

NOAA FISHERIES

Southeast Regional Office

Rice's Whale Recovery Planning Workshop

Workshop Summary • Fall 2021



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Rice's Whale Recovery Planning Workshop

**Workshop Summary
October – November 2021
NOAA Fisheries, Southeast Regional Office**

Summary report developed by the Consensus Building Institute

Greatest Challenges for Rice's Whale Recovery Workshop Word Cloud



Figure 1. Greatest Challenges for Rice's Whale Recovery. Word Cloud developed from ~30 invited experts and stakeholders' polled responses during Workshop Session #1.

This summary report was drafted by the workshop facilitation team (the Consensus Building Institute) and has been reviewed by NOAA Fisheries staff, workshop Steering Committee members, and invited workshop participants to ensure its accuracy and completeness in reflecting workshop discussions. The contents of the report do not necessarily reflect the opinion of NOAA Fisheries.

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Acronyms

AI	Artificial Intelligence
AIS	Automatic Identification System
AOML	Atlantic Oceanographic and Meteorological Laboratory
ATBA	Areas To Be Avoided
BMP	Best Management Practice
BOEM	Bureau of Ocean Energy Management
BSEE	Bureau of Safety and Environmental Enforcement
CBI	Consensus Building Institute
DWH	Deep Water Horizon
ECHO	Enhancing Cetacean Habitat and Observation
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FMC	Fishery Management Council
FSC	Fisheries Science Center
FWC	Fish and Wildlife Conservation Commission
IWC	International Whaling Commission
MMPA	Marine Mammal Protection Act
NEPA	National Environmental Policy Act
NFWF	National Fish and Wildlife Foundation
NGO	Non-Governmental Organization
NOAA	National Oceanic and Atmospheric Administration
NPFC	North Pacific Fisheries Commission
NRDA	Natural Resource Damage Assessment
O&E	Outreach & Engagement
OCSLA	Outer Continental Shelf Lands Act
OSRO	Oil Spill Removal Organization
PAM	Passive Acoustic Monitoring
PBR	Potential Biological Removal
POP	Persistent Organic Pollutant
PVA	Population Viability Analysis
RIS	Recovery Implementation Strategy
RP	Recovery Plan
RSR	Recovery Status Review
SEFSC	Southeast Fisheries Science Center
SERO	Southeast Regional Office
SRKW	Southern Resident Killer Whales
UC	Unified Command
VMS	Vessel Monitoring System

SECTION I | Workshop Overview

Workshop in Brief

The National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NOAA Fisheries or Agency) is developing a recovery plan for Rice's whale (*Balaenoptera ricei*), listed as endangered under the Endangered Species Act (ESA) in 2019¹. This guidance document provides a roadmap for species recovery, with the goal of improving their status and managing threats to the point at which protections under the ESA are no longer needed.

There are significant challenges in designing a practical and feasible recovery plan for the Rice's whale, including limited information regarding (1) the species' current and historical abundance, (2) current and historical distribution in U.S. waters, (3) population structure and dynamics, (4) calving intervals and seasonality, (5) diet and prey species, (6) foraging behavior, (7) essential habitat features, (8) factors affecting individual health, and (9) human-caused mortality rates (e.g., from bycatch, vessel strikes, marine debris).

In Fall 2021, NOAA Fisheries convened a multi-session virtual workshop to harness the collective expertise, creativity, and ingenuity of stakeholders and experts from across the United States and beyond to help the Agency develop an effective recovery plan for the Rice's whale. NOAA Fisheries sought input on (1) approaches for recovery planning that address the challenges relevant to the recovery of the listed species in its current and foreseeable environment; (2) development of possible recovery criteria that would indicate when the species should be considered for delisting; and (3) development of suggested recovery actions to reduce and/or ameliorate the threats to these listed whales.

Workshop participants were asked to review foundational materials prior to attending the workshop and were invited to openly share facts, information, and ideas during and for a limited time after the workshop sessions. The workshop was not a consensus-seeking meeting; rather, invited participants were asked to provide their perspectives and suggestions related to threats or recovery of the Rice's whale. Invited participants included experts and stakeholders representing specific interests and organizations/agencies. The workshop was open to the public, and public comment was invited at the end of each day.

Workshop participants were not expected to assist in the actual writing of the recovery plan. Rather, input from workshop participants will help NOAA Fisheries identify gaps in knowledge and associated research needs, begin developing recovery criteria for the species, and identify potential actions and implementation strategies to fill knowledge gaps and address the threats to the species.

Workshop-related information and materials are available on the [NOAA Fisheries Rice's whale website](#).

¹In 2019, NOAA Fisheries listed the Gulf of Mexico Bryde's whale as an endangered subspecies under the Endangered Species Act. In 2021, NOAA Fisheries revised the common and scientific name of the listed entity to Rice's whale, *Balaenoptera ricei*, and classification to species to reflect the new scientifically accepted taxonomy and nomenclature of the species.

Recovery Planning Workshop Background

Gulf of Mexico Rice's Whale – Endangered Species

The Rice's whale occurs consistently in the northeastern Gulf of Mexico, along the continental shelf break between 100 and about 400 meters depth. They are the only resident baleen whale in the Gulf of Mexico and are most closely related to Bryde's (pronounced "broodus") whales (also refer to footnote I regarding the 2021 name change from Bryde's whale to Rice's whale).

Like all marine mammals, the Rice's whale is protected under the Marine Mammal Protection Act (MMPA) and, given its ESA listing, it is considered depleted under the MMPA. When a comprehensive ESA status review was completed in 2016, the team of scientists conducting the status review concluded that there were likely fewer than 100 individual Rice's whales throughout the Gulf, with 50 or fewer being mature individuals. NOAA Fisheries' most recent abundance estimate from 2017–2018 surveys in the northeastern Gulf of Mexico is approximately 50 individual whales.

In the Rice's whale status review, Rosel et al. (2016) evaluated the species' status and extinction risk and included an evaluation of the threats to the species and a description of the distribution, abundance, and threat susceptibilities, exposures, and vulnerabilities. The threats ranked as high to moderate in severity and certainty in the status review included range curtailment from energy exploration and development, exposure to oil spills and spill response, vessel collisions, anthropogenic noise during seismic surveys, small population effects, genetics, low productivity rate, fishing gear entanglements, difficulty for individual whales to find mates due to small population size/reduced density, noise from shipping traffic and other vessels, and unpredictable and catastrophic events.

With likely fewer than 100 individuals remaining, Rice's whales are the most endangered whales in the world. Recovery of the species depends upon the protection of each remaining whale and an increasing population trend.

Recovery Planning Framework

NOAA Fisheries is required by section 4(f) of the ESA to develop and implement recovery plans for the conservation and survival of federally listed species unless the Secretary finds that such a plan will not promote the conservation of the species. Recovery means that the status of a listed species has improved to the point at which the protections of the ESA are no longer necessary.

The ESA specifies that recovery plans are to include:

1. A description of site-specific management actions necessary to achieve the plan's goal for the conservation and survival of the species
2. Objective, measurable criteria which, when met, would result in the species being removed from the list
3. Estimates of the time and costs required to carry out the actions needed to achieve the plan's conservation and survival goal and to achieve intermediate steps toward that goal

In an effort to make the recovery plan most effective for a species like Rice's whale, for which limited information is available, the plan must facilitate adaptive management. As such, NOAA Fisheries is utilizing the three-part framework approach to recovery planning (NOAA Fisheries 2020; Section I.4.1.1) for the Rice's Whale Recovery Plan, which involves developing three, stand-alone recovery planning documents:

- Part One – Recovery Status Review (RSR), summarizes the biology, trends, and threats for the Rice’s whale. The RSR will serve as the scientific basis upon which the recovery plan and implementation strategy will be based and can be updated periodically as new information becomes available.
- Part Two – Recovery Plan (RP), will include an introduction and the three statutory requirements for an RP pursuant to ESA Section 4(f)(1)(B): (1) objective measurable recovery criteria, that when met, indicates the species no longer needs the protections of the ESA; (2) site-specific recovery actions to be undertaken in order to meet the recovery criteria; and (3) estimates of the time and costs necessary to recover the species.
- Part Three – Recovery Implementation Strategy (RIS), is a flexible operational plan that steps down recovery actions into manageable, step-by-step activities for the implementation of each action in the plan.

NOAA Fisheries has developed a [recovery outline](#) to serve as an interim guidance document to direct recovery efforts, including recovery planning, for the Rice's whale until a full recovery plan is developed and approved. The recovery outline presents a preliminary strategy for recovery of the species and recommends high priority actions to stabilize and recover the species.

Recovery Planning Workshop

NOAA Fisheries convened an ESA recovery planning workshop consisting of five virtual sessions, between October 18 and November 18, 2021, to involve stakeholders and elicit expert input to assist with the development of a recovery plan for the Rice’s whale (Part Two of the 3-part framework described in the section above).

Workshop Purpose

NOAA Fisheries’ intent with the workshop was to harness the collective expertise, creativity, and ingenuity of the invited experts and stakeholders to inform the development of an effective and practical recovery plan for the Rice’s whale. NOAA Fisheries aims to maintain the connections and relationships developed during the workshop throughout the recovery planning effort and into the long-term implementation phase.

Workshop Objectives

Obtain facts, information, and ideas from the invited stakeholders and experts on the following topics:

- Approaches for Rice’s whale recovery planning that address the factors/challenges relevant to the recovery of the Rice's whale.
- Recovery criteria that indicate the species should be considered for delisting.
- Whether demographic-related objectives and criteria for delisting are practicable at this time given the very small population size.
- Recovery actions to reduce and/or ameliorate the threats to the Rice's whale.
- Prioritization of recovery actions to ensure actions are implemented in an order that is most effective for achieving recovery.

Workshop Desired Outcomes

- Participants are informed, engaged, and contribute to Rice’s whale recovery planning discussions.

- Input on whether demographic-based recovery criteria should be included and, if not, why delisting objectives and criteria are practicable at this time given the very small population size.
- Draft list of recovery criteria concepts that indicate the Rice's whale can be delisted.
- Draft list of recovery actions to promote recovery of the Rice's whale.
- Draft priority ranking of potential recovery actions.
- Create connections and relationships with invited participants to enable continued conversations beyond the workshop.

Workshop Structure and Design

Schedule and Workshop Session Topics

The workshop sessions were held virtually because of in-person meeting constraints tied to the ongoing Covid pandemic. To foster effective deliberations given the online meeting structure, the workshops were split into five separate sessions outlined below.

- Session 1 – Monday, October 18: Workshop kick-off; recovery process; population dynamics
- Session 2 – Monday, November 1: Threats related to prey, climate change, entanglement, and renewable energy
- Session 3 – Wednesday, November 10: Threats related to environmental pollutants, disease and health indicators, and marine debris
- Session 4 – Tuesday, November 16: Threats related to noise (acute and chronic) and vessel collisions
- Session 5 – Thursday, November 18: Threat ratings and recovery criteria

Planning and Design

Workshop planning and design were guided by a Steering Committee consisting of NOAA Fisheries representatives and a member of the Marine Mammal Commission. The Steering Committee received additional planning support from other NOAA Fisheries staff and the Consensus Building Institute (CBI), a neutral-party organization providing facilitation services. **Appendix A** lists Steering Committee members and support staff.

The Steering Committee began planning in spring 2021 to outline the purpose and scope of the workshop. The group identified a range of perspectives and associated potential experts and stakeholders to participate in the workshop. The Steering Committee directed CBI to reach out to several individuals with diverse experience and interest in Rice's whale recovery and/or the recovery planning process to obtain their input on workshop planning and design. Based on those discussions and other planning considerations (e.g., newly released research findings, fieldwork seasons and participants' availability, virtual meeting dynamics, etc.), the Steering Committee decided to hold multiple half-day sessions in Fall 2021 and structure the workshop to support multiple avenues for soliciting input (e.g., verbal/written and before/during/after each workshop session). Initially, the Steering Committee aimed to convene a relatively small group of experts and stakeholders to foster more in-depth conversations. However, the Steering Committee decided to invite more participants to better ensure diverse and well-informed perspectives, while also inviting other interested parties to attend as observers and reserve input for designated public comment periods to retain some small-group dynamics for more in-depth dialogue.

Prior to attending the workshop, workshop participants were asked to review select background materials to better understand the goals of the workshop and the recovery planning process. Workshop participants were asked to share facts, information, and ideas at each of the workshop sessions, including the small group discussions.

Most of the workshop discussions were designed to build on preliminary lists of population dynamics-based recovery actions and criteria, threats-based recovery actions and criteria, and threat levels characterization. These initial lists were drafted by NOAA Fisheries staff (with input from the Steering Committee and other experts) and were intended to serve as starting points for discussions – the workshop was designed to help confirm or identify other issues that might be key to Rice’s whale recovery planning.

Workshop Format and Feedback

The Rice’s Whale Recovery Planning Workshop sessions followed a similar format and approach: provide upfront information to participants to support brainstorming and establish a common baseline; foster meaningful dialogue and input to get the benefit of participants’ perspectives; and offer post-session time to provide additional ideas. Each session started with presentations and opportunities for clarifying Question & Answer intended to prepare participants for engaging in brainstorming discussions on potential recovery actions, criteria, and other aspects of the recovery planning process. During breakout group discussions, participants could share ideas verbally or typed directly via note-taking virtual media (i.e., Zoom chat, Mural notes platform, and/or Google Docs).

After brainstorming discussions, NOAA Fisheries staff reviewed discussion notes and drafted potential recovery actions to elicit feedback from participants via online surveys (i.e., Menti polling or Survey Monkey). Participants were asked to indicate the importance of recovery actions and had approximately one week after each session to review/edit/add ideas to potential recovery actions and criteria documents. The polls were provided as a means for the Agency to get a feel for which actions appear to be resonating with experts; they were not intended and will not be used as a determinant for recovery plan actions.

