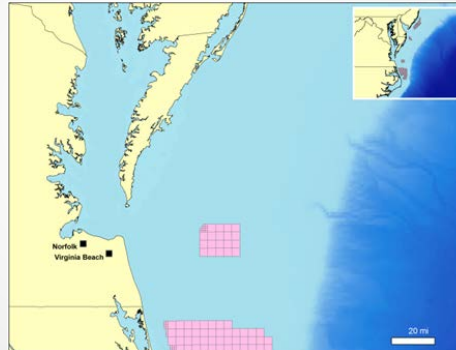


Understanding Whale Presence in the Virginia Offshore Wind Energy Area

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Responsible for NEPA, ESA, MMPA compliance:

BOEM Information Need:

- Geographic information describing marine mammal presence, distribution and seasonality;
- Information regarding baseline noise levels in order to determine the potential impacts from underwater noise that may occur during construction and operation of offshore wind energy facilities, upon marine mammals and other marine species.

Recommended JSOST Federal Research Action Area : Long-term biological and ambient noise measurements in high-priority areas (Southall *et al.* 2009).

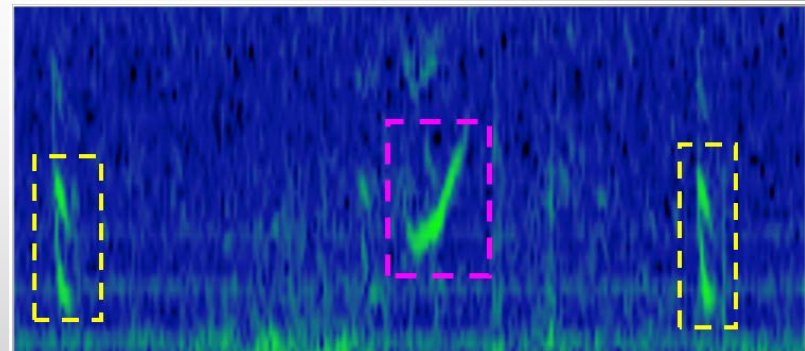
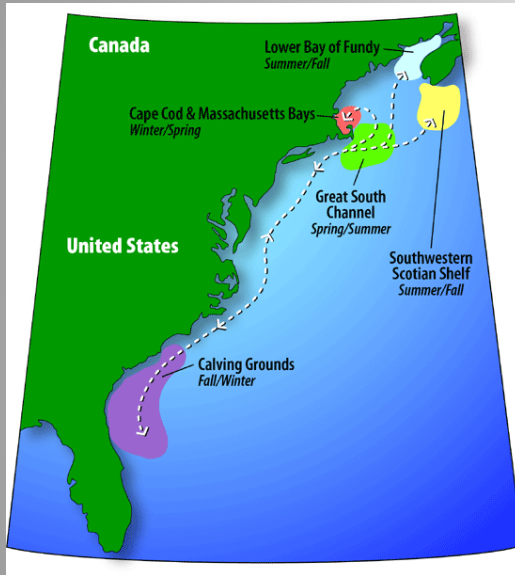


Image by Dr. Aaron Rice, BRP, Cornell University

Background:



- Current studies include ship-based/aerial surveys: Atlantic Marine Assessment Program for Protected Species (AMAPPS)(BOEM), Biodiversity Research Institute Study (DOE), Virginia Aquarium study (VA)
- Extremely useful but limited in duration of coverage;
- Gaps in migratory pattern/seasonal distribution data.

- Other **PAM** projects include: Stellwagen Bank Sanctuary Ocean Noise Research project (NOPP), RI/MA (MassCEC/BOEM), NJ, NC, GA (BOEM).

