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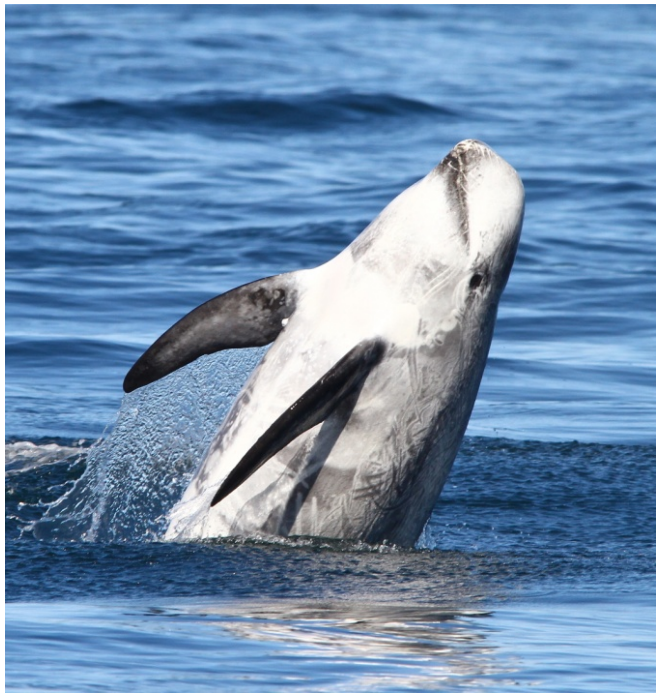
Approach for Marine Mammal Impact Assessment in the Atlantic G&G Programmatic EIS

GGEIS@boem.gov

Impact Assessment Method – Overview

- 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



Marine Mammal Species Present within the AOI

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

Federal Laws

- 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.

ESA Listed Species

Baleen Whales

- North Atlantic right whale
- Blue whale
- Fin whale
- Humpback whale
- Sei whale