Participants were asked to provide workshop design feedback after each session, which contributed substantively to subsequent session formats. The Steering Committee frequently modified the workshop approach and content based on participants’ discussions and feedback. A workshop feedback survey conducted at the end of Workshop #5 indicated that participants appreciated the revisions and the Steering Committee’s responsiveness to participants’ feedback.

Participants and Attendance

Invited workshop participants included experts and stakeholders in specific topic areas, including the species’ biology and ecology, threats to the species and its habitat, the recovery planning process itself, and cetacean conservation and management. Invited participants included representatives of Federal and State agencies, scientific experts and researchers, individuals from industry, and individuals from conservation partners and non-governmental organizations (**Table I**). Invited participants were encouraged to attend workshop sessions related to their specific expertise and interests; however, all were welcome to attend any of the other sessions if desired (and most attended multiple workshops).

The workshop was open to the public (non-participants could attend as “observers”), and public comment was invited at the end of each day. Overall, 45 invited participants (mostly from the U.S.; a few

participants were from Europe or New Zealand) and 51 observers attended at least one of the workshop sessions, with the vast majority attending at least three sessions.

For a full list of invited participants, Steering Committee members, and additional workshop attendees, see **Appendix A.**)

Table I. Invited Workshop Participants

Name	Affiliation
Research Sector	
Fredrik Christiansen	Aarhus University, Assistant Professor
Mary Jo Barkaszi	Continental Shelf Associates, Marine Mammals Program Manager
Denise Boyd	Florida Fish & Wildlife Conservation Commission, Researcher
Jeremy Kiszka	Florida International University, Assistant Professor
David Zeddies	JASCO Applied Sciences, Director of U.S. Operations
Peter Corkeron	New England Aquarium, Marine Conservation Biologist
Jessica Redfern	New England Aquarium, Sr Scientist, Chair of the Spatial Ecology, Mapping, and Assessment Program (EcoMap)
Tracey Sutton	Nova Southeastern University/DEEPEND (Deep Pelagic Nekton Dynamics of the Gulf of Mexico), Professor
John Hildebrand	Scripps Institution of Oceanography, Professor of Oceanography
Len Thomas	Sea Mammal Research Unit, University of St. Andrews, Statistics Professor
Brandon Southall	Southall Environmental Associates, Inc., Bioacoustician
Rochelle Constantine	University of Auckland, Associate Professor
Non-Governmental Organization (NGO) Sector	
Kristin Carden	Center for Biological Diversity, Senior Scientist
Michael Jasny	Natural Resources Defense Council, Marine Mammal Project Director
Industry Sector	
Alex Loureiro	EnerGeo Alliance (previously named International Assoc. of Geophysical Contractors [IAGC]), Dir. of Marine Enviro. & Biology
Eric Brazer	Gulf of Mexico Reef Fish Shareholders' Alliance, Deputy Director
Lee Kindberg	Maersk, Head of Environment & Sustainability
Ruth Perry	Shell, Marine Scientist and Business Environment Advisor
State Agency Sector	
Leslie Ward	Florida Fish and Wildlife Conservation Commission (FWC), Fish and Wildlife Research Institute, Threatened and Endangered Species Research Lead
Federal Agency Sector	
Donald "Tre" Glenn	Bureau of Ocean Energy Management (BOEM), Biologist/Environmental Engineer
Tamara Arzt	BOEM, Environmental Protection Specialist
James Price	BOEM, Marine Mammals Studies Coordinator

Benjamin Colbert	Navy, Acoustician
Dawn Noren	NOAA Fisheries Northwest Fisheries Science Center (FSC), Research Fishery Biologist
Lance Garrison	NOAA Fisheries Southeast FSC/MMTD, Research Biologist
Melissa Soldevilla	NOAA Fisheries SEFSC, Research Fishery Biologist
Patricia Rosel	NOAA Fisheries SEFSC, Research Geneticist
Ruth Ewing	NOAA Fisheries SEFSC, Veterinary Medical Officer
Jessica Powell	NOAA Fisheries Southeast Regional Office (SERO), Fisheries Biologist
Barbara Taylor	NOAA Fisheries SWFSC/MMTD, Supervisory Research Biologist
John Walter	NOAA Fisheries, SEFSC Deputy Director of Science Operations and Council Services
Ashley Hill	NOAA Fisheries, Marine Debris Program, Florida & Caribbean Coordinator
Caitlin Wessel	NOAA Fisheries, Marine Debris Program, Gulf of Mexico Coordinator
Caroline Good	NOAA Fisheries, OPR, Cetacean and Pinniped Conservation
Allison Hernandez	NOAA Fisheries, OPR, Endangered Species Biologist
Ben Laws	NOAA Fisheries, OPR, Fishery Biologist
Eric Patterson	NOAA Fisheries, OPR, Fishery Biologist
Teri Rowles	NOAA Fisheries, OPR, Senior Advisor for Marine Mammal Health Science
Kevin Kirsch	NOAA, Office of Response & Restoration, Southeast Branch Chief
Fabian Gomez	NOAA, Office of Atmospheric Research (OAR)/Atlantic Oceanographic and Meteorological Laboratory (AOML), Northern Gulf Institute Research Scientist
Sang-Ki Lee	NOAA, OAR/AOML, Physical Oceanographer
Chris Kelble	NOAA, OAR/AOML, Supervisory Research Oceanographer
Charlie Stock	NOAA, OAR/Geophysical Fluid Dynamics Laboratory, Research Oceanographer
Mike Runge	U.S. Fish & Wildlife Service, Patuxent Research Refuge, Research Ecologist
Julien Martin	U.S. Geological Survey, Population Ecologist

SECTION 2 | Workshop Summary

This section of the workshop summary compiles key takeaways from the discussions and participants' input on recovery actions. For more details on meeting resources, discussions, etc., refer to the appendices.

List of Appendices

- A. List of Attendees
- B. Population-based recovery actions brainstorm original breakout group notes
- C. Threats-based recovery actions original breakout group notes
- D. Recovery actions survey results
- E. Threat group ratings poll results
- F. Recovery criteria original plenary discussion notes
- G. Specific references shared during the workshop

Recovery Actions Brainstorm

The ESA mandates that recovery plans be developed and implemented for the conservation and survival of ESA-listed species. Recovery plans are not solely intended to guide funding and actions of NOAA Fisheries; rather, they are meant to guide funding and actions of all stakeholders who may be involved or interested in conserving and recovering a species. Recovery plans are intended to be guidance documents, not regulatory documents. Recovery plans also typically include research actions to fill information gaps and inform future management actions to facilitate recovery.

Participants were asked to brainstorm four types of recovery actions: (1) research; (2) management; (3) monitoring; and (4) outreach & engagement (O&E) recovery actions. This was intended to encourage a diverse range of ideas across the different categories, while acknowledging a recovery action could apply to more than one category.

Recovery actions should explicitly relate to threats to the species; contribute to achieving recovery; include short and long-term actions; and be concrete and action oriented. Following an overview of recovery actions, workshop participants were divided into groups and asked to brainstorm on possible research, management, monitoring, and O&E recovery actions as they pertained to the days' themes (e.g., prey/climate change, fisheries interactions, contaminants, noise, vessel strikes). Each group had members of the Steering Committee/workshop support staff to assist breakout group discussions (e.g., a process facilitator and/or subject-matter expert moderator and notetaker/flipcharter). For Workshops #2–4, brainstorming discussions were conducted in 2–3 rounds of breakout group discussions where small groups of participants (and observers) circulated among the session's threat topics such that all participants had an opportunity to discuss each threat group and could build off the ideas of preceding breakout group discussions.

As previously mentioned, participants were asked to individually rate the importance of the potential recovery actions after each brainstorming session. During Workshop #1 on population dynamics-based recovery actions, participants chose their top three suggested recovery actions (focused on research and monitoring due to time constraints) toward the end of the day's session. Unfortunately, participants and the Steering Committee reflected that this process did not offer adequate time for sufficiently meaningful consideration and input. Therefore, for subsequent sessions, NOAA Fisheries staff would have a day after each workshop session to draft recovery actions based on breakout group discussions

and create a more substantive online survey that participants had approximately one week to review and submit input.

The following lists are the suite of suggested recovery actions divided into two general types of actions: population dynamics-based and threats-based. The workshop focused on threats that were rated by the original ESA-listing status review team as high or moderate, as well as threats that may be higher than originally rated by the status review team due to changing conditions and/or new information (refer to the subsection on [threats characterization feedback](#) for additional information). Post-workshop recovery action ideas and other comments submitted through the post-workshop informal survey or during the draft workshop summary review process have also been incorporated where possible.

Participants could also identify potential partners, costs, and/or recurrence for recovery actions (either during the workshop session if time allowed, or between workshop sessions). This generated fewer responses due to time limitations. The Steering Committee and NOAA Fisheries staff indicated future stakeholder discussions could revisit this topic in 2022 as NOAA Fisheries develops its draft implementation strategy.

Population Dynamics-Based Recovery Actions

In addition to a number of presentations on the recovery planning process and Rice's whale background, Workshop #1 included a focused presentation and discussion on population dynamics. Specific presentations included the following:

Presentations: ESA Section 7; Rice's Whale Population Status and Distribution

Section 7 Effects Analysis Overview

- Allison Hernandez, ESA Section 7 Biologist, NOAA Fisheries

Population Status and Distribution

- Lance Garrison, Senior Research Biologist, Southeast Fisheries Science Center

Appendix B provides the population dynamics-based recovery action breakout group discussion notes. NOAA Fisheries staff and the facilitation team used the discussion notes to create a quick informal poll on the potential recovery actions (see **Figures 2 and 3** below). Due to time constraints, participants were asked to pick their top 3 recovery actions regarding just two of the four categories — Research and Monitoring. The number of selections or “votes” attributed to the action is presented in parentheses in the lists below. Again, as noted earlier, these polls are not determinative of recovery plan actions; rather, they are intended solely to give Agency staff a sense of which suggested actions appear to resonate among workshop participants.

Research

Participants were asked to pick their top 3 recovery actions related to Research (10 options to select from; 24 respondents) (**Figure 2**) and Monitoring (10 options to select from; 26 respondents) (**Figure 3**).

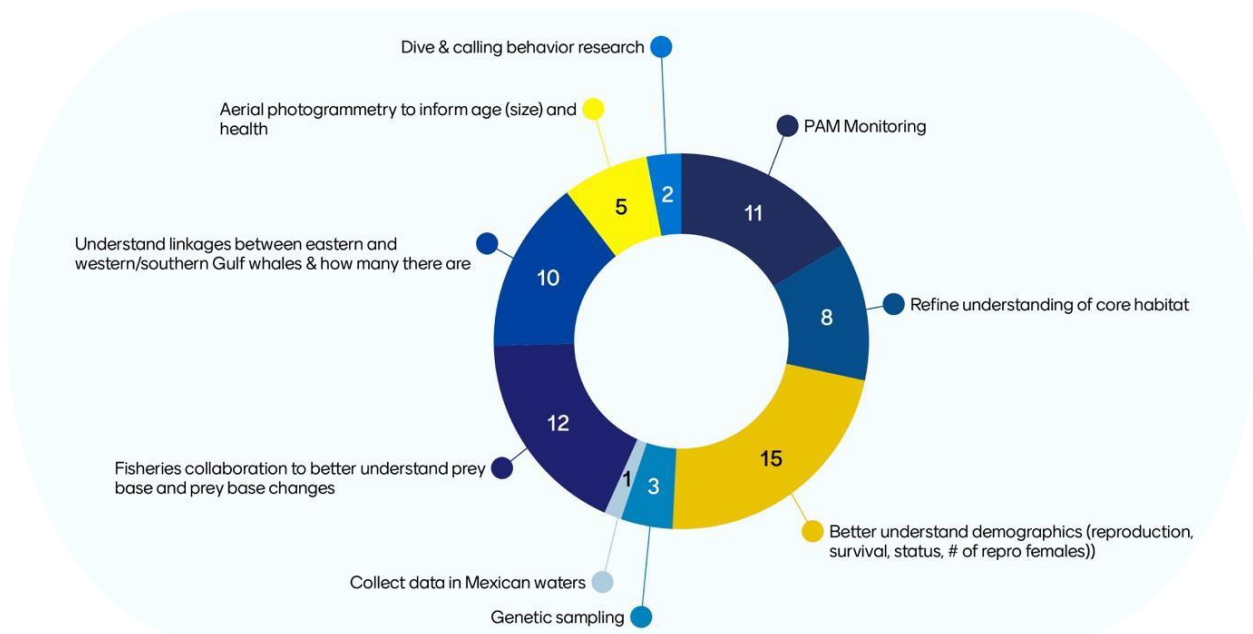


Figure 2. Workshop #1 – Participants’ top 3 recovery actions related to Research (10 options to select from; 24 respondents)

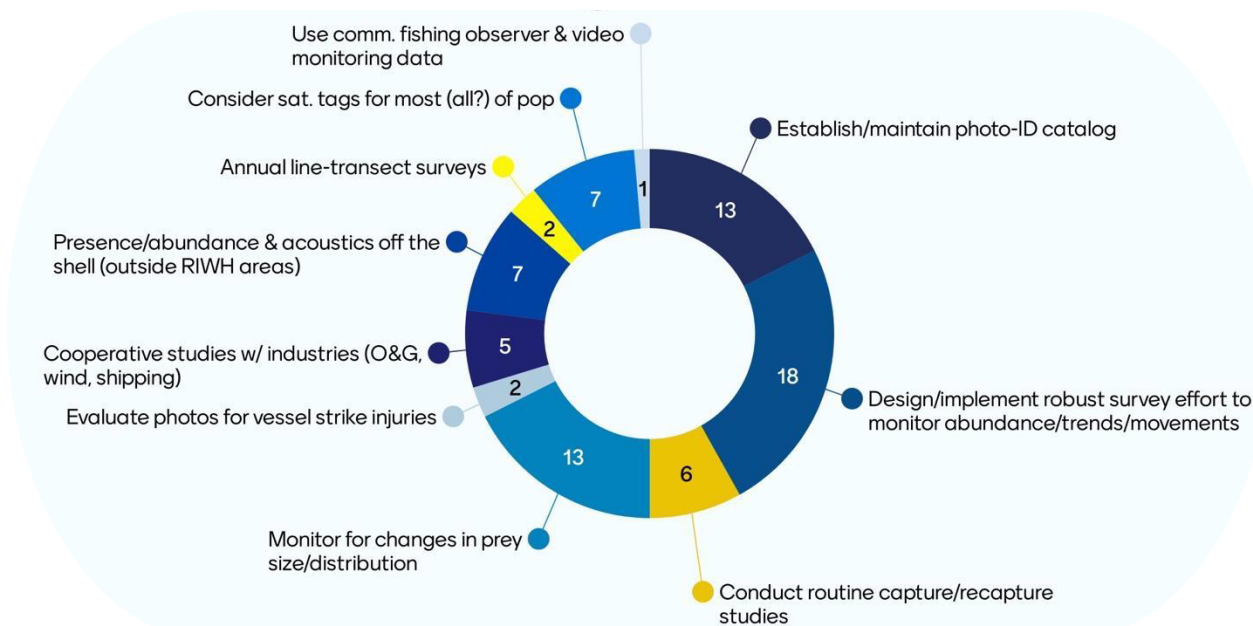


Figure 3. Workshop #1 – Participants’ top 3 recovery actions related to Monitoring (10 options to select from; 26 respondents)

Management

(Note: these options were drafted by staff but not discussed in plenary due to time constraints)

- Ship speed reductions.
- Limit human activity within core distribution area (i.e., limitations on seismic exploration).
- Potentially close (core) area to new experimental industries/fisheries.
- Limit vessel transiting to only daytime in core distribution area.

