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Listening to “See” Beneath the Waves: Soundscape monitoring in the Channel Islands National Marine Sanctuary



National Marine Sanctuaries

- Raising public awareness and understanding through education and outreach.
- Improving management through research (e.g., historical, conservation science, social science).
- Helping coastal economies by promoting and protecting healthy resources.
- Facilitating public use compatible with primary objective of resource protection.



National Marine Sanctuary System



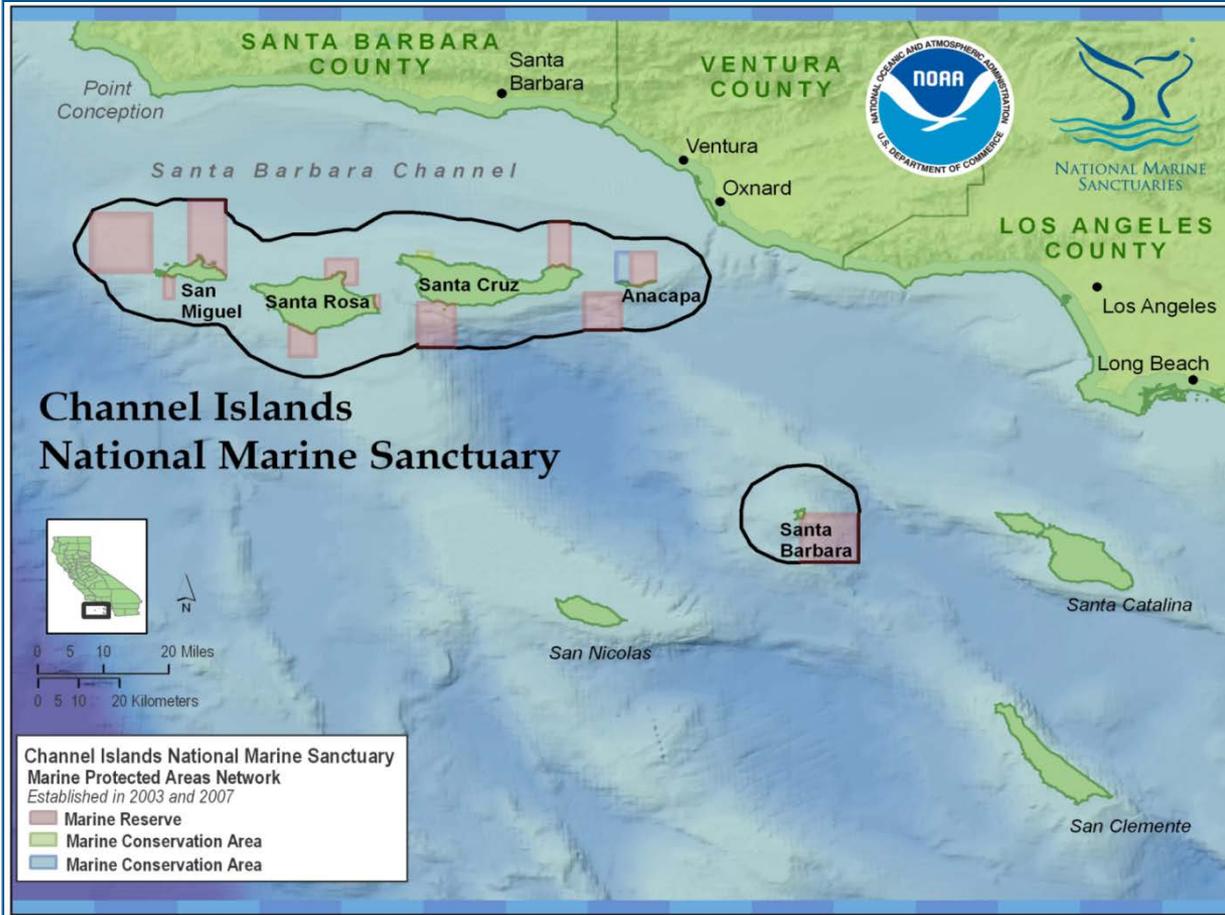
NATIONAL MARINE
SANCTUARIES

CHANNEL ISLANDS

- National Marine Sanctuary
- △ Marine National Monument
- Proposed National Marine Sanctuary

Scale varies in this perspective. Adapted from National Geographic Maps.

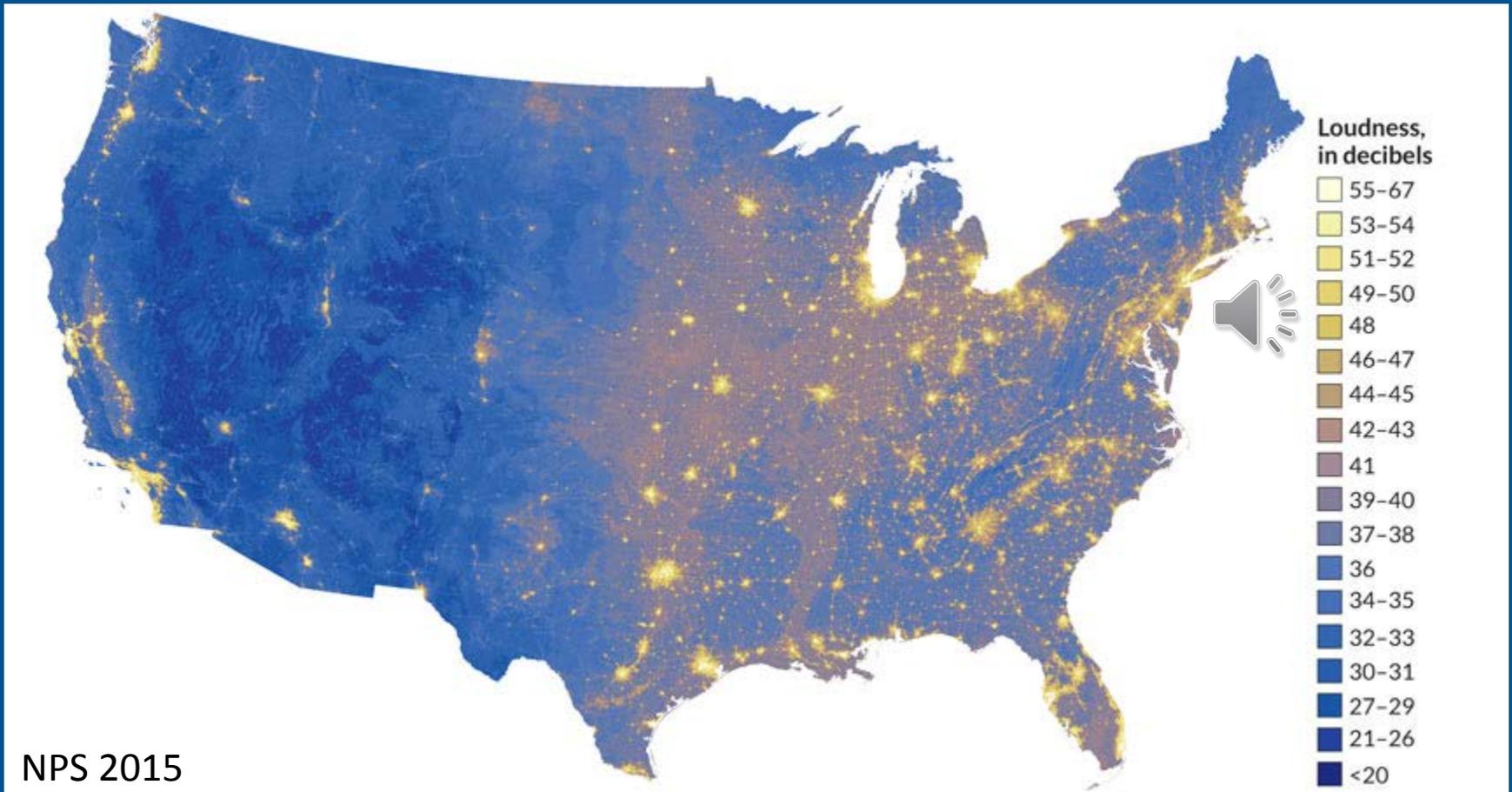
Channel Islands National Marine Sanctuary



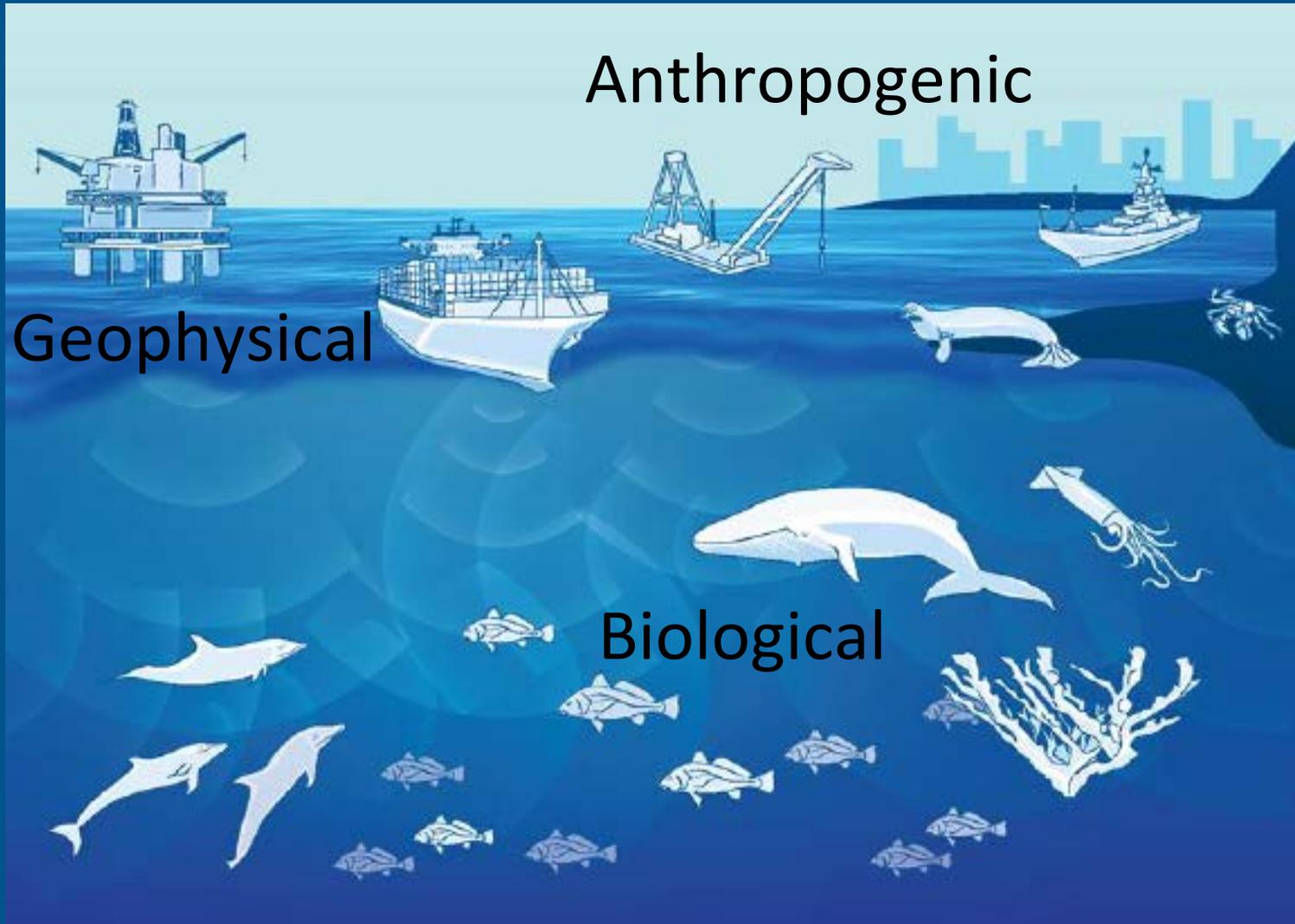
- Designated: Sept. 1980
- Encircles 5 Islands & 2 offshore rocks
- Seaward Boundary: ~ 7 miles offshore (6nm)
- Shoreward Boundary: Mean High Water
- Area: ~ 1,470 square statute miles
- First network of marine reserves on west coast

Soundscape Monitoring

What is a Soundscape?



