An Update on Sound Related Research

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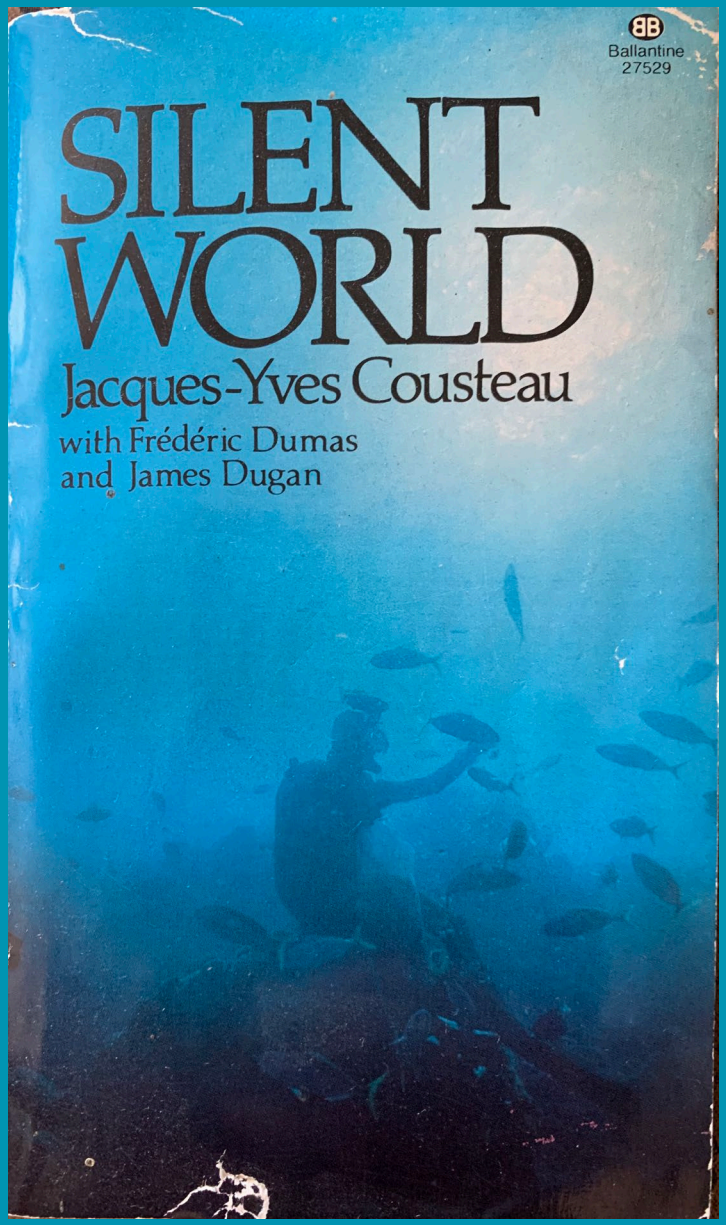
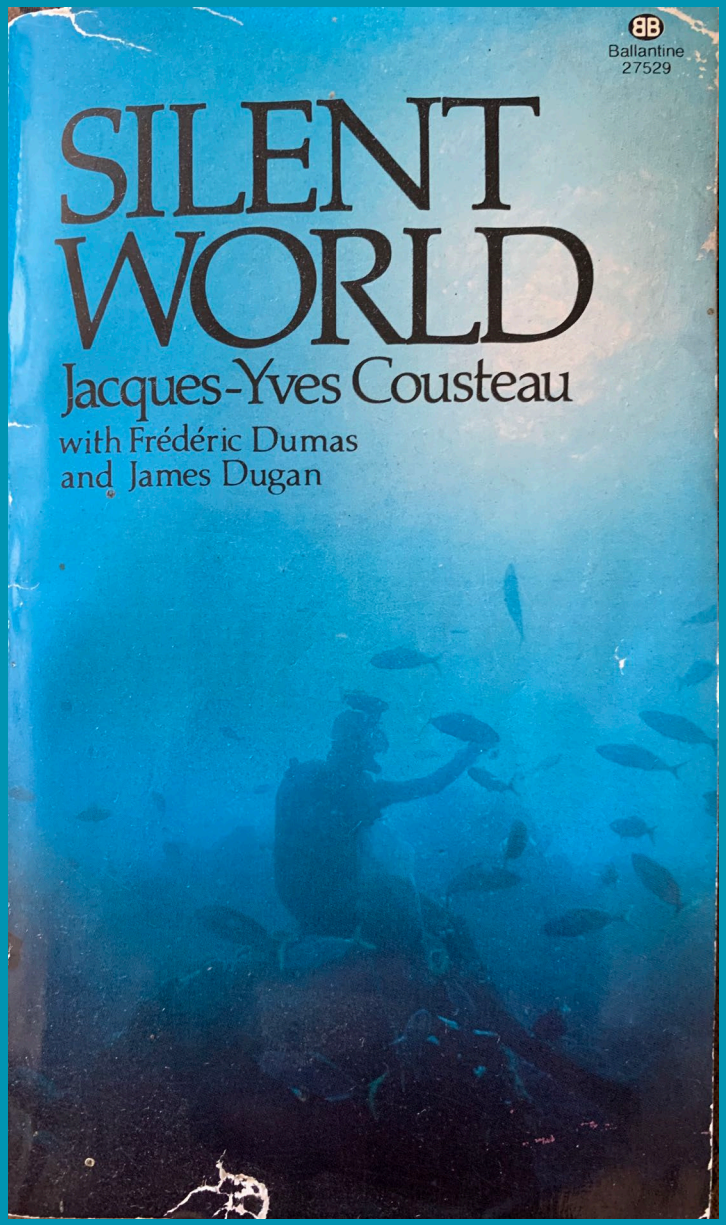
Sanctuary Advisory Council