- Fixed permanent passive acoustic monitoring (PAM) array in high-density area to inform vessel speeds, etc.
- Develop adaptive management practices for all ocean users.
- Delineate areas of importance (prior to critical habitat designation).
- Ensure enhanced data collection from stranded animals.

Outreach & Education

(Note: these options were drafted by staff but not discussed in plenary due to time constraints)

- Develop partnerships with marine users to share info on Rice's whale status.
- Public outreach on all threats to whales.
- Directly engage with state/regional fishery management bodies.
- Increase O&E efforts in panhandle/offshore fishing community.
- Explore citizen science approaches to improve monitoring/awareness/etc.
- Develop/integrate curricula for local schools and explore opportunities for citizen science (e.g., photo-identification [photo-ID]).
- Engage with local/regional politicians to raise awareness.

Plenary Discussion Reflecting on Menti Poll Results

- A few participants stated they acknowledge the importance of research and monitoring due to the lack of current information on Rice's whale; however, management and outreach & engagement are also extremely important to advance given the state of the species' population and threats.
- Participant preferences may have varied due to participants' different interpretations of the actions (e.g., different groups in mind for research collaboration). Options were also not consistently categorized (i.e., some options were described as outcomes while other options seemed more like tools for achieving desired outcomes), which may have affected participants' votes. The group acknowledged that the short turnaround time to draft options and then indicate preferences proved challenging to substantively identify, articulate, and evaluate top recovery actions. (Note: The Steering Committee adapted this approach for subsequent workshops based on the feedback.)
- Renewable energy (e.g., offshore wind development) emerged as a common potential threat of concern. (Note: The Steering Committee modified workshop session topics to focus on "Renewable Energy" in the following Workshop session discussion due to these conversations.)
- [Post-workshop comment(s)]: There was a suggestion to spatially identify the habitat/core distribution area (e.g., with clear coordinates) for Rice's whale, and widely communicate the area to natural resource and ocean-use managers, fisheries, and other stakeholders. A participant emphasized communicating the boundaries in simple terms is important for effective application and enforcement of management actions. Another participant suggested incorporating some flexibility due to the mobile nature of the whales (e.g., adding "at least" before "core distribution area").
- [Post-workshop comment(s)]: Participants shared differing perspectives on whether several items were relevant to the scope of Rice's whale recovery. A participant expressed concerns that several of the suggested recovery actions, particularly those that may have major ramifications for shipping, fishing, energy, and other natural resource/ocean-use management activities in the Gulf of Mexico, generally lacked specificity and were not always within the Agency's authority. Other participants indicated the suggested ideas respond to the high threats to Rice's whales and reflect workshop discussion. Agency staff acknowledge participants were asked to brainstorm and prioritize high-level ideas that contribute to the recovery of Rice's

whales to inform the Agency's future work; the ideas do not necessarily reflect the Agency's opinion or management decisions.

- [Post-workshop comment(s)]: A participant commented on the suggested recovery action in **Figure 2** and **Appendix B**: "Fisheries collaboration to better understand prey base and prey base changes." While the participant agreed the idea as discussed during the workshop is important, the stand-alone language could be misinterpreted. There are no existing fisheries for the prey base of Rice's whale, and thus, no fisheries database exists, nor are there any dedicated fisheries-independent monitoring programs in place. Alternatively, the commenter suggested, "Better understand prey base and prey base changes," and remove the fisheries component.

Threats-Based Recovery Actions – Introduction

As previously mentioned, Workshops #2–4 focused on brainstorming potential recovery actions related to high-risk threats to Rice's whale:

- Prey and/or Climate Change
- Entanglement and Fisheries Interaction
- Renewable Energy
- Environmental Pollutants
- Disease and Health Indicators
- Marine Debris
- Acute and Chronic Noise
- Vessel Collisions

These are not the only threats that may substantially affect Rice's whale. Other threats (e.g., aquaculture and cumulative/synergistic effects) were briefly discussed during the workshop but were not focused topics of discussion.

Breakout Group Discussion Introductions and Plenary Debriefing Discussions

For each workshop session, NOAA Fisheries staff and the facilitation team provided an overview of the "threat groups" being discussed that session and the process for discussions.

- Workshop #2 – Prey and/or Climate Change; Renewable Energy; Entanglement
- Workshop #3 – Environmental Pollutants; Disease/Health Indicators; Marine Debris
- Workshop #4 – Chronic & Acute Noise; Vessel Collisions

Potential Threats-Based Recovery Actions

Appendix C captures the original notes from the breakout group discussions. Refer to this appendix for additional context and details that fed into the list of potential threats-based recovery actions listed below.

The following list of suggested recovery actions are based on the breakout group discussions and used for the post-working informal polling (more details are in **Appendix D**). Minor language edits were made to add clarity while maintaining the original intended meaning.

Again, the suggested recovery actions are intended only to present the range of ideas from discussions and give the Agency a sense of which actions appear to resonate among those participants who submitted responses. They do not necessarily represent the opinions of the Agency or individual participants.

Prey and/or Climate Change Recovery Actions

Presentations

Climate Change

- Charlie Stock, Oceanographer, OAR/Geophysical Fluid Dynamics Laboratory
- Chris Kelble, Supervisory Physical Scientist, OAR/AOML

Prey

- Lance Garrison, Senior Research Biologist, Southeast Fisheries Science Center

Refer to **Appendix C** for the recovery action breakout group discussion notes and **Appendix D** for the informal survey results (14 responses).

Suggested Recovery Actions

Prey and/or Climate Change – Suggested Recovery Actions

RESEARCH

1. Habitat: Research presence of Rice's whale in the southern Gulf of Mexico.
2. Bioenergetics: Use additional Rice's whale tag data across seasons and years to track data through time including body conditions, reproductive rate, body index measurements (and whether current body condition is optimal), and photo-ID.
 - a. [Post-workshop comment(s)]: Consider including demographics-integrated bioenergetic modeling; also consider assessing trends in respiratory rates in addition to the other body condition variables. There are several emerging tools to evaluate lung function. However, respiratory rates may prove to be a difficult parameter for long-term health monitoring for wild-free swimming cetaceans (particularly due to Rice's whales' sporadic observations and low sample sizes); tracking particular individual(s) of concern may be a more viable option.
3. Foraging dynamics/energetics: Deploy additional tags paired with visual or other health assessment research to improve understanding of foraging dynamics and energetics.
4. Forecasting: Develop forecast models on how prey and whale distribution may shift with climate change. Monitor over time.
5. Habitat: Investigate other potential Rice's whale habitat areas that may become more important as prey shifts, etc.
6. Prey dynamics: Review available acoustic data to examine prey patch dynamics elsewhere in the Gulf. That is, research what specifically is causing direct mortality to prey species. Better understand patch dynamics to understand how whales can adapt over time.
 - a. [Post-workshop comment(s)]: Consider using active acoustic or backscatter to differentiate from passive acoustic studies.
7. Prey biomass: Research both quality and quantity of prey to see if either has changed over time for bioenergetics modeling.
 - a. [Post-workshop comment(s)]: Consider researching if there are other areas in the Gulf of Mexico with sufficient prey quality and quantity to support Rice's whales, if Rice's whales are using these potential habitat areas as expected, and what drives differential use of potential habitat areas.
8. Prey abundance: Investigate how effects from climate change and changes in stratification/mixing will affect diel migration of prey.

9. Synergistic effects: Determine whether prey dynamics and effects from climate change (ocean warming, ocean productivity, etc.) are synergistically linked or are more independent threats.
10. Aquaculture: Research potential effects to prey from aquaculture facility(ies) emplacement within or near the core distribution area. Once a facility is in place, include extensive monitoring of effects, both of facility discharges and potential for downstream effects to prey.
11. Prey type: Conduct prey and stable isotope sampling in other locations and seasons to further identify prey types.
12. Habitat: Test our assumptions of the >400 m depth range to better understand the depth contour of prey (e.g., are Rice's whales as specialized in their feeding as they appear; are other prey important in other areas; are there similar aggregations of prey in other areas of the Gulf of Mexico).
13. Habitat: Investigate the effects of coastal sediment diversion projects on prey species.
14. Prey predators: Better understand what other predators might be targeting the main prey for Rice's whale as this may help us better understand future effects from climate change.
15. Prey life history: Investigate life cycle of prey species.

Additional suggested research recovery actions or related comments [post-workshop]

16. Investigate fisheries competing for Rice's whale prey – This action and prey abundance are related to the Forecasting action.

Prey and/or Climate Change – Suggested Recovery Actions

MANAGEMENT

1. Habitat conservation: Consider creating a marine protected area(s) for these whales.
2. Habitat/Commercial fisheries restrictions: Ban/restrict exploratory/novel pelagic and midwater species fisheries to protect Rice's whale prey species (no deepwater trawls).
 - a. [Post-workshop comment(s)]: The depths for "midwater" and "deepwater" fisheries were not specifically defined at the workshop; the discussion focused on recovery actions that would help protect Rice's whale prey. However, specifying the precise depth could be a recovery action.
3. Risk assessment framework: Given Rice's whale preferred habitat, develop a risk assessment framework using key parameters such as aquaculture, wind energy, renewable energy, shipping/vessel traffic, etc.
4. Reduce burning of fossil fuels (both locally and globally).
 - a. [Post-workshop comment(s)]: A participant questioned whether this should be included as a potential recovery action given that NOAA Fisheries does not have authority over U.S. energy policy. Agency staff noted that a recovery plan is a guidance document outlining a path to a species' recovery and is not limited the Agency's actions. Other participants added that while this is not specific to recovery of the Rice's whale, this proposal would directly reduce the identified threat over time and may prevent it from getting worse.
5. Aquaculture: Require aquaculture operations to model/track movement of effluent, fish food/productivity into local areas and how that radiates out to a larger area (i.e., size, shape, and significance of plume and water quality).
6. Habitat restoration: Determine if there are any unoccupied or underutilized areas that could be improved/restored to help with nutrient and prey limitation.

Additional suggested management recovery actions or related comments [post-workshop]

7. Consider the viability of dynamic management measures that may help achieve conservation goals while minimizing negative economic effects.

8. Require ropeless fishing gear in core and projected Rice's whale habitat; prohibit aquaculture and wind farms in core and projected Rice's whale habitat. (Clarify what is "ropeless fishing gear" and how it is defined by applicable regulations.)
9. Restrictions on fisheries (including commercial, charter, and/or private angler) should be evidence-based and crafted involving fishermen along with state, regional, and federal managers throughout the process.

Prey and/or Climate Change – Suggested Recovery Actions

MONITORING

1. Rice's whale long-term spatial monitoring: Research the potential for whales and prey to encounter even more/different threats as they may spatially relocate due to effects from climate change. Better understand how this will affect the threat landscape in the future.
 - a. [Post-workshop comment(s)]: Partner with industry and fisheries to facilitate information collection.
2. Prey long-term monitoring: Develop and implement a long-term standardized monitoring effort to track prey abundance, distribution, and quality in the Gulf of Mexico.

Additional suggested monitoring recovery actions or related comments [post-workshop]

3. Better understand distribution outside core area and movement of whales between core and outside areas to quantify year-round threats.
4. Ideally, conduct monitoring as part of a holistic program aimed at protected species and fisheries mandates.

Prey and/or Climate Change – Suggested Recovery Actions

OUTREACH & ENGAGEMENT

Note: All ideas below were suggested recovery actions and/or comments submitted post-workshop by individual informal survey respondents or during the draft workshop summary review (no O&E-related actions were drafted based on the workshop breakout group discussions). These are listed in no particular order of rank.