Soundscape Monitoring

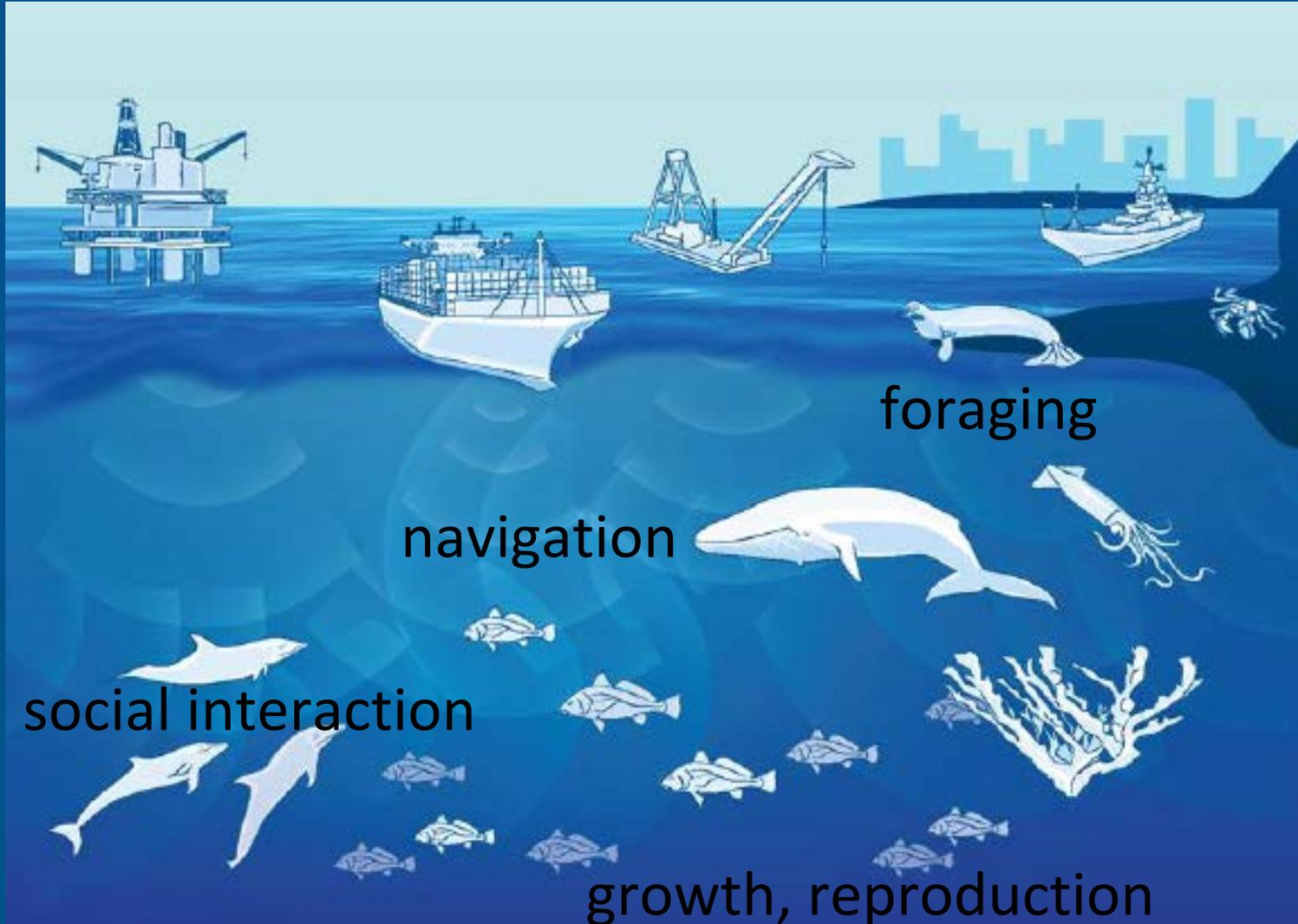


Geophysical

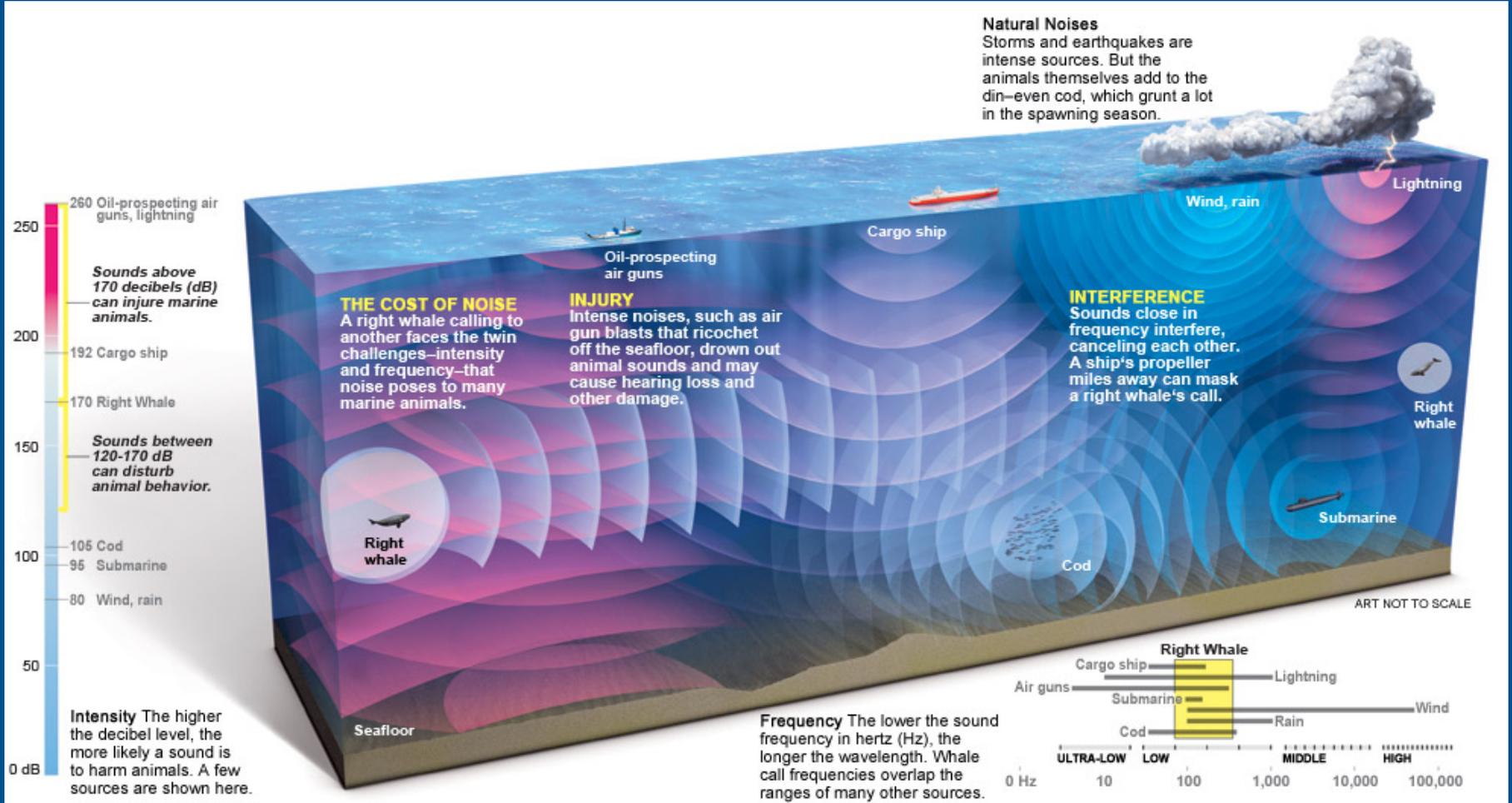
Anthropogenic

Biological

Soundscape Monitoring

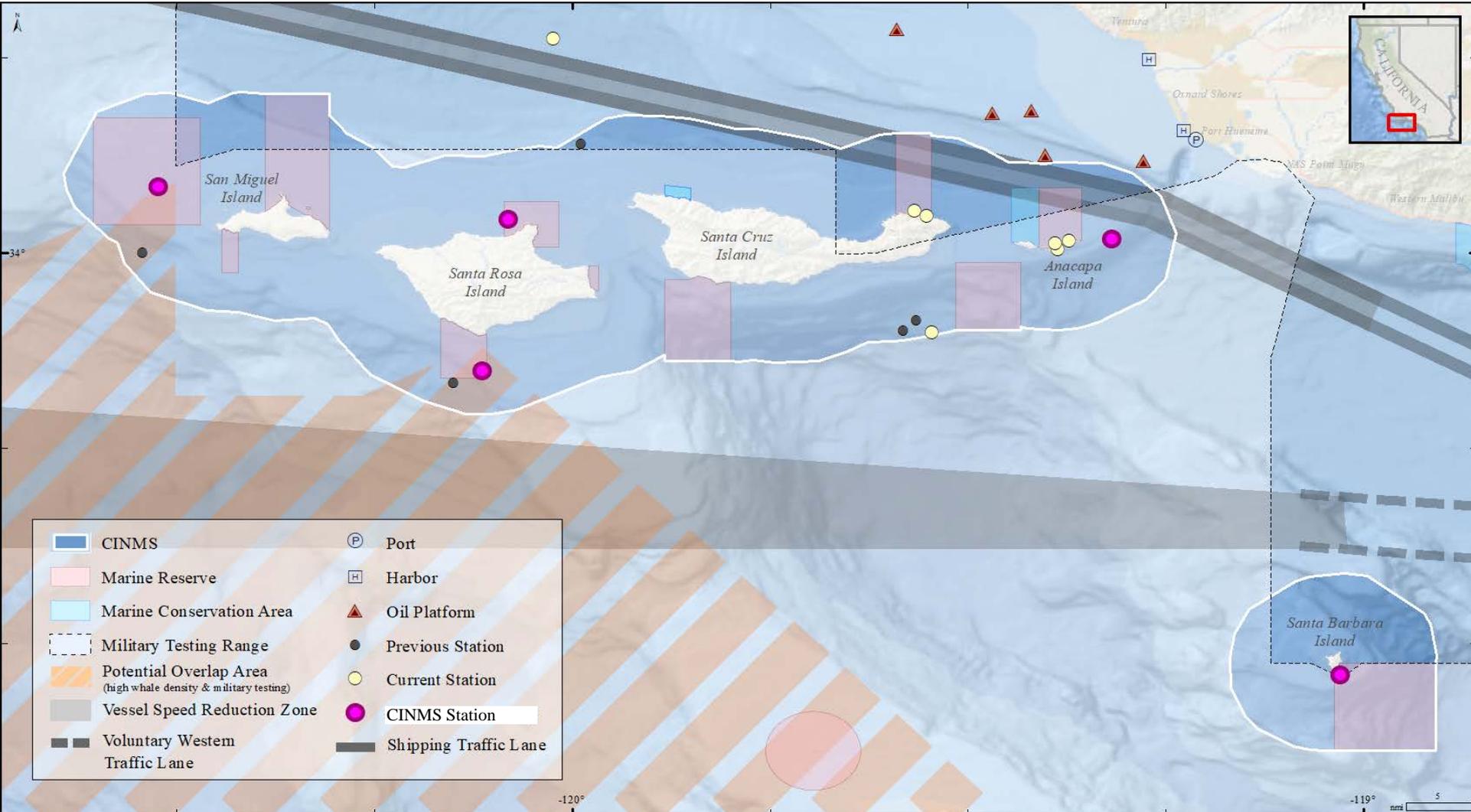


Soundscape Monitoring

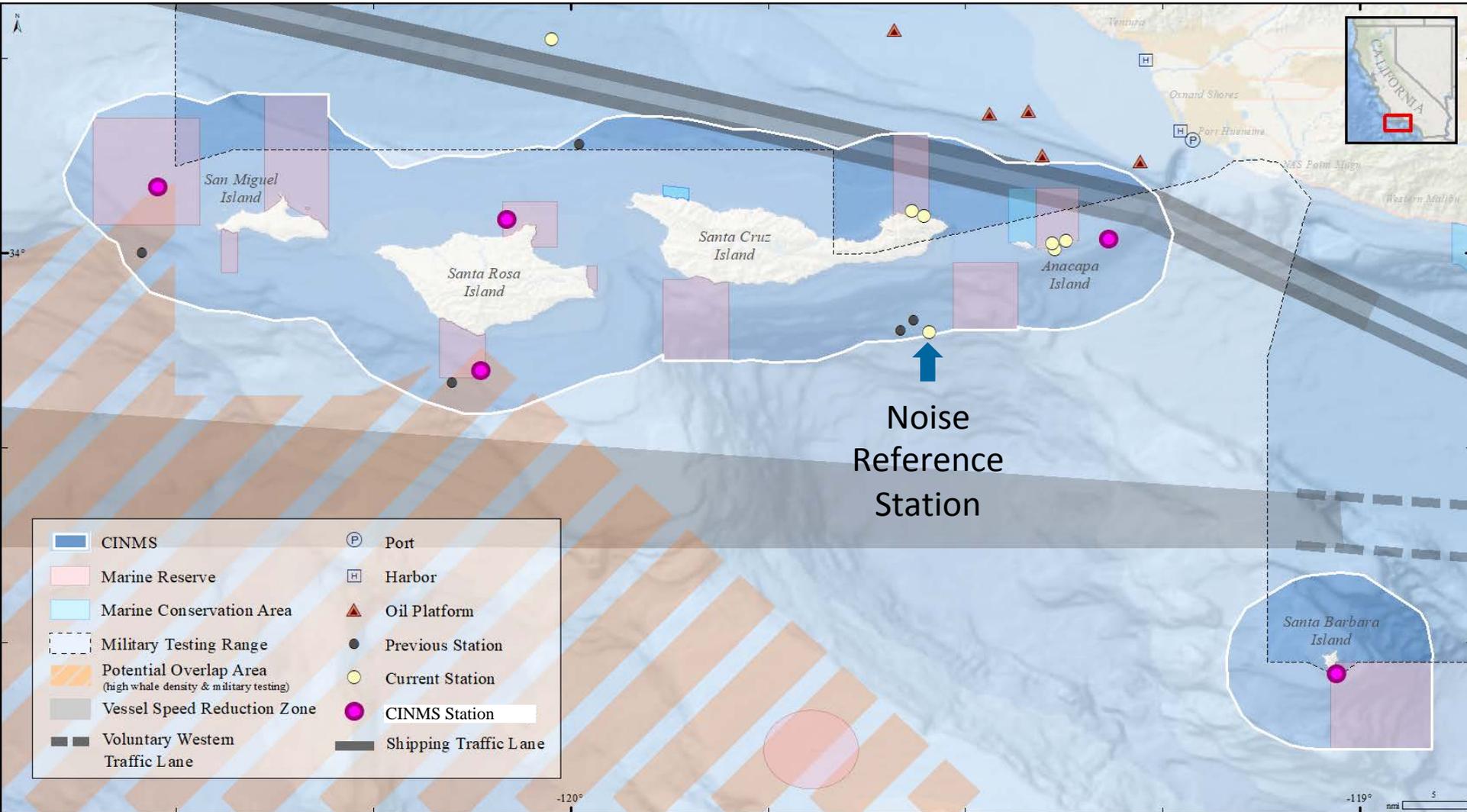


CINMS:

