



## RECOVERY OUTLINE

### GULF OF MEXICO BRYDE'S WHALE

The Gulf of Mexico (GOMx) Bryde's whale (*Balaenoptera edeni*) was listed as endangered under the Endangered Species Act (ESA) on April 15, 2019 (84 FR 15446). The National Marine Fisheries (NMFS) will develop a recovery plan for this species. In the interim, NMFS has developed this recovery outline to provide a preliminary strategy for conservation of the GOMx Bryde's whale. The recovery outline guides initial recovery actions while ensuring that future recovery options are not precluded due to a lack of interim planning. As such, this outline is meant to serve as an interim guidance document to direct recovery efforts, including recovery planning, for the GOMx Bryde's whale until a full recovery plan is developed and approved. A preliminary strategy for recovery of the species is presented here, as are recommended high priority actions to stabilize and recover the species.

This recovery outline commences our recovery planning process. The recovery outline is intended primarily for internal use by NMFS as an interim planning document. Public participation in recovery planning for the GOMx Bryde's whale will be invited upon the release of a draft recovery plan for the species. However, any new information or comments that members of the public may wish to offer as a result of this recovery outline will be taken into consideration during the recovery planning process. Interested parties may contact Barb Zoodsma ([Barb.Zoodsma@noaa.gov](mailto:Barb.Zoodsma@noaa.gov)).

### LISTING INFORMATION

**Species Name:** Gulf of Mexico Bryde's whale, *Balaenoptera edeni*

**Species Range:** Northeastern GOMx in the De Soto canyon area, along the continental shelf break between 100 m and 400 m depth

**Recovery Priority Number:** 1C

**Listing Status:** Endangered; April 15, 2019

**Lead Office:** NMFS Southeast Regional Office, Protected Resources Division

**Lead Contact:** Barb Zoodsma, 904-321-2806, [Barb.Zoodsma@noaa.gov](mailto:Barb.Zoodsma@noaa.gov)

## BACKGROUND

### *Type and Quality of Information to Date:*

Available information on the biology, life history, range, and habitat preferences of the GOMx Bryde's whale is described in the status review report (Rosel *et al.* 2016) and the proposed and final listing rules (81 FR 88639, December 8, 2016; 84 FR 15446, April 15, 2019). The most significant uncertainties with respect to setting recovery objectives and recovery actions include limited information regarding:

- the species' current and historical abundance,
- current and former distribution in U.S. waters and throughout the GOMx,
- population structure and dynamics,
- reproductive intervals and seasonality,
- locations of breeding and nursery grounds,
- diet (species, proportion of specific prey items, etc.),
- prey species (health, status, distribution etc.),
- foraging behavior,
- essential habitat features,
- travel distance/range information,
- factors impacting individual health, and
- human-caused mortality rates (e.g., bycatch, vessels strikes, marine debris).

These uncertainties will limit early recovery efforts for this species and should be resolved to the extent possible through close coordination between the whale research community and the recovery planning process. Another recovery challenge may arise if GOMx Bryde's whales occur in Mexican waters. That would reduce the overall effectiveness of a U.S.-only recovery plan. Bi-national recovery plans can be developed (e.g., Kemp's ridley sea turtle), but they require significant additional time and effort to coordinate, and the Government of Mexico has not designated the GOMx Bryde's whale as an endangered species under their national laws.

### *Life History:*

There is little information on reproduction and growth of the GOMx Bryde's whale. The largest stranded individual in the GOMx was a lactating female (12.65 m) (Rosel & Wilcox 2014). No calf/neonate Bryde's whales have been sighted during NMFS assessment surveys. However, a 4.7 m calf stranded in the Florida Panhandle in 2006 (SEUS Historical Stranding Database) and a 6.9 m juvenile stranded north of Tampa in 1988 (Edds *et al.* 1993).

Taylor *et al.* (2007) estimated generation length for cetaceans using only a few parameters: oldest age (or an estimate based on length), calf survival, adult survival, age at maturity, gestation length, and interbirth interval. The estimated generation length for all Bryde's whales was 18.4 yr using the following estimated parameters: maximum age = 58 yr (based on length from Best (1977)), age at first reproduction = 9 yr based on gestation length (Lockyer 1984) and age of sexual maturity (IWC 1997), interbirth interval = 2.5 yr (Lockyer 1984), calf survival rate = 0.840 and non-calf survival rate = 0.925 (IWC 1997). The estimates from the literature are probably made from data collected from the *B. e. brydei* subspecies as the majority of the samples used to estimate the parameters came from Japanese whaling data from the 'typical' or pelagic form of Bryde's whale in the North Pacific and from South Africa.