1. Outreach to ALL stakeholders – fisheries, states, federal agencies, industry (oil, renewable, and marine minerals), academia, etc.
 - a. Develop a sighting network and advertise across groups that utilize the Gulf of Mexico frequently, including fishing industry, renewable and mainstay energy industry, Coast Guard, and citizen scientists. Request photos and sighting information (latitude, longitude, date, time, # of individuals) to add knowledge regarding habitat use and distribution. Develop a near real-time PAM network with whale alerts, similar to the North Atlantic Right Whale auto-buoy network off Boston, to alert stakeholders and public of whale presence, particularly in predicted habitat outside the core area.
2. Public engagement/awareness of Rice's whale status and threats.
 - a. Including focusing on climate change effects.
 - b. Effects of human activities on deep-sea environment and fragility of deep-sea environments.
3. Co-design mitigation with industry.
 - a. Phase out hydrocarbon extraction from the Gulf of Mexico.
 - b. Similar to a previous item, this idea was flagged as outside of NOAA Fisheries authority; however, was discussed during the workshop and relates to Rice's whale recovery. A participant added that while this item reflects a broader policy objective, it also

responds to a stressor identified by NOAA's status review as a high threat to this particular species.

4. Weave into educational curricula to increase awareness of Rice's whale.
 - a. Outreach education for Coast Guard about vessel hazard during resting periods.
5. Outreach activities regarding ship strike and disturbance from vessels is imperative to reduce ship strike. Similar to efforts with Southern Resident Killer Whales, there could be something like a "Be Whale Wise" campaign for Rice's whales. This includes a website, printed material, regulations printed in various marine brochures (e.g., fishing regulation brochures).
6. Engage with fisheries (e.g., commercial, charter, and private angler) and other commercial interests to try and find a solution meeting both conservation and economic goals.
 - a. Fishery councils to be engaged about outreach for commercial fishermen.
 - b. Develop outreach to charter boat fishermen in the northeast Gulf.
 - c. "What is a Rice's whale" signage for public operators at ports.
 - d. Work with fisheries and other partners to develop Rice's whale-smart fishery management strategies for new fisheries (e.g., avoid possibility for fisheries targeting Rice's whales' key prey).

Prey and/or Climate Change – Additional/General Comments [Post-Workshop]

1. Need to raise profile of these whales.
2. Concern was expressed about the effectiveness of the recovery actions given that there are so few whales.
3. Climate change is at least a moderate risk for a species with such a small tolerance for viability in its population. A significant change in the physical and prey environment, as would be expected under climate change, could cause a significant change in the fecundity and/or survival.
4. Information/research needs:
 - a. First, need an improved understanding of Rice's whale demographics and habitat range...then prey.
 - b. More monitoring and better understanding for freshwater input into Rice's whale habitat (or prey habitat) from change in precipitation including along Gulf of Mexico's watersheds. Consider implementing more eDNA and microbiome monitoring for changes associated with climate change.
 - c. Understanding the effects of anthropogenic underwater sound on prey – do these activities alter the patch dynamics of important species?
5. Resources: Is there potential to use some Deep Water Horizon (DWH) recovery funds to create grants for more research on these critically endangered whales?
6. A participant emphasized that Prey and Climate Change as threats to Rice's whale are potentially related; however, their timescales of actuation differ markedly. Classification as a single entity implies a concerted approach. What we learned from DWH suggests that prey is definitely a "now issue," while climate change is more a "potentially tomorrow issue." *[Post-summary review note]: The topic "Prey/Climate Change: was modified to "Prey and/or Climate Change" where possible in the workshop summary and appendices in response to this suggestion.*

Entanglement/Fisheries Interaction Recovery Actions

Presentations

Entanglement/Fisheries Interaction

- Jess Powell, Biologist, NOAA Fisheries SERO

Refer to **Appendix C** for the recovery action breakout group discussion notes and **Appendix D** for the informal survey results (14 responses).

Suggested Recovery Actions

Entanglement/Fisheries Interaction – Suggested Recovery Actions

RESEARCH

1. Entanglement: Identify all sources of potential entanglement.
2. Commercial fisheries: Identify areas of commercial fisheries within Rice's whale predicted habitat.
3. Commercial fisheries: Identify areas (e.g., coordinates and boundaries) of highest entanglement risk to Rice's whales.
4. Commercial fishing: Investigate scarring rates and severity.
5. Recreational (e.g., charter/for-hire and private angler) fisheries: Better understand potential effects to Rice's whales from recreational fishing (e.g., deep drop fishing).
6. Commercial fisheries: Determine potential triggers (e.g., real-time acoustic monitoring or surveys) for fishery closures under a dynamic management scenario to target measures in a meaningful way.
7. Aquaculture & wind farms: Investigate and better understand risk of hurricanes on aquaculture facilities and floating wind turbines (anchoring cables and other unknowns from gear/operation, ghost gear/marine debris).
8. Aquaculture: Better understand risks of aquaculture facilities to Rice's whales. Use information from other parts of the world, e.g., Mediterranean and New Zealand to characterize potential effects and solutions.
9. Commercial fisheries: Determine viability of using modeling for dynamic management.

Additional suggested research recovery actions or related comments [post-workshop]

10. Research what precedent is being set with potential emplacement of aquaculture structures within Rice's whale core distribution area (other industries are paying attention).
11. Entanglements: identify and rank by likelihood and severity all sources of potential entanglements. Also, all kinds of recreational fishing (not just deep dropping) should be better understood. And if scarring rates and severity are to be looked at, it should be for all vessels, including fishing and non-fishing, not just commercial fishing.

Entanglement/Fisheries Interaction – Suggested Recovery Actions

MANAGEMENT

1. Commercial and recreational fisheries: Require vessel monitoring system (VMS) reporting of all Gulf commercial, charter, recreational fisheries.
2. Protected area: Establish a protected area that would prevent additional risk from new or emerging industries.
3. Protected area: Establish a protected area to coincide with the core distribution area and prohibit commercial fishing and vessels (unless by special permit).

4. Aquaculture: Prohibit aquaculture structures in Rice's whale core distribution area as well as their predicted habitat.
5. Aquaculture: Prohibit aquaculture structures in the Rice's whale core distribution area as well as their predicted habitat until risk from gear/operation to Rice's whale is better understood and whale safe practices can be developed and required.
6. Commercial fisheries: Require reporting of lost gear and remove ghost gear (including parachutes). (Clarify definition of "ghost gear.")
7. Aquaculture: Develop mitigation measures/BMPs to address risks from aquaculture structure development and operation, if necessary.
8. Commercial fisheries: Require ropeless fishing gear in Rice's whale core distribution area as well as their predicted habitat. (Clarify definition of "ropeless gear.")

Additional suggested management recovery actions or related comments [post-workshop]

9. Not sure if protected area is aligned with critical habitat designation, but it would be good to have a better understanding of if/when Rice's whale use areas outside the core area when establishing protections.
10. Exclude parachutes from the "Commercial fisheries" category.
11. Ban gear prone to whale entanglement from being used in the area where these whales occur.
12. Prohibition is warranted only if there is found to be significant risk for the activity being considered.
13. A number of recommendations listed in the "Prey" section above (e.g., ropeless gear, use of dynamic management) are also directly applicable to this section.

Entanglement/Fisheries Interaction – Suggested Recovery Actions

MONITORING

1. Commercial fisheries: Expansion of observer coverage (including electronic monitoring) for fisheries that operate in Rice's whale habitats.

Additional suggested monitoring recovery actions or related comments [post-workshop]

2. If fisheries operate in core Rice's whale habitat, observer coverage should be 100%.
3. Consider the very low likelihood of detecting an entanglement from an observer program.

Entanglement/Fisheries Interaction – Suggested Recovery Actions

OUTREACH & ENGAGEMENT

1. Commercial fisheries and renewable energy development: Develop partnerships with Gulf of Mexico Fishery Management Council (FMC), Gulf of Mexico Reef Fish Shareholders' Alliance, and Responsible Offshore Development Alliance-like entities (e.g., Gulf of Mexico Alliance, Gulf States Marine Fisheries Commission, Sea Grant, etc.) to develop and encourage use of and outreach regarding BMPs to reduce threats to Rice's whales.
2. Recreational fisheries: Develop a Rice's whale conservation outreach strategy for the recreational boating community.

Entanglement/Fisheries Interaction – Additional/General Comments [Post-Workshop]

1. Determine if fisheries are competing for prey species.
2. While it is important to aggregate threats, these threats will need to be disaggregated in order to effectively apply solutions – it is less about commercial vs. recreational fishing and more about the behavior, gear, amount, vessels, etc. that may overlap spatially and temporally with this species.

3. A couple participants suggested that several of these actions should apply to all fisheries (i.e., not focus on commercial vs. recreational fisheries) because all fisheries – commercial, charter/for-hire, and private angler fisheries – overlap or have the potential to overlap with Rice’s whale areas. In general, Agency staff decided to retain the original language used in the informal survey (refer to **Appendix D**) while still capturing the suggestions in the main body of the workshop summary.
4. Consider using necropsies for fisheries (e.g., evidence of fisheries entanglement scarring from necropsies or photo-ID / health assessments). Necropsies can provide useful information for many of the human interactions covered in all these workshops.

Renewable Energy Recovery Actions

Presentations

Renewable Energy

- John Walter, Deputy Director of Science Operations and Council Services, NOAA

Refer to **Appendix C** for the recovery action breakout group discussion notes and **Appendix D** for the informal survey results (14 responses).

Suggested Recovery Actions

Renewable Energy – Suggested Recovery Actions

RESEARCH

1. Renewable energy planning: Characterize Rice’s whale use of habitat and routinely updated maps regarding potential conflicts with Rice’s whales and potential lease sales.
2. Marine spatial planning: Expand surveys prior to siting/planning, and increase surveys beyond current expected depth ranges and enhance to a finer scale.
3. Marine spatial planning: Consider potential effects from climate change in future site planning processes.
4. Renewable energy effects: Better understand effects of electrical energy cables on Rice’s whales (e.g., navigation and other behaviors), prey, and predators.

Additional suggested research recovery actions or related comments [post-workshop]

5. Research to better understand Rice’s whale occurrence in western and southern Gulf of Mexico habitats.

Renewable Energy – Suggested Recovery Actions

MANAGEMENT

1. Marine spatial planning: Avoid siting of wind farms within Rice’s whale predicted habitat (e.g., Western Gulf of Mexico, waters deeper than 100m).
2. Renewable energy development and operation: Develop mitigation measures to eliminate/minimize threats (e.g., mitigate sound from pile driving, night travel restrictions, spatio-temporal windows for construction activities, passive acoustic monitoring for detecting whales as well as monitoring soundscape, etc.).
 - a. [Post-workshop comment(s)]: Potential for increased vessel traffic during development and operations including potential risk of vessel collisions (day or night) and increased noise should be considered

3. Renewable energy development and operation: Better inform Section 7 consultations by developing aids (distribution maps, conservation frameworks, etc.) for biologists that are involved in planning and assessing the effects of projects.
4. Marine spatial planning: Develop a robust marine spatial planning tool that includes a species distribution model with environmental drivers that can be used to avoid conflicts in lease/wind development. Ideally, the tool will include a climate change component and empirical data on Rice's whale detections.
5. Marine spatial planning: Prohibit renewable energy development in the Eastern Planning Area.
 - a. [Post-workshop comment(s)]: Similar to previous items, participants had differing perspectives on whether this item was relevant to the scope of Rice's whale recovery.

Additional suggested management recovery actions or related comments [post-workshop]

6. Ensure that restricting the location of renewable energy development doesn't instead promote the continuation of oil/gas. Increasing the development of renewable energy is important for mitigating effects from climate change.
7. Encourage developers and BOEM to make use of existing infrastructure in the Gulf of Mexico to the extent possible for renewable energy siting (rather than pile driving more structures).

Renewable Energy – Suggested Recovery Actions

MONITORING

1. Renewable energy construction: Develop PAM guidelines for detection of Rice's whale before, during, and after construction of offshore wind projects.

Renewable Energy – Suggested Recovery Actions

OUTREACH & ENGAGEMENT

1. Conduct outreach about Rice's whale conservation to the renewable energy community and NGOs engaged in renewable energy.

Renewable Energy – Additional/General Comments [Post-Workshop]

1. There was a comment that there is insufficient science/data to support excluding activities specifically in the Western Gulf of Mexico; we need to fill relevant data gaps before excluding activities (i.e., we need to know what we don't know first). Another post-workshop comment stated that such evidence of Rice's whales in the Western Gulf of Mexico exists; data with better spatial resolution will be important to fill data gaps.
2. In general, there is relatively low concern because lease sales are not expected in Eastern Planning Area (which encompasses Rice's whale core distribution area); however, there needs to be a better understanding of the distribution of Rice's whales outside the core area to best understand how to manage any energy actions.
3. Concern was expressed related to certain research goals like "Better understand effects of electrical energy transfer lines upon Rice's whale." While this would be useful information, presumably it involves either the construction of technologies that would expose Rice's whale to this habitat or some experimental exposure of Rice's whale to such transfer lines, both of which – if particularly harmful – could irreparably harm the Rice's whale population. A participant's comment supported a precautionary approach that avoids exposure – studying the effects on similar species might provide useful information to inform the likelihood of adverse effects for Rice's whales. Another post-workshop comment stated this may have unintended consequences (e.g., hindering development of renewable energy resources, while not providing sufficient benefit).

Environmental Pollutants Recovery Actions

Presentations

Environmental Pollutants

- Kevin Kirsch, SE Branch Chief, NOAA Assessment & Restoration Division

Refer to **Appendix C** for the recovery action breakout group discussion notes and **Appendix D** for the informal survey results (11 responses).