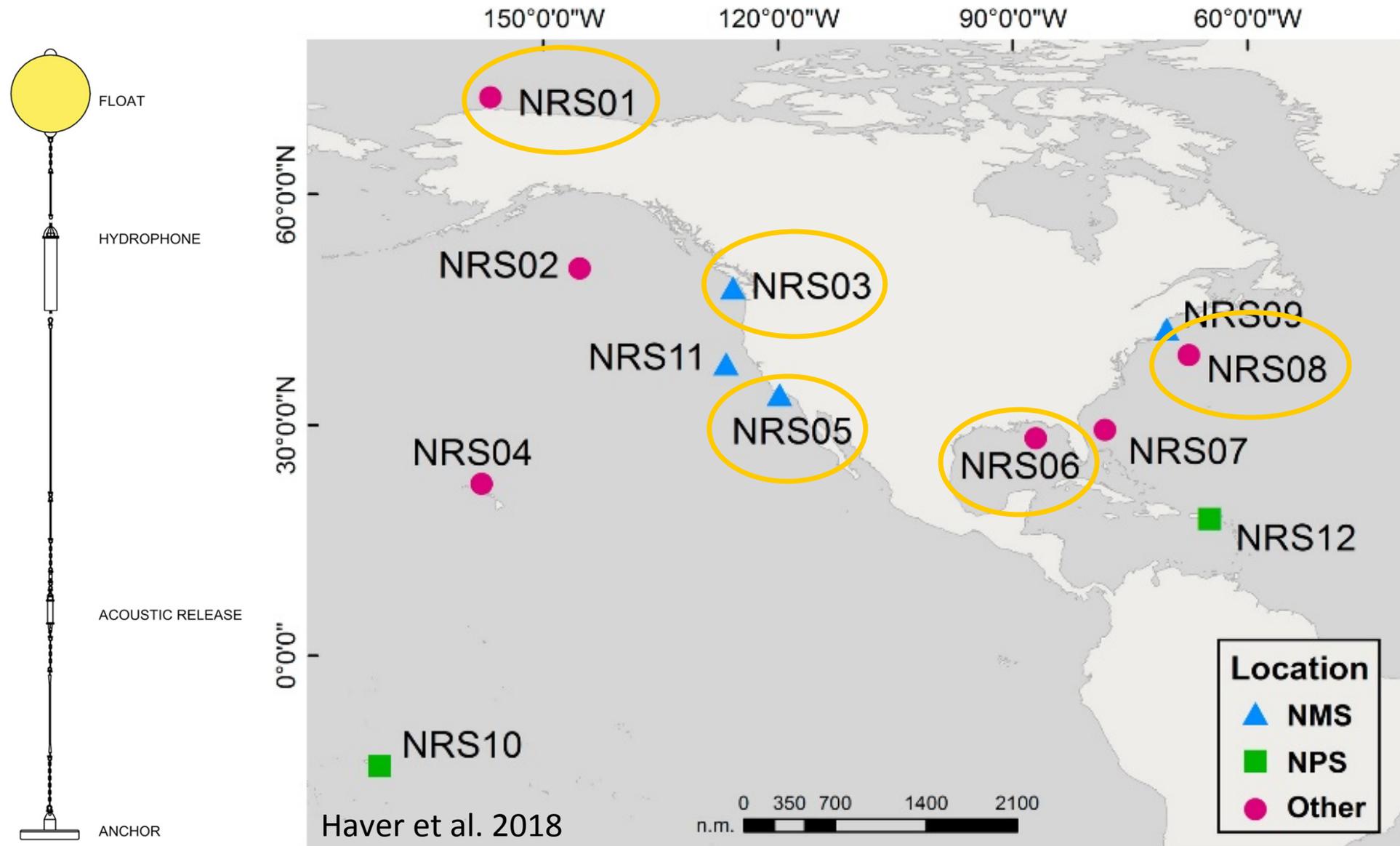
Human Uses and Underwater Sound



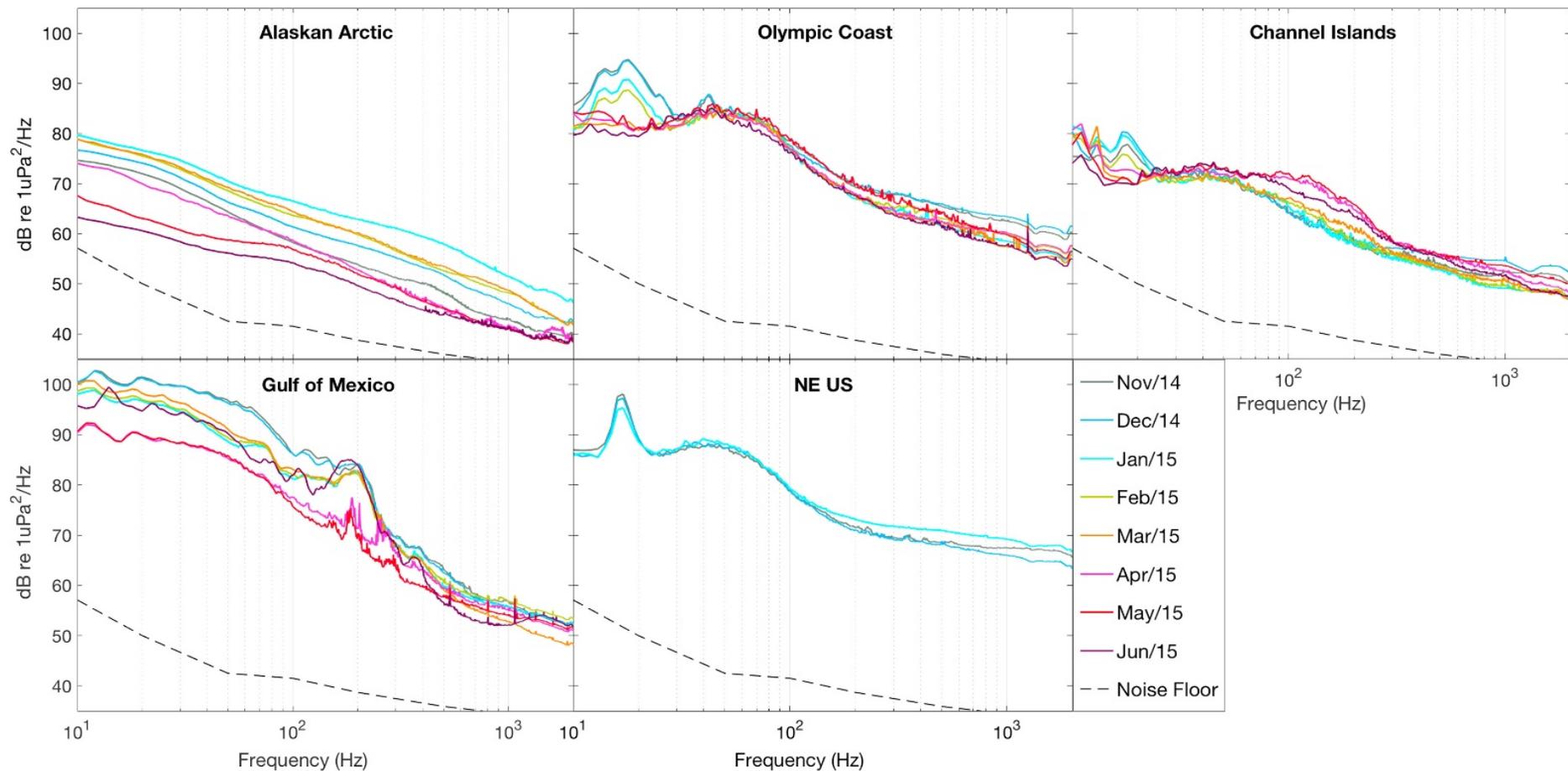
CINMS: Human Uses and Underwater Sound



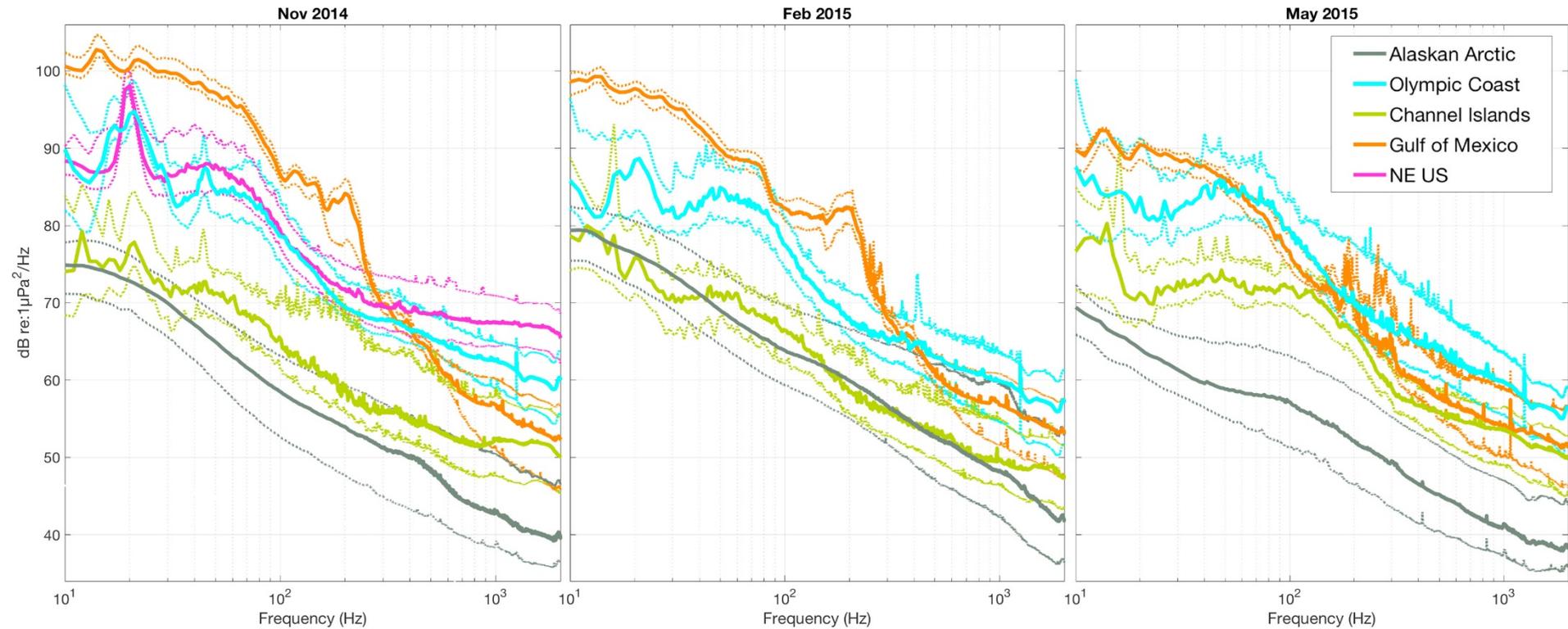
NOAA Noise Reference Stations

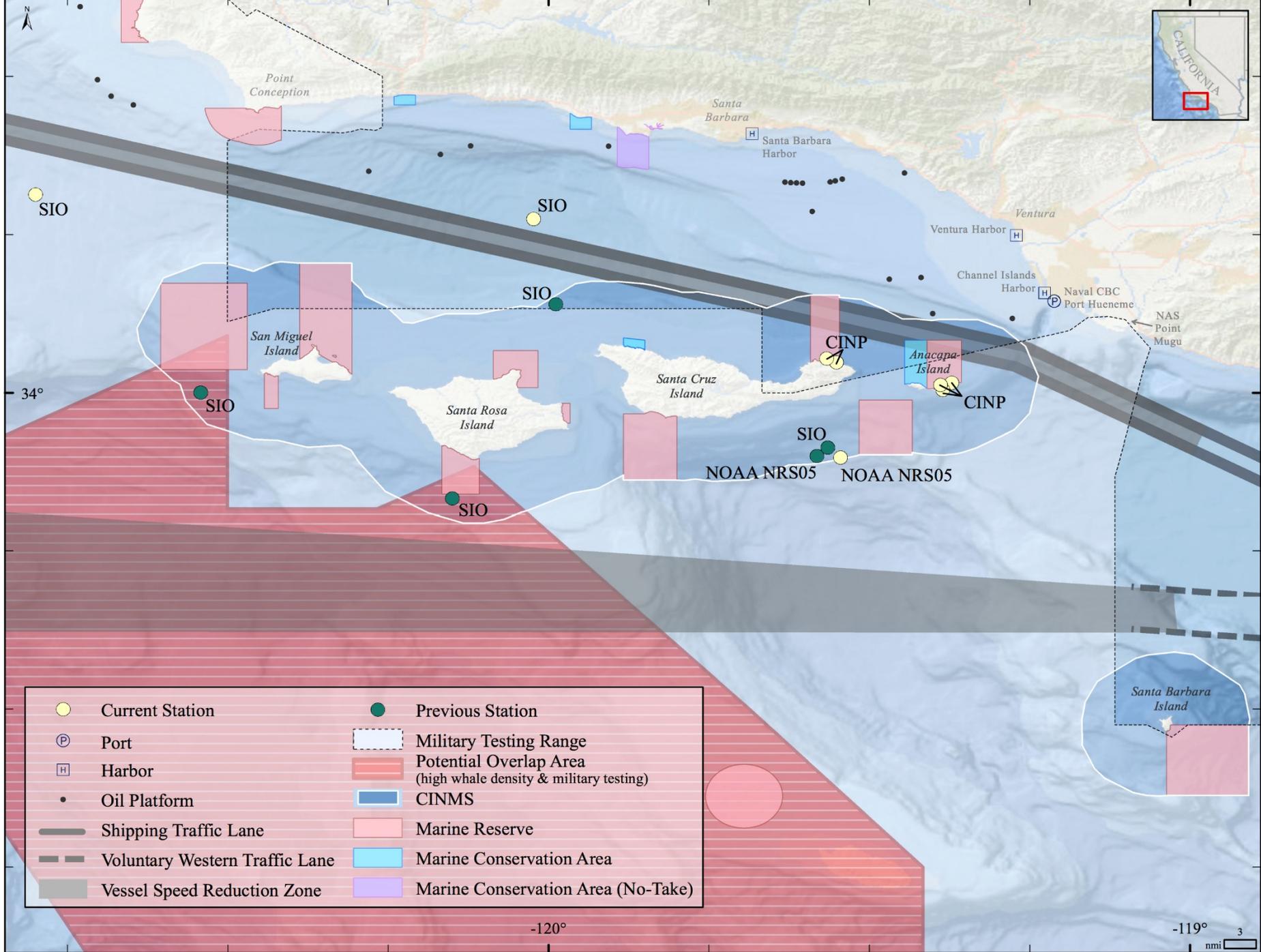


NOAA Noise Reference Stations

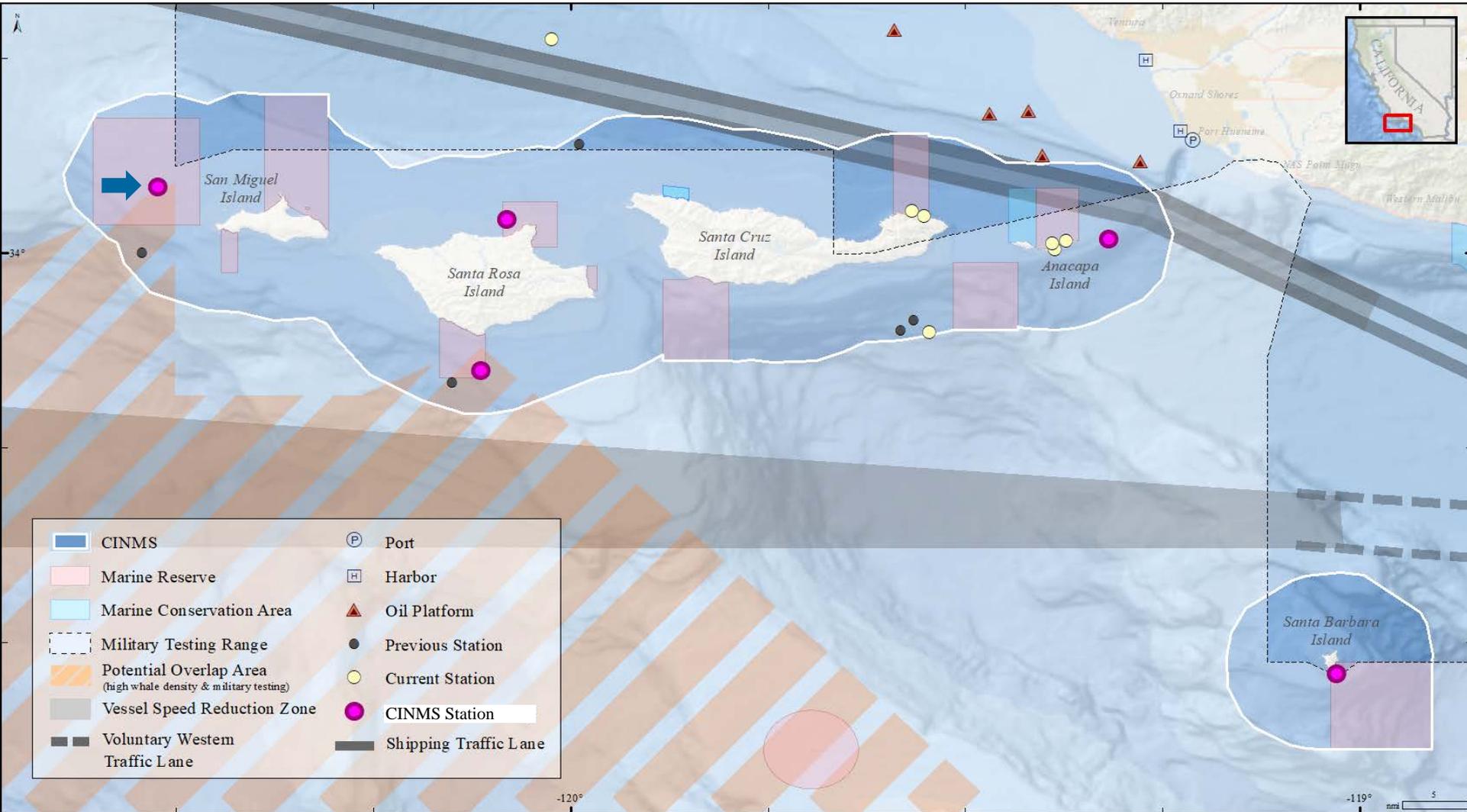


NOAA Noise Reference Stations



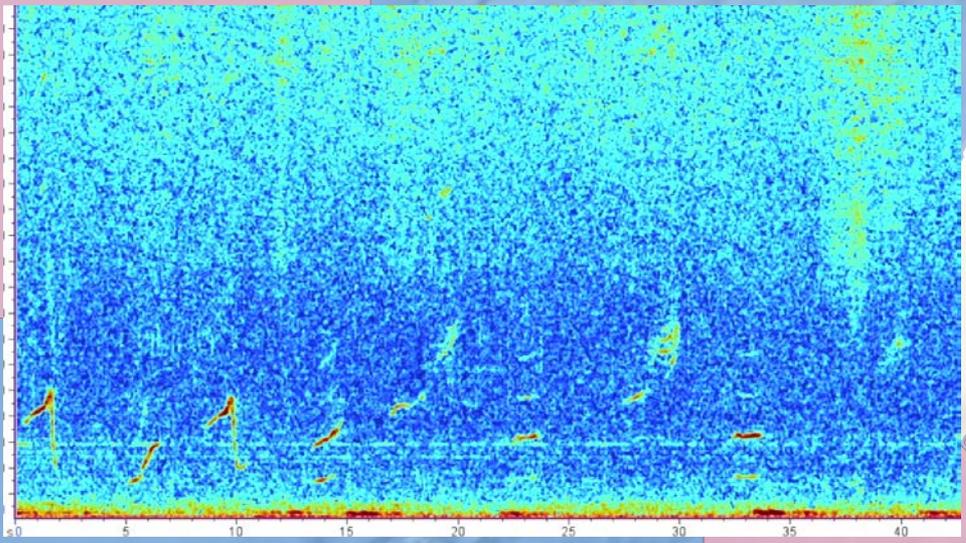


CINMS Shallow Water Soundscapes