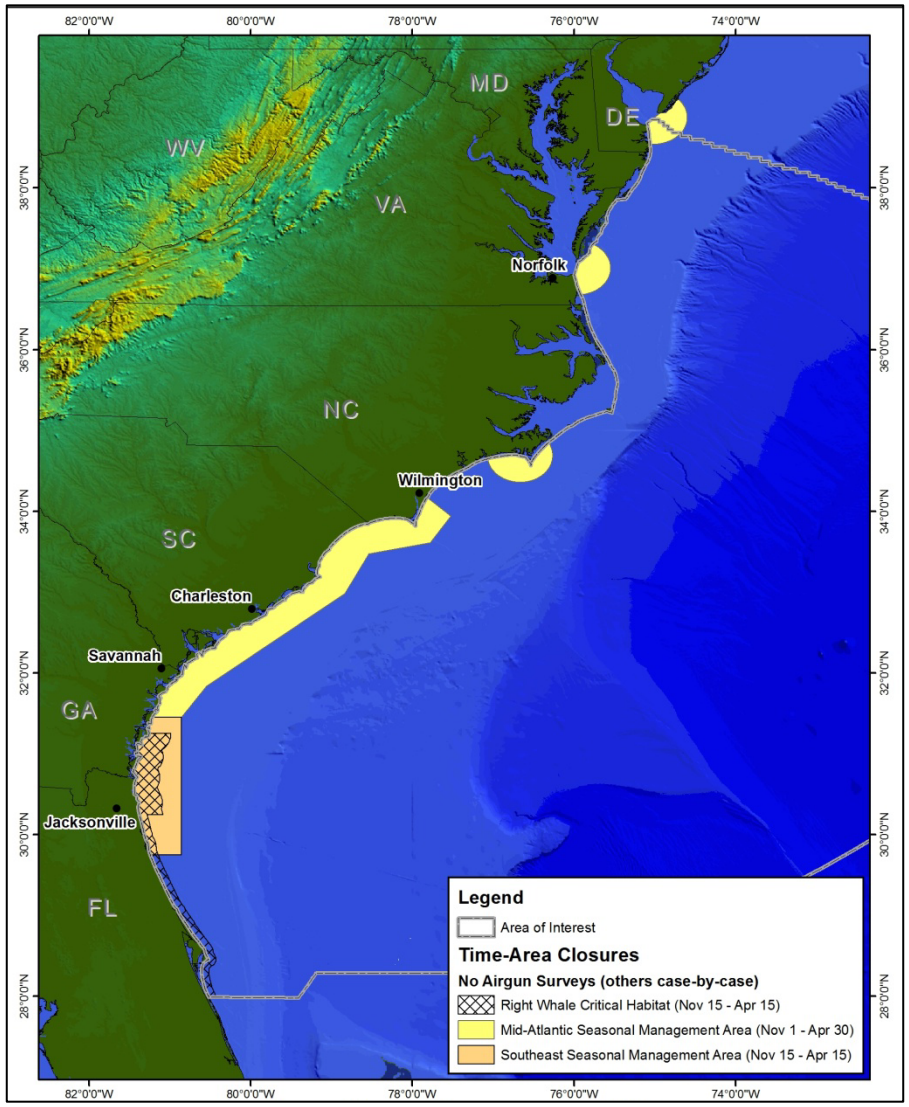
Toothed Whales and Dolphins

- Sperm whale

Sirenians

- West Indian Manatee

Time-Area Closure – Alternative A



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)

Marine Mammal Protection Act (MMPA)

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

Impact Assessment Methods

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

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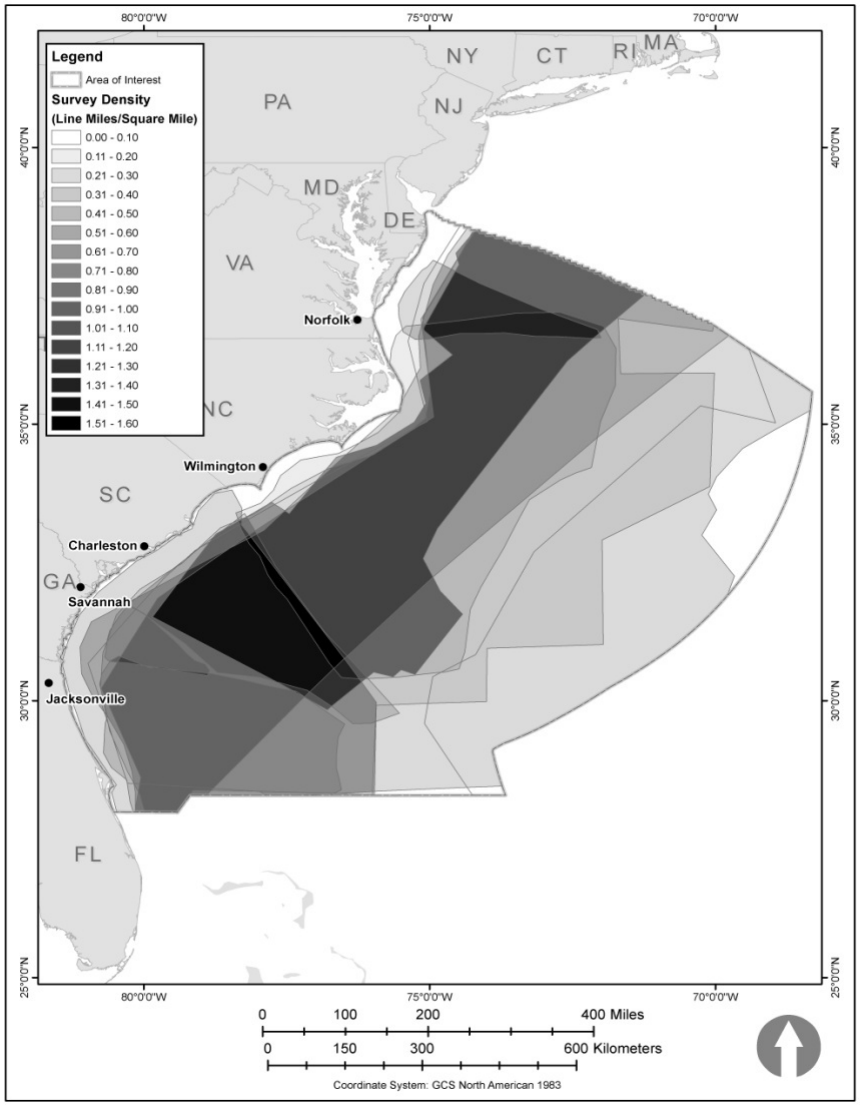
Survey Level of Effort