Suggested Recovery Actions

Environmental Pollutants – Suggested Recovery Actions

RESEARCH

1. Exposure/Effects: Identify sources of contaminants and contaminant loads in Rice's whales and their primary prey species to inform management initiatives.
2. Exposure/Effects: Investigate types of contaminant loads in Rice's whales and their prey.
3. Habitat/Range: Investigate and identify pollutants/contaminants that are entering the Gulf of Mexico from the Mississippi River or other land-based sources.
4. Habitat/Effects: Conduct additional modeling for catastrophic spills to more fully reflect the industry shift in lease distribution to deeper water. Model should include hydrodynamic flow fields around leases to better understand the risk of an oil spill being carried into Rice's whale habitat (including the extended shelf-edge habitat beyond the core area).
5. Investigate existing Gulf of Mexico contaminant models that can be enhanced with Rice's whale information.
6. Exposure/Effects: Learn more about exposure and effects to Rice's whales from stimulation chemicals, produced water, and other oil and gas-related activities.
7. Habitat/Range: More dynamic hydrodynamic modeling is needed coupled with more dynamic Rice's whale modeling; this will aid in the increased state of readiness and flow of information for any exposure risks.
8. Health/Effects: Investigate correlation between health/condition, predicted population outcome, and various types of contaminants and contaminant load (as a precursor to being able to enact stronger regulations).
 - a. [Post-workshop comment(s)]: Investigate contaminants and contaminant load in Rice's whales or their prey. This should inform changes in regulations, responses, and/or clean-up.
9. Habitat/Effects: Determine if barrels of chemicals/industrial waste that were legally dumped in the Gulf of Mexico are degrading Rice's whale habitat or the health of the whales.
10. Habitat/Effects: Develop and/or implement subsurface oil detection/monitoring.
11. Habitat/Effects: Develop a better understanding of potential contaminants and pollutants from SpaceX capsules, recovery boats, and mobile launch platforms
 - a. [Post-workshop comment(s)]: Particularly focus on the northern Gulf of Mexico.
12. Habitat/Effects: Develop a better understanding of what is creating the "Dead Zone" in the Gulf of Mexico and how it could be mitigated.

Additional suggested research recovery actions or related comments [post-workshop]

13. Some of these recovery actions should be considered for natural background (e.g., naturally occurring oil slicks from seeps versus oil spills from human activities), other point and non-point sources, and whether projects will actually happen (e.g., SpaceX).
14. Subsurface and surface oil detection should include from natural seeps.

Environmental Pollutants – Suggested Recovery Actions

MANAGEMENT

1. Habitat: Consider water quality as an essential feature of Rice's whale critical habitat.
2. Habitat/Effects: Develop rapid response teams directed on Rice's whale assessment or protection for pollution events detected by monitoring systems within Rice's whale habitat or are projected to impact Rice's habitat.
3. Habitat/Range: Reduce/cease new oil and gas leases in the Gulf of Mexico (particularly in core distribution area and projected habitat areas).
4. Habitat/Effects: Develop standardized communication protocols between the Office of Response and Restoration for notifying Rice's whale recovery personnel of smaller spills in Rice's whale habitat so they can track possible cumulative effects.
5. Habitat/Effects: Enact programmatic policy or funding method for decommissioning derelict, abandoned/"orphaned" oil rigs/pipelines.
 - a. [Post-workshop comment(s)]: Review the language on this issue in the Infrastructure Act
6. Habitat/Effects: Pursue containment/clean-up of existing coastal land-based Superfund sites around the Gulf of Mexico.
 - a. [Post-workshop comment(s)]: The Infrastructure Act should also be reviewed related to this idea.

Additional suggested management recovery actions or related comments [post-workshop]

7. Need more knowledge of Rice's whales and their core distribution area (versus using information from surrogate species).
 - a. A few of these recovery action ideas require more baseline and conditional data, like offshore water quality and biogeochemistry work, that needs to be done before we can extrapolate effects to Rice's whales.
8. Update the existing oil spill response structure within Unified Command (UC), wildlife branch, Natural Resource Damage Assessment (NRDA), and restoration to be more proactive when a spill occurs such that reconnaissance and ephemeral data collected as rapidly as possible. The UC through the Environmental Unit should be aware of core distribution area and required observers for operations.

Environmental Pollutants – Suggested Recovery Actions

MONITORING

1. Necropsies: Consider additional sample/tests from stranded animals' necropsies, including comparative analyses between stranded animals.
2. Necropsies: Enhance carcass sampling protocols and allow for team-lead-driven changes due to "unknown unknowns" or novel findings.
3. Necropsies: Create a Rice's whale necropsy and sample documentation portal with more complete data sharing.
4. Habitat: Establish a forum for inter-agency/inter-organization collaboration and coordination on long-term monitoring.
5. Habitat: Develop long-term water quality monitoring stations within and just outside of Rice's whale habitat.
 - a. [Post-workshop comment(s)]: Water quality is a broad term. Consider recommending specific parameters to include in water quality.

6. Effects: Map and inventory areas where chemicals/industrial waste was permitted by the Environmental Protection Agency (EPA) to be dumped into the Gulf of Mexico in the 1970s.
 - a. [Post-workshop comment(s)]: Include dredge depositories (i.e., Ocean Dredged Material Disposal Sites, ODMDS).

Additional suggested monitoring recovery actions or related comments [post-workshop]

7. It is important to conduct long-term monitoring of water quality, but it is unknown whether establishing stations in the Rice's whale habitat is the best way to accomplish that. For example, it may be more important to conduct toxicology analysis of preferred Rice's whale prey species. A post-workshop comment added that, alternatively, water quality monitoring may pick up different contaminants than a food web-based monitoring program.

Environmental Pollutants – Suggested Recovery Actions

OUTREACH & ENGAGEMENT

Note: All ideas below were suggested recovery actions and/or comments submitted post-workshop by individual informal survey respondents or during the draft workshop summary review (no O&E-related actions were drafted based on the workshop breakout group discussions). These are listed in no particular order of rank.

1. Enhance engagement with the oil & gas community and all the contractors to ensure that all parties will prioritize Rice's response/response adequately.
 - a. Require all personnel engaged in oil and gas exploration and production in the Gulf of Mexico to undergo training on risks to Rice's whales and other marine fauna.
 - b. If this is directed for response during a spill then it should probably go to Bureau of Safety and Environmental Enforcement (BSEE) and become part of its required response plans for Potential Responsible Parties and additional education to NOAA's DARPP, USCG and the North Pacific Fisheries Commission (NPFC) managers so the UC is informed, sensitized, and aware of the protection for Rice's whales.
2. Engage with oil and gas, aquaculture, wind energy, and fishery communities so they can provide information on where Rice's whales are seen in the western side.
 - a. Set up an application for rapid notification of sightings.
3. Engage with the potential federal and industry entities that need accurate and updated information on Rice's whales as part of their National Environmental Policy Act (NEPA) or permitting requirements so that needs can be met collaboratively and shared.
4. Engage coastal municipalities regarding the effect of land-based pollution and debris to the ocean. Encourage coastal municipalities to harden infrastructure to mitigate the introduction of land-based pollutants.
 - a. Work with NOAA's marine debris program
5. Improve general education on types and pathways of different contaminants in the Gulf of Mexico (and their primary sources).
 - a. Increase public education about the extent of oil production activities in the Gulf of Mexico.
 - b. Develop K–12 curricula on the links between contaminants and the health of marine wildlife, including Rice's whales.

Environmental Pollutants – Additional/General Comments [Post-Workshop]

1. Improve remote coastal water quality monitoring stations consistently across the northern Gulf of Mexico. Need more baseline data and monitoring efforts in deeper waters near Rice's whale habitats.
2. One workshop participant suggested that oil spill prevention has benefits beyond just containment or mitigation and recommended the recovery plan include elimination of oil/gas leasing in part or all of the Gulf as an important recovery action and identify relevant authorities under Outer Continental Shelf Lands Act (OCSLA) and ESA. Similar to previous items, participants had differing perspectives on whether this observation was relevant to the scope of Rice's whale recovery.
3. Ensure that Potential Responsible Parties for chemical spills and the Gulf of Mexico Oil Spill Removal Organization (OSRO) are fully informed of the needed actions in any chemical or oil spill (from the response, through NRDA to restoration). A post-workshop comment suggested this could be done with the Disaster Response Coordinator.

Disease / Health Indicators Recovery Actions

Presentations

Disease/Health Indicators

- Teri Rowles, Sr Advisor for Marine Mammal Health Science, NOAA Fisheries

Refer to **Appendix C** for the recovery action breakout group discussion notes and **Appendix D** for the informal survey results (9–10 responses)

Suggested Recovery Actions

Disease/Health Indicators – Suggested Recovery Actions

RESEARCH

1. Body condition/health: Develop detailed stranding/necropsy protocols that include body condition measurements and body tissue collection, including proximate composition analysis to inform bioenergetic models.
2. Body condition/health: Develop body condition indices via aerial photogrammetry/morphometrics, including at sea and when stranded to compare/contrast body condition/inform bioenergetics.
 - a. [Post-workshop comment(s)]: Also conduct vessel-based assessments.
3. Body condition/health: Establish a baseline on body condition to determine what a healthy Rice's whale looks like.
 - a. [Post-workshop comment(s)]: We expect there may be differences seasonally or interannually and with physiological status (pregnant, lactating, sick, injured). We need to know how these body condition metrics may normally change with season, Temperature, reproductive state. Integrating body condition metrics with reproductive status (biopsy or fecal hormone), growth/condition curves in calves.
 - b. [Post-workshop comment(s)]: Consider also doing this related to prey and environmental conditions.

4. Body condition/health: Identify potential stressors that may lead to a weakened condition (immunocompromised) and thus increase susceptibility to ubiquitous or opportunistic disease vectors (fungi, bacteria, viruses, etc.).
5. Body condition/health: Prioritize sample/data collection that can inform immunosuppression.

Additional suggested research recovery actions or related comments [post-workshop]

6. Expand remote biopsy analyses to include biomarkers for physiologic and pathophysiologic indicators.
7. Establishing a baseline on body condition may require comparison with other mysticete populations in tropical oceans (e.g., thriving coastal populations of Rice's whales in relatively pristine areas).
8. Note that it may already be too late to "Establish a baseline on body condition to determine what a healthy Rice's whale looks like" (shifting baseline; what we see now may not be truly "healthy").
9. Determine what type and pathways of contaminants affect the health of megafauna, including Rice's whale. There is a heavy emphasis on oil and gas, because likely dedicated research post-DWH, but do we have enough information on the range of potential contaminants.

Disease/Health Indicators – Suggested Recovery Actions

MANAGEMENT

1. Response: Ensure resources are in place to immediately deploy trained teams if/when there is a stranding/deceased animal.
2. Cumulative/synergistic threats: Address/manage other threats (i.e., potential sources for pathogen/disease transmission (e.g., oil and gas, farm pollutants) or noise/vessel traffic) to lessen negative effects from other primary or secondary threats.
3. Disease/pathogens: Based on disease/pathogen research/monitoring, develop management measures to reduce the source of disease/pathogen (e.g., vaccines, transmission source, environmental conditions.) and/or exclude activities that will exacerbate the immune system.
 - a. [Post-workshop comment(s)]: Immune function may not be the only indicator of adverse health outcome.

Disease/Health Indicators – Suggested Recovery Actions

MONITORING

1. Body condition: Using photo-ID images from small boats, use automated artificial intelligence (AI) tools to evaluate/monitor body condition images to speed the evaluation process.
 - a. [Post-workshop comment(s)]: Include boats with and without UAS.
2. Body condition: Identify appropriate health metrics through external conditions or intrinsic health parameters that will aid in long-term monitoring of individual and population-level health, and compare body condition with other tropical whales.
3. Body condition: Identify lesions during photo-ID studies that may indicate immunocompromised health/malnutrition.
4. Habitat: Determine what types of pathogens, etc., might get flushed into the habitat during freshwater runoff events; monitor for changes during runoff events; manage where possible.
5. Body condition/health: Improve our tools/methods to better collect/monitor breath samples from mysticetes to determine the presence and risk of pathogens, etc.
6. Climate change: Integrate/analyze body condition measurements because Rice's whale may be more heat challenged than we currently realize, i.e., physiologically they may need to reduce insulation to dissipate heat; therefore, look at the whole picture with a chronic-change lens.

7. Habitat: Better understand and monitor for disease/pathogen prevalence in the Gulf of Mexico to determine the what/where/how/and rate of the risk (e.g., threat of Morbillivirus caused by likely interactions between Rice's whale and bottlenose dolphins; synthesis of pathogens circulating in Gulf of Mexico cetaceans that might be a risk for Rice's whales).

Additional suggested monitoring recovery actions or related comments [post-workshop]

8. Body condition: Identify lesions during photo-ID studies that may indicate human interaction-induced trauma.
9. Does monitoring for pregnancy/fecundity/calf survival fall under health indicators?

Disease/Health Indicators – Suggested Recovery Actions
OUTREACH & ENGAGEMENT

1. Collaboration: Enhance efforts to increase detection/reporting of carcasses, and data collection.

Marine Debris Recovery Actions

Presentations

Marine Debris

- Denise Boyd, Researcher, Florida Fish & Wildlife Conservation Commission
- Caitlin Wessel, Gulf of Mexico Coordinator, NOAA Marine Debris Program
- Ashley Hill, Florida & Caribbean Coordinator, NOAA Marine Debris Program

Refer to **Appendix C** for the recovery action breakout group discussion notes and **Appendix D** for the informal survey results (10 responses).

Suggested Recovery Actions

Marine Debris – Suggested Recovery Actions

RESEARCH

1. Body condition/health: Mine existing data (photo-ID, stranding, other existing data) to determine prevalence of indication of entanglement or ingestion on population.
2. Prey: Determine what specific types of marine debris Rice's whale are encountering; monitor what is in the environment where animals are feeding.
3. Prey: Sampling should examine debris near seafloor where whales are feeding.
4. Collaboration: Explore methods of sourcing plastic, specifically the piece that was found in the animal that stranded in the Everglades.
5. Collaboration: Engage student groups in robotics and other fields to explore innovative ways of investigating marine debris (e.g., sources, transport, material).
6. Comparison studies: Look at other deep diving cetacean species that strand more frequently (e.g., Kogia); try to quantify the type of plastics that end up in deep divers.