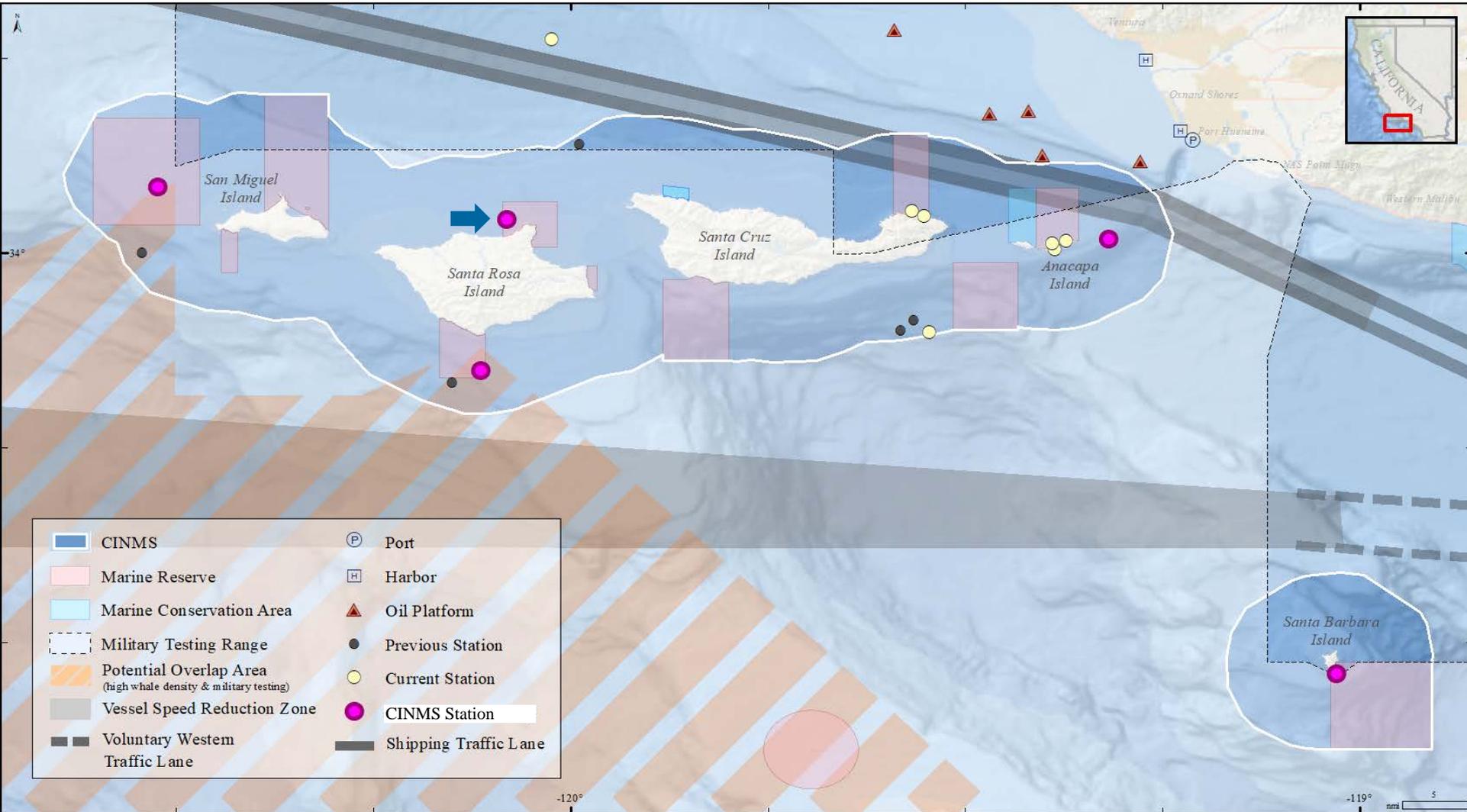
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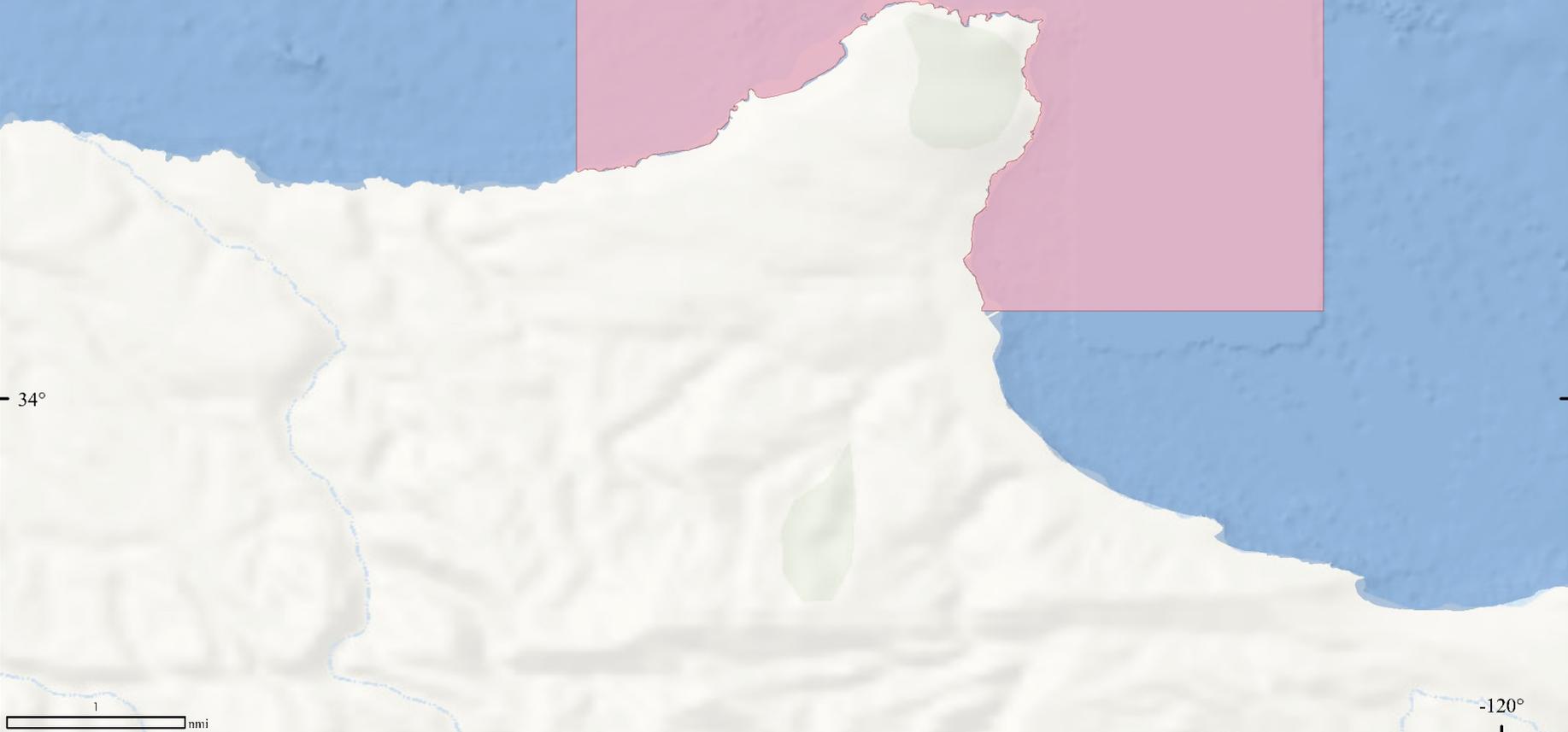
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CINMS Shallow Water Soundscapes