Year	Mid-Atlantic Planning Area						South Atlantic Planning Area					
	2D (km)	3D (blocks)	WAZ (blocks)	HRG (line km)	VSP (line km)	CSEM (line km)	2D (km)	3D (blocks)	WAZ (blocks)	HRG (line km)	VSP (line km)	CSEM (line km)
2012	0	0	0	0	0	0	0	0	0	0	0	0
2013	83,400	0	0	0	0	0	28,450	0	0	0	0	0
2014	160,950	0	0	0	0	0	56,900	0	0	0	0	0
2015	12,875	0	0	0	0	0	8,050	0	0	0	0	0
2016	64,375	400	0	0	0	3,220	48,300	300	0	0	0	1,600
2017	41,800	200	0	0	0	16,100	38,624	200	0	3,220	0	8,050
2018	16,100	200	100	3,220	0	32,200	32,200	200	100	32,200	0	9,650
2019	16,100	200	100	16,100	160	16,100	8,050	200	200	16,100	320	320
2020	800	300	200	64,375	320	32,200	800	300	200	40,250	480	320
TOTAL	**396,400**	**1,300**	**400**	**83,695**	**480**	**99,820**	**221,374**	**1,200**	**500**	**91,770**	**800**	**19,940**

Survey Locations



Resource Specific Parameters

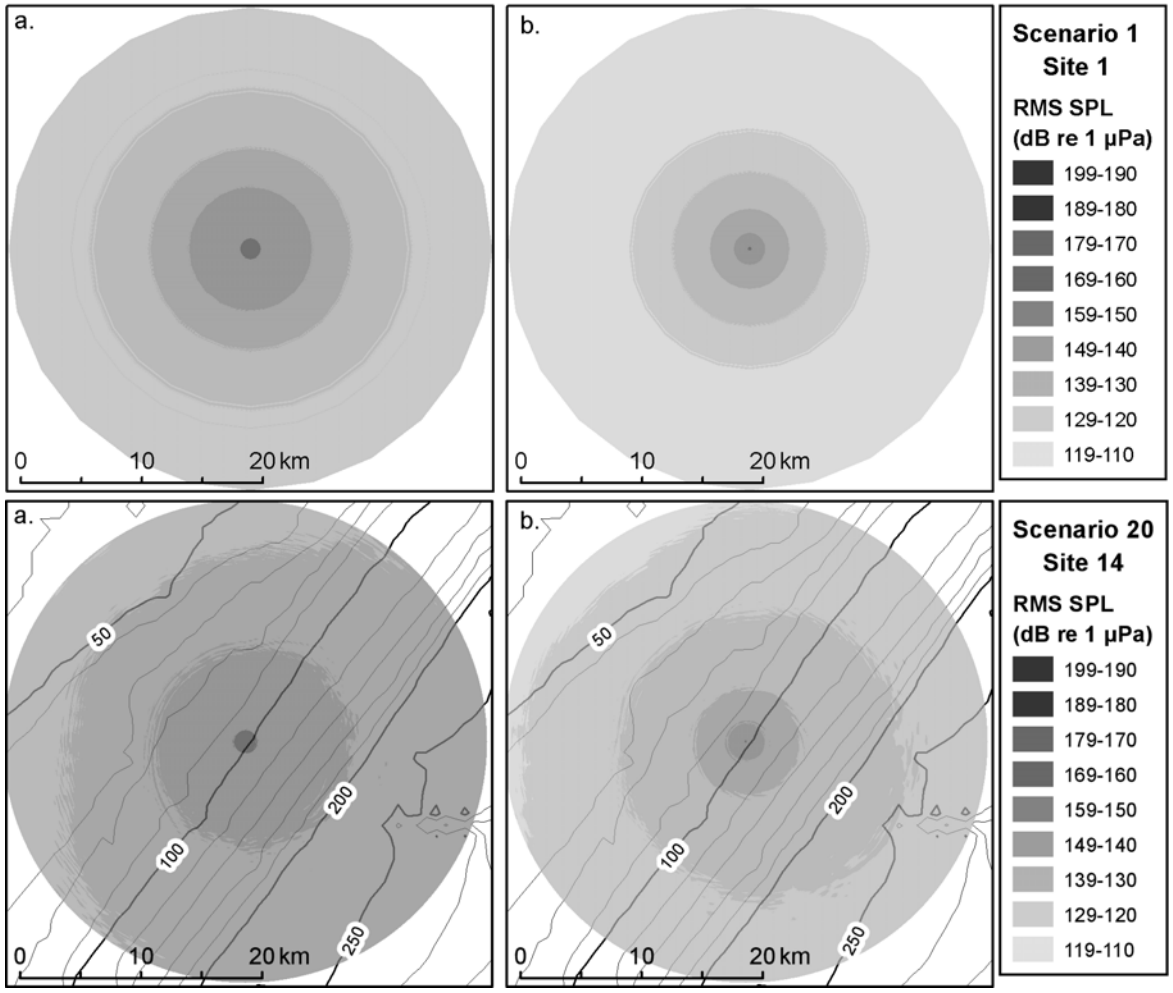
Mammal Hearing and Sensitivity

- Frequency Range for Each Species
- Acoustic Thresholds for Each Epecies
- 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.

