



Partnerships to Better Understand and Address the Impacts of Offshore Energy Development on Marine Mammals and Ecosystems

Marine Mammal Commission 2014 Meeting

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CetSound: Phase I

2010 multifaceted NOAA commitment:

- Developing tools & soliciting stakeholder input
- To help comprehensively address cumulative impacts of human-induced sound

CetSound Working Groups (Jan. 2011-May 2012):

- **CetMap:** new tools to map cetacean density, distribution & important areas; provide additional context for impact analyses
- **SoundMap:** new tools to predict and map noise contributions from multiple sources

Symposium (May 2012):

- Share products, talk about *potential* management applications, & solicit input from multi-stakeholder audience

Website: cetsound.noaa.gov

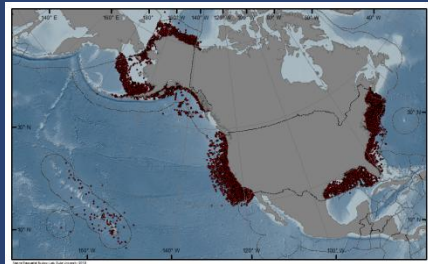
Supported by:



Cetacean Density and Distribution Mapping (CetMap)



1. Cetacean Data Availability Analysis
2. New Density Modeling
3. Biologically Important Areas
4. Mapping & Public Accessibility to Products



Cetacean & Sound Mapping

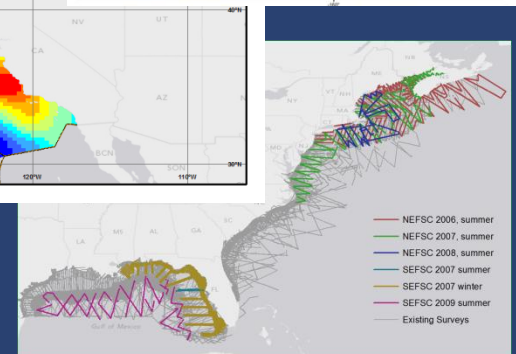
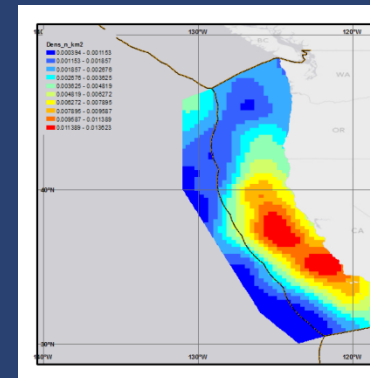
Home Participants Cetacean Sound

| Tier Code | Description | Extend |
|-----------|------------------------------------|--------|
| 1 | hab | hab |
| 2 | sd | sd |
| 3 | po | po |
| 4 | rec | rec |
| 5 | exp | exp |
| 5 | exa | exa |
| | Biologically Important Areas exist | |

Cetacean Data Availability

Show data availability for Region: West Coast (WC) ☒ Hide rows where species is absent

