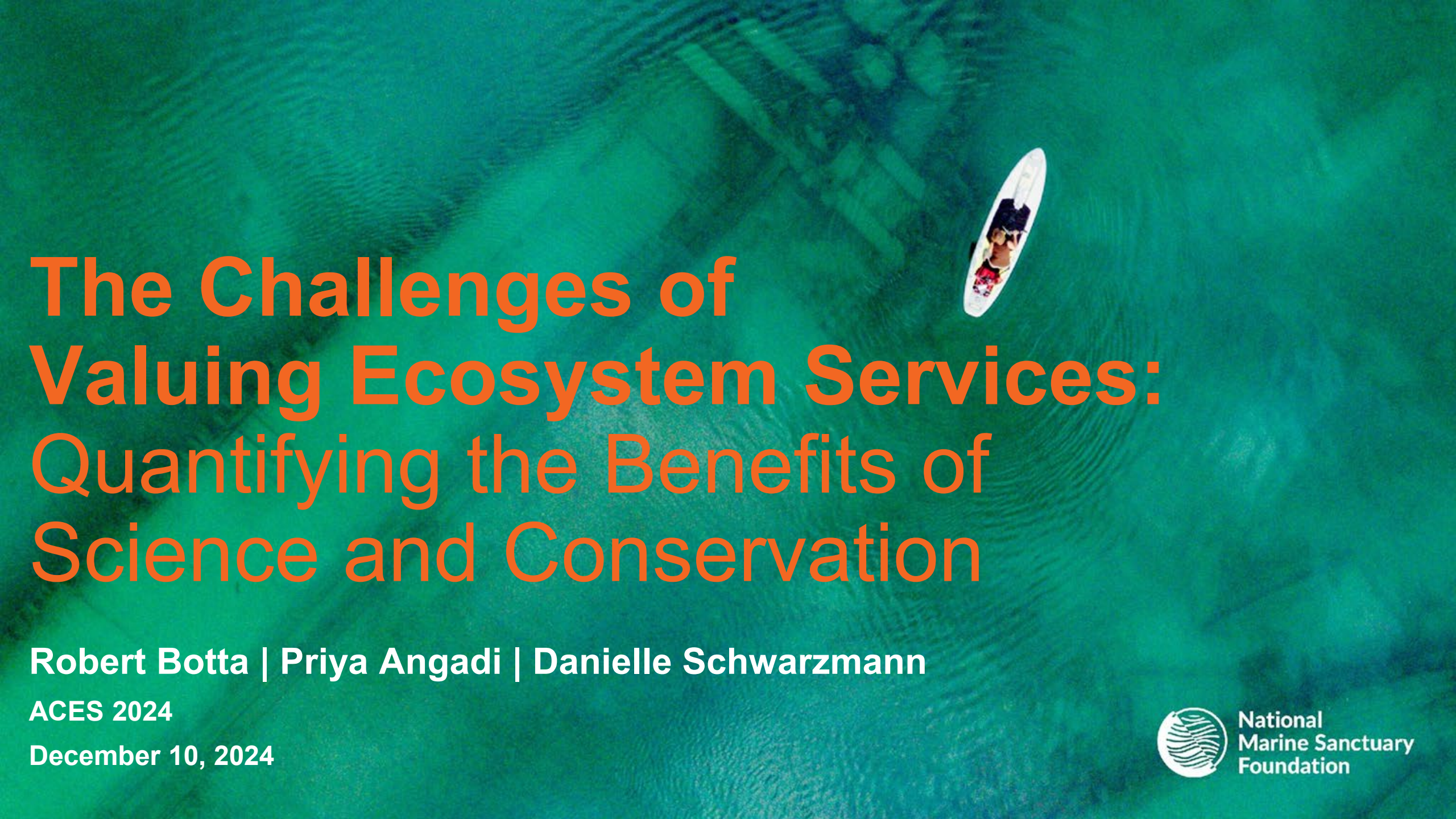


The Challenges of Valuing Ecosystem Services: Quantifying the Benefits of Science and Conservation