Sound Pressure Levels



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.

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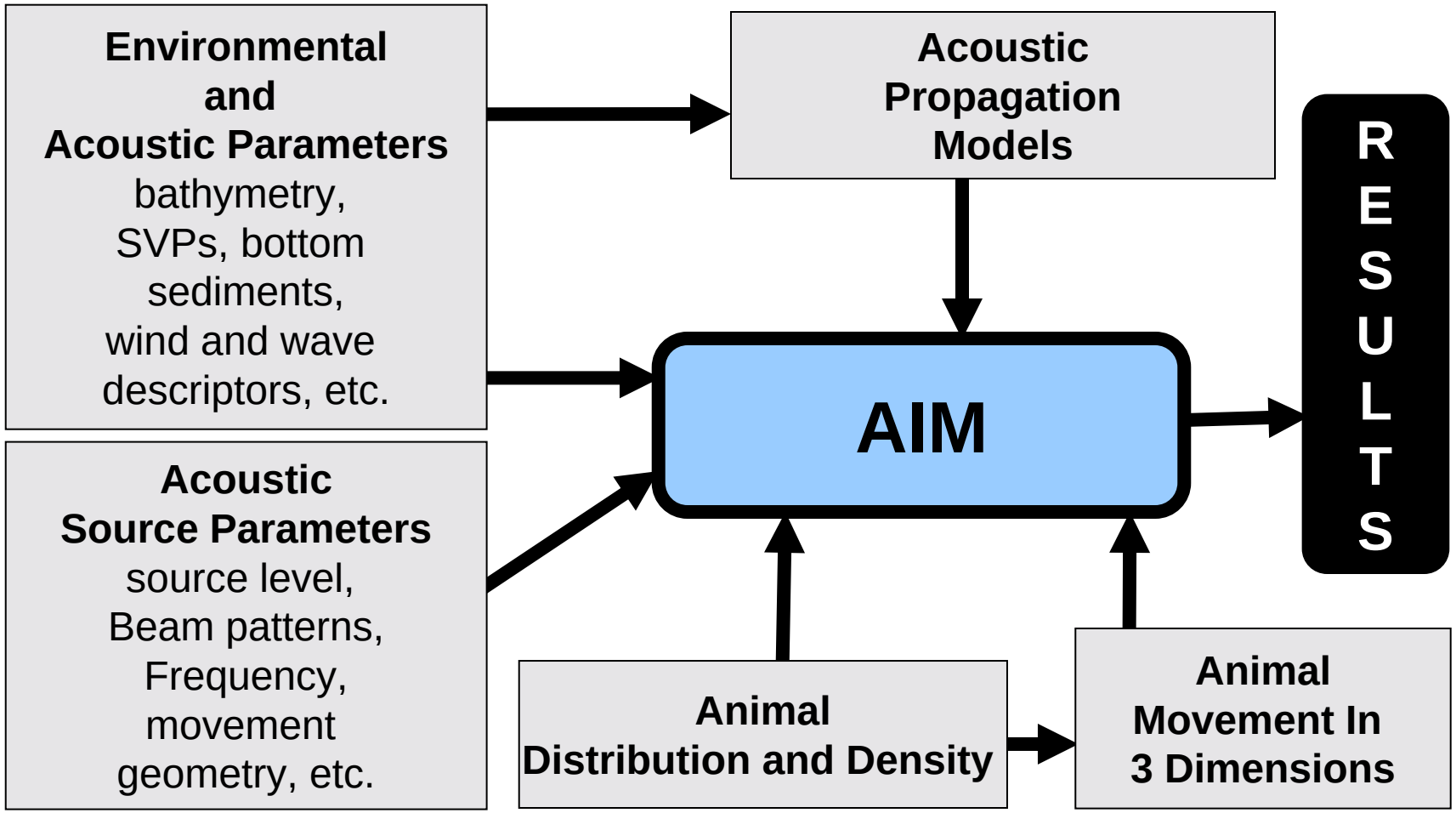
Analysis of Impacts – Estimation of Incidental Take from the Acoustic Integration Model (AIM)



Necessary Inputs
AIM Model

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Impacts from Seismic Airgun Surveys

- 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).