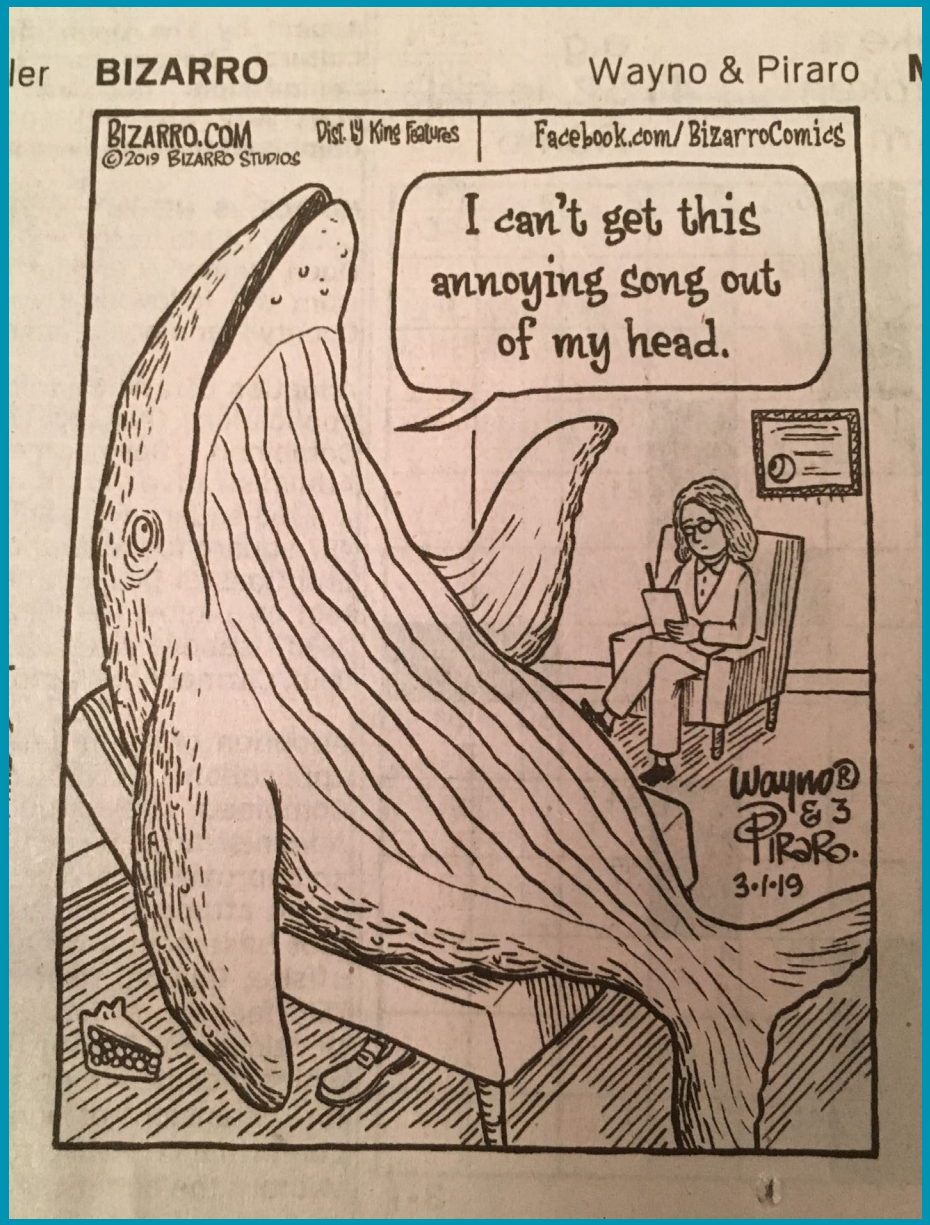
Monterey Bay National Marine Sanctuary

October 16, 2020



Cousteau Society gift in the 1970's, and a book "chosen overwhelmingly the world over as a textbook."


Ballantine
27529
SILENT WORLD
Jacques-Yves Cousteau
with Frédéric Dumas
and James Dugan


BIZARRO
Wayno & Piraro
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Dist. by King Features
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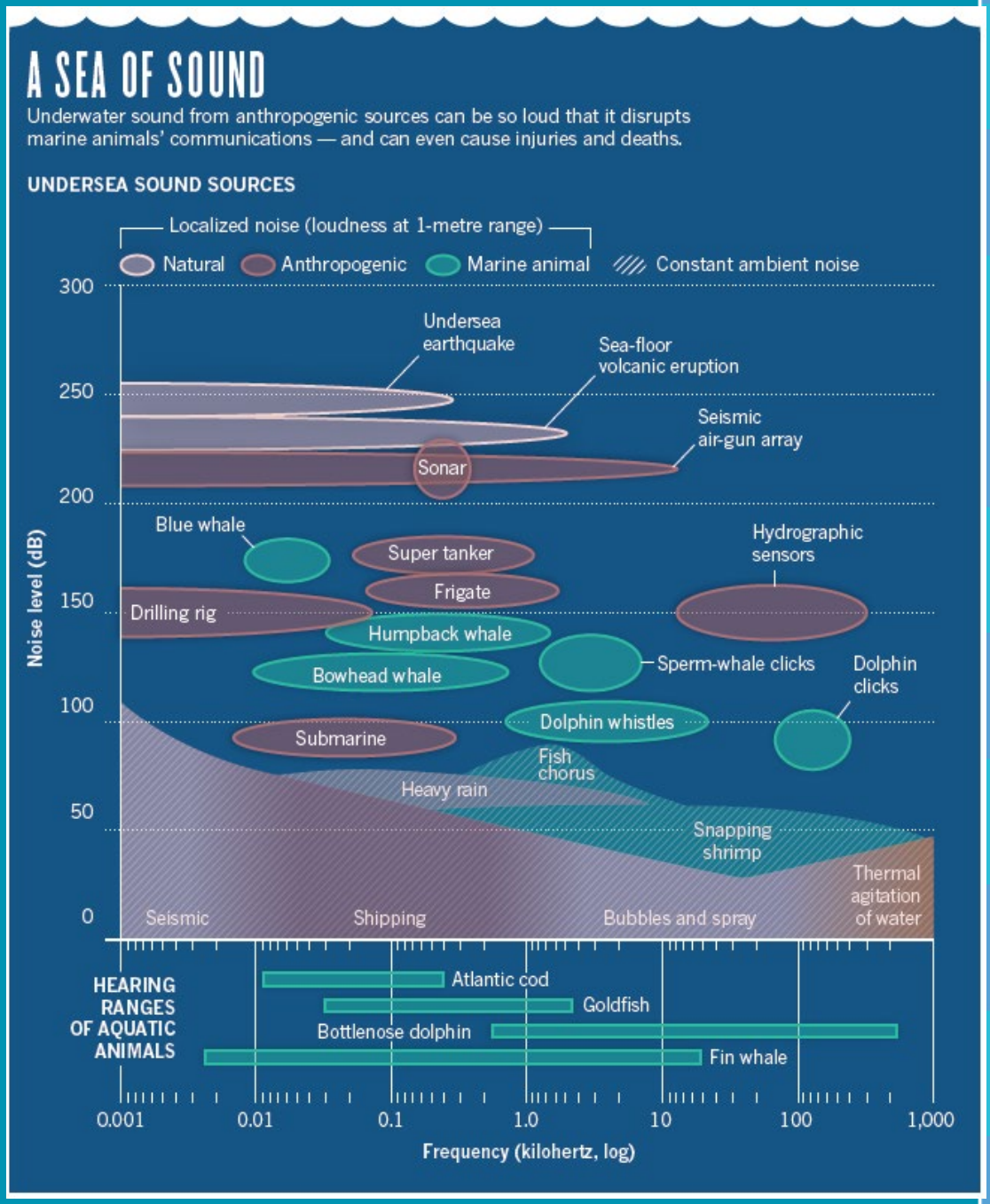
I can't get this annoying song out of my head.
Wayno® & Piraro.
3-1-19

What is a soundscape?