### *Limiting life history characteristics:*

The GOMx Bryde's whale likely has low productivity, including a slow growth rate, a relatively late age of maturity (estimated 9 years for females), long gestation periods, single offspring, and potentially

biennial or longer reproductive periodicity. All of these characteristics limit the species' ability to recover from threats that impact its abundance and productivity.

Sightings of the GOMx Bryde's whale are mostly restricted to a very narrow depth corridor along the shelf break in the northeastern GOMx, indicating that the Bryde's whale population is vulnerable to activities in this area.

#### *Primary Threats:*

These factors were ranked as "high" to "moderate" in severity and "high" to "moderate" in certainty by Rosel et al. (2016) and, therefore, are thought to pose the greatest threat to GOMx Bryde's whales:

- range curtailment from energy exploration and development,
- exposure to oil spills and spill response,
- vessel collisions,
- anthropogenic noise during seismic surveys,
- small population effects, particularly irregularities that may occur with age and sex classes,
- genetics (inbreeding depression, loss of potentially adaptive genetic diversity and accumulation of deleterious mutations),
- 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.

There have been two developments subsequent to the publication of Rosel et al. (2016) and not considered by those authors.

- A Bryde's whale stranded live, then later died, in the Everglades National Park in 2019. The animal was necropsied and a small piece of hard plastic (6.6 x 6.2 x 0.2 cm) and accompanying ulcerations were found in the stomach and determined to be the likely cause of death for this individual, which suggests that plastic and marine debris are also a threat to this species.
- Aquaculture was not considered by Rosel et al. (2016) to be a major threat to this species, in part, because no aquaculture facilities were sited in the Gulf of Mexico and because the authors believed NOAA would be scrutinizing proposed aquaculture facilities and methods as part of the aquaculture permitting process. However, these are no longer true. First, the Gulf of Mexico has been selected as an "Aquaculture Opportunity Area"—an area identified by NOAA to show high potential for commercial aquaculture. This suggests that aquaculture-related activities in and adjacent to important Bryde's whale habitat may increase. Second, in 2018 a Federal court ruled that NOAA does not have the authority to regulate aquaculture under the Magnuson-Stevens Fishery Conservation and Management Act. Consequently, the process for regulating aquaculture is less clear. Depending on the location and characteristics of aquaculture facilities, aquaculture may be a major threat to this species.

#### *Current Biological Status of the Species:*

As summarized in the status review report (Rosel *et al.*, 2016), estimates of GOMx Bryde's whales range from 15-44 whales; even accounting for uncertainty in these estimates, there are likely fewer than 100 individuals. Historical whaling records from the 1800s suggest Bryde's whales may have been more

common in the U.S. waters of the north central GOMx and in the southern GOMx in the Bay of Campeche (Reeves *et al.* 2011). A population trend analysis has not been conducted.

In 2010, oil from the *Deepwater Horizon* (DWH) Macondo oil well drilling platform explosion spilled into 48% of the Bryde's whale's known habitat in the northeastern GOMx. The Natural Resources Damage Assessment (NRDA) estimated that 17% (95% Confidence Interval (CI) 7% – 24%) of the GOMx Bryde's whale population was killed, 22% (95% CI 10% – 31%) of reproductive females experienced reproductive failure due to the spill and 18% (95% CI 7% – 28%) of the population likely suffered adverse health effects due to the spill (DWH NRDA Trustees 2016).

Genetic diversity in the population is exceedingly low (Rosel & Wilcox 2014) – lower than North Atlantic right whales, *Eubalaena glacialis*, other Bryde's whale populations, and humpback whales isolated in the Arabian Sea (Rosel *et al.* 2016). The severely reduced genetic variability seen in the GOMx Bryde's whale is of concern as the whales may be at risk of decreased fitness and evolutionary potential, and from demographic stochasticity (Rosel & Reeves 2000).

#### *Conservation Actions to Date:*

Within the GOMx, Bryde's whales occur within U.S. and possibly Mexican jurisdiction. Several laws, regulations, and policies governing U.S. waters provide various protections for whales in general (e.g., Marine Mammal Protection Act (MMPA), Outer Continental Shelf Lands Act, Oil Pollution Act, etc.) and also whales listed under the Endangered Species Act. Internationally, whales are protected by the International Convention for the Regulation of Whaling. The Convention's whaling moratorium provides significant protection for the GOMx Bryde's whale. The species is also listed in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, which regulates international trade of the species and its parts.

In July 2012, the Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act (RESTORE Act) was signed into law. The RESTORE Act dedicates 80 percent of civil and administrative penalties paid under the Clean Water Act, after the date of enactment, by responsible parties in connection with the DWH oil spill to a trust fund for ecosystem restoration, economic recovery, and tourism promotion in the Gulf Coast region. A portion of these funds were allocated to the NOAA RESTORE Act Science Program. Under this program, an important study was initiated in 2017 and is scheduled for completion in 2020: [\*Trophic Interactions and Habitat Requirements of Gulf of Mexico Bryde's Whales\*](#) (<https://restoreactscienceprogram.noaa.gov/projects/brydes-whales>). This project will help provide a comprehensive ecological understanding of Gulf of Mexico Bryde's whales, including the physical, oceanographic, and biological features defining critical habitat and their ecological role in Gulf of Mexico marine food webs.

In February 2016, the United States, the five Gulf states (Trustees), and BP proposed a settlement for natural resource injuries from the DWH oil spill. The Trustees determined that the best method for addressing the injuries is comprehensive, integrated ecosystem restoration and published the DWH Oil Spill Final Programmatic Damage Assessment and Restoration Plan (PDARP, DWH Trustees 2016). The plan allocates up to \$8.8 billion for restoration and identifies five goals intended to restore wildlife, habitat, water quality, and recreational activities in the Gulf. To achieve these goals, funds are allocated to 13 different restoration categories, including a category for marine mammals.

The DWH oil spill impacted Bryde's whales more than other offshore cetaceans. Forty-eight percent of the GOMx Bryde's whale habitat was affected, and an estimated 22 percent of reproductive females

experienced reproductive failure, and 18 percent of the population likely suffered adverse health effects due to the spill (DWH Trustees 2016). Many of the proposed restoration activities in the PDARP should benefit Bryde’s whales. Two projects in particular, which have been approved for implementation, will likely benefit Bryde’s whales: *Reduce Impacts of Anthropogenic Noise on Cetaceans* and *Reduce and Mitigate Vessel Strike Mortality of Cetaceans*.

The GOMx Marine Assessment Program for Protected Species (GOMAPPS) is led by the Bureau of Energy Management (BOEM) Environmental Studies Program and involves collaboration among BOEM, NMFS, U.S. Fish and Wildlife Service, U.S. Geological Survey, and the U.S. Navy. The purpose of this program is to improve information about abundance, distribution, habitat use, and behavior of living marine resources (e.g., marine mammals, sea turtles, sea birds) in the GOMx, as well as mitigate and monitor potential impacts of human activities. Results from GOMAPPS continue to improve the best available science for many marine mammal species, including Bryde’s whales, providing updated data for enhanced predictive model outputs, particularly for species abundance, density and distribution and informing analyses used for Biological Opinions developed under Section 7 of the ESA and other MMPA actions.

*Recovery Priority Number:*

Based on NMFS Recovery Priority Guidance (84 FR 18243, April 30, 2019), the GOMx Bryde’s whale should be assigned a recovery priority number of 1C due to the following: 1) the species has a high demographic risk; 2) there is an adequate understanding of major threats to the species 3) the United States has sufficient jurisdiction, authority, or influence to address major threats through management or protective actions; and 4) there is high certainty that management actions will be effective. The information described earlier on the species life history, primary threats, biological status, and conservation efforts provide the support for assigning a recovery priority number 1C. The GOMx Bryde’s whale received a “C” for conflict, because of the suite of anthropogenic threats posed primarily by energy exploration, development and production, and by vessel collisions.

**INTERIM RECOVERY PROGRAM**

*Interim Recovery Strategy*

In advance of an approved recovery plan, the initial focus of the interim recovery program will be two-fold:

1. control threats to the species in its known range and
2. gather additional information through research and monitoring on the species’:
  - a. current distribution and abundance;
  - b. reproductive periodicity and seasonality;
  - c. location of breeding and nursery grounds;
  - d. mortality causes and rates; and
  - e. prey species and the status and distribution of those species.

