Approach for Marine Mammal Impact Assessment in the Atlantic G&G Programmatic EIS
• Identify Resources
  • Species present within the Area of Interest (AOI)
  • Distributions (spatial and temporal)
  • Relative densities
• Define Impact Significance Criteria
• Identify Impact-Producing Factors (IPFs)
• Data
  • Proposed Action-related information
  • Resource-related information
  • Establish mitigation measures
• Analysis of Impacts
  • Estimates of incidental take
  • Determination of impact level for each IPF
**Mysticete (Baleen) Whales**
- North Atlantic right whale
- Blue whale
- Fin whale
- Humpback whale
- Sei whale
- Bryde’s whale
- Common minke whale

**Sirenians**
- West Indian manatee

**Pinnipeds (Outside normal range)**
- Hooded seal
- Harbor seal
- Gray seal

**Odontocete (Toothed) Whales, Dolphins, and Porpoises**
- Sperm whale
- Short-beaked common dolphin
- Pygmy killer whale
- Short-finned pilot whale
- Long-finned pilot whale
- Risso’s dolphin
- Northern bottlenose whale
- Pygmy sperm whale
- Dwarf sperm whale
- Atlantic white-sided dolphin
- Fraser’s dolphin
- Sowerby’s beaked whale
- Blainville’s beaked whale
- Gervais’ beaked whale
- True’s beaked whale
- Killer whale
- Melon-headed whale

- Harbor porpoise
- False killer whale
- Pantropical spotted dolphin
- Clymene dolphin
- Striped dolphin
- Atlantic spotted dolphin
- Spinner dolphin
- Rough-toothed dolphin
- Bottlenose dolphin
- Cuvier’s beaked whale
• The **Endangered Species Act of 1973 (ESA)** provides for the conservation of species that are *endangered* or *threatened* throughout all or a significant portion of their range.

The BOEM has prepared a Biological Assessment for Section 7 consultation with the National Marine Fisheries Service (NMFS).

• The **Marine Mammal Protection Act (MMPA)** protects marine mammals and prohibits, with certain exceptions, the “take” of marine mammals in U.S. waters and by U.S. citizens on the high seas.

Operators would have to apply for incidental take authorizations for their specific surveys.
Baleen Whales
  • North Atlantic right whale
  • Blue whale
  • Fin whale
  • Humpback whale
  • Sei whale

Toothed Whales and Dolphins
  • Sperm whale

Sireniants
  • West Indian Manatee
Time-Area Closures

No Airgun Surveys (others case-by-case)

- Right Whale Critical Habitat (Nov 15 – Apr 15)
- Mid-Atlantic Seasonal Management Area (Nov 1 – Apr 30)
- Southeast Seasonal Management Area (Nov 15 – Apr 15)
The MMPA has established a process by which citizens of the U.S. can apply for an authorization to incidentally ‘take’ small numbers of marine mammals by harassment, referred to as Incidental Harassment Authorizations, or IHAs.

‘Take’ is defined under the MMPA as "harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect."

‘Harassment’ under the MMPA has been separated into two levels:

- **Level A Harassment** – any act of pursuit, torment, or annoyance that has the **potential to injure** a marine mammal or marine mammal stock in the wild; or
- **Level B Harassment** – any act of pursuit, torment, or annoyance that has the potential to disturb a marine mammal or marine mammal stock in the wild by causing **disruption of behavioral patterns**, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.
Impact Significance Criteria

• **Negligible** – Little or no measurable impacts are observed or expected.
• **Minor** – Impacts are detectable, but are neither extensive nor severe.
• **Moderate** – Impacts are detectable, short-term, extensive, and severe; or impacts are detectable, short-term or long-lasting, localized, and severe; or impacts are detectable, long-lasting, extensive or localized, but less than severe.
• **Major** – Impacts are detectable, extensive, and severe.
Impact-Producing Factors

- Active Acoustic Sound Sources
- Vessel and Equipment Noise
- Vessel and Aircraft Traffic
  - Vessel strike
  - Disturbance
- Trash and Debris
  - Ingestion
  - Entanglement
- Accidental Fuel Spills
1. Description of the Proposed Action
   • Project details
     • Activity types
     • Equipment
     • Spatial and temporal levels of effort
   • Resource-specific parameters
     • Review of mammal hearing and sensitivity
     • Review of established acoustic thresholds for take (Levels A and B)

2. Establishment of Effective and Practical Mitigation Measures

3. Determination of Potential Impacts
   • Estimation of incidental take (Levels A and B harassment) for each species
   • Determination of potential impacts using species-specific information
Active Acoustic Sound Sources

- Seismic Airguns
- Electromechanical Sources
  - Sidescan sonar
  - Boomer subbottom profiler
  - Chirp subbottom profiler
  - Multibeam depth sounder
<table>
<thead>
<tr>
<th>Year</th>
<th>Mid-Atlantic Planning Area</th>
<th>South Atlantic Planning Area</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>2D (km)</td>
<td>3D (blocks)</td>
</tr>
<tr>
<td>2012</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2013</td>
<td>83,400</td>
<td>0</td>
</tr>
<tr>
<td>2014</td>
<td>160,950</td>
<td>0</td>
</tr>
<tr>
<td>2015</td>
<td>12,875</td>
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<tr>
<td>2016</td>
<td>64,375</td>
<td>400</td>
</tr>
<tr>
<td>2017</td>
<td>41,800</td>
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<td>2018</td>
<td>16,100</td>
<td>200</td>
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<tr>
<td>2019</td>
<td>16,100</td>
<td>200</td>
</tr>
<tr>
<td>2020</td>
<td>800</td>
<td>300</td>
</tr>
<tr>
<td>TOTAL</td>
<td>396,400</td>
<td>1,300</td>
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</tbody>
</table>
Mammal Hearing and Sensitivity