- Ambient sounds
- Biological sounds
- Anthropogenic sounds

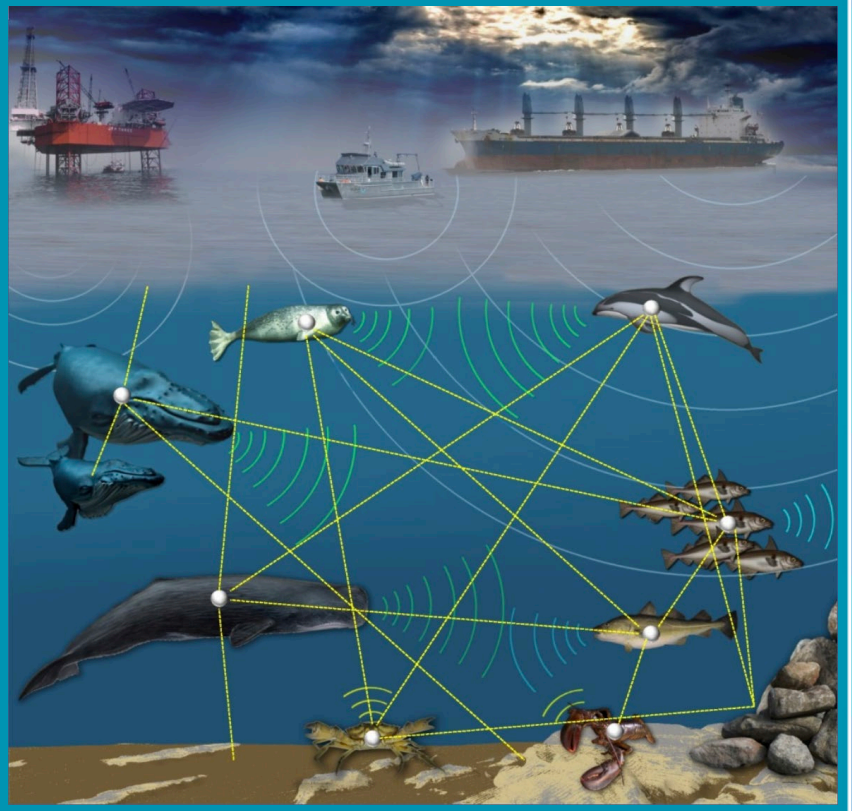
Go to MBARI soundscape listening room

https://www.mbari.org/soundscape-listening-room/



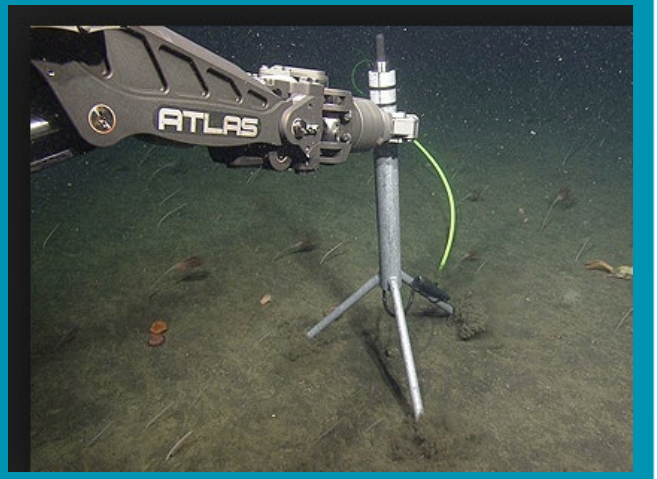
Sanctuary Objectives Related to Sound

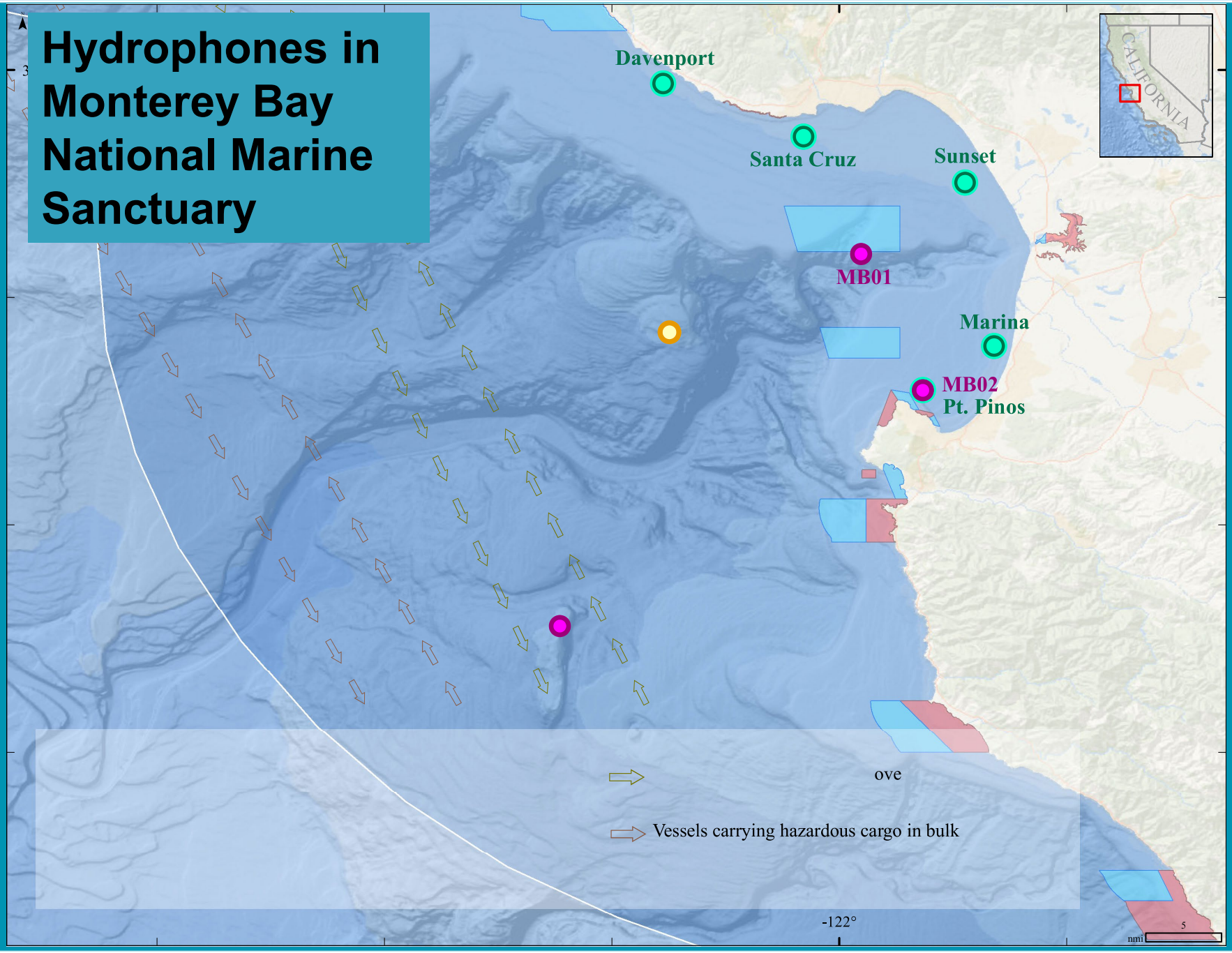
- Develop capacity to protect acoustic habitats
  - determine best metrics to characterize sound
  - include sound as an Observatory System core variable and Condition Report critical parameter
  - add hydrophones
- Assess seal bomb use and explore alternatives
- Feature sound in Sanctuary visitor centers



