

**ABBREVIATED NOAA ENVIRONMENTAL COMPLIANCE QUESTIONNAIRE**

Instructions: Answer EVERY question in the yellow square below it.

Questions are selected from the full 62-question NOAA Environmental Compliance Questionnaire (available at [www.nepa.noaa.gov](http://www.nepa.noaa.gov)), as such questions are not in numerical order.

Grant number and/or Project ID (if available)
Project Title
NEPA Worksheet Fieldwork Example
Name and contact information for the person completing this form
Rebecca Certner (rebecca.certner@noaa.gov)
State Sea Grant Program
National Sea Grant Office
<b><u>PROPOSED ACTIVITY</u></b>
1. Describe the proposed activity, including: <ul style="list-style-type: none"><li>● Explain the purpose, objectives, and goals; and</li><li>● Explain whether the proposed activity would occur in different locations and/or have multiple phases.</li><li>●</li></ul>
<p>Microplastic marine debris (MPMD) is a pollutant of growing concern both globally and regionally. This project integrates land and ocean observations and models with expertise from the natural and social sciences to comprehensively assess the issue of MPMD across three locations (the C&amp;D Canal, the Bower’s Beach area, and the Cape May area) in the Delaware Estuary that will be sampled across two years. The objectives of this project are:</p> <ol style="list-style-type: none"><li>1. Estimate riverine sources of MPMD in the Delaware Estuary based on human activity.</li><li>2. Determine the importance of the Delaware River and lower bay tributaries as MPMD sources based on field sampling.</li><li>3. Identify transport and accumulation patterns of MPMD in the Delaware Estuary.</li><li>4. Assess MPMD abundance in the food web at accumulation zones.</li><li>5. Integrate the GIS, field sampling, and model analyses to link land-use and environmental conditions with MPMD abundance in the Delaware Estuary ecosystem.</li></ol> <p>Our approach combines GIS analysis of land surface and socio-economic data, MPMD abundance and material transport observations, numerical transport modeling, and biological effects data. The team will integrate geography, marine biology and physical oceanography to link human behavior, MPMD sources, and physical transport to biological impact. Results will be communicated to our partners at DNREC and DRBC and other regional stakeholders through regular updates, face-to-face meetings, and presentations at regional meetings. Outreach on MPMD in the Delaware Estuary will also be conducted. Thus, this project will empower regional resource managers to understand the scope of plastic pollution as an environmental threat in the Delaware Estuary, and prioritize sub-watersheds for local and</p>

regional mitigation/management efforts.

2. Is the proposed activity a continuation or part of an ongoing activity? If yes, then:

- Describe any changes to the proposed activity since it was initiated, including progress toward achieving its objectives/goals; and
- Provide any additional information, previous environmental review documents, and/or reports from previous years.

No.

3. Describe sampling, collecting, or observation protocols and operational procedures

This project will take place over two years (ten days total, five days per year) and has a large fieldwork component within the Delaware Estuary and Bay. Sampling days will be scheduled to capture a range of seasonal and weather conditions. Sampling areas will be concentrated within three locations: the C&D Canal, the Bower's Beach area, and the Cape May area. These locations were chosen based on elevated MPMD concentrations in prior studies. At each of the three locations, we will establish a grid of at least four sampling stations based on physical dynamics.

At each sampling station, we will measure MPMD in the water column. First, we will take a CTD profile using a Sea Bird SBE19. Next, to get the MPMD concentrations, we will conduct depth-stratified net sampling (surface, mid-depth, bottom) using a 3-net Tucker Trawl (100 um mesh, 0.25 m<sup>2</sup> mouth).

Dispersion properties and transport patterns of MPMD will also be investigated using Lagrangian driftcards and drifters. At each of the three sampling locations, a group of four drifters will be deployed and recovered after 48 hours (drifters will be re-used). 50-100 30-cm bamboo plates will also be released within each of the three locations. Their dispersion will be monitored by a drone with mounted cameras. Plates will not be recovered as they are biodegradable.