Discovery of Sound in the Sea

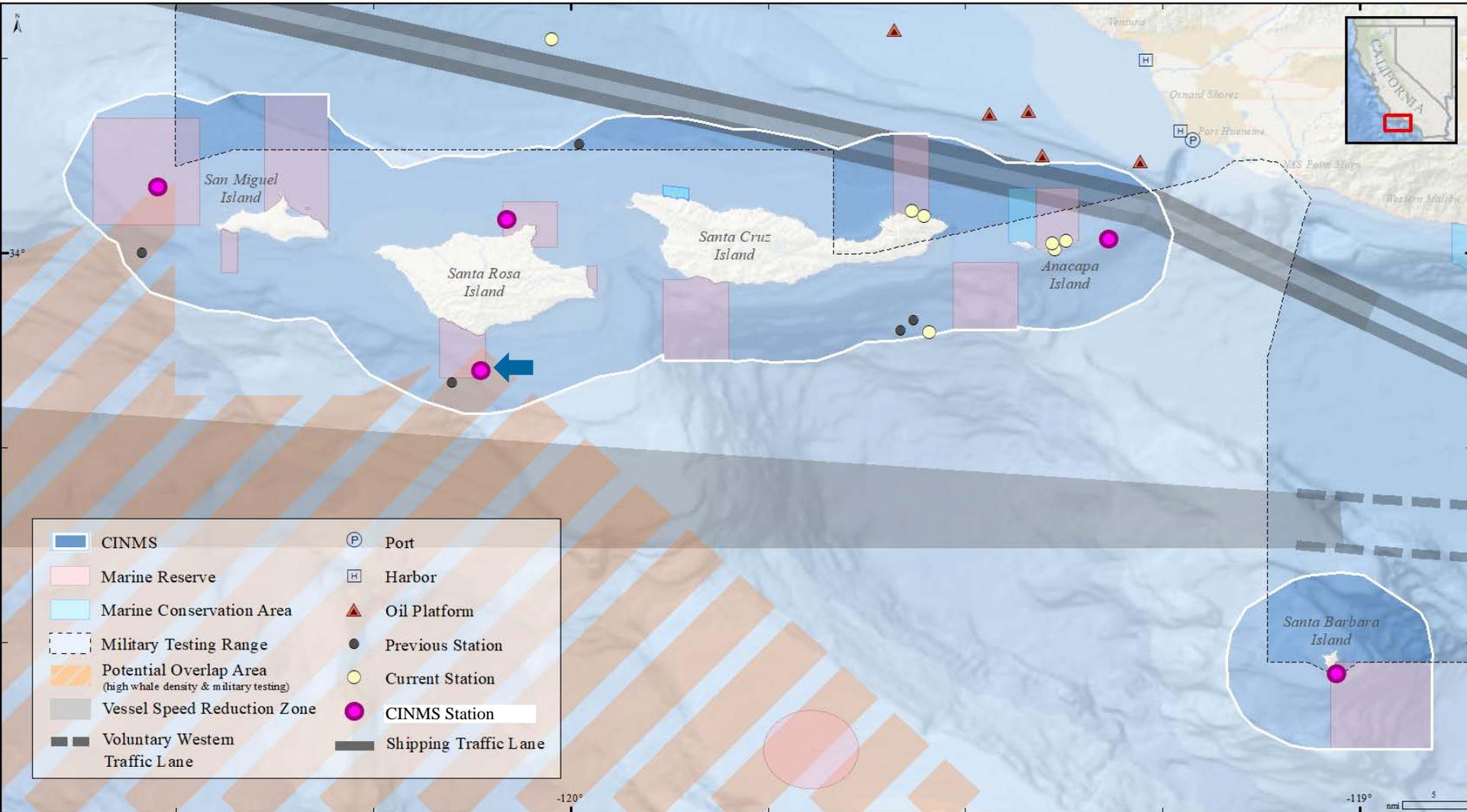


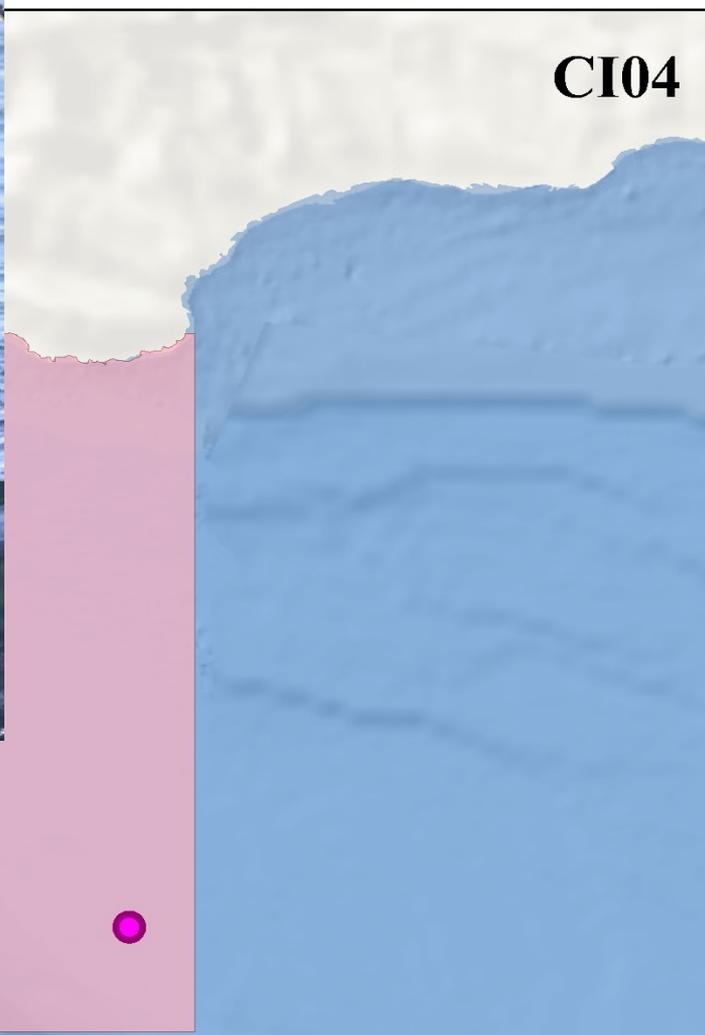
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34°