Additional suggested research recovery actions or related comments [post-workshop]

7. Many of these topics would require larger collaborative effort, e.g., NOAA Marine Debris Program and other groups to run studies in deeper waters. Most of debris work in Gulf is shelf-limited.

Marine Debris – Suggested Recovery Actions

MANAGEMENT

1. Best management practices: Exploration/requirement of the use of ropeless fishing gear in Rice's whale core/projected habitat.
2. Coordination: Evaluate terms and conditions for dealing with derelict gear, other debris on permits and for EFH/ESA consultations to identify gaps in management actions.
3. Coordination: Add info to large whale stranding manual specific to Rice's whale.
 - a. [Post-workshop comment(s)]: Specifically add information on protocols and procedures to detect marine debris ingestion or entanglement.
4. Coordination: Reduce sources of microplastics from industrial sources, including virgin pellets
5. Habitat/Range: Encourage investment in stormwater mitigation measures to limit stormwater marine debris in the Gulf of Mexico.
6. Response: Consider need for large whale entanglement response training
 - a. [Post-workshop comment(s)]: In addition/alternative to training – establish a process to bring level 4 large whale entanglement response personnel on scene to assist.
 - b. [Post-workshop comment(s)]: Large whale disentanglement requires very specialized training. Therefore, training could be fore NOAA staff or other responders (e.g., existing stranding network responders) that could become certified through this training.
7. Best management practices: Develop BMPs in collaboration with experts, industry, etc.
 - a. [From **Appendix C** discussion notes]: BMPs exist for removal of marine debris, but participants were not aware of removal occurring at deep depths. This activity could involve identifying key user groups, debris associated with those user groups, and establish a consortium of those user groups to approach this issue in a more coordinated/efficient manner. Look at National Fish and Wildlife Foundation (NFWF) example project working with commercial fishermen on gear disposal at ports.
8. Coordination: Work with NASA and other partners to prevent landing/launch of SpaceX capsules near Rice's whale habitat.
9. Coordination: Strengthen reporting requirements for marine trash and debris appendix in the Gulf of Mexico Oil and Gas BiOp.
10. Coordination: Encourage/require labeling fishing gear to better identify whether it is active vs. derelict gear.
11. Habitat/Range: Conduct large scale clean-up in Gulf of Mexico.

Additional suggested management recovery actions or related comments [post-workshop]

12. A commenter expressed concerns related to the BiOp recommendation: oil and gas is highly regulated in its management of debris on platforms/vessels so it is unclear if this is meaning reporting that we see 'at sea' in transit or from a platform. This is not something that could easily be done. More clarification is needed here to properly assess. Related to fisheries, more clarity and information is needed on the types of fishing activities in and around Rice's whale habitats. Not sure how much deep fishing and gear employment is done.
13. It seems likely that stormwater is a significant pathway for marine debris, as it is in other regions, and that the problem will be exacerbated by increased storm severity and coastal flooding. This would be "very important" if we had more information about the contribution runoff is making.
14. A commenter stated they had interpreted the ropeless fishing requirement as a bar on fishing that does not use ropeless gear, including fishing practices for which ropeless gear is inappropriate (e.g., longline fishing). With that understanding, the commenter would rank this

measure as very important. Another participant commented that transitioning to ropeless gear would likely be expensive and a slow transition (e.g., Gulf of Maine experience).

Marine Debris – Suggested Recovery Actions

MONITORING

1. Habitat/Range: Improve/centralize reporting and tracking of marine debris from not only disasters/catastrophic events but from overall sources to understand origins of marine debris to help target outreach and mitigation efforts.
2. Collaboration: Establish a forum for collaboration and coordination on long-term monitoring.
3. Collaboration: Collaborate with industry in tracking and monitoring where marine debris is in the environment.

Additional suggested monitoring recovery actions or related comments [post-workshop]

4. “Industry” should be better defined.
5. Do not limit the first action to catastrophes; we need to get a better handle on marine debris sources overall.

Marine Debris – Suggested Recovery Actions

OUTREACH & ENGAGEMENT

1. Best management practices: Improve outreach to fishermen (commercial and recreational) operating near Rice’s whale habitat and throughout Gulf regarding prevention of marine debris.
2. Best management practices: Involve marine debris coordinators in outreach, recovery efforts, and development of BMPs in Rice’s whale habitat.
3. Best management practices: Encourage reduction of plastic usage.
 - a. [Post-workshop comment(s)]: A participant indicated this statement seemed broad. Another participant emphasized the importance for explaining how the general public can help – broad outreach statements can still encourage positive change that benefits Rice’s whales (particularly if the beneficial effect on whales is widely communicated).
4. Best management practices: Outreach to fishing community to determine whether they are using debris as aggregation devices, or survey to determine whether devices were seen.

Additional suggested outreach and engagement recovery actions or related comments [post-workshop]

5. Outreach and educational initiatives toward coastal municipalities also with respect to their waste management programs and loss (litter) to the environment. (Very Important)
6. Expanded marine debris public education and outreach.

Marine Debris – Additional/General Comments [Post-Workshop]

1. A participant observed that some of the suggested marine debris recovery actions could be very challenging to measure and/or complete.
2. Another participant reflected on whether Rice’s whale might be impacted by increasing Sargassum, perhaps as accumulators of plastic. The commenter flagged this as a potential emergent issue in the future that did not appear to be a prominent topic during the workshop.

Acute and Chronic Noise Recovery Actions

Presentations

Anthropogenic Noise / Acoustic Habitat (Chronic & Acute)

- Brandon Southall, Bioacoustician, Southall Environmental Associates
- Melissa Soldevilla, Research Fishery Biologist, NOAA Southeast Fisheries Science Center

Refer to **Appendix C** for the recovery action breakout group discussion notes and **Appendix D** for the informal survey results (6 responses).

Suggested Recovery Actions

Acute/Chronic Noise – Suggested Recovery Actions

RESEARCH

1. Characterizing sound: Improve understanding of viable acoustic habitat and how sound levels and occupancy co-vary.
2. Habitat: Research whether acoustics are actually driving the “core range” to determine whether Rice's whale are confining themselves to the quieter areas of the Gulf or if it is just coincidence that they occur in areas that are quieter.
 - a. [Post-workshop comment(s)]: Consider reframing this to “Determine factors driving core range selection.” De Soto canyon topography may have a stronger effect than noise.
3. Hearing: Better understand effects of sound on vital rates (e.g., reproduction, stress levels).
4. Prey: Research acoustic effects on Rice's whale's prey, especially with regards to whether acoustic disturbance could be affecting prey distribution.
5. Hearing: Better understand Rice's whale hearing, what frequencies they are most sensitive to, etc.
6. Hearing: Add to the stranding response plan to collect ear bones and other parts of the whale to get a better understanding of their hearing sensitivities and potential for noise-related injury
7. Characterizing sound: Characterize operational rig noise.
8. Characterizing sound: Characterize aquaculture and renewable energy noise.

Additional suggested research recovery action or related comments [post-workshop]

9. Consider including actions related to Rice's whale response to different sound sources and sound types, i.e., changes in behavior, short-term or long-term displacement, etc.

Acute/Chronic Noise – Suggested Recovery Actions

RESEARCH/MONITORING

1. Characterizing sound: Continue/expand collection and analysis of long-term PAM data to better understand Gulf-wide spatio-temporal distribution of Rice's whale.
2. Characterizing sound: Continue/expand collection and analysis of long-term PAM data to understand Gulf-wide soundscape.

Acute/Chronic Noise – Suggested Recovery Actions

MANAGEMENT

1. Collaboration: Work with industry to develop and adopt noise reduction and attenuation technologies/measures (i.e., newer, quieter technologies) – potentially with a “no net increase” goal/policy for noise in important habitats.
2. Regulatory measures: Consider more voluntary restrictions.

3. Regulatory measures: Identify the regulatory mechanisms that are currently in place; then develop appropriate management measures to ensure measures are comparable for both new and established operations.
 - a. [From **Appendix C**, discussion notes]: This refers to reevaluating existing protective regulatory measures. Concerns were raised that some industries were not regulated equally across industries; all players should be managed equally and equitably.
4. Collaboration: Work with industry to reduce shipping and seismic survey sound levels in core, western, and predicted habitat.
5. Regulatory measures: Consider mandatory restrictions.
6. Habitat: Keep “quiet” areas quiet – i.e., no new sound sources in Rice's whale core distribution area where sound levels are lower.
7. Regulatory measures: Expand speed/restriction of vessel transit at night to the west of the core distribution area.
8. Regulatory measures: Consider expanding protections from core area to beyond.
 - a. [Post-workshop comment(s)]: A participant stated that mitigation measures should be proportional to the risk; applying mitigation for animals that may or may not be in an area can have unintended detrimental consequences (e.g., slowing ship speeds leads to longer transit time, which leads to more noise). Conversely, another participant said the recovery action idea appears consistent with the ESA, which requires consideration not only of occupied habitat, but of unoccupied habitat that may be necessary for species recovery. That is why, for example, critical habitat designations may include both. The commenter also indicated it is important for mitigation measures to be evaluated to ensure any adverse effects on other species are understood (the commenter acknowledged this idea was not discussed during the workshop).
9. Habitat: Keep “nearby” areas (i.e., areas adjacent to core distribution area) quiet as well, and future areas of potential occupancy.
 - a. [Post-workshop comment(s)]: As previously mentioned, a commenter stated that mitigation applications should be based on evidence. Another commenter reiterated the importance to specifically define the boundaries for these areas.

Additional suggested management recovery actions or related comments [post-workshop]

10. Using optimization algorithms to prioritize speed regulations in space and time to minimize expected whale mortality while considering socio-economic constraints.
11. Still too many unknowns to implement effective sound source mitigations.
12. A participant noted that several of the suggested items in the management section are already occurring and therefore encouraged building/expanding upon existing efforts.
13. Another participant observed substantial overlap between these items and ones related to offshore energy and vessel strikes management recovery actions (and several other suggested recovery actions).

Acute/Chronic Noise – Suggested Recovery Actions

OUTREACH & ENGAGEMENT

1. Collaboration: Advance existing outreach and engagement efforts to minimize vessel-based sound sources at all ports: fishing, cruise, industry.

Vessel Collisions Recovery Actions

Presentations

Vessel Collisions

- Eric Patterson, Fishery Biologist, NOAA Fisheries

Refer to **Appendix C** for the recovery action breakout group discussion notes and **Appendix D** for the informal survey results (6 responses).

Suggested Recovery Actions

Vessel Collisions – Suggested Recovery Actions

RESEARCH

1. Characterizing vessel traffic: Characterize vessel traffic in Rice's whale habitat.
2. Regulatory measures: Optimize speed zones in space and time to consider different constraints.
 - a. Post-workshop note: this idea relates closer to management actions.
3. Regulatory measures: Better understand seasonal and spatial distribution of Rice's whale to better understand rare events and risk (tagging or passive acoustics).
4. Characterizing vessel traffic: Characterize night vs. daytime traffic and Rice's whale diving behavior.
5. [Research/Management] Noise effects: Evaluate the effect of noise from various vessel types, oil & gas platform safety, offshore wind farms, and marine hydrokinetic devices if nighttime operations are restricted.
6. Behavior: Develop a better understanding of Rice's whale avoidance behavior.

Vessel Collisions – Suggested Recovery Actions

MANAGEMENT

1. Regulatory measures: Consider potential synergies between mitigating vessel speed and vessel noise.
2. Regulatory measures: Implement mandatory speed limits in core and predicted Rice's whale habitat for all vessel types.
3. Regulatory measures: Avoid transit through slow zone at night, maintain 500 m distance, require vessel lookouts, and report non-compliance to NOAA.
4. Regulatory measures: Consider/investigate “Areas To Be Avoided” (ATBA) in areas used by Rice's whale.

Vessel Collisions – Suggested Recovery Actions

MONITORING

1. Mortalities: Improve understanding and frequency of unobserved vessel strike mortalities.

Vessel Collisions – Suggested Recovery Actions

OUTREACH & ENGAGEMENT

1. Collaboration: Engage and work collaboratively with user groups to identify solutions to mitigate vessel strikes.
2. Collaboration: Utilize existing or develop new app that synthesizes information on whale location (e.g., Whale Alert) and make it available to vessel operators.
3. Collaboration: Consider a program similar to Canada’s Enhancing Cetacean Habitat and Observation (ECHO) program, in coordination with Chamber of Shipping of America.

4. Collaboration: Hold an annual festival in the Gulf of Mexico region to raise awareness of Rice's whales and engage coastal communities.
5. Engage with mariners and Gulf of Mexico protected species observers to ensure that vessel strikes and/or carcass detections are rapidly and accurately reported.
 - a. [Post-workshop comment(s)]: A commenter noted that mariners may be less likely to report a strike or carcass if they believe they will be fined/penalized after doing so. If this action is a high priority, then there will need to be substantial outreach to mariners and potentially a modification to the regulations, akin to a "good Samaritan"-type clause.

Additional suggested outreach and engagement recovery actions or related comments [post-workshop]

6. Develop phone apps that identify the zones with the greatest risk of collisions.

Vessel Collisions – Additional/General Comments [Post-Workshop]

1. Research and development to improve technology to detect whales in order to reduce risk of deadly collisions.
2. Investigate and implement measures already being taken in other areas of the world to reduce vessel strikes.

Threats Characterization Feedback

As previously stated, the workshop focused on threat groups that were rated by the original ESA-listing status review team as high or moderate threat levels, or that may now qualify for a high or moderate threat level due to changing conditions and/or new information since the status review was completed. During Workshops #1–4, participants were asked for initial input on the threats and threat levels.