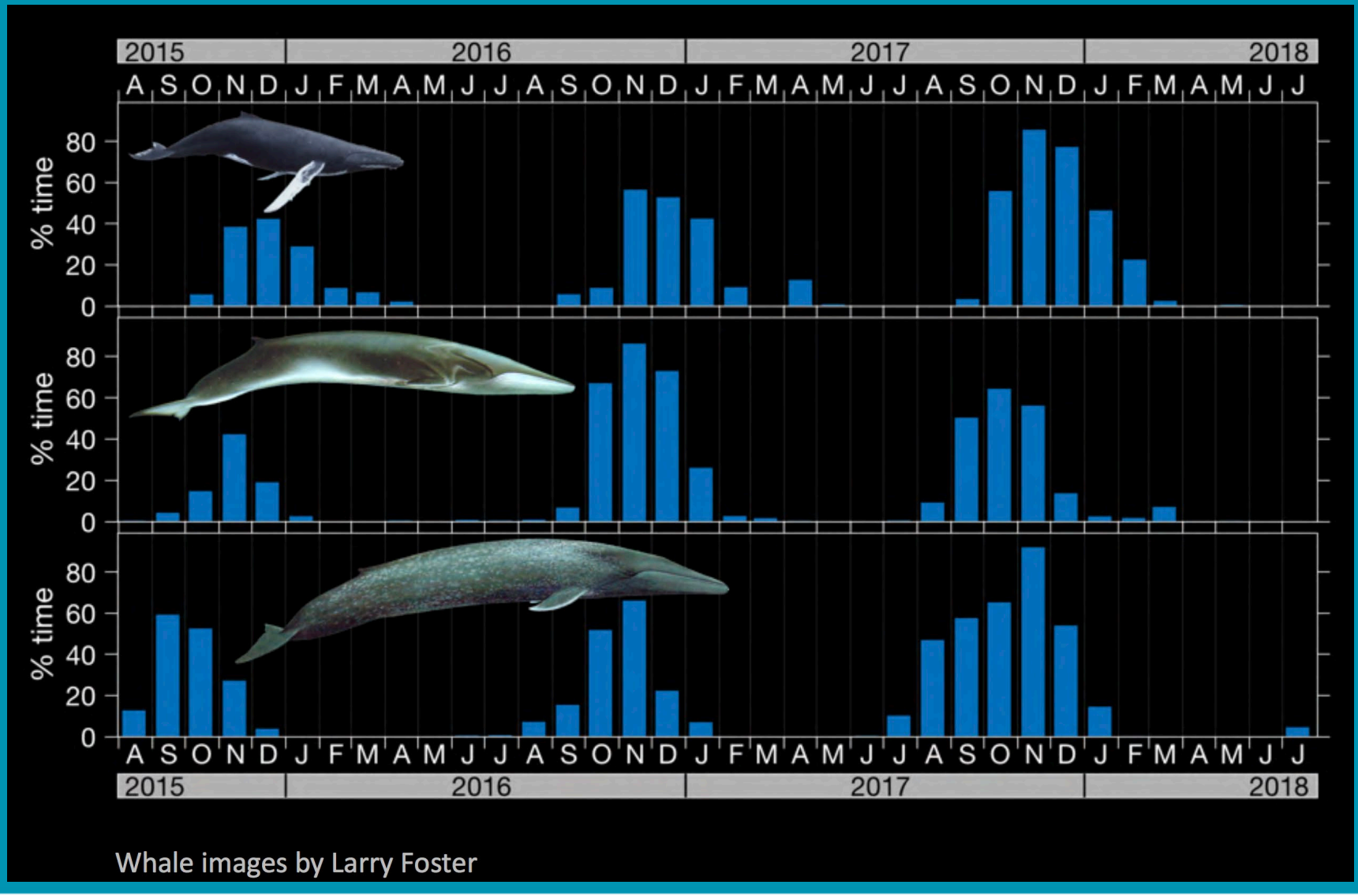
We have an amazing regional sound team!

MBARI
John Ryan
Danelle Cline
David French
Yanwu Zhang
NOAA
Kathy Broughton
Karin Forney
Ryan Freedman
Leila Hatch
Lindsey Peavey Reeves
Shanon Rankin
Anne Simonis
Lisa Uttal
Andrew DeVogelaere
Naval Postgraduate School
John Joseph
Tetyana Margolina
John Colosi
Moss Landing Marine Labs
Alison Stimpert
Southall Envronmental Associates
Brandon Southhall
Aguasonic Acoustics
Mark Fischer
Hopkins Marine Station
Jeremy Goldbogen
U.C. Santa Cruz
Stephanie Adamczak
Ari Friedlaender



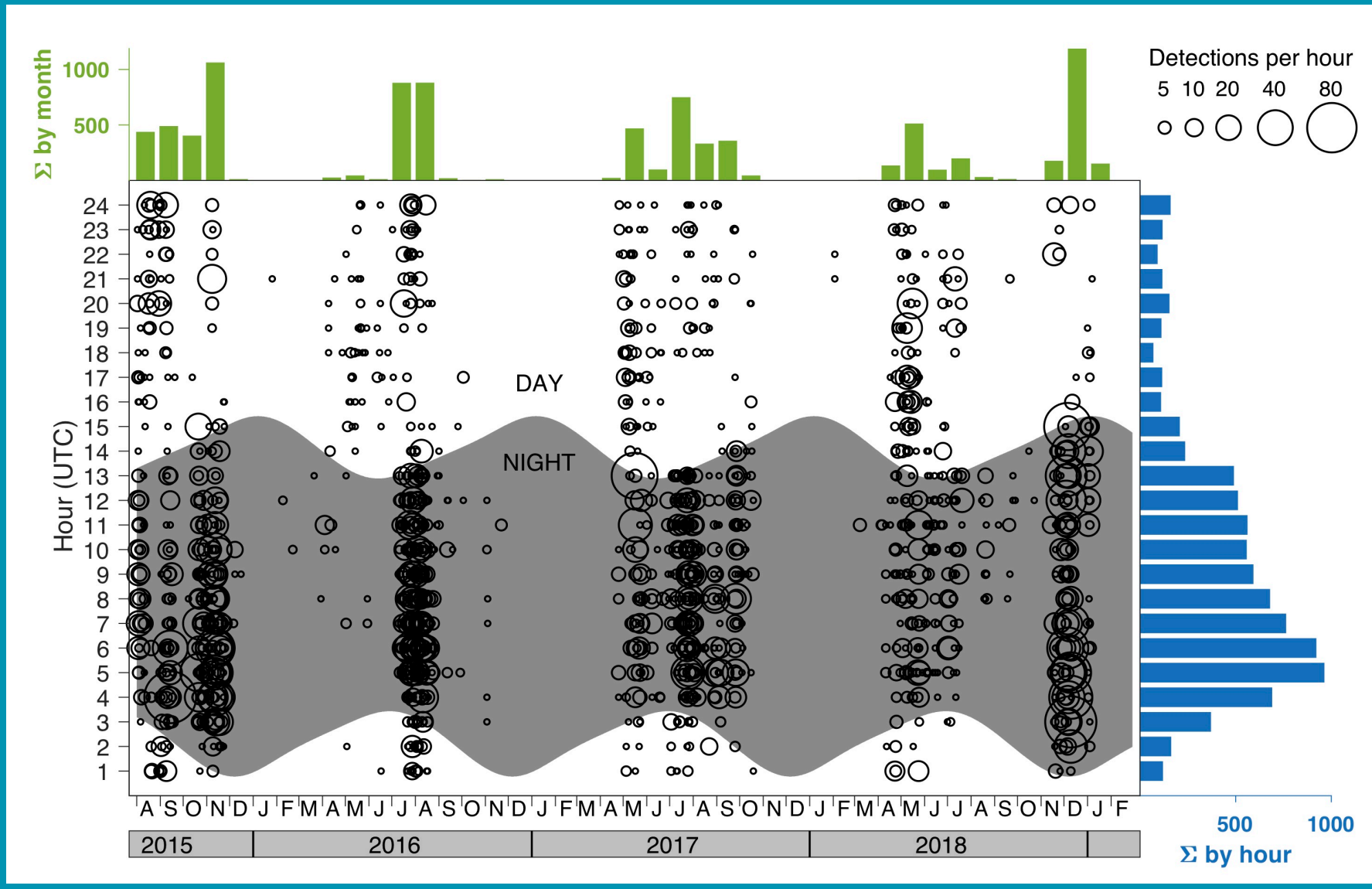

Hydrophones in Monterey Bay National Marine Sanctuary
Davenport
Santa Cruz
Sunset
MB01
Marina
MB02
Pt. Pinos
CALIFORNIA
ove
Vessels carrying hazardous cargo in bulk
-122°
5
nmi

Using machines to detect and quantify sounds from the MBARI cabled observatory

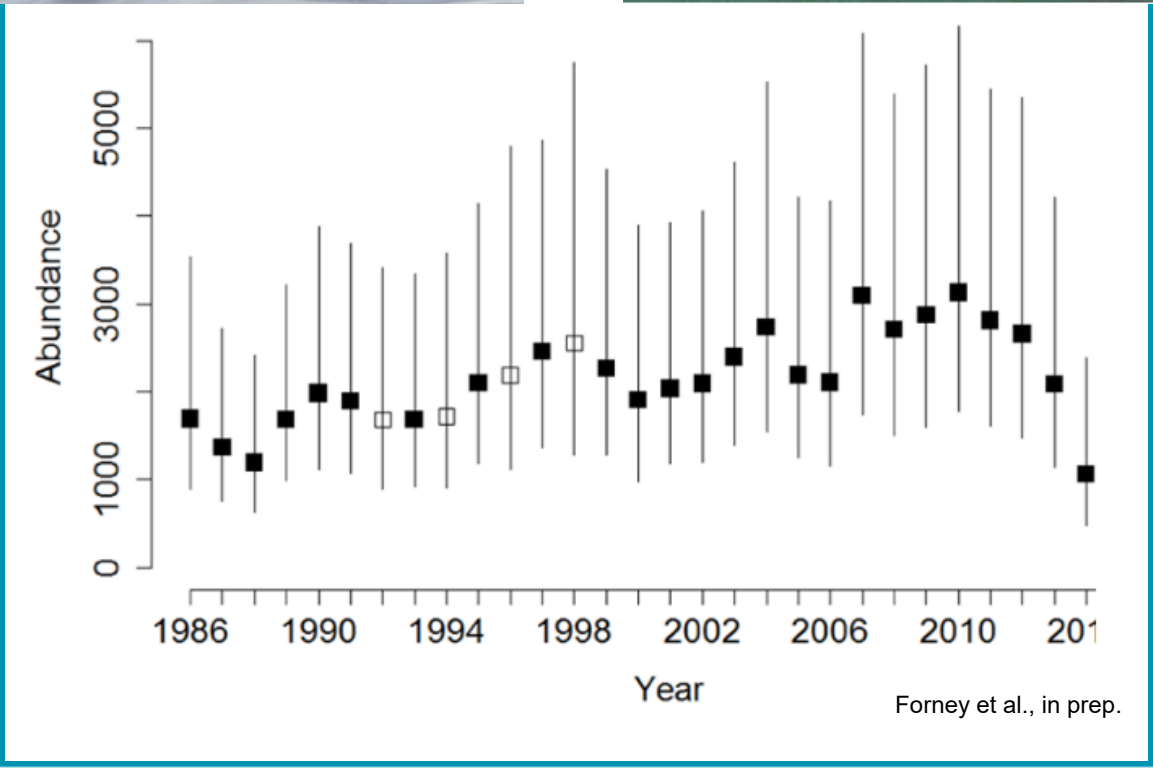


Whale images by Larry Foster

Seal bomb explosions in Monterey Bay: up to 88 per hour, 335 per day, and 1188 explosions per month