• Frequency Range for Each Species
• Acoustic Thresholds for Each Species
• Established Acoustic Impact Thresholds
  • Sound pressure level (NMFS approach)
  • Sound exposure level (Southall et al. approach)
Acoustic Sound Source Modeling

- Six acoustic sources were considered for the modeling study – large and small airgun arrays, sidescan sonar, boomer, chirp subbottom profiler, and multibeam depth sounder.
- Twenty-two modeling sites were defined throughout the AOI.
  - The water depth at the sites varied from 30 to 5,400 meters (m)
  - Two types of bottom composition were considered: sand and clay
  - Twelve sound speed profiles for the water column
  - Thirty-five distinct propagation scenarios. Multiple sources modeled for each scenario, 105 acoustic field estimates.
Predicted SPL (rms) for Modeling Scenarios 1 and 20 (water depth is 5,390 m and 100 m at the source, respectively.) The sources are (a) 5,400 in.³ and (b) 90 in.³ airgun arrays.
Analysis of Impacts – Estimation of Incidental Take from the Acoustic Integration Model (AIM)

Environmental and Acoustic Parameters
- bathymetry,
- SVPs, bottom sediments,
- wind and wave descriptors, etc.

Acoustic Source Parameters
- source level,
- Beam patterns,
- Frequency,
- movement geometry, etc.

Acoustic Propagation Models

AIM

Animal Distribution and Density

Animal Movement In 3 Dimensions

Necessary Inputs
- AIM Model
- Analysis of Impacts – Estimation of Incidental Take
• No lethal impacts to marine mammals are expected.
• Estimates of Levels A and B takes are detailed in the Programmatic EIS using both the NMFS and Southall et al. criteria.
• Although the modeling predicts Level A takes (injury), most are expected to be avoided through mitigation included in the seismic survey protocol.
• Behavioral responses (Level B harassment) are the most likely and extensive effects of underwater noise on marine mammals.
• Time-area closures are expected to significantly reduce the risk of impacts to North Atlantic right whales (and other species).
• Alternative B would further reduce impacts through additional time-area closures, separation between seismic surveys, and required use of passive acoustic monitoring (PAM).
## Mitigation Measures

<table>
<thead>
<tr>
<th>Mitigation Measure</th>
<th>Alternative</th>
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<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Time-Area Closure for North Atlantic Right Whales</td>
<td>Yes</td>
</tr>
<tr>
<td>Seismic Survey Protocol (ramp-up, visual observers, and startup and shutdown requirements)</td>
<td>Yes</td>
</tr>
<tr>
<td>Passive Acoustic Monitoring (PAM)</td>
<td>Optional</td>
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<tr>
<td>Separation between Simultaneous Seismic Surveys</td>
<td>No</td>
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<tr>
<td>HRG Survey Protocol (for non-airgun surveys)</td>
<td>Yes</td>
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<tr>
<td>Guidance for Vessel Strike Avoidance</td>
<td>Yes</td>
</tr>
<tr>
<td>Guidance for Marine Debris Awareness</td>
<td>Yes</td>
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</tbody>
</table>
Time-Area Closures

No Airgun Surveys (others case-by-case)

- Right Whale Critical Habitat (Nov 15 – Apr 15)
- Mid-Atlantic Seasonal Management Area (Nov 1 – Apr 30)
- Southeast Seasonal Management Area (Nov 15 – Apr 15)
Time-Area Closures

No Airgun Surveys (others case-by-case)

- Right Whale Critical Habitat (Nov 15 – Apr 15)
- Mid-Atlantic Seasonal Management Area (Nov 1 – Apr 30)
- Southeast Seasonal Management Area (Nov 15 – Apr 15)
- Sea Turtle Closure Off Brevard County (May 1– Oct 31)
- Additional 20-nmi Closure Zone (Nov 1 – Apr 30)
- Additional 20-nmi Closure Zone (Nov 15 – Apr 15)
### Summary of Impacts to Marine Mammals

<table>
<thead>
<tr>
<th>Impact-Producing Factor</th>
<th>Impact Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alternative A</td>
</tr>
<tr>
<td>Active Acoustic Sound Sources - Airguns</td>
<td>Moderate</td>
</tr>
<tr>
<td>Active Acoustic Sound Sources - Electromechanical sources</td>
<td>Minor</td>
</tr>
<tr>
<td>Vessel and Equipment Noise</td>
<td>Negligible-Minor</td>
</tr>
<tr>
<td>Vessel Traffic</td>
<td>Negligible</td>
</tr>
<tr>
<td>Aircraft Traffic and Noise</td>
<td>Negligible-Minor</td>
</tr>
<tr>
<td>Trash and Debris</td>
<td>Negligible</td>
</tr>
<tr>
<td>Accidental Fuel Spills</td>
<td>Negligible-Minor</td>
</tr>
</tbody>
</table>
• Comment period closes on May 30, 2012.

• Comments collected at this meeting may be
  • Oral comments – 3-minute maximum
  • Written comments – leave at the registration table

• Comments may be emailed to GGEIS@boem.gov.


• Label and mail “Comments on the G&G Draft Programmatic EIS”

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