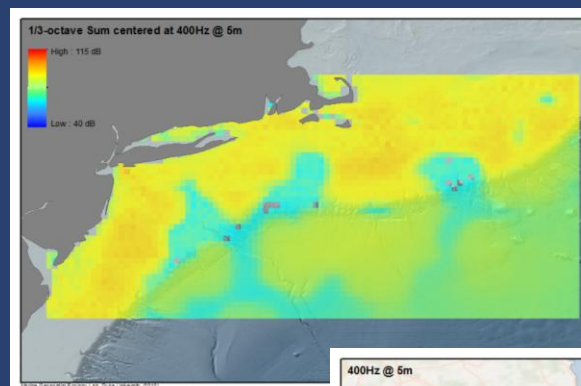
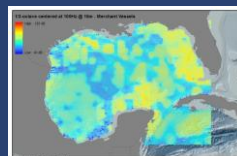
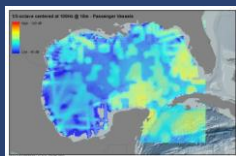
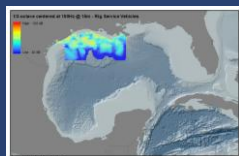
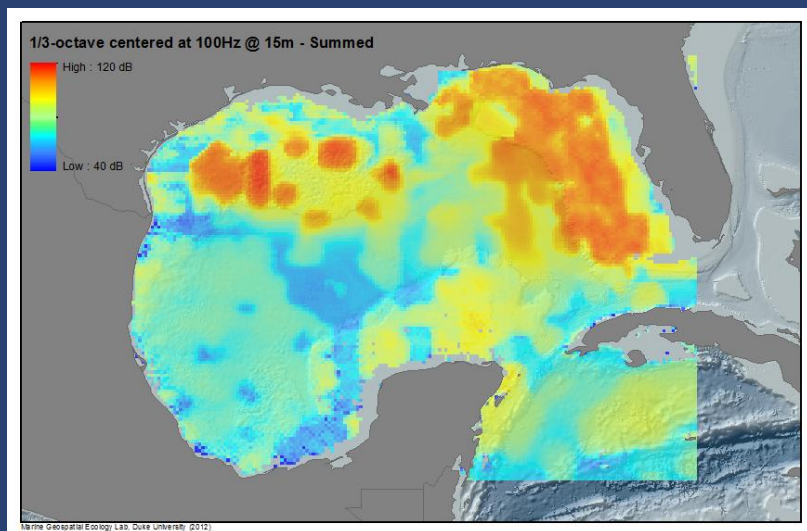
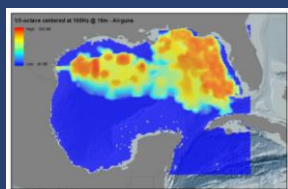
| Region | Species | Package | Product | J | F | M | A | M | J | J | A | S | O | N | D |
|--------|---------------------------------|-------------------------------------|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| ▲ | WC | | | | | | | | | | | | | | |
| ▼ | Balaenoptera acutorostrata | | | sde | sd | | | rec | rec | rec | rec | rec | rec | rec | rec |
| ▼ | Balaenoptera borealis | | | exp | rec | | rec | | | sd | | | | | |
| ▼ | Balaenoptera edeni | | | rec | | | | | | sd | | | | | rec |
| ▼ | Balaenoptera musculus | | | sde | sd | | | rec | rec | hd | | | rec | rec | rec |
| ▲ | Balaenoptera physalus | | | sde | sd | | | rec | rec | hd | | | rec | rec | rec |
| | swfsc_serp_coe_2009 | swfsc_1_coe_25km_balphy_rs_summer | | | | | | | | hd | | | | | |
| | swfsc_stratified_densities_2009 | swfsc_strata_coe_bal_phy_winter | | sde | sd | | | | | | | | | | |
| ▼ | cetmap_observations_2012 | | | rec | rec | rec | rec | rec | rec | rec | rec | rec | rec | rec | rec |
| | cetmap_expertpresence_2012 | cetmap_exp_wc_balaenoptera_physalus | | exp | | | | | | | | | | | |
| ▼ | Berardius bairdii | | | rec | rec | rec | rec | rec | rec | hd | | | rec | rec | |
| ▼ | Delphinus capensis | | | rec | | | rec | | sd | sd | | sd | | | |
| ▼ | Delphinus delphis | | | rec | rec | rec | rec | rec | rec | hd | | | rec | rec | rec |
| ▼ | Delphinus spp. | | | sde | sd | | | rec | rec | hd | | | rec | rec | rec |
| ▼ | Eschrichtius robustus | | | rec | rec | rec | rec | rec | rec | rec | rec | rec | rec | rec | rec |
| ▼ | Eubalaena japonica | | | sde | sd | | | rec | | | | | | | |
| ▼ | Globicephala macrorhynchus | | | exp | | rec | | | | sd | | | | | rec |
| ▼ | Grampus griseus | | | sde | sd | | | rec | rec | hd | | | rec | rec | rec |