Preliminary Discussions on Threat Rankings

Workshops #1–4

- Workshop #1 – **Figure 1** Word Cloud of this summary
- Workshop #2 – Prey / Climate Change; Renewable Energy; and Entanglement
- Workshop #3 – Environmental Pollutants; Disease/Health Indicators; Marine Debris
- Workshop #4 – Chronic & Acute Noise, Vessel Collisions

Workshop #5 Revisit Threat Rankings Discussion and Polling

Participants revisited the threats and threat levels

- Refer to **Appendix E** Menti Poll Results

Threat level rankings are a function of threat **severity** and threat **certainty** (as described in the table below):

Definitions of Threat Severity	
The risk that this threat will contribute to species decline over the next 55 years (3 generations)*	
High	This threat is likely to <i>eliminate or seriously degrade Rice’s whale throughout its range.</i>
Moderate	This threat is likely to <i>moderately degrade Rice’s whale at some locations within the species’ range.</i>
Low	This threat is likely to <i>only slightly impair Rice’s whale in a limited portion of the species’ range.</i>

*Based on a generation time of 18.4 years (Taylor et al. 2007)

Level of Threat Certainty	
High	There is <i>definitive</i> published and unpublished data to support the conclusion that this threat is likely to affect the population.
Moderate	There is <i>some</i> published and unpublished data to support the conclusion that this threat is likely to affect the population.
Low	There is <i>little</i> published and unpublished data to support the conclusion that this threat is likely to affect the population.

Threat Level Rankings – Menti Poll Conducted During Workshop #5 (19 Respondents)

During Workshop #5, participants were asked to rate the threat level (considering both severity and certainty) for the threat groups discussed during previous workshop sessions. “Score” options ranged from 1 (low threat) to 5 (high threat). The results, shared below in **Figure 4**, show the average ranking scores (in the circles) and the range in selections (as bell curves):

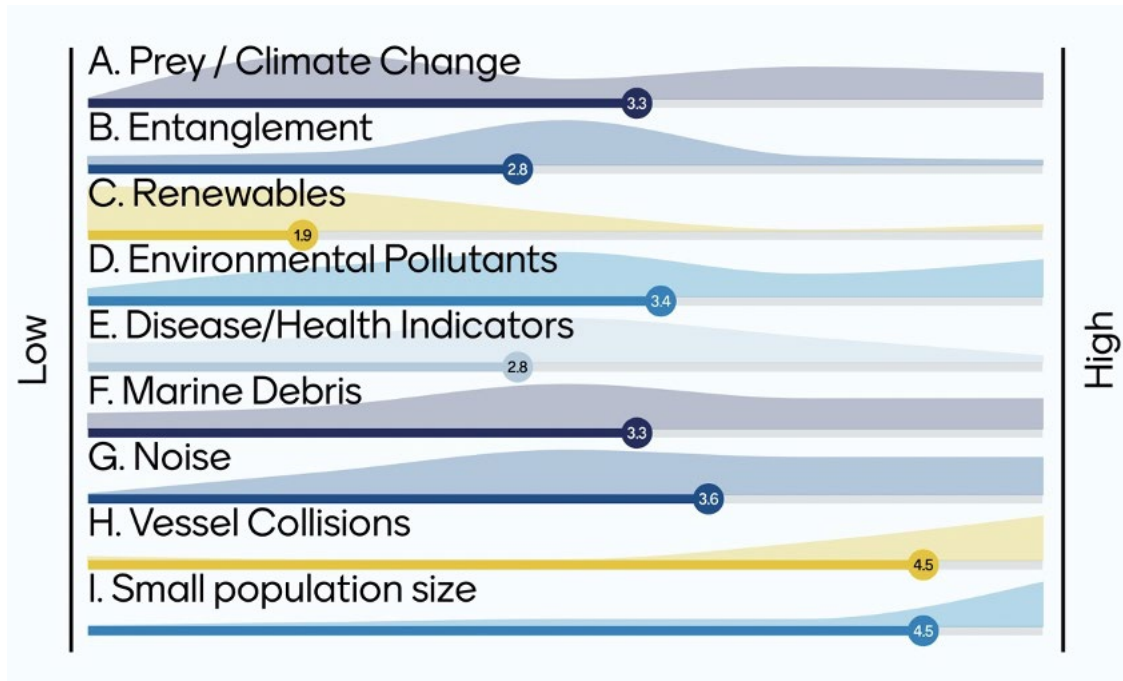


Figure 4. Workshop #5 – Participants rated the threat level (considering both severity and certainty) for the threat groups discussed during previous workshop sessions.

Summary of Threat Ranking Poll Results

- Highest risk: Vessel Collision and Small Population Size were strongly characterized as high-risk threats (both averaged 4.5).
- Lowest risk: Renewable Energy was generally characterized as a lower risk (1.9 average rating).
- Moderate-high risk: Marine Debris and Noise were overall characterized as moderately high risks (averaged 3.3 and 3.6, respectively); however, responses ranged widely between moderately low to high risk.
- Moderate-low risk: Entanglement and Disease/Health Indicators were generally characterized as moderately low risks (both averaged 2.8). Disease/Health Indicators had a wider distribution of threat level scores compared to Entanglement.
- Prey and/or Climate Change and Environmental Pollutants appeared to have distinct divergent opinions (signified by bimodal bell curve distributions).

Again, these rankings do not distinguish between chronic and acute threats, which could have different lethal and sublethal effects. Also, the rankings are not determinative, but they do provide workshop participants’ input for the Agency to consider as it develops the Rice’s Whale Recovery Plan.

Discussion

Due to time constraints, discussion focused on where there appeared to be the greatest divergent opinions: Prey and/or Climate Change and Environmental Pollutants:

Environmental Pollutants

- Lower scores: Those who had given a lower score did so because they said the contaminants mentioned (e.g., persistent organic pollutants [POPs], PCBs) are not impeding the viability of Rice's whale.
- Higher scores: Multiple participants stated they rated environmental pollutants as a high threat level because of oil spill concerns.
- Oil is a major concern: Other participants who had given environmental pollutants a lower rating said that if oil was a separate threat, they would give oil a higher threat level score.
- Aquaculture: Aquaculture effluents could become another type of pollutant (several planned aquaculture operations are near the edges of core distribution area).

Prey and/or Climate Change

- Lower scores: Multiple participants explained their lower threat level rating was due to uncertainty with how climate change will affect prey and how Rice's whale will respond (e.g., unknown if effects to blubber layer will significantly harm Rice's whale; prey can handle a much wider temperature range than climate change projections).
- Higher scores: Those who gave this a high score shared several considerations that affected their scores, including climate change's effect on circulation (e.g., DWH had major effects on mesopelagic fishes and have not recovered to 2011 levels). Effects to overall productivity in important habitat areas (e.g., warming at the shelf break) could have major effects on Rice's whale (which already seem to have a narrow habitat niche in the Gulf of Mexico and do not want to inadvertently shift prey and subsequently Rice's whale into high-vessel traffic areas). A participant's post-workshop comment underscored the importance and urgency to support maximum growth rate for Rice's whale – actions need to be taken swiftly and not wait for absolute proof that its small population is a threat to its recovery.

Other

- [Post-workshop comment(s)]: Participants reflected on the relatively lower risk score for renewable energy. A participant observed that the score did not seem aligned with previous suggested recovery actions calling for restrictions/bans on certain activities. Another participant indicated that the score may reflect a temporal variable – that renewable energy is not a threat now because it is not there now. However, the commenter cautioned it could become an emerging concern in the future. Even though the Severity text says 'over the next 55 years', it is not clear for something like renewable energy what should be assumed over that time period since it is not in the core distribution range now.

Recovery Criteria Brainstorm

An important element of the workshops was to elicit participant input on suggested recovery criteria. This section summarizes participant discussion on this important topic.

During each of the five sessions, NOAA Fisheries staff (Kristen Koyama, National Recovery Coordinator) provided background on recovery criteria. In her presentations, she noted that when a species is listed as threatened or endangered under the ESA, the Act requires that recovery plans incorporate objective, measurable criteria, which, when met, would result in a determination that the species be removed from the list (i.e., delisted). Developing objective/informative, and measurable criteria for a recovery plan focus on two areas:

- **Population dynamics-based criteria.** These criteria (not required but highly recommended) address the species' long-term viability as measured by overall abundance, productivity, spatial distribution, and diversity.
- **Threats-based criteria.** These criteria focus on the reduction of threats that may have caused the population decline or that limit recovery, and must address each of the five ESA section 4(a)(1) factors that led to the listing of the species (i.e., habitat destruction or modification; overutilization; disease or predation; inadequacy of existing regulations; and other natural or manmade factors affecting its continued existence).

After a general overview of recovery criteria and examples from other recovery plans (e.g., from the main Hawaiian Islands insular false killer whale, Southern Resident killer whale, black abalone, North Atlantic Right Whale, and Cook Inlet beluga whale), workshop participants were asked to brainstorm on suggested recovery criteria for Rice's whale related to that day's topics (population dynamics or specific threat groups). Participants were encouraged to be as specific as possible with suggested criteria (e.g., measurable and informative) as well as identify where there is room for flexibility.

NOAA Fisheries staff captured participants' input on a Mural board during workshop sessions; participants then had a week after each session to provide additional input on the Mural board. Recovery criteria discussed during the first four workshop sessions were then compiled and presented during the fifth and final workshop session for more in-depth discussions (refer to **Appendix F** for the recovery criteria brainstorm notes). Participants were also given time after Workshop #5 to provide additional input if desired.

Discussion

The following overarching themes emerged during discussions:

- In previous conversations, participants expressed the view that delisting criteria may prove extremely difficult within the foreseeable future given the low Rice's whale population size and other complex/challenging threats facing Rice's whale. However, NOAA Fisheries staff explained that delisting criteria can still provide milestones to eventual recovery and help evaluate the effectiveness of the recovery plan.
- Reclassification or "downlisting" criteria are not required under the ESA, but are encouraged. NOAA Fisheries staff recommended participants focus on delisting criteria during the workshop (as these are required). NOAA Fisheries staff further noted that reclassification criteria would likely be similar and could build off of identified delisting criteria (e.g., use different thresholds).
- Participants indicated setting quantitative criteria is challenging without sufficient historical context (e.g., population size). General concerns were raised about abundance targets being too low and threshold time periods too short to consider delisting (more characteristic of

threatened species). Given the unknown size, some participants suggested the Agency consider using other metrics (e.g., extinction probability, population trends) rather than specific abundance targets. Conversely, there may still be value to also identify a minimum, acceptable number of Rice's whale.

- A participant suggested that using reproductive-based rates (e.g., number of breeding females) may be better suited for reclassification/downlisting criteria rather than delisting.
- There were recommendations to analyze other recovery planning examples of similarly rare species (e.g., vaquita). For instance, tracking genetic variability helps both evaluate how rare and genetically diverse the Rice's whale is as well as track/evaluate other potential threats (e.g., risk of inbreeding).
- A participant suggested if Rice's whale health/survival is closely connected to prey availability, consider tracking prey dynamics (e.g., biomass and quality), which is likely easier to monitor compared to Rice's whale.
- Concerns were shared about criteria that are quantifiable but difficult to detect (e.g., vessel strike or marine debris-related mortalities). For these, participants suggested focusing on reducing exposure instead.
- Participants often suggested using different temporal, geographic, etc., scales for criteria. For instance, consider tracking both long-term progress and relatively near-term (e.g., running 5 or 10-year average) to avoid short-term dips; consider setting different noise level criteria in core / existing habitat (eastern Gulf of Mexico) compared to potential habitat (deeper waters and/or Western Gulf of Mexico).
- Several expressed support for diverse criteria “packages” – applying multiple and different approaches to address one or more threats to be more strategic/holistic and foster more effective/long-lasting progress (e.g., combining reduced vessel strikes, reduced vessel traffic, and related management/regulatory measures in place).

Possible Recovery Criteria

Building on the ideas generated at Workshops #1–4, participants at Workshop #5 fleshed out suggested recovery criteria (listed below in descending order of threat levels to Rice's whale). All discussions during Workshop #5 were conducted in plenary session; there were no breakout group discussions. Again, as with the other four workshops, the conversation was structured to generate suggested criteria. The list below represents the ideas discussed and is not intended to represent a consensus perspective among participants.

Biological Productivity / Population Size and Trend (Threat Level – High)

Objective: Ensure the **biological productivity/population size and trend** of the Rice's whale has met or exceeds target levels.

- There are at least 355 individuals, measured by the lower 95% confidence bound of a stock assessment, and stable or increasing population estimate over 2 generations (355 assumes starting w/ ~50 individuals w/ annual growth rate of 4% over next 50 years).
- Probability of extinction and/or population trend as evidenced by a stock assessment or population viability analysis (PVA) should be <X% over Y years (consider short-term benchmarks in addition to long-term).
- There are at least 1000+ individuals, and stable or increasing population estimate over 2 generations.
- There are X# or % of breeding females and the fecundity rate is stable or increasing.

- Reproductive female survival rate and/or calving rate is X (good threshold for downlisting vs. delisting) (Is calving rate sufficient, or does a calf survival rate need to be included here?).
- Total population growth rate is X%, and the survival rate is Y%.
- Genetic variability is deemed sufficient (this doesn't capture inbreeding). Maintain genetic diversity by incorporating insights from demographic history into abundance criteria.

Adequate Habitat (and Prey?) (Threat Level = High)

Objective: Ensure that adequate **habitat (and prey?)** are available and are not limiting the recovery of Rice's whale and are managed accordingly (Consider criteria not just for space but also for prey biomass and quality).

