

SCOPE OF WORK

The Moffatt & Nichol project team will collaborate to provide each of the requisite services outlined in the RFQ. The general strategy for addressing each service is identified below.

Service 1 – Data Identification and Acquisition – (6 Months)

Based on prior experience, the M&N project team members already maintain, in-house, an extensive amount of the physical and environmental spatial and temporal data in a GIS format which will serve as the foundation for the NCBIIMP. In 2005, M&N undertook a comprehensