direction ↷



Distance between whale and vessel

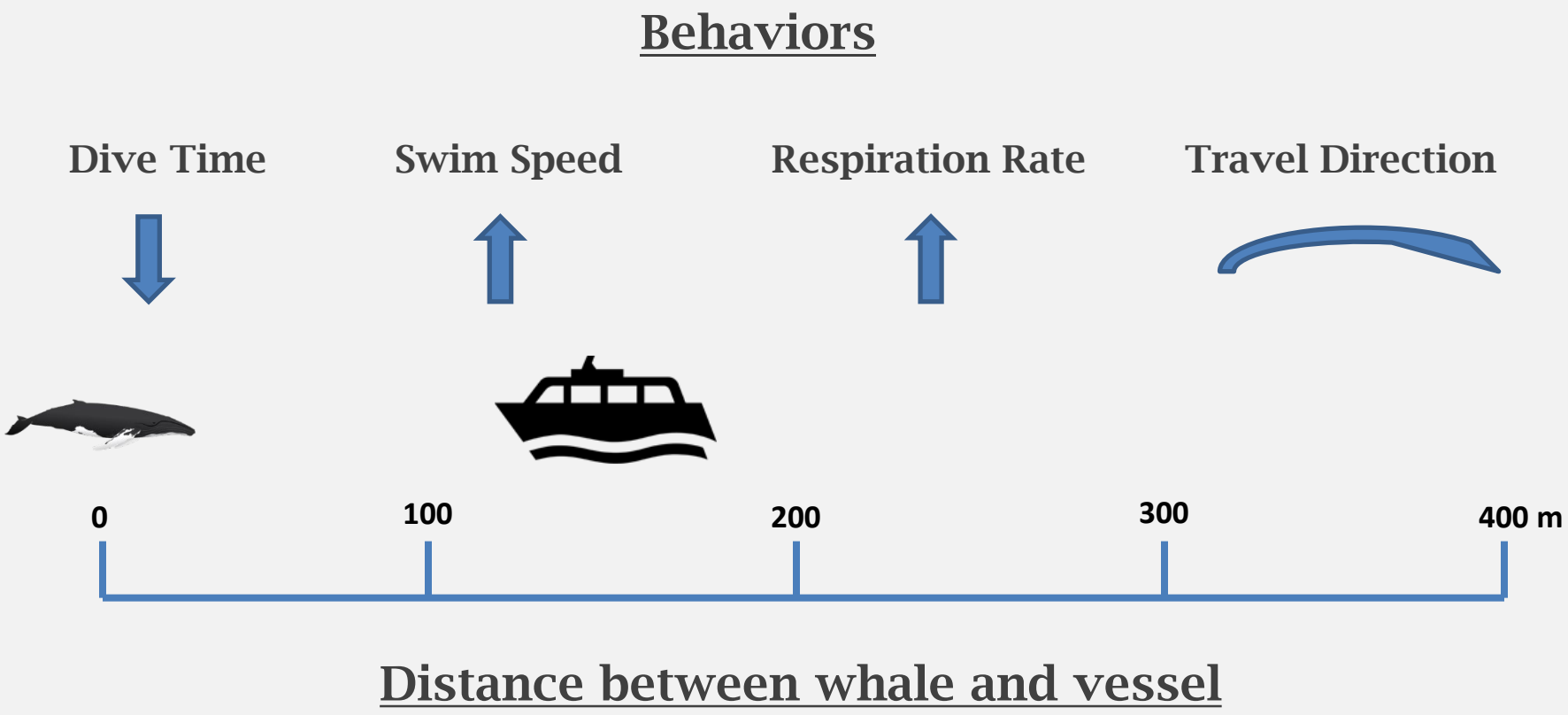
Changes in **behavior**

WHAT IS ACTUALLY HAPPENING?



Changes in **behavior**

WHAT IS ACTUALLY HAPPENING?



Changes in **behavior**

WHAT IS ACTUALLY HAPPENING?