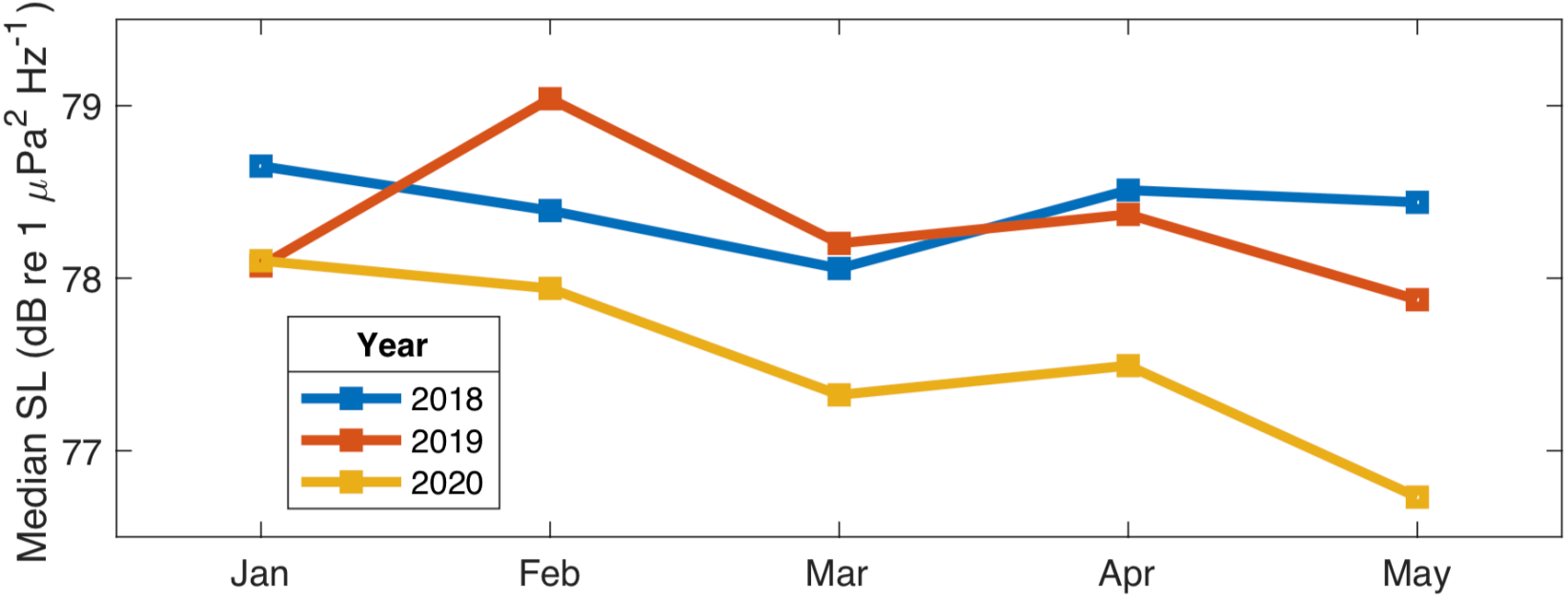


Harbor Porpoise and sound



Forney et al., in prep.

Covid-19 Effects:
Ship Noise and Whale Stress Hormones



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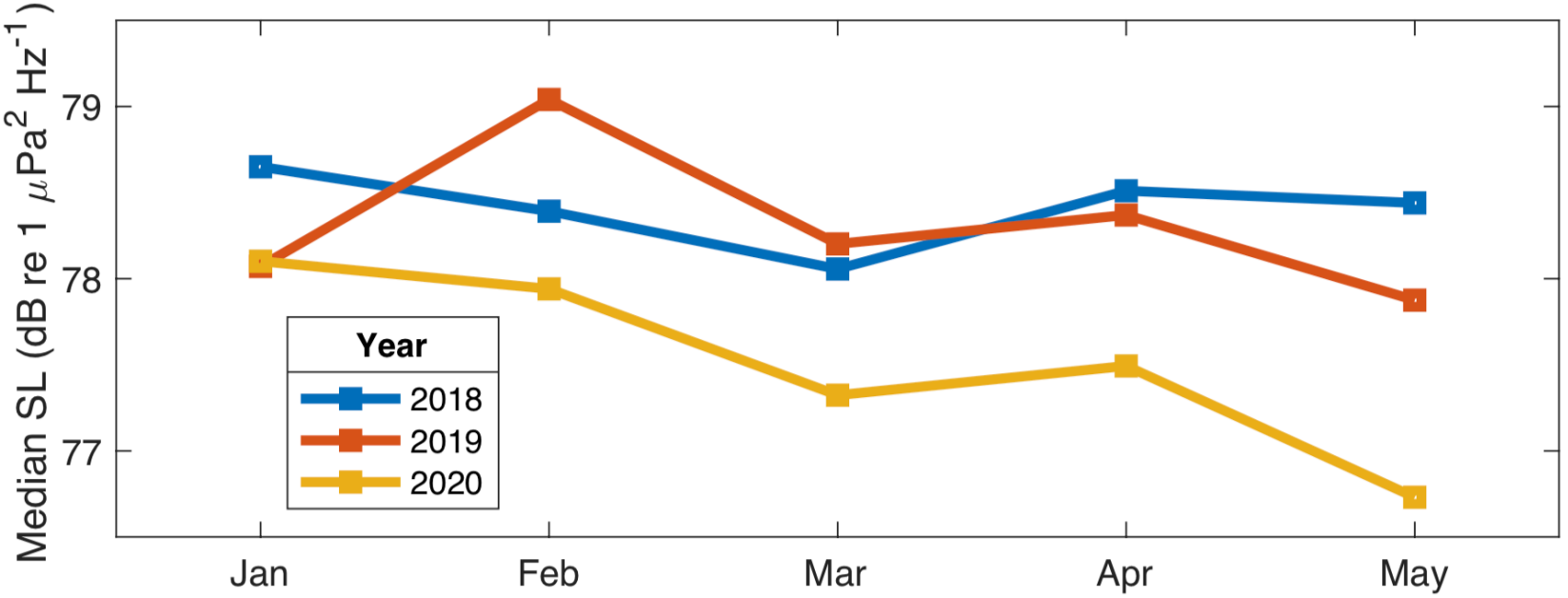
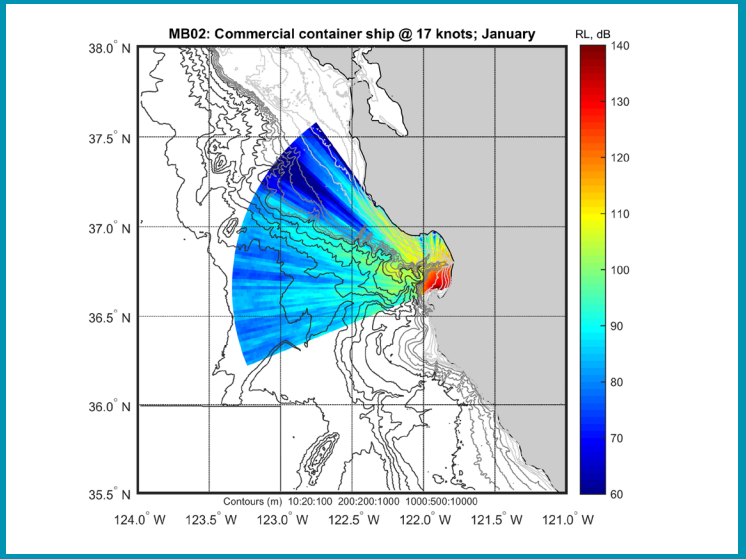