*Interim Recovery Action Plan*

Management Activities
<ul style="list-style-type: none"> <li>● Maintain existing U.S. laws and regulations that protect GOMx Bryde’s whales.</li> <li>● Coordinate and collaborate with other federal, state, and private sector partners to conserve listed GOMx Bryde’s whales and the ecosystem upon which they depend.</li> </ul>

Management Activities
<ul style="list-style-type: none"> <li>● Identify appropriate mitigation/conservation measures for activities to protect GOMx Bryde’s whales and their habitat.</li> <li>● Continue including GOMx Bryde’s whales in relevant ESA Section 7 Consultations</li> <li>● Continue to update the status review report with new literature and information.</li> <li>● Track cumulative effects on the species.</li> <li>● Protect important habitat from threats associated with energy development (including anthropogenic noise during seismic surveys), oil spills, and spill response.</li> <li>● Reduce primary threat of vessel strikes, and marine debris to prevent further declines in the species’ abundance and stabilize the population.</li> </ul>
Needed Research Activities
<ul style="list-style-type: none"> <li>● Evaluate the habitats currently occupied by the species as well as other areas that may meet the definition of critical habitat under the ESA.</li> <li>● Update the known GOMx Bryde’s whale distribution area for use in spatial planning tools.</li> <li>● Improve understanding of Bryde’s whale distribution throughout the GOMx.</li> <li>● Improve understanding of population abundance, trends, and demography through research, monitoring, and modeling.</li> <li>● Improve understanding of reproductive periodicity and seasonality to inform future management measures for minimizing impacts to the species during key life history functions.</li> <li>● Identify GOMx Bryde’s whale prey species and investigate the status, distribution and threats to those prey species.</li> <li>● Identify key habitat areas, including feeding, breeding, and nursery grounds through research, monitoring, and modeling.</li> <li>● Develop and implement a health assessment program to understand if and what factors may be negatively affecting GOMx Bryde’s whale health.</li> <li>● Conduct research to better understand entanglement threats to GOMx Bryde’s whales.</li> </ul>
Education/Outreach
<ul style="list-style-type: none"> <li>● Share information on Bryde’s whales with stakeholder groups such as fishing, maritime and marine operations communities.</li> </ul>

## PRELIMINARY STEPS FOR RECOVERY PLANNING

### *Recovery Plan Development*

NMFS will develop a recovery plan for the GOMx Bryde's whale within the United States pursuant to section 4(f) of the ESA. The plan will be a single species plan and will include site-specific measures that will lead to recovery of the species, objective and measurable criteria that will enable NMFS to evaluate progress toward recovery and delisting, and estimates of time and costs of recovery.

In lieu of appointing a formal recovery team to draft a recovery plan, NMFS will host a series of stakeholder workshops to gather facts, input, and perspectives from key stakeholders and scientific experts on how to recover the GOMx Bryde's whale. Recovery planning efforts will be coordinated with NMFS Office of Protected Resources, Southeast Fisheries Science Center and Southeast Regional Office, Office of Sustainable Fisheries Highly Migratory Species Division, Office of International Affairs and Seafood Inspection, and GOMx Fishery Management Council. The draft recovery plan will be made available for public review and comment.

### *Stakeholder Involvement*

While NMFS is ultimately responsible for developing and implementing this recovery plan, the plan will have a greater likelihood of success if it is developed in partnership with key stakeholders, including those who have the responsibility and authority to implement specific recovery actions. Therefore, we intend to invite representatives of key stakeholder groups to participate in the recovery planning process. As needed, meetings/workshops (virtual or in person) and/or conference calls will be held to discuss particular issues and stakeholders will be invited to participate.

Key stakeholders may include:

- Federal, state, territorial, local, and international<sup>1</sup> agencies
- Domestic and foreign universities and research organizations
- Domestic and foreign conservation organizations
- Domestic and foreign fisheries management organizations
- Domestic and foreign fishermen
- Domestic and foreign shipping interests
- Domestic and foreign energy developers

### *Recovery Planning Milestones*

#### **2020**

- Draft and finalize recovery outline; post to NOAA webpage
- Identify experts and fora for GOMx Bryde's whale recovery planning workshops
- Update the Status Review Report to serve as the Recovery Status Review

#### **2021**

- Publish papers on GOMx Bryde's whale:
  - Foraging behavior
  - Foraging ecology
  - Habitat, including physical features, in the Northern Gulf of Mexico
  - Visual assessment of body condition and size of GOMx Bryde's whales

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<sup>1</sup> GOMx Bryde's whale distribution in Mexican waters has not yet been shown. However, if that changes in the future, we will need to coordinate with Mexican entities.

- Complete literature review, field investigations, and initiate analyses to determine physical and biological features important to GOMx Bryde's whales
- Convene two or more Recovery Planning Workshops for the GOMx Bryde's whale
- Complete Recovery Planning Workshop summary reports

## 2022

- Draft proposed rule for critical habitat if determinable and appropriate
- Draft the GOMx Bryde's whale Recovery Plan. This document will be peer reviewed and will go out for public comment
- Begin development of Recovery Implementation Strategy with input from key stakeholders

## LITERATURE CITED

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