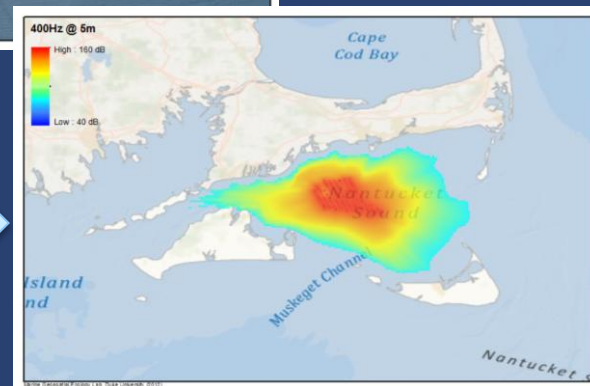
Underwater Sound Field Mapping Working Group (SoundMap)

- Chronic, regional to ocean-basin scale sound fields associated with multiple source types
- More comprehensive representations of local sound fields associated with shorter-term exemplar “events”



State I: Chronic Background Noise

State II: Pile Driving



Phase II: NOAA Ocean Noise Strategy: *Near-term Objectives*



1. Secure support within NOAA for next steps toward the 10 year vision – *Fall 2012*
 - Identify staff and leadership within NMFS and NOS responsible for developing and implementing Strategy
 - Brief NOAA leadership (June-Dr. Lubchenco, November-Dr. Titley)
2. Organize cross-NOAA team to identify noise conservation goals to guide: a) science planning and prioritization, and b) management decisions under multiple authorities – *Underway*
3. Create new or utilize existing external forums (Federal agencies, non-governmental stakeholders, international) to maximize synergy with related efforts - *Underway*
4. Maintain and further develop tools that support policy decision making - *Requires further support*
5. Implement outreach and education on ocean noise and NOAA's goals for reducing its impacts – *Requires further support*

Phase II: NOAA Ocean Noise Strategy

2013-2014 Work



- ***Ocean Noise Strategy Framework Drafting***: Creation and leadership for 3 cross-line office writing groups to draft 3 chapters
- ***NOAA Noise Reference Stations***: OAR/NMFS/NOS collaboration to deploy first NOAA-coordinated network of acoustic monitoring sensors throughout US EEZ.
- ***Biologically Important Areas***: Submittal to peer-reviewed journal 8 articles identifying important reproductive, feeding, and migratory areas, and resident populations, for cetaceans in US EEZ (March 2014).
- ***International Underwater Sound Field Mapping Techniques Workshop***: Initiated and led planning with IWC, IQOE, ONRG, and the Netherlands (April 2014).
- ***Joint Subcommittee on Ocean Science and Technology (JSOST) Interagency Task Force on Ocean Noise and Marine Life***: Coordinated with Navy/BOEM/MMC to facilitate across-agency approach to Noise (science and management)
- ***Representing Strategy Objectives in Various Forums***: Effects of Noise on Aquatic Life (Hungary, 8/13), Arctic Council PAME (Russia, 9/13), IWC Arctic (Alaska, 3/14)



Additional Partnering: Gulf of Mexico Workshops

- Jointly planned and sponsored workshops (NMFS, BOEM, MMC, API, IAGC, and individual companies).
- Enhance data/information collection, discussion, and stakeholder input in support of analyses needed for regulatory compliance.

Mitigation and Monitoring Workshop (late 2012)

- Understanding benefits to species, effectiveness, and practicability of proposed mitigation measures
- Beginning to prioritize data needs and monitoring strategies in the Gulf of Mexico

Sound Exposure Modeling workshop (early 2014)

- Approaches to modeling sound fields from airgun arrays and other active acoustic sources, including data requirements and performance in various contexts.
- Approaches for integration of modeled sound fields with biological data to estimate marine mammal sound exposures.
- Assumptions and uncertainties for each approach and resultant effects on exposure estimates.