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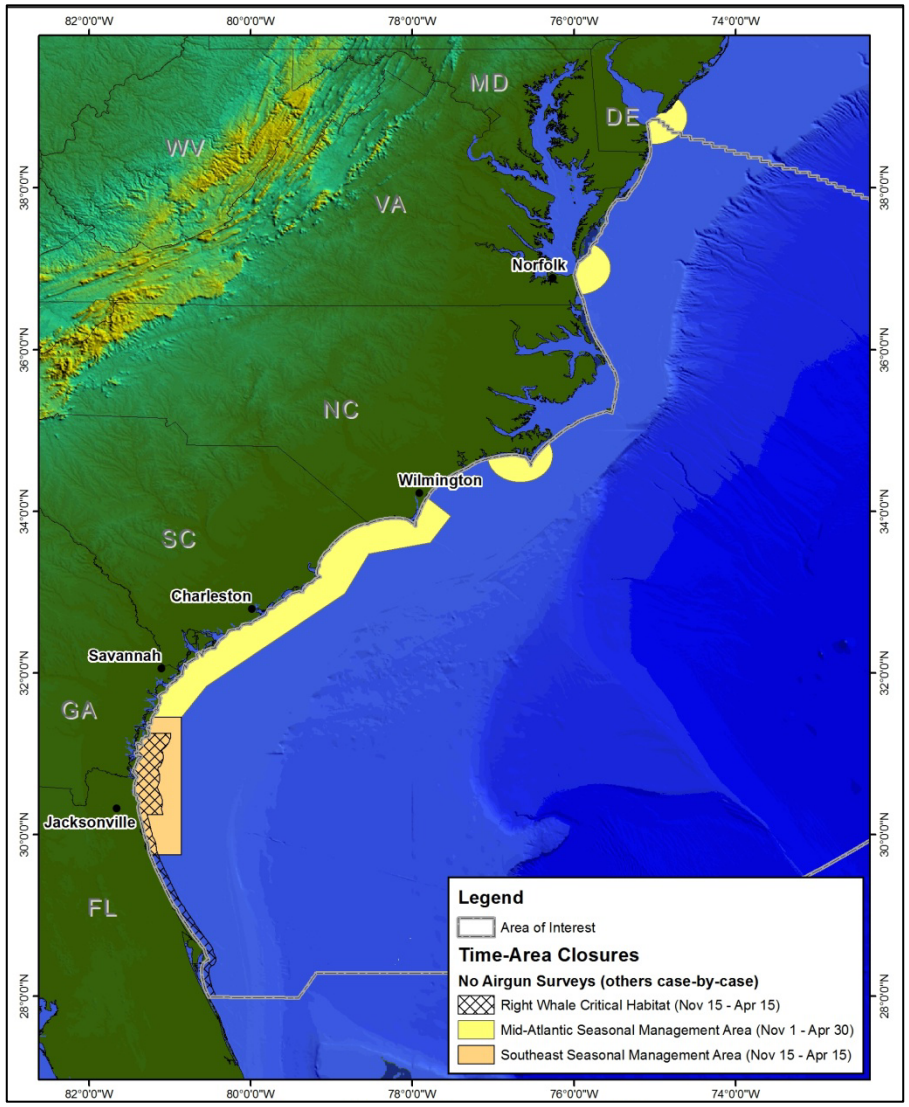
Mitigation Measures

Mitigation Measure	Alternative		
	A	B	C
Time-Area Closure for North Atlantic Right Whales	Yes	Expanded	No
Seismic Survey Protocol (ramp-up, visual observers, and startup and shutdown requirements)	Yes	Yes	N/A
Passive Acoustic Monitoring (PAM)	Optional	Required	N/A
Separation between Simultaneous Seismic Surveys	No	Yes	N/A
HRG Survey Protocol (for non-airgun surveys)	Yes	Yes	Yes
Guidance for Vessel Strike Avoidance	Yes	Yes	Yes
Guidance for Marine Debris Awareness	Yes	Yes	Yes