Passive Acoustic Monitoring

Advantages

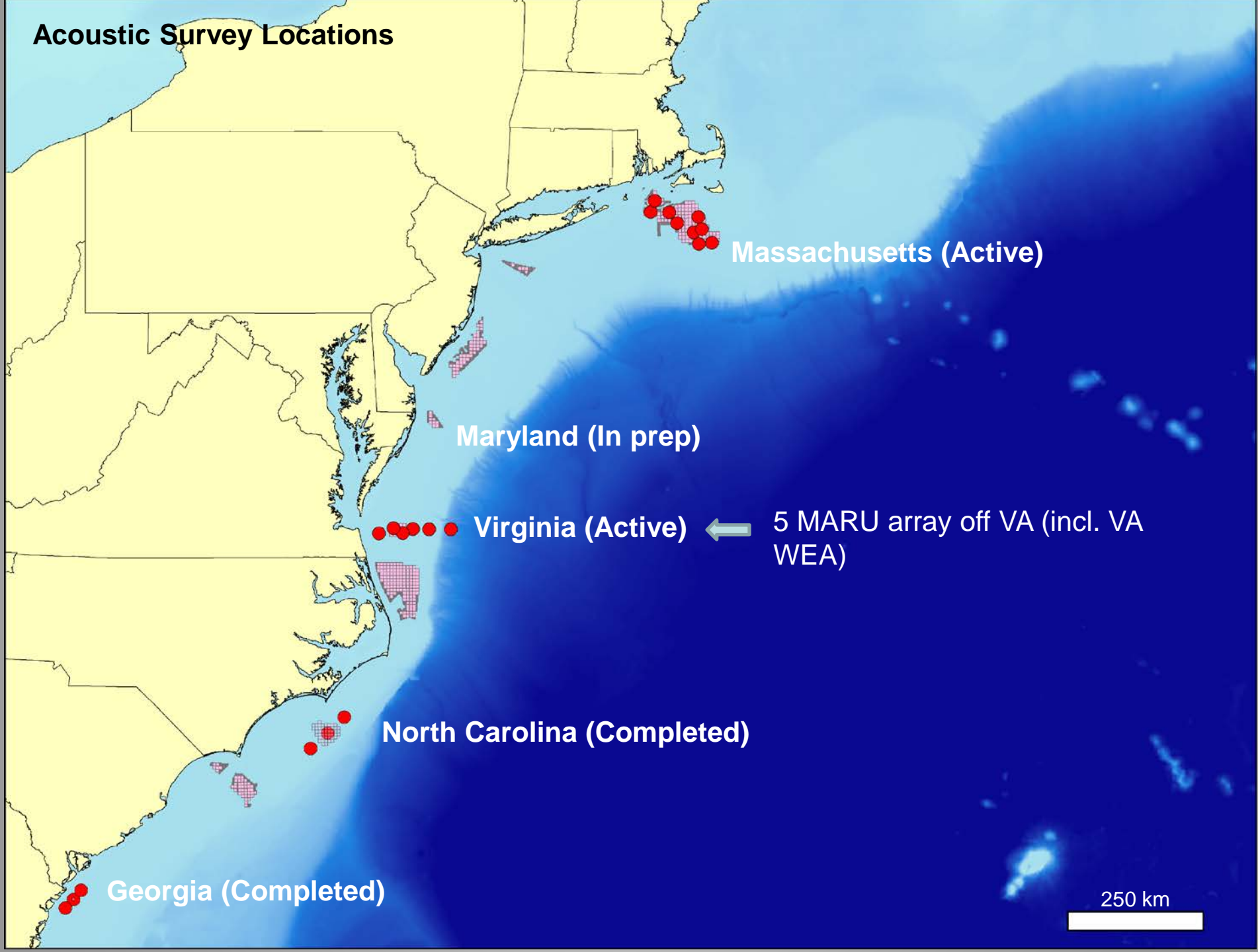
- Excellent for detecting vocally active species
 - particularly species that are difficult to see
- Provides pervasive record
- Ability to simultaneously detect multiple species
- Ability to detect other environmental sounds
- Ability to detect anthropogenic activity
- Non-invasive

Disadvantages

- Can't detect non-vocalizing species
- Many unknown calls
- Challenging to analyze and curate large datasets



Acoustic Survey Locations



Massachusetts (Active)

Maryland (In prep)

Virginia (Active)

← 5 MARU array off VA (incl. VA WEA)