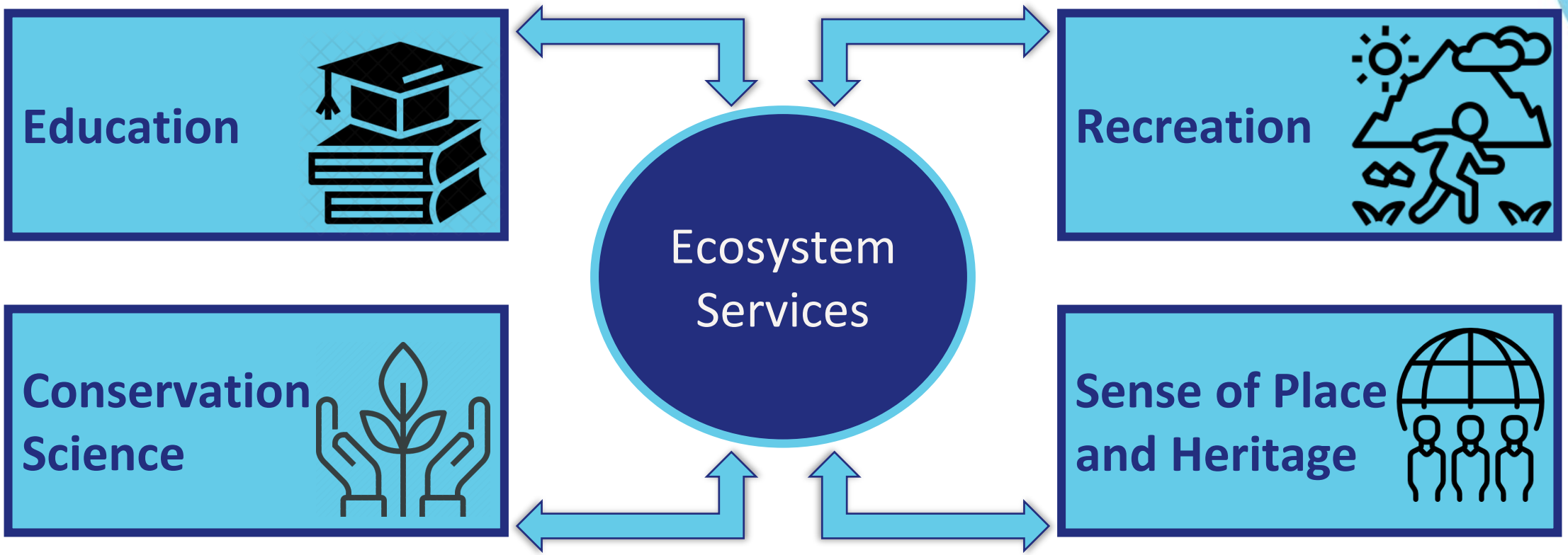
Robert Botta | Priya Angadi | Danielle Schwarzmann