-120°

CINMS Shallow Water Soundscapes





NMFS Technical Guidance

CINMS Shallow Water Soundscapes

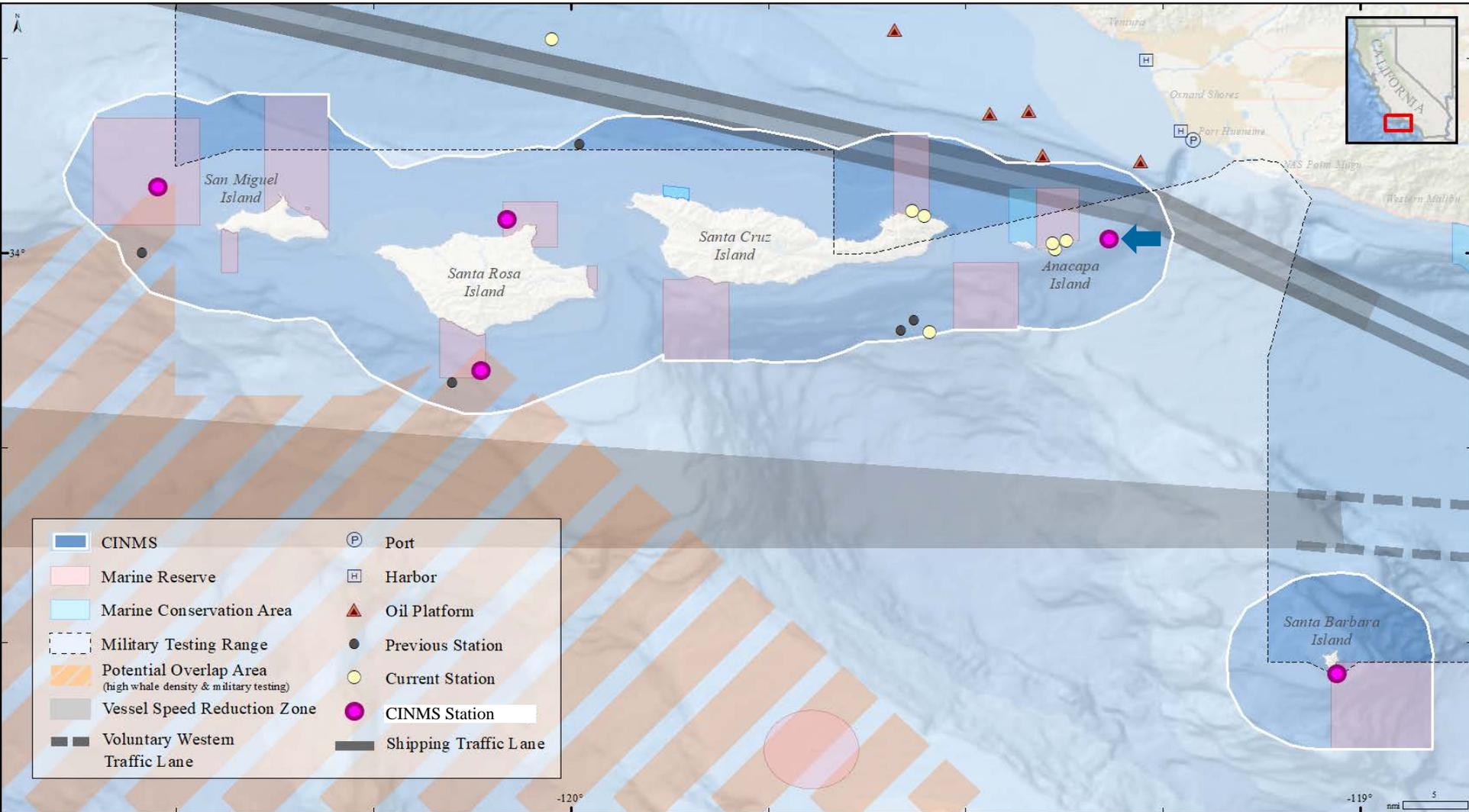
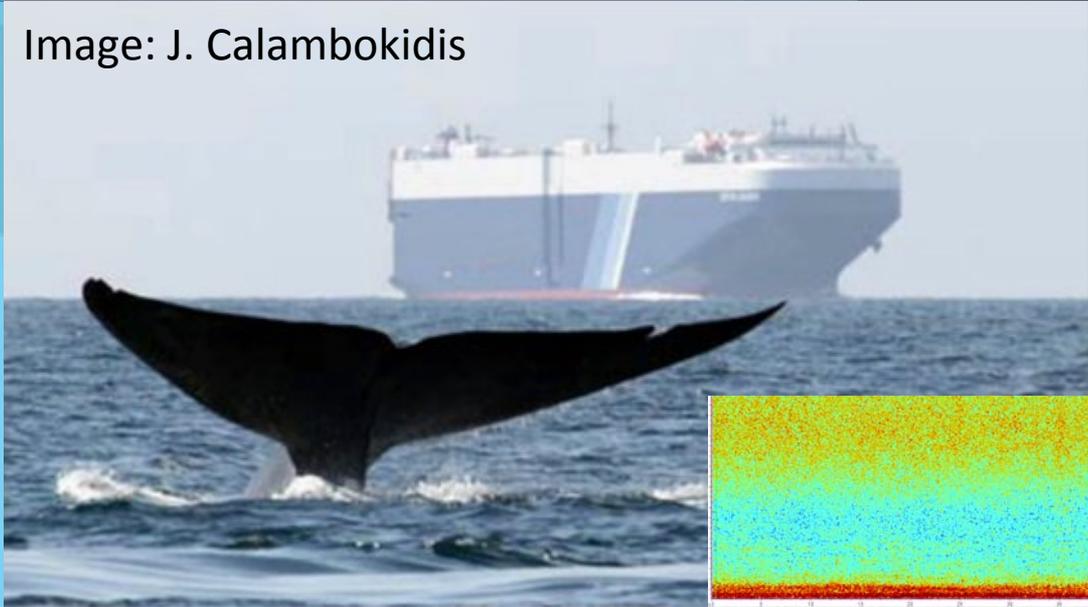


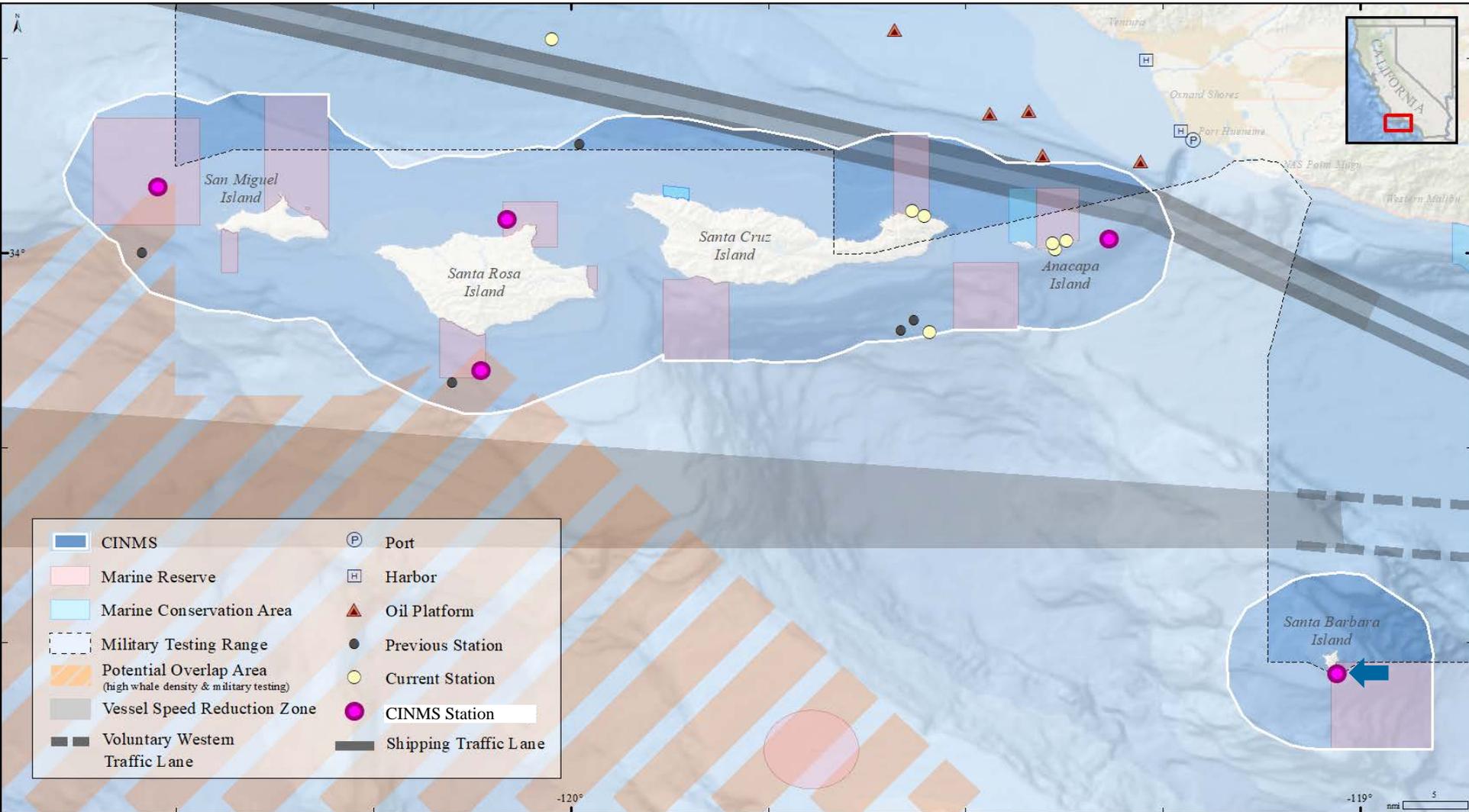
Image: J. Calambokidis

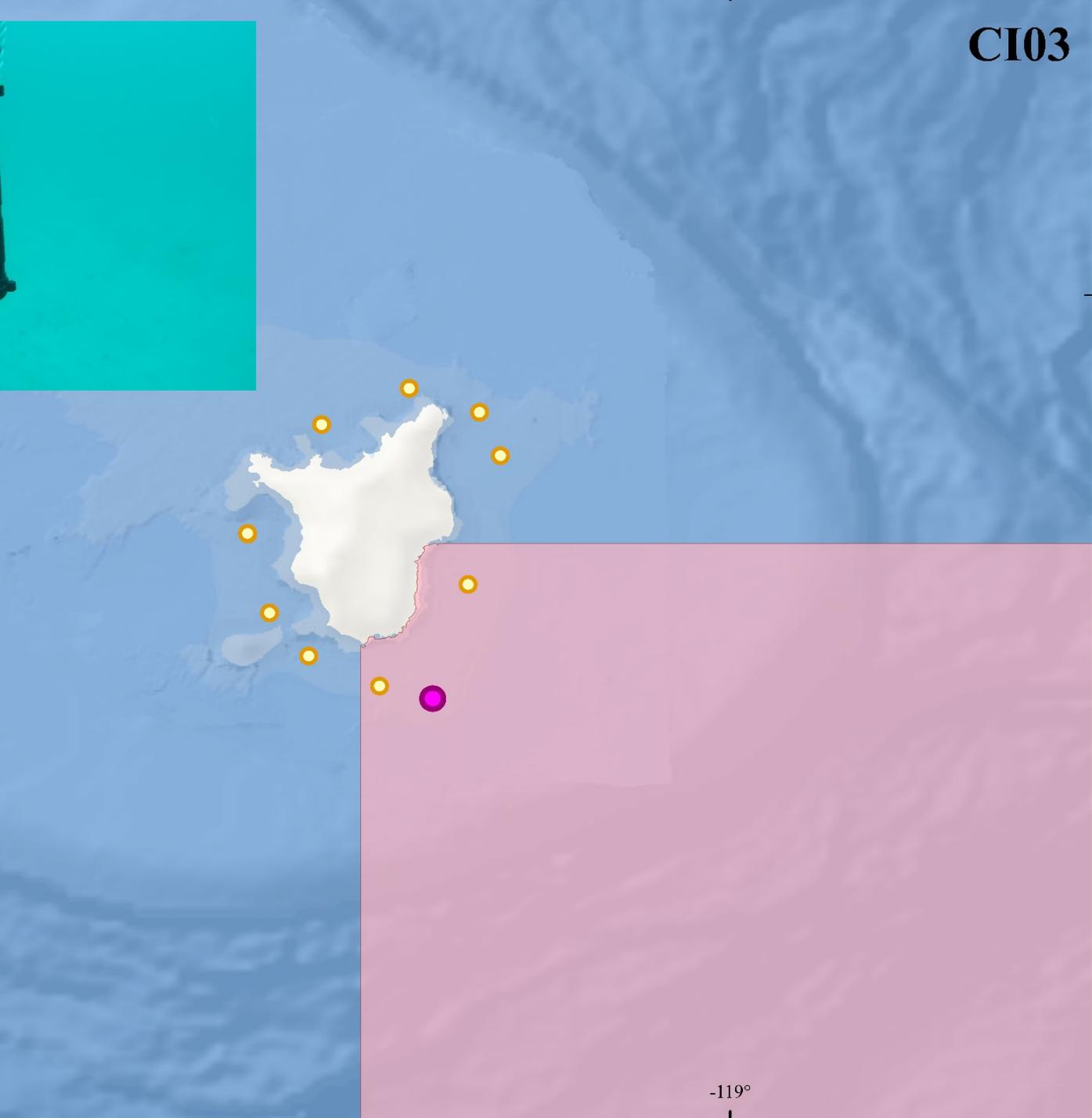
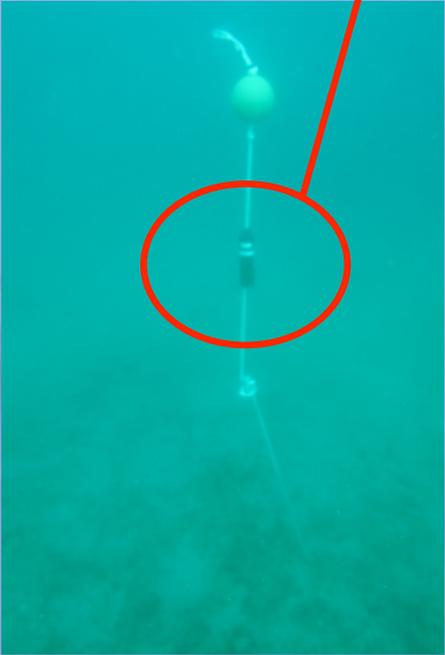