- There is adequate available habitat and sufficient transboundary distribution to support stable and/or increasing population.
 - Core distribution area is X% of the Gulf of Mexico; species might occupy a larger portion of the Gulf of Mexico.
 - [Post-workshop comment(s)]: Diverse perspectives shared on protecting potential habitat.
 - One viewpoint is to have potential future habitat/unoccupied habitat protected. A participant stated that it is not plausible that the current range/habitat for around 50 whales could support a species of several thousand individuals. The current range is for a critically endangered species that is resident in the Gulf to the best of our knowledge. Thus, maintaining the current range should not be a recovery criteria. Similarly, having a habitat area as a recovery criteria that supports 50-100 whales is not adequate as a recovery criteria because 50-100 whales are not acceptable as a recovered abundance criteria.
 - Another participant recommended focusing on the established region of preferred habitat (rather than assuming potential habitat that may or may not be viable).
 - [Post-workshop comment(s)]: The 'adequate habitat' should be linked to the 'biological productivity' criteria and will likely have to be fairly vague at this point: There is adequate available habitat to support a population where the probability of extinction is < x% over y time.
- The distribution of the species is robust to anticipate catastrophes that have an X% chance of occurring in Y time. (Note that "robust" will need to be defined in quantitative terms.)
- Establish corridors between known areas with suitable habitat that would result in probabilities of mortality < Potential Biological Removal (PBR) from known threats.
 - There is safe passage/connectivity to other habitat (so there is source/sink availability).
 - At a minimum, the current core distribution area is maintained. (Concerns were raised that this is too low of a bar; habitat must be maintained, but is that enough?)

Vessel Strikes (Threat Level = High)

Objective: Address threats from **vessel strikes** and manage accordingly.

- There is sufficient evidence to indicate that vessel speed and size as well as transit traveled in the core distribution area are not impeding the viability of Rice's whale.

- Measured by X% of Automatic Identification System (AIS) tracks are at speeds <Y km/hr (However, this metric doesn't capture all vessel traffic in the area).
- Measured by a threshold of estimated vessel strikes have at least a 90% chance of mortalities being <PBR (current PBR = 0.1) and this is based on modeling that incorporates uncertainty.
- Measured by evidence of either no propeller wounds or propeller wounds healing as documented by long-term photo-ID (i.e., resightings over years). If Rice's whale are being negatively affected by vessel strikes, regulations and/or protected areas have been implemented.
- Management measures that reduce the risk of vessel strike to X# are in place and compliance remains greater than Y% over Z years (e.g., to <1 vessel strike with a compliance rate of 99% for 10 years).
- Use a combination of sufficient evidence to indicate that vessel speed and size as well as transit traveled in the core distribution area are not impeding the viability of Rice's whale. This can be measured by a threshold of estimated vessel strikes that have a 90% chance of mortalities being <PBR (current PBR = 0.1), and management measures that reduce the risk of vessel strikes to X# are in place and compliance remains greater than Y% over Z years.
- There exists an exclusion zone of no traffic (at least for large vessels) in the core distribution area at night to ensure the viability of the species. (This is more or a regulatory measure – Agency should consider adding this to criteria 8 [regulatory mechanisms].)
 - There are no deaths by vessel strike up to <10% of PBR and in the future, vessel strikes aren't limiting the viability of the population.

Anthropogenic Noise (Threat Level = High)

Objective: Address threats from **anthropogenic noise** and manage accordingly.

- Noise levels (acute and chronic) are monitored in known and potential habitat and are below a threshold (X) level.
 - [Post-workshop comment(s)]: Directly tie this to thresholds that may result in permanent threshold shift or acoustic injury (adhere to NOAA Fisheries acoustic policy and start thinking about implementing behavioral acoustic criteria that NOAA Fisheries is currently working on).
 - [Post-workshop comment(s)]: A participant stated that monitoring environmental noise may not be particularly beneficial, as it does not indicate the level of sound experienced by the receiver. The participant suggested focus would be more appropriate on mitigation measures to minimize potential point-source interactions. Another participant valued both approaches since point-source interactions don't get at chronic effects such as masking. Analyses of masking effects on particular species from chronic noise sources has been done in other areas (e.g., vessel noise around Stellwagen National Marine Sanctuary).
 - If a quantitative threshold cannot be determined based on current information, consider if describing X qualitatively is possible, e.g., “below the threshold at which X effects (masking, trauma, etc.) are expected to occur.”
- Management actions sufficiently address the effects of anthropogenic ocean noise (e.g., vessel traffic, sonar, alternative energy development) on Rice's whale and their habitat such that it is

not adversely affecting and/or reducing their ability to successfully travel, communicate, and forage, and is not causing population-level effects.

- [Post-workshop comment(s)]: Seismic airgun surveys are the primary source of low-frequency noise in the Gulf of Mexico and should be in this list
- Noise levels within primary habitat are below levels that may interfere with feeding/communication, etc.

Environmental Contaminants (Threat Level = High [primarily due to oil concerns])

Objective: Address threats from **environmental contaminants** and manage accordingly.

- There is sufficient evidence to indicate that contaminant levels in the marine environment (i.e., POPs, PCBs, DDTs, PBDEs, heavy metals, and chemicals of emerging concern [CECs]) are not impeding the viability of Rice's whale.
 - This can be measured in Rice's whale tissues, prey species, or surrogate marine mammals as well as in water samples in the Gulf of Mexico.
 - It can also be measured by determining if the cause of death from a stranding is due to elevated environmental contaminants. (Difficult to assess, so not sure if this is useful for POPs but it is for oil).
- Oil and hazardous substance spill prevention and response plans are in place and effectively address protections for Rice's whales and their habitat.
 - This can be measured by a reduction (by X amount) of detected oil slicks to sufficiently ensure no effects on species.
- There is minimal to zero expansion of new activities inside the core and predicted habitat (e.g., aquaculture, space launch/recovery) that results in exposure to environmental contaminants and disease.
- The annual risk of an oil spill that produces a slick greater than X mi² is less than Y%.

Marine Debris (Threat Level = High)

Objective: Address threats from marine debris and manage accordingly.

- There is sufficient evidence that ingestion of marine debris is not causing population-level effects by impeding the viability of Rice's whale.
 - This can be measured by examination of the cause of death during necropsy. That is, while marine debris may be found in stomach contents, there is not an increase of strandings and known deaths attributable to ingestion of marine debris leading to population-level effects of Rice's whale.
- Marine debris is reduced within Rice's whale critical habitat such that there are no lethal events within X years (< PBR).
 - A trained response team is in place for responding to disentanglements.
- Evidence of introduction of marine debris from ocean sources has been reduced by X% (90%?) [better to prevent the debris than try to remove it].
- Estimated mortalities from marine debris do not, together with mortalities estimate from other threats, exceed PBR.

Climate Change (Threat Level = High)

Objective: Better understand the effects of climate change and manage accordingly.

- There is sufficient evidence to indicate that short- and long-term effects from climate change-related threats, such as ocean warming, diminished productivity, and ocean acidification, are not impeding the viability of Rice's whales.
 - This can be measured in quantity (biomass), quality (size), and availability of prey species and/or body condition of Rice's whales (and relationships with body condition, e.g., disease, not eating due to disturbance).
 - Measured through changes in species distribution patterns from currently defined core distribution area in northeastern Gulf of Mexico [Comment 1: Changes in species' distribution should also be evaluated in terms of increase/decrease in the use of risky or less risky habitats that may impede recovery.][Comment 2: Need to think about the difference between changes in distribution patterns from what is currently known vs. new knowledge of distribution patterns in areas where there historically is limited data (e.g., Southern Gulf of Mexico)].
- Distributional shifts resulting from climate change are accounted for in risk estimates such that expected recovery time is not delayed by >X% (10%?).

Regulatory Mechanisms (Threat Level = High)

Objective: Ensure that regulatory mechanisms, including state and federal management and post-delisting monitoring, are in place prior to delisting.

- Regulatory mechanisms other than the ESA are in place to successfully manage threats and ensure that Rice's whale remains stable or increases after it is delisted.
- Regulations are in place to limit the introduction of harmful contaminants, and there is evidence of decreasing levels of contaminants detected in Rice's whale, prey species, or surrogate marine mammal populations, or evidence that the current level of contaminants causes no harm to the whales.
- A post-delisting monitoring plan is in place (consider pre-delisting monitoring).
- Sufficient monitoring is in place to assess population status and progress toward recovery goals and identify emerging threats.

Entanglement (Threat Level = Moderate)

Objective: Address threats from entanglements and manage accordingly.

- Entanglement risk in Rice's whale habitat (and nearby habitat) is <PBR (i.e., zero or is targeted to be zero) over X # of years (short #) and is model-based vs. empirically-based.
- The threat of entanglement has been evaluated, and, if determined to be impeding Rice's whale recovery, measures have been taken to minimize effects. Following this evaluation and where effects to the species are known, specific measures have been taken to minimize effects.

Prey (Threat Level = Low → Moderately High)

(Note: the threat level was originally characterized as "Low" – workshop participants indicated the threat level should be increased to "Moderately High.")

Objective: Address threats related to **prey** and manage accordingly.

- The diet of Rice's whale and prey availability/abundance to sustain the population is sufficient to support a healthy population.

- This can be measured in quantity (biomass), quality (size), and availability of prey species and/or body condition of Rice's whales.
- Quantity and quality of prey (calories) is enough to ensure reproduction, nursing of calves, etc.
- Harvest of offshore prey is not limiting the recovery or viability of Rice's whale
 - The standing biomass (abundance, availability, accessibility) of pelagic prey is X (more than there is now)
- From Southern Resident Killer Whales (SRKW): Observations indicating that lack of prey is not a source of mortality or a factor limiting recovery of Southern Residents. Consistent observations or measurements of good body condition in a significant number of individuals, and no or limited observations of reduced feeding behavior or of emaciated animals.

Small Population Size (Threat Level = Moderate/High)

[Post-workshop comment(s)]: Consider setting the threat level as “High” given the International Whaling Commission (IWC) rationale that considers small populations to be of special conservation concern. Small population size can impede recovery since sightings will be poor and information will be imperfect to make decisions.

Objective: Address threats from **small population** size (e.g., allee effects, demographic stochasticity).

- Population has recovered such that allee effects, etc., are not a concern.

Secondary Threats and Synergies (Threat Level = Moderate)

Objective: Ensure that **secondary threats and synergies** among threats are not limiting recovery of the Rice's whale and manage accordingly.

- There is sufficient evidence that each of the secondary threats independently is not causing population-level effects by impeding the viability of Rice's whale.
- There is sufficient evidence that cumulative and synergistic effects among all of the threats are well understood and are not causing population-level effects by impeding the viability of Rice's whale.
- Monitoring of Rice's whale is deemed sufficient for rapid response (~6 months) of redistribution brought about by multiple acute stressors.

Disease and marine structures were not discussed in great detail during Workshop #5:

Disease (Threat Level = Low)

Objective: Address threats from disease and manage accordingly.

- A disease research and risk management plan is in place to adequately study, monitor, and manage for diseases that may affect Rice's whales.
- X% amount of the population is considered "healthy" (based on skin and body condition).
- There is sufficient evidence to indicate that effects from climate change are not increasing the widespread presence of disease vectors and thus impeding the viability of Rice's whales.
 - This can be measured by the prevalence or severity of infectious diseases caused by pathogens, fungi, worms, or parasites. That is, results from biopsies, breath analyses, and/or necropsies do not indicate that there is an over burdensome load of infectious

disease(s) leading to reduced health and fitness or mortality in individuals.

Marine Structures / New Blue Economy (Threat Level = X?)

Note: “New Blue Economy” builds on marine structures to include aquaculture, renewable energy, marine tourism (including recreational fisheries), and coastal development.

Objective: Address threats from marine structures (e.g., aquaculture, renewable energy, sediment diversion).

- There is sufficient evidence that interactions with new blue economy growth-related activities (e.g., aquaculture, renewable energy, sediment diversion) are not causing population-level effects by impeding the viability of Rice's whale.
 - This can be measured by a marked increase in sighting rate, duration, and altered behavior of Rice's whale near marine structures. If Rice's whale are being negatively affected, regulations or other measures have been implemented to reduce or eliminate the possibility of interactions.

Public Comment

Toward the end of each workshop session, observers/members of the public had the opportunity to provide comments. Over the course of the workshop, 51 observers/members of the public attended at least one of the workshop sessions.

There was only one public comment across all five workshops:

- [Member of the public/student, Workshop #1]: Will critical habitat be identified and monitored outside of the Gulf of Mexico (e.g., referred to a paper on suitable habitat off of North Carolina where there had also been a couple of strandings)? For example, it may be important to monitor outside of the Gulf of Mexico to detect avenues of gene flow.

Next Steps

Below is a brief summary of next steps tied to the recovery planning effort identified during the workshop.

2021 – early 2022

- CBI will draft a Recovery Planning Workshop summary report for the Steering Committee to review (this document).
- Workshop participants will be asked to review the draft summary report to confirm the report accurately captures the discussions and input that NOAA Fisheries received during the workshop.
- The Recovery Planning Workshop summary report is expected to be revised/finalized and made available to the public in spring 2022.

2022 and beyond

- NOAA Fisheries will revise and update the [2016 status review](#).
- NOAA Fisheries will draft the Rice's Whale Recovery Plan. This document will be peer reviewed and made available for public comment.
- NOAA Fisheries will develop a Recovery Implementation Strategy with input from key stakeholders.

SECTION 3 | List of Appendices

- Appendix A – Attendance and Participation
- Appendix B – Population Dynamics-Based Recovery Actions Brainstorm Notes
- Appendix C – Recovery Actions Brainstorm: Breakout Group Original Notes
- Appendix D – Recovery Actions Survey Results
- Appendix E – Threat Group Ratings
- Appendix F – Recovery Criteria Brainstorm: Discussion Notes
- Appendix G – References