At each of the three sampling locations, we will sample MPMD abundance in a range of organisms including zooplankton, finfish, crabs, and oysters within the identified accumulation zones. Approximately 15 zooplankton tows will take place within each of the three locations. Approximately 15 of each species (outlined below) will be taken at each of the three locations. Zooplankton will be collected by plankton net, finfish will be collected by trawl, crabs will be collected by epibenthic sled, and oysters will be collected by bottom dredge.

All activity will occur on a single 46' research vessel. Individual trawl/dredge soak times will be limited to five minutes, resulting in approximately 150-450 square meters of trawled area per set, and repeated no more than three times per location.

4. Will the proposed activity require the cataloging and compiling of sources of socioeconomic data? If yes, then please explain.

We will use existing socio-economic data as a layer in our GIS analysis (Census Bureau population, income level, education, etc.) but we will not be cataloging or compiling sources.

5. Does the proposed activity consist solely of software research and manipulation? If yes, please explain.

No.

6. Does the proposed activity utilize a new or untested scientific technology or method? If yes, then describe briefly the technological process or methodology and potential environmental effects of the proposed activity.

No.

7. For the proposed action, what amount (total numbers and/or weight) of fish or invertebrates are proposed to be caught? What is the size (weight, length, and age class) of each species targeted for capture?

We plan to measure MPMD in the tissues of a broad suite of pelagic and benthic organisms.

- Zooplankton: Numbers and weight are undefined, but we will conduct ~50 plankton tows total at various depths, times, and locations.
- Finfish: We will target Menhaden (*Brevoortia tyrannus*), Atlantic croaker (*Micropogonias undulatus*), Spot (*Leiostomus xanthurus*), and Northern Kingfish (*Menticirrhus saxatilis*). These are species we routinely collect in Delaware Bay using the previously outlined methods. We are aiming to collect ~25 individuals from each species and lengths will be < 15 cm.
- Crabs: We will target blue crabs (*Callinectes sapidus*) and mud crabs (e.g., *Rhithropanopeus*, *Hexapanopeus*, etc.). We are aiming to collect ~25 individuals from each species. Juvenile blue crabs and adult mud crabs will be targeted.
- Oyster: We will target eastern oysters (*Crassostrea virginica*). We are aiming to collect ~25 individuals and lengths will be < 10 cm.

1. List non-target species that may occur in the proposed sampling area and specify how many of each non-targeted species are expected to be caught.

Non-target species in trawls may include: horseshoe crabs, smooth hound dogfish, and clearnose skate. We expect < 5 individuals of each to be caught in the study. Endangered Atlantic sturgeon migrate through the sample area. To avoid them, we will check a local sturgeon forecast prior to trawling and will only trawl if probability in our trawl area is low.

2. Would the proposed activity introduce genetically modified organisms, species bred for specific traits (e.g. disease resistant stocks), or non-indigenous species into an area?

No.

3. Describe the data processing methods to be used to conduct the research.

Zooplankton will be fixed in 4% formaldehyde and other organisms will be wrapped and frozen. Back in the lab, water samples will be processed by wet peroxide oxidation for microplastics. Tissue samples will be digested by enzymes or potassium hydroxide. FTIR and or Raman spectroscopy will be used to identify plastic composition.

#### LOCATION

4. Describe the proposed activity location, including, if available and appropriate, geographic coordinates (latitude, longitude in DD MM.MMM), river mile markers, etc. for all distinct phases of the proposed activity.

All sampling will occur within the Delaware Bay. We will sample microplastics presence and transport, along with biota, at three locations:

1. The estuarine turbidity maximum near the C&D canal [39.452706°, -75.559274°]
2. The Bower's Beach area [39.067250°, -75.326133°]
3. The Cape May area [38.970450°, -75.029350°]

12. Are there pre-existing or ongoing uses at the location of the proposed activity? If yes, then describe and explain the pre-existing or ongoing uses at the location of the proposed activity or, if not known, describe how pre-existing/ongoing uses will be determined.