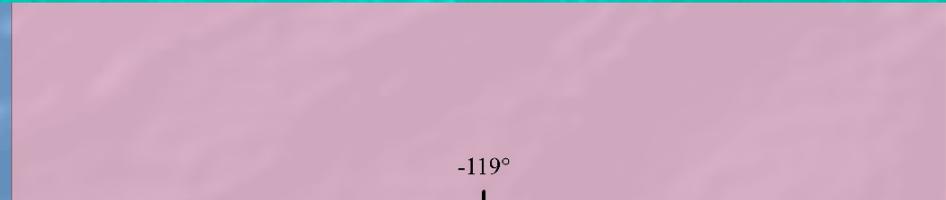
34°



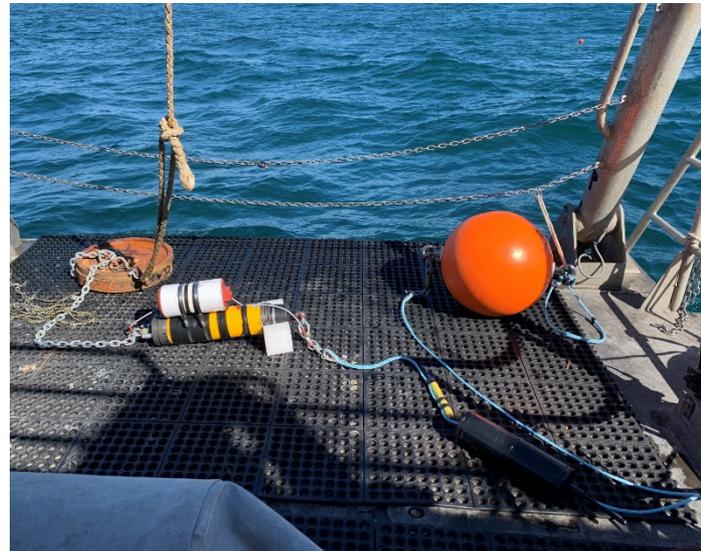
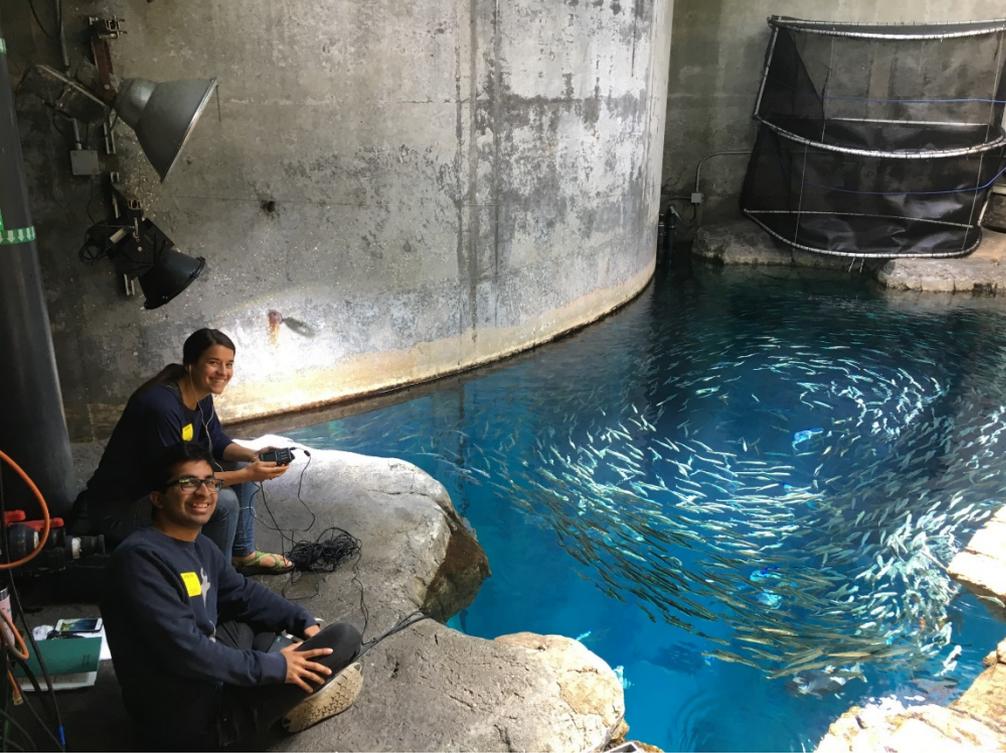
CINMS Shallow Water Soundscapes





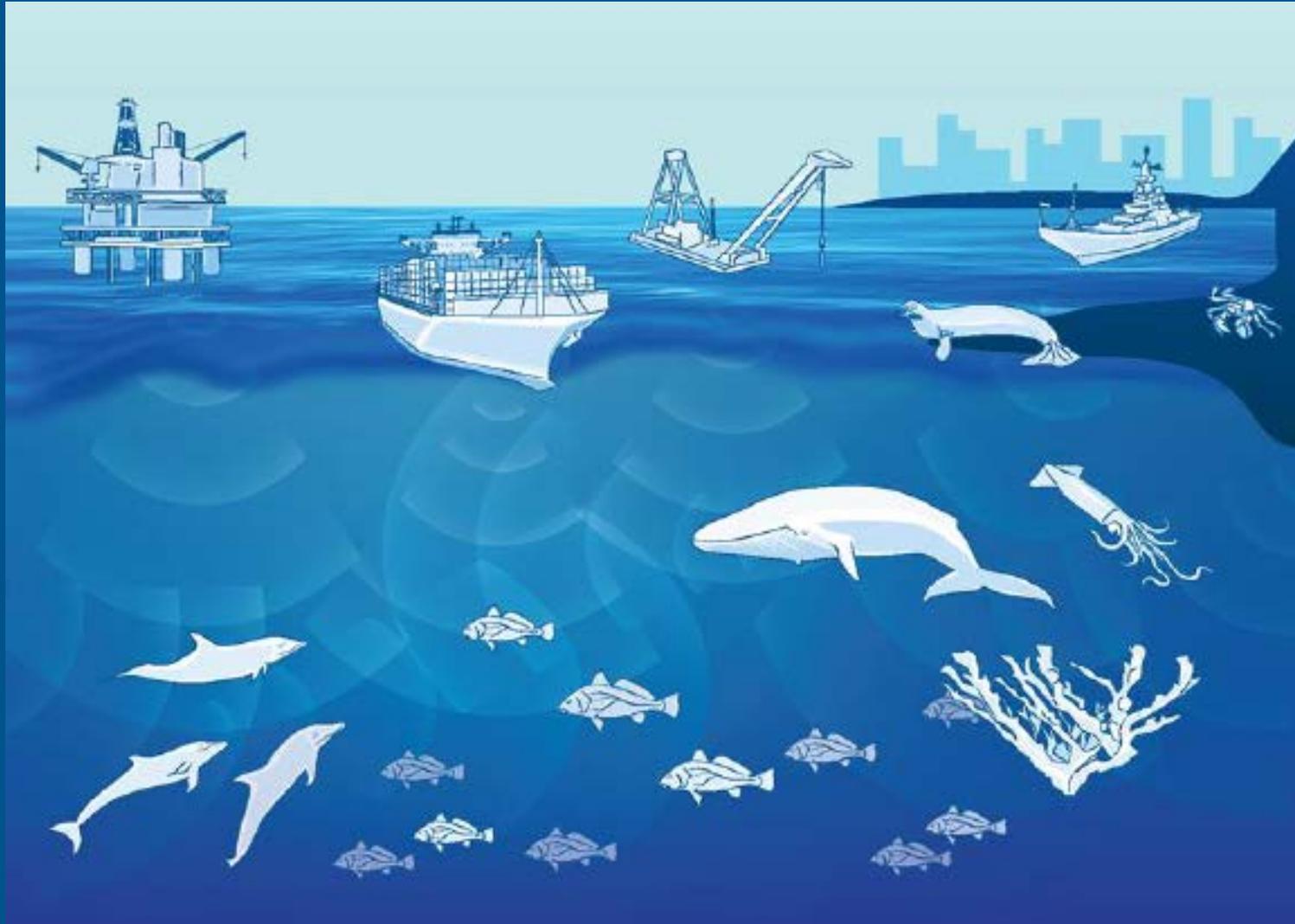


Aquarium recordings



In situ recordings

Soundscape Monitoring: CINMS



Education Resources

- Discovery of Sounds in the Sea: <https://dosits.org/>
- Cetaceans & Sound Mapping: <https://cetsound.noaa.gov/index>
- ONMS website:
<https://sanctuaries.noaa.gov/science/sentinel-site-program/noise.html>
- Recent NPR story: <https://www.wabe.org/reef-georgias-coast-racket/>
- Cabled hydrophone in Monterey Bay National Marine Sanctuary:
<https://www.mbari.org/hydrophone-stream-release/>
- TED-ed:
https://www.ted.com/talks/stephanie_sardelis_why_do_whales_sing/transcript?language=en
- CINMS Soundscape:
<https://nature-other.ambient-mixer.com/channel-islands-nms-soundscape>
- NOAA-NPS NRS soundscape monitoring:
<https://www.pmel.noaa.gov/acoustics/noaanps-ocean-noise-reference-station-network>
- NOAA-Navy soundscape monitoring:
<https://sanctuaries.noaa.gov/science/monitoring/sound/>
- Tracking giant sea bass story:
<https://sanctuaries.noaa.gov/news/dec18/return-of-the-king-giant-sea-bass-research.html>