New sound exhibit at the Sanctuary Exploration Center In Santa Cruz

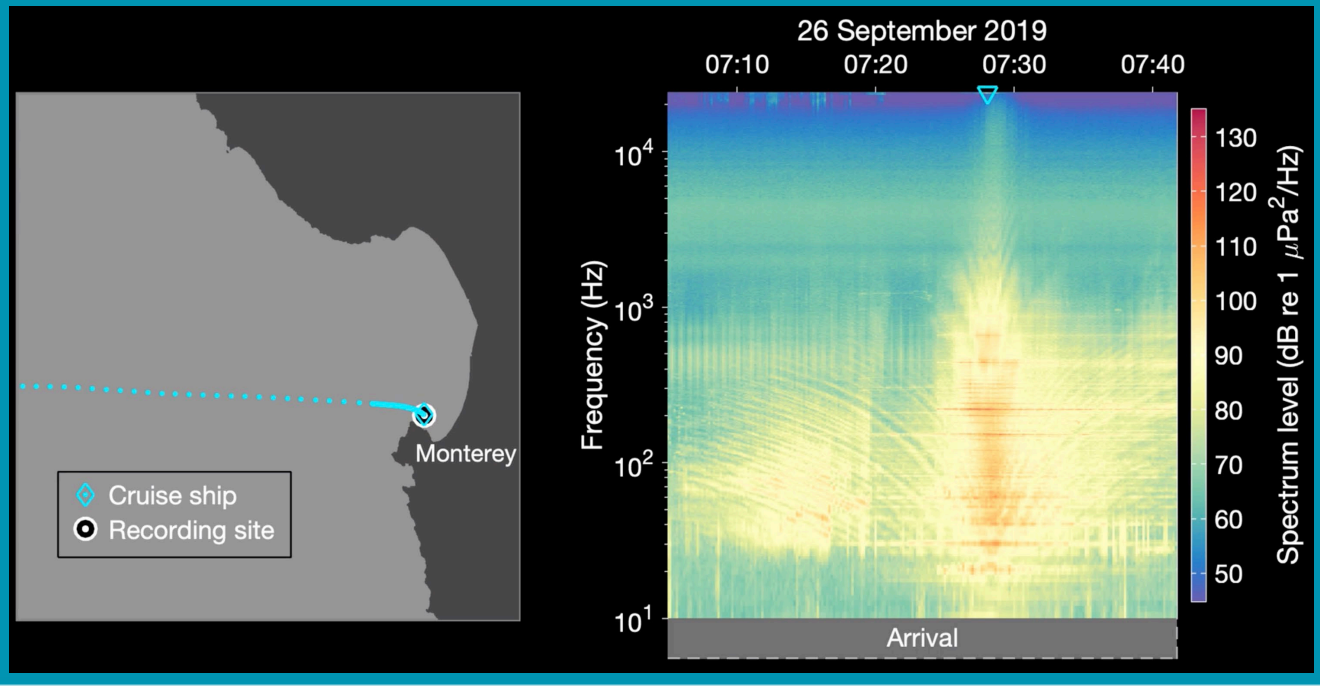
Exploration Center Education Products

Mobile Soundscape

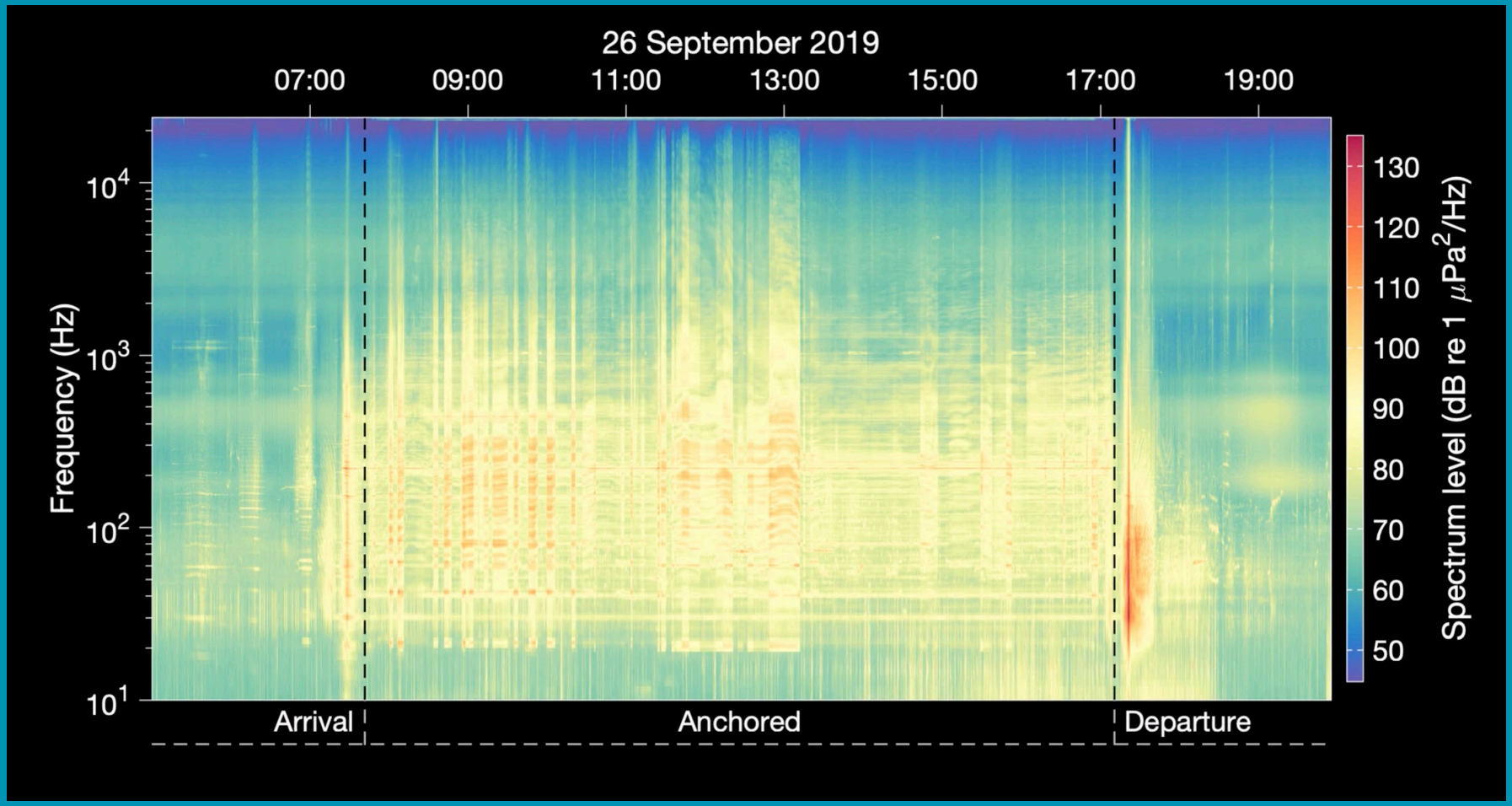


Video on modeling sound

Cruise Ship Noise Video



Cruise Ship Noise Video



Other Efforts

- ONMS Sound Team
- Sound is a West Coast Region Priority
- Transitioning SanctSound from Navy to collaborative funding
- Integration with NOAA's Noise Reference Station (NRS) program
- Collaboration with Google's AI Perception Team on machine learning methods w/seal bombs as the first focal topic
- Sound as an IOOS critical parameter, and integrating SanctSound information into the IOOS Data Management & Cyberinfrastructure (DMAC)

The Near Future

- New ROV to retrieve hydrophone with lost float
- SanctSound Data Portal web site
  (Building off MBON and Beach COMBERS)
- CeNCOOS, NANOOS, SCCOOS supporting
  Ocean Sound Observing Network (OSON)
- NCCOS proposal on habitat connectivity
  $ 2 million over 4 years
- New hydrophone at Sur Ridge
  SOSUS in 1958 comparison to now
- Sound in sanctuary Condition Reports

August 2020

Proposed Rule for Safely Deterring Marine Mammals

NOAA FISHERIES

Guidelines by Taxa:

Mysticetes

Odontocetes

Conflicts between humans and marine mammals can arise when the animals interact with fishing gear or catch, damage property, or endanger people. Although the Marine Mammal Protection Act of 1972 (MMPA) and the Endangered Species Act of 1973 (ESA) prohibit the "taking" of marine mammals, there are limited exceptions to the prohibitions under certain circumstances. Section 101(a)(4)(A) of the MMPA allows "specified persons" (e.g., the owner of fishing gear or catch, the owner of private property, or an employee or agent of such owner as well as any person deterring a marine mammal from endangering personal safety and any government employee to deter a marine mammal from damaging public property) to use measures that deter marine mammals from damaging fishing gear, catch, personal or public property, or endangering personal safety, **as long as those measures do not result in death or serious injury of marine mammals**.

Deterrent Types NOAA Fisheries Evaluated

(See the remaining tables in this Fact Sheet for guidelines, specific measures, & prohibitions for specific deterrent types.)

Non-Acoustic Deterrent Types							Acoustic Deterrent Types		
Visual	Physical Barriers	Chemo-sensory	Tactile: Projectiles	Tactile: Manual	Tactile: Electrical	Tactile: Water	Impulsive: Explosive	Impulsive: Non-Explosive	Non-Impulsive
									

Acoustic Deterrents: Non-ESA Pinniped Taxa						
GUIDELINES*				PROHIBITIONS		