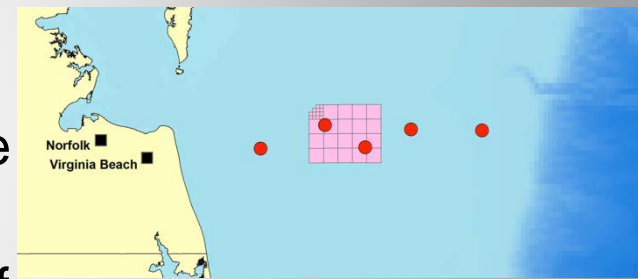
North Carolina (Completed)

Georgia (Completed)

250 km

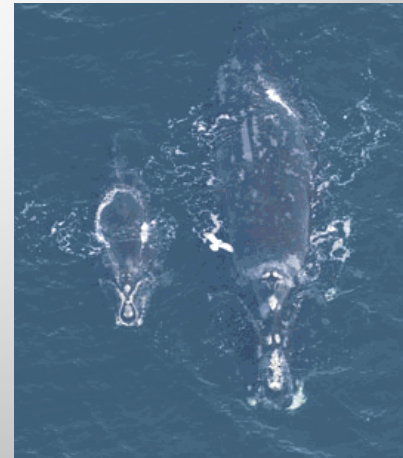
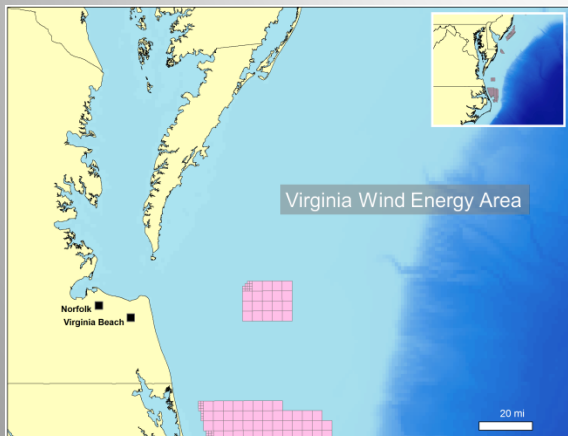
Understanding Whale Presence in the Virginia Offshore Wind Energy Area

- Cornell started VA project in May 2012 until May 2014;
- 5 MARU array recording continuously;
- Focused on NARWs, incl. fin, humpbacks, fish species and possibly minke whales;
- Can identify ship noise and ambient noise;
- Fence transect design, cost effective to identify presence of baleen whales migrating across the continental shelf, but not localization;
- First year of data shows year round presence of NARWs in state and federal waters offshore VA, with peak occurrence in February and March; different to other studies, more detail is required;
- Potential recordings of independent site assessment activities (Fugro, June 2013) – first empirical sound source verification for HRG equipment in a WEA.



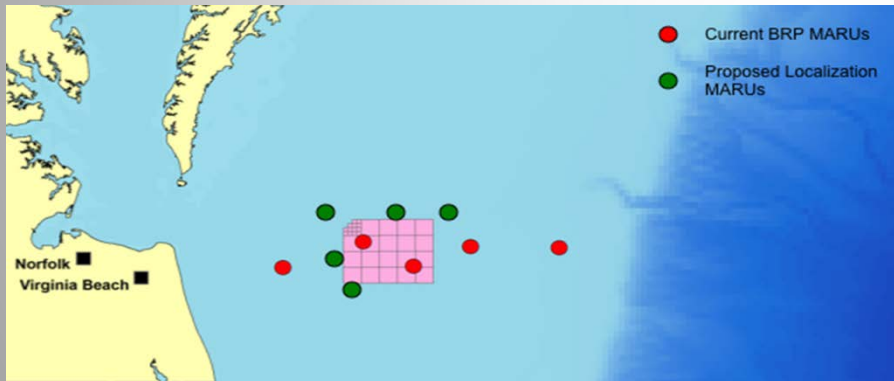
Study Objectives (within the vicinity of the VA WEA):

- Provide an assessment and abundance/relative abundance of the species and geographic distributions of baleen whales present;
- Provide localized positions of NARWs (migratory corridor) and other baleen whale species;
- Provide a baseline of ambient underwater noise offshore VA;
- If possible, analyze recordings of independent site assessment activities for empirical HRG equipment sound source verification.