We have sampled previously in all proposed locations and are familiar with other activities. These include recreational boating, commercial fishing, commercial shipping, and a passenger ferry. Our exact sampling locations in the general study regions are selected to minimize interactions with these activities. We assess the ongoing activities prior to beginning any sampling, and adjust our boat position to avoid interaction.

13. Describe the characteristics of the location of the proposed activity by:

- Indicate degree to which the location has been disturbed. Examples include highly developed, light development, active harbor use, public beach, open space, etc.
- Indicate whether the area is a unique geographic area of notable recreational, ecological, scientific, cultural, historical, scenic, economic, or aesthetic importance;
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- Identify ESA-listed and/or MMPA species that may occur and overlap with the proposed activity;
- Describe any anticipated changes over time to the natural landscape and/or viewshed that would result from the proposed activity;
- List any ecologically significant or critical (e.g., spawning, nursery, or foraging grounds) areas in the location of the proposed activity, including areas that are normally inundated by water (wetlands including permanent or temporary wetlands) or other aquatic habitat or areas within the 100-year flood plain;
- List any designated Essential Fish Habitat and Habitat Areas of Particular Concern designated under the Magnuson-Stevens Fishery Conservation and Management Act;
- List any critical habitat areas for Endangered Species Act-listed species;
- List any marine protected areas including national marine sanctuaries and national marine monuments in the location of the proposed activity;
- List any National Wildlife Refuge areas, wild or scenic rivers, wetlands, or prime/unique farmland in the location of the proposed activity;
- List any properties listed or eligible for listing on the National Register of Historic Places, National Historic Landmarks, or National Monuments; and
- List any religious or cultural sites of any federally recognized Indian Tribes or Native Hawaiian organizations in the proposed activity area.
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Delaware Bay is a highly trafficked area lacking in protected lands. However, federally-endangered Atlantic sturgeon are known to migrate through the sample area. In order to avoid them, we will check a local sturgeon forecast prior to trawling and will only trawl if the probability of sturgeon presence is low.

#### **PROJECT PARTNERS, PERMITS AND CONSULTATIONS**

**15.** List all other interested or affected Federal, state, and local agencies, Native American tribes or Native Hawaiian organizations, non-governmental organizations, and private individuals which may potentially be interested and/or affected by the action.

Delaware Department of Natural Resources and Environmental Control; Delaware River and Basin Commission

16. Are Federal, state, or local permits, authorizations, waivers, determinations, or consultations required for the proposed activity to comply with all applicable environmental laws and regulations? If yes, then:

- List and provide the status of all required Federal, state, or local permits, authorizations, waivers, determinations, conditions, and consultations, as applicable; and
- Provide copies of all required Federal, state, or local permits, authorizations, waivers, or determinations that you have secured.

Delaware Department of Natural Resources and Environmental Control collection permit #12345 (see attached).

**SAFETY**

17. Describe potential unique or unknown risks to human health or the environment from the proposed activity.

None.

Describe the potential to generate, use, store, transport, or dispose of hazardous or toxic substances. Please include the following:

- A list of any hazardous substances (as defined by 29 C.F.R. 1910.120(a)(3)) that will be involved in this project and any hazardous wastes (as defined by 40 C.F.R. 261.3) that could potentially be generated during the proposed activity;
- Any hazardous contaminants that may be uncovered and/or disturbed by the proposed activity;
- A list of the procedures/protocols that will be followed to ensure safe handling, storage, use, collection and transport of hazardous substances and proper disposal of all hazardous wastes
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Researchers will use formaldehyde for plankton fixation and hydrogen peroxide, iron sulfate, and sulfuric acid for wet peroxide oxidation during microplastics processing. All use, storage, handling, and disposal of these chemicals will be done in accordance with the University of Delaware's Environmental Health and Safety office (<http://www1.udel.edu/ehs/>). This includes use of personal protective equipment, laboratory fume hoods, etc.