Behaviors

Dive Time ↓ | Swim Speed ↓ | Respiration Rate ↑ | Travel Direction ↷

0 — 100 — 200 — 300 — 400 m

Distance between whale and vessel

Summary

IMPLICATIONS FOR WHALE WATCHING

When vessels approach the 100 yard limit, observed humpback whales behaviors indicate a horizontal avoidance strategy:

When vessels follow additional approach guidelines, we see the impacts on **dive time** and **travel direction** go away.

(1) max vessel speeds of 13 knots;
(2) vessel speeds of 6 knots or less when whales were within 400 yards;
(3) max viewing times of 30 minutes or less when calves present;
(4) vessel operations only parallel and to the side of whale direction of travel;
(5) max 3 vessels per group of whales.

Reducing the potential impacts

MINIMIZING **DISTURBANCE** AND **COLLISION RISK**

Short-term behavior responses have been observed for humpback whales in Hawai‘i.

Whale-vessel collisions occur each year in Hawai‘i, with the 2019-2020 season having the highest number of reports.

The best available science shows that speed limits and approach guidelines can reduce potential impacts of vessel presence.

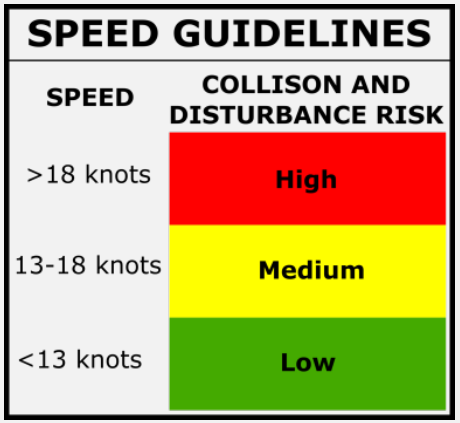
Support a resolution based on the *best available science*

VOLUNTARY GUIDELINES FOR THE HIHWNMS

Follow the low risk (green) speed guidelines when whales are present from December to April and post a dedicated observer when underway.

Reduce vessel speeds to 6 knots or less when whales are within 400 yards to minimize acoustic disturbance.

Stop your vessel if you unexpectedly encounter a whale within 100 yards.



Limit viewing of groups containing calves to 30 minutes or less.

When approaching whales, operate only parallel and to the side rear of whale's direction of travel.

Limit the number of vessels to 3 or less per whale or group of whales.

Voluntary guidelines

EDUCATION AND AWARENESS CAMPAIGN

Voluntary guidelines require effective education, which can only be achieved with support from the SAC and the community.

Let's work to make sure the next whale season starts off right, with additional voluntary guidelines for whale watching in sanctuary waters.

Thank you for allowing me to share some of the latest science from Maui

Members and supporters of Pacific Whale Foundation for funding this research.

Pacific Whale Foundation Staff/Interns/Volunteers who worked on the project.

Hawaiian Islands Humpback Whale National Marine Sanctuary Advisory Council for inviting me to present.

All research was conducted under NMFS/ESA/MMPA permit #16479

10:50 AM - 11:05 AM

PUBLIC COMMENT CAN BE SUBMITTED VIA:

- The question box in your control panel
- Vocally provide public comment where a staff member will unmute you when it's your time to speak
- Via e-mail to cindy.among-serrao@noaa.gov

Important Note for Members of the Public Planning to Make Public Comment:

- The order of comments will be based on your date and time of registration.
- Please note, no public comments will be audio or video recorded.
- If you would like to provide public comment anonymously please indicate via question box or e-mail

11:05 AM – 11:20 AM

POTENTIAL ACTION ITEM

- Creation of a Kīhei site working group (Allen Tom)

11:20 AM – 11:30 AM

NEXT STEPS (SOL)

- **Next meeting is Tuesday, November 17, 2020 & will be virtual**

- **Expect a fall/winter SAC recruitment**
  - Fishing Primary
  - Maui Island Primary
  - O'ahu Island Primary
  - Business/Commerce Primary & Alternate
  - Youth seat Primary
  - Conservation alternate

11:30 am: Pau!

Mahalo!