

Request for Proposals

Reconstruction of New Jersey coastal wetlands past characteristics based on diatom assemblages

The New Jersey Department of Environmental Protection (NJDEP) Division of Science and Research is seeking a qualified diatom analyst to: (1) conduct diatom identification on sediment core intervals collected from New Jersey coastal area; and (2) conduct diatom-based inferences for nitrogen, salinity, and wetland tidal exposure.

Deadline for proposals: December 6, 2021

INTRODUCTION

The New Jersey DEP Division of Science and Research conducted a series of sediment diatom investigations for the New Jersey Coastal wetlands to assess present and past condition and produce metrics that will assist future management practices in assessment and monitoring of wetland mitigation practices. Throughout these projects, both diatom species and environmental data (water and sediment chemistry, wetland elevation) were collected and diatom-based metrics for sediment nitrogen, salinity and wetland tidal exposure were computed. Findings are published in the Journal of Coastal Research and Estuaries and Coasts (Desianti et al. 2017; 2019) and show that diatoms have the potential to be successfully used in coastal wetland monitoring for nutrient enrichment and variations in salinity, as well as an independent source of evidence for sea-level change through time.

Previous investigations of sediment cores from various locations across the New Jersey wetlands expanded our knowledge of wetland characteristics beyond the existing monitoring records and prior to the arrival of the European settlers. These studies resulted in the identification of more than 600 wetland species together with their ecological attributes and include species that indicate various conditions with regard to nutrients, salinity, tidal frequency and duration. These species and their ecological attributes can be used to produce reconstructions of past wetland characteristics from sediment cores. The diatom flora of New Jersey coastal wetlands is available to the public and scientific community on NJDEP website <https://www.nj.gov/dep/dsr/wetlands/>.

Expanding the use of diatom metrics to assess past wetland conditions in New Jersey salt marshes

This call for proposals seeks to expand the use of diatom metrics developed through six years of research to assess past wetland condition using sediment cores collected from New Jersey coastal wetlands. The wetland condition bioassessment will be based on diatom species identification and enumeration from sediment core intervals. For each sample, a total of 400 diatom valves will be identified and counted, and inferences for nitrogen, salinity, and wetland Tidal Exposure and Standardized Water Level indices (TEI, SWLI) calculated. The diatom-based metrics will provide information on wetland condition covering a temporal scale of up to 1000 years, which will provide holistic information on wetland dynamics with regard to nutrients, salinity and tidal exposure variations through time.

SCOPE OF WORK

The Division of Science and Research seeks to secure consulting expertise for a wetland bioassessment based on ecological preferences of diatom species.

The goal of this study will be to provide information on southern New Jersey wetland dynamics over the past ~1000 years based on the presence of diatom species and the quantitative inferences that can be calculated based on their specific abundances.

TASKS/DELIVERABLES

The expected tasks and deliverables for this project include:

1. Sediment diatom samples preparation and counting.

Sediment samples for diatom analysis will be subsampled from sediment cores and wetland surface samples by a team involving NJDEP Division of Science and Research and Rutgers University. Projected total number of samples to be analyzed for diatom species would reach up to sixty (60) samples. These samples will be utilized for the following sub-tasks:

- a. Diatom sample slide preparation according to the NAWQA protocol (<https://diatom.anasp.org/nawqa/pdfs/ProtocolPublication.pdf>).
- b. Diatom species identification and enumeration – 400 valves/sample on random transects.
- c. Record digital images of species present with abundances > 5% in a count, with at least one (1) image taken per species. The image may be taken at different foci if necessary, to reveal specific morphological features (e.g. areola, stigma, raphe canal, raphe ends curvature, etc.).
- d. Diatom identification should be based on the New Jersey wetland flora (https://www.nj.gov/dep/dsr/publications/Diatom_Flora_of_the_New_Jersey_Coastal_Wetlands_Final%20Report.pdf)

Deliverables:

- a) Excel spreadsheet compiling all counts across all sites listing all species identified and number of valves for each species.
- b) TIFF format digital images of diatom specimens meeting the criteria stated above.

2. Diatom-based inferences for nitrogen, salinity and tidal exposure

Identification and enumeration of diatom species recorded in Task 1 will be utilized in the development of inferred estimates of nitrogen, salinity and tidal exposure.

Deliverables:

- a) Spreadsheets with values for inferred nitrogen, salinity and tidal exposures indices (TEI, SWLI) in study sites, and the clean data sets used in computations of these four parameters.
- b) Graphing of results
- c) Description of methods used for computing the diatom-based inferences

PROJECT TIMEFRAME

The NJDEP Division of Science and Research seeks to complete the tasks/deliverables identified above **by December 31, 2022. No extensions will be granted.**

PROPOSAL REQUIREMENTS

All proposals in response to this Request for Proposals must be submitted via email to Mihaela Enache at Mihaela.Enache@dep.nj.gov by **5:00 pm on December 6, 2021.**

Proposal specifications:

All proposals should include:

- A statement of qualifications, including experience, background, skills, and degree of expertise in the specific area of diatom identification and analysis and application of transfer functions.
- Two references that address applicant's successful relevant experience in diatom identification and analysis for wetland diatoms and application of transfer functions.
- Financial proposal for the project including total work hours and hourly rate schedule to perform this work must be submitted using the [PB-120 Form](#).
- Any other relevant contractual language. The successful applicant's final proposal will become part of any signed agreement.

This request for proposals does not commit the State of New Jersey to engaging the services of any firm for any of the items either within or outside the outlined scope of work.

Schedule for Selection of Consultant

1. Deadline for receipt of proposals: **December 6, 2021**.
2. Applicant notified of selection: By **December 15, 2021**.
3. Work will commence upon execution of a purchase order.

Please note: applicants must be registered in NJSTART by execution of the purchase order. If you are a new grantee (not in the State's Treasury system) or an existing grantee with a new payment address or wish to receive direct deposit, you must register/update information at www.njstart.gov in order to process a purchase order.

References

Desianti N. et al. 2017. Sediment Diatoms as Environmental Indicators in New Jersey Coastal Lagoons. *Journal of Coastal Research*, Special issue 78: 127-140

Desianti N. et al. 2019. The Potential and Limitations of Diatoms as Environmental Indicators in Mid-Atlantic Coastal Wetlands. *Estuaries and Coasts*, <https://doi.org/10.1007/s12237-019-00603-4>