Taxa	**Impulsive: Explosives**	**Impulsive: Non-Explosives**	**Non-Impulsive: <170 dB RMS**	**Impulsive: Explosive**	**Impulsive: Non-Explosive**	**Non-Impulsive**
	• Aerial pyrotechnics/fireworks • Bird bangers, bird whistlers/screamers • Bear bangers using pencil launcher • Propane cannons • Cracker shells, bird bombs, seal bombs, & underwater firecrackers when visibility ≥ 100 m	• Banging objects (e.g., Oikomi pipes) underwater; low frequency broadband devices; or pulsed powered devices when visibility ≥ 100m • In-air passive acoustic devices (e.g., hanging chains, cans)	• Acoustic alarm (i.e., pingers/transducers) • Predator sounds/alarm vocalizations using underwater speakers • Air horns, in-air noisemakers, sirens, & whistles	• Any impulsive explosives not included in the guidelines or specific measures • Seal bombs, underwater & cracker shells, when visibility is <100m (e.g., at night, fog)	Banging objects underwater, pulse powered devices, or low frequency broadband devices when visibility is <100m (e.g., at night, fog)	Any non-impulsive device with an underwater source level ≥170 dB RMS, unless that device has been evaluated and meets NMFS criterion via the NMFS Acoustic Deterrent Web Tool
						

*These guidelines include additional provisions for some deterrents; see proposed rule for details.

GENERAL PROHIBITIONS

- Targeting a deterrent action at a marine mammal calf or pup
- Striking a marine mammal's head or blowhole when attempting to deter a marine mammal
- Deploying or attempting to deploy a deterrent into the middle of a group of marine mammals
- Feeding or attempting to feed a marine mammal pursuant to 50 CFR 226.3 even for the purposes of deterrence
- Deterring or attempting to deter any marine mammal demonstrating signs of aggression, including charging, lunging, or vocalizing, except when necessary to deter a marine mammal from endangering personal safety
- Approaching certain ESA-listed marine mammals, including humpback whales in Alaska, North Atlantic right whales, western Steller sea lions, and killer whales in Washington, pursuant to 50 CFR 223.214 and 224.103

Individual Comments- Due October 30

We want your input on other types of issues to be addressed with hydrophone data…

- Locating difficult to see species (e.g., beaked whales)
- Assessing impacts of cruise ships
- Describing different types of construction sounds
- Assessing sounds that SCUBA divers are exposed to
- Measuring sounds from drones
- Determining if sanctuaries are “quiet zones”
- Determining if the ocean getting noisier through time
- Characterizing sounds associated with wildlife viewing boats, including different hull types and approach methods
- Developing soniferous species lists
- Other?

Send ideas to:

andrew.devogelaere@noaa.gov

Thank you!