Time-Area Closure – Alternative A

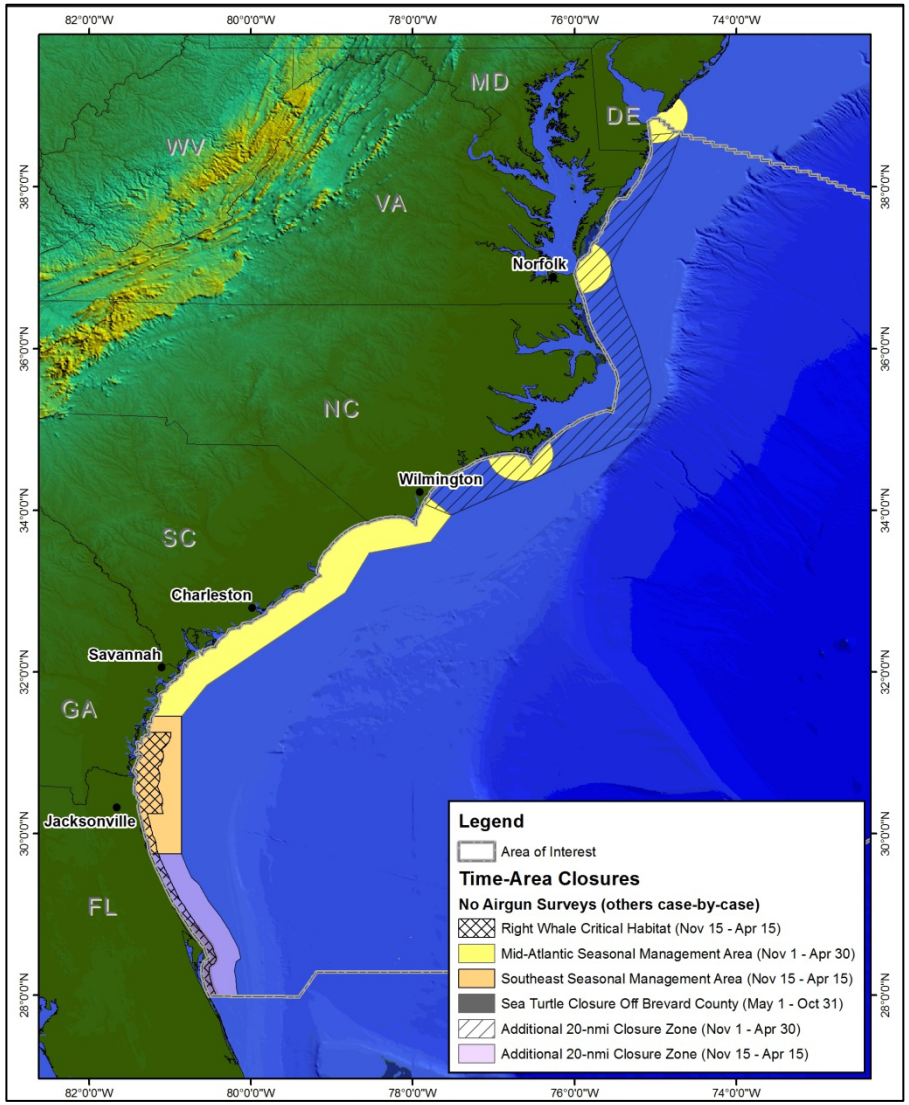


Time-Area Closures

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 Closure – Alternative B



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)

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Summary of Impacts to Marine Mammals

Impact-Producing Factor	Impact Level		
	Alternative A	Alternative B	Alternative C
Active Acoustic Sound Sources - Airguns	Moderate	Moderate	N/A
Active Acoustic Sound Sources - Electromechanical sources	Minor	Minor	Minor
Vessel and Equipment Noise	Negligible-Minor	Negligible-Minor	Negligible-Minor
Vessel Traffic	Negligible	Negligible	Negligible
Aircraft Traffic and Noise	Negligible-Minor	Negligible-Minor	N/A
Trash and Debris	Negligible	Negligible	Negligible
Accidental Fuel Spills	Negligible-Minor	Negligible-Minor	Negligible-Minor

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Submitting Comments

- 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.
- A copy of the Draft Programmatic EIS can be found at http://www.boem.gov/Oil-and-Gas-Energy-Program/GOMR/GandG.aspx.
- Label and mail "Comments on the G&G Draft Programmatic EIS"

Gary D. Goeke
Chief, Regional Assessment Section
Office of Environment (GM 623E)
Bureau of Ocean Energy Management
Gulf of Mexico OCS Region
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123-2394