

Continuous Plankton Recorder Survey Mitigation Plan

I. Purpose of the survey

What data is collected?

Zooplankton and phytoplankton abundance by taxon are collected at approximately 10 meters depth along 2 fixed transect lines. One transect crosses the Gulf of Maine from Portland, Maine, to Cape Sable, Nova Scotia, and the other crosses the Mid-Atlantic shelf for 200 nautical miles from New York toward Bermuda. These transect lines correspond to existing navigational lanes for large vessels.

What specific products use this survey?

This dataset is used primarily in scientific research papers. This includes research relevant to the management of the endangered North Atlantic right whale (*Eubalaena glacialis*). A recent example is Meyer-Guthbrod et al. (2021).

Which assessments/science advice pathways currently use this survey?

The data are currently not used in NOAA assessments due to a hiatus in the data collection from 2013-2020. The continuous plankton recorder (CPR) survey has historically been used in a variety of scientific publications and NOAA reports. The survey was suspended by NOAA in 2013, and NOAA support resumed in late 2020. Collection of this data has been supported by congress through a direct appropriation with the explicit purpose of better understanding distributions of North Atlantic right whales. It will likely be used in future marine mammal assessments and the Northeast Fisheries Science Center (NEFSC) State of the Ecosystem reports. It is also made publicly available to external researchers.

Who are users of the survey data generated?

Users have included NOAA, the Gulf of Maine Research Institute, the Bigelow Laboratory, Plymouth Marine Biological Association, and Woods Hole Oceanographic Institution, among others.

The survey is operated with NOAA funding by the Plymouth Marine Biological Association in association with the Northeastern Regional Association of Coastal Ocean Observing Systems (NERACOOS). This partnership has been strengthening over the past several years.

Are there any formal quality standards (e.g., operational/gear requirements or standard operating procedures) for the survey that need to be considered?

The survey is conducted with standard CPR methods which are used by numerous CPR surveys around the world. The use of the CPR method by this survey is directed by the current federal budget language.

Are there added values that cannot be met without this survey?

This is the only source of monthly zooplankton transect data in these regions. No other sources of zooplankton data are able to sample at the same temporal and spatial scales, making it a unique resource to understand phenology and changing spatial distributions of zooplankton and their predators.

This survey is one of several that use the same methods. These surveys are networked together under the [Global Alliance of Continuous Plankton Recorder Surveys](#). These partner surveys include a line that crosses Georges Bank and another line from Nova Scotia toward Iceland. Along with the 2 NOAA-funded CPR lines discussed in this plan, these partner surveys combine to allow analysis of regional and global trends in zooplankton.

How does offshore wind energy impact survey objectives going forward?

We do not expect any alteration to survey objectives. The survey is not expected to operate or collect data within wind energy areas (WEAs). This will be re-evaluated if circumstances change.

II. Survey Details

Beginning Year: 1961

Frequency: Monthly

Season: All

Geographic Scope: Transect lines in the Gulf of Maine from Portland to Cape Sable and in the Mid-Atlantic Bight from New York 200 nautical miles toward Bermuda.

Platform(s): The survey is conducted from volunteer merchant vessels (currently, vessels are operated by Eimskip and Bermuda Container Line).

Statistical Design: Fixed transect line

Methods: A CPR is towed at approximately 10 meters in depth and 15-20 knots along fixed transect lines from volunteer merchant vessels. Samples are analyzed in the laboratory for zooplankton and phytoplankton abundance. The survey is operated by the Plymouth Marine Biological Association in partnership with NERACOOS with NOAA funding. The NEFSC does not directly participate in survey operations, data collection, or data management for this survey. The NEFSC has operated this survey in the past and has used and is planning to use the data in science products.

III. Effect of Four Impacts

1. **Preclusion** of NOAA Fisheries sampling platforms from the wind development area because of operational and safety limitations.

We do not currently expect spatial overlap between the existing sampling lines and offshore wind leases that would result in preclusion from current sampling areas. It is possible that this could change with future leases.

The survey operates from volunteer commercial container ships within major navigational lanes that do not have any overlapping wind energy leases at this time. This survey's transect locations are based on the commercial marine traffic patterns. If those navigational lanes are altered in the future by WEAs, the survey would move to the new lanes with the host vessels.

The survey has adjusted both the Gulf of Maine and Mid-Atlantic sampling lines on multiple occasions for a variety of reasons including changes in host vessels, changes in home ports, weather, re-rerouting of marine traffic to avoid right whales, and navigational decisions by host vessel's operators that are beyond our control. It is an expected limitation of this survey method that we cannot precisely control the sampling transect when using vessels of opportunity.

2. **Impacts on the statistical design of surveys** (including random-stratified, fixed station, transect, opportunistic, and other designs), which are the basis for scientific assessments, advice, and analyses.

No significant impact on survey design is expected, and the current wind energy leases do not overlap existing sampling. If this occurs in the future, any adjustments are likely to be within the historical range of past sampling. If this assumption is violated in the future, we would re-evaluate at that time.

3. **Alteration of benthic and pelagic habitats and airspace** in and around the wind energy development, requiring new designs and methods to sample new habitats.

No alteration of habitat requiring new designs is expected. The WEAs should not overlap existing sampling. The CPR method integrates samples over 10 nautical mile blocks, so only effects on that scale in the areas adjacent to WEAs would be detectable.

4. **Reduced sampling productivity** caused by navigation impacts of wind energy infrastructure on aerial and vessel surveys.

No navigational impacts are expected at this time, but if impacts did occur, it would be in the form of adjusting routes to avoid WEAs.

IV. Mitigation Planned, as per Six Elements

1. ***Evaluation of survey designs***

No evaluation is needed at this time as we do not currently anticipate an overlap between the CPR transects and WEAs. If this assumption changes, we would evaluate alternative partner vessels and routes as needed.

2. ***Identification and development of new survey approaches:***

No new approach is needed at this time.

3. ***Calibration and integration of new survey approaches:***

We do not anticipate new survey approaches in response to WEA development.

4. ***Development of interim provisional survey indices:***

No interim survey indices will be developed for this survey.

5. *Wind energy monitoring to fill regional scientific survey data needs:*

This method will not be able to sample within WEAs, but samples collected adjacent to WEAs could be used to detect broadscale changes in plankton distributions after the construction of WEAs. Samples are integrated across 10 nautical mile blocks, so this method will not be suitable for detecting more fine-scale changes to plankton distributions.

6. *Development and communication of new regional data streams:*

No new data management needs or communication related to survey mitigation are expected. These data are not hosted, processed, or stored by the NEFSC. Data management is handled externally by the Plymouth MBA and NERACOOS.

V. Proposed Schedule for Implementation

There is no proposed mitigation required at this time.

VI. Links to Other Surveys

There are no direct linkages to the methods, platforms, or staffing of other surveys.

VII. Adaptive Management Considerations/ Opportunities:

No need for mitigation measures is anticipated. In the event that mitigation measures become necessary, we will revise this plan.

VIII. Statement of Peer-Review Plans

Because there is no mitigation planned, a peer review would not be appropriate.

IX. Performance Metrics

This is not applicable, as no mitigation measures are planned

X. Literature Cited

Meyer-Gutbrod EL, Greene CH, Davies KTA, Johns DG. 2021. Ocean regime shift is driving collapse of the North Atlantic right whale population. *Oceanography*. 34(3):22-31.
<https://doi.org/10.5670/oceanog.2021.308>.