Study's Methods:

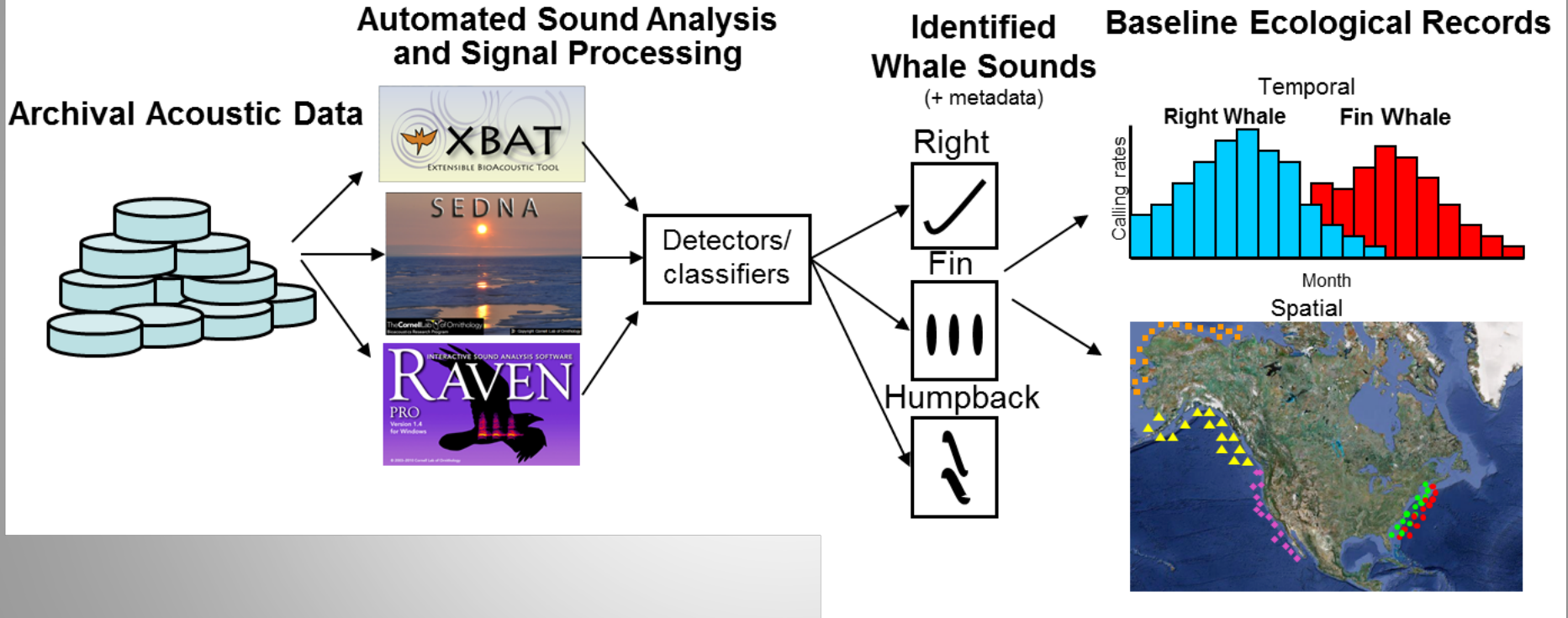
- A contractor will be hired to deploy and maintain the instruments and collect and analyze data;
- Approx. 10 Fixed MARUs: add 5 in localization pattern to current transect fence array;



MARU's - Cornell Bioacoustics Research Program

- MARUs recording at 2 kHz sampling rate targeting baleen whales;
- Data would be collected continuously for two full years and analyzed during the following year.

Atlantic Region



Time-stamp and sensor location of sounds of interest becomes the foundation for understanding spatial and temporal occurrence patterns.

Atlantic Region





Questions?