ACES 2024

December 10, 2024

National Marine Sanctuary Foundation

Valuation of Ecosystem Services



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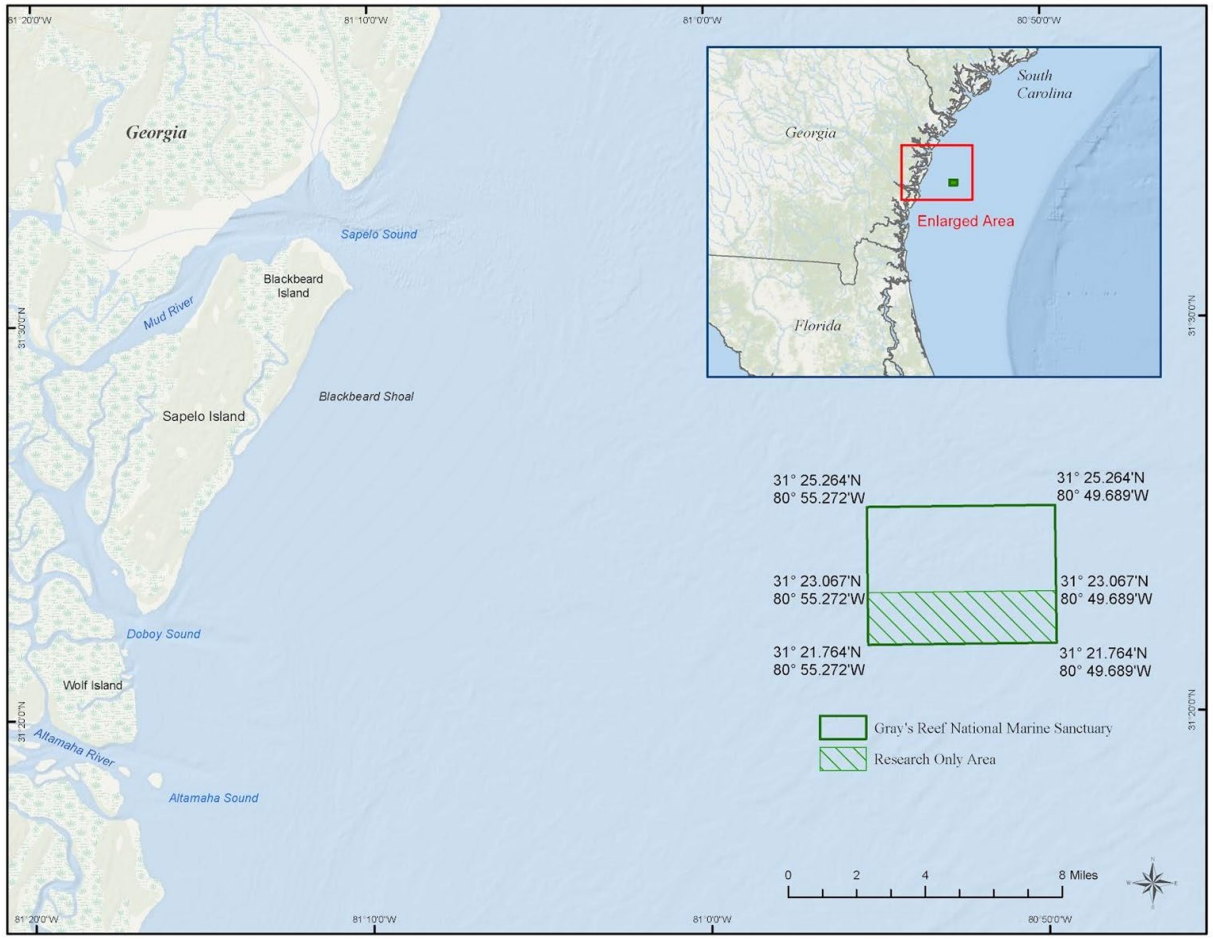
Conservation Science in Gray's Reef NMS

- Literature review to assess scientific research efforts in the Gray's Reef NMS
- 72 papers collected (2008 – 2022)
- 336 affiliated authors from 14 countries and 26 states/territories



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Conservation Science in Gray's Reef NMS

Affiliation Location	Frequency
United States: Total	294
Georgia	75
Maryland	38
North Carolina	32
Washington	25
Connecticut	24
All other states	100
Brazil	13
Portugal	4
United Kingdom	4
France	4
All other countries	17
Total	336

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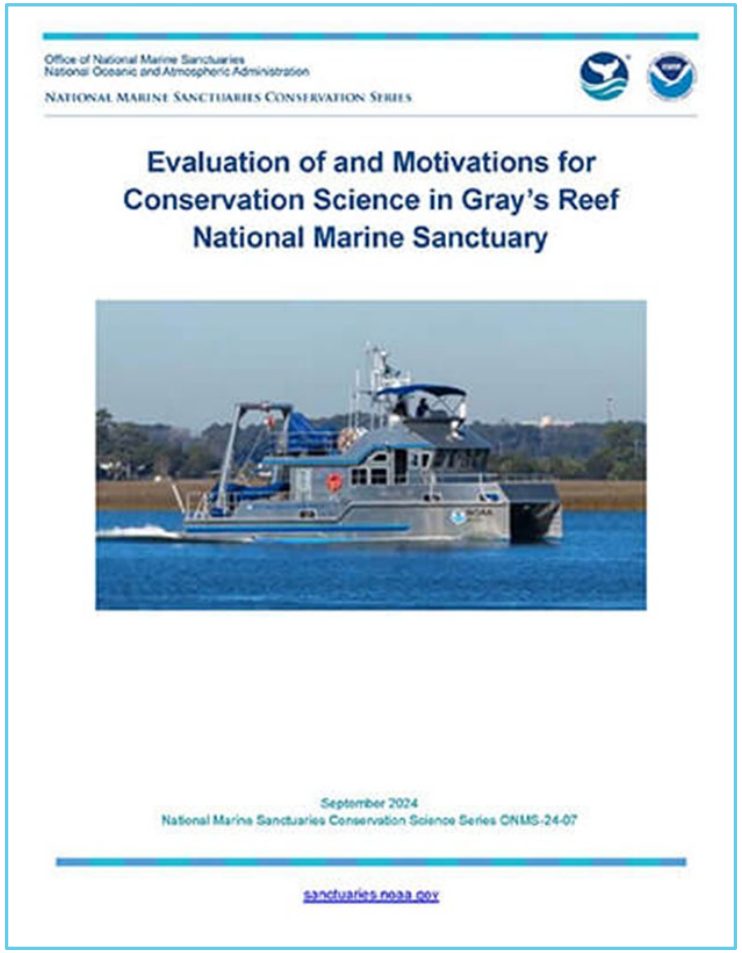
Conservation Science in Gray's Reef NMS

- Survey designed to collect additional information on research that occurred in Gray's Reef NMS between 2019, 2022
- Respondent population informed by literature review + site staff
- 23 responses (41% response rate)



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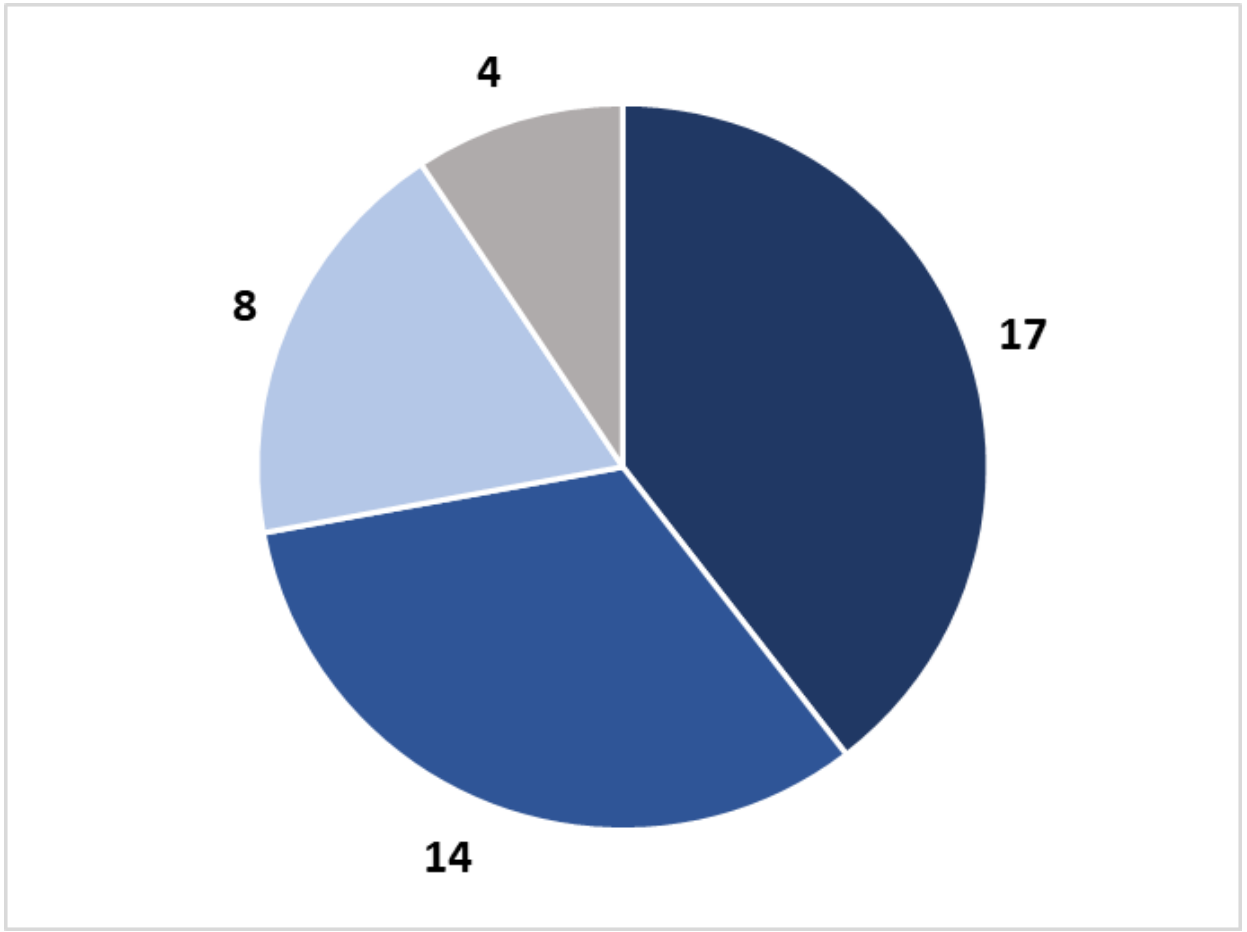
Project Objectives in Gray's Reef NMS



Research (74%)
The process of generating knowledge through the systematic investigations of new and existing information

Monitoring (61%)
The systematic observation of indicators of natural resources, cultural resources, or ecosystem conditions

Characterization (35%)
The process of identifying, describing, and attributing qualities to natural/cultural resources or systems

Exploration (17%)
The process of discovering unknown, unusual, or unexpected aspects of a place, thing, or system

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Project Objectives in Gray's Reef NMS: Top Research Topics

Study Topic	Research Objective	Monitoring Objective	Characterization Objective	Exploration Objective
Fauna study	8	7	5	1
Habitat study	5	4	2	1
Anthropogenic impact study	4	3	1	0
Water column study	4	2	0	1
Pollutant/contaminant study	3	4	0	0
Cultural heritage/archaeological research	0	0	2	1
All others	0	0	4	0

Reasons for Site Selection

1. The site's status as a National Marine Sanctuary
2. GRNMS or another resource management agency contacted the respondent with a specific request
3. Biodiversity/productivity of the area
4. Dive support

5a. Vessel availability

5b. The area contains the natural resources and/or process necessary for the research

5c. Necessary part of a larger-scale spatial project

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Next Steps

- Survey is meant to be replicated across the National Marine Sanctuary System
- Updated survey to be deployed in Thunder Bay NMS
- Respondent population informed by literature review

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Thunder Bay National Marine Sanctuary

- Thunder Bay National Marine Sanctuary (TBNMS) is a federally designated protected area established in 2000, located along the shores of Lake Huron in northeastern Michigan.
- Home to nearly 100 identified shipwrecks, it offers a glimpse into centuries of Great Lakes maritime history, spanning from wooden schooners to steel steamers.
- Our literature review explores the evolving contributions of the Thunder Bay National Marine Sanctuary to scientific research over time

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Survey Respondent Population

- Primarily informed by a literature review that is in progress
  - Google Scholar
  - 2017 - 2024
  - Thunder Bay; Thunder Bay NMS; Thunder Bay National Marine Sanctuary; TBNMS
  - Allows for additional data collection while decreasing respondent burden
- Collaboration with site staff

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Challenges Associated with Literature Reviews

1. Limited NMS-specific literature
2. Interdisciplinary nature of the scientific contributions.
3. Technological Advancements and Impact.
4. Dispersed publication platforms

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Limited NMS-Specific Literature

Limited Data Attribution

- Many studies relevant to Thunder Bay NMS and Lake Huron do not mention the sanctuary or focus on its contributions, making it harder to evaluate its role in ecosystem services

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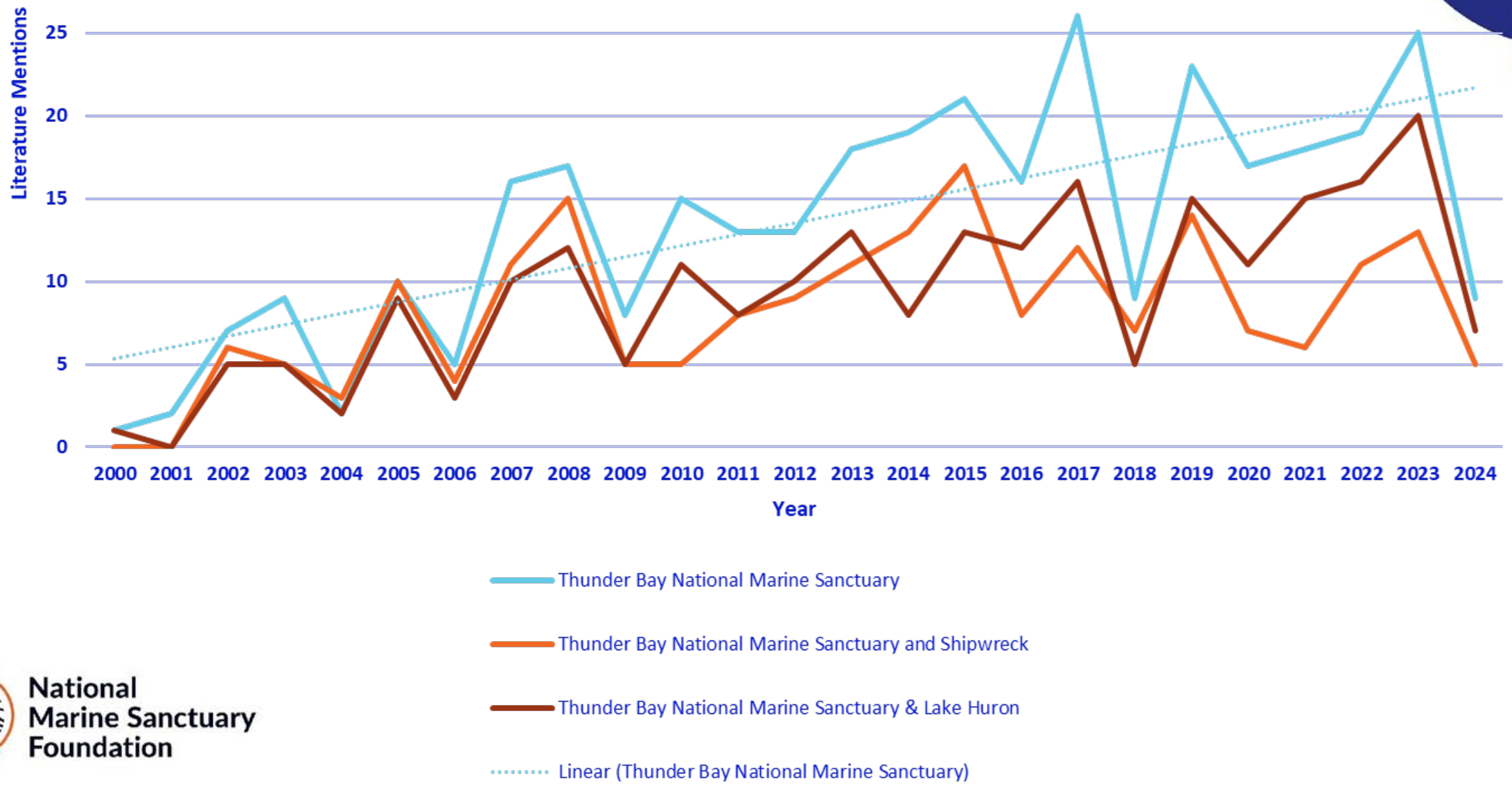
Thunder Bay NMS Literature Mentions



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Interdisciplinary Nature

Multiple Fields of Study

- TBNMS research spans various disciplines, such as marine biology, archaeology, climate science, and social science

Integration Challenges

- Synthesizing findings from different disciplines into a cohesive narrative can be difficult due to varying terminologies, methods, and focus areas

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Technological Advancements and Impact and

Dispersed Publication Platforms

The technological advancements result in more detailed and precise findings today, making earlier studies appear less complete or even incompatible.

Diverse Publication Platforms:

Research related to TBNMS is published across diverse platforms, including academic journals, government reports, and conference proceedings, making it difficult to locate and consolidate all relevant studies

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Conclusions

- Literature reviews in combination with surveys can provide valuable information on the role of science as an ecosystem service
- Next steps include quantifying the value of science in the Great Lakes Region
- Updated survey to be deployed in 2025 for Thunder Bay National Marine Sanctuary

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Questions or feedback?

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Contact information:

Robert Botta

rbotta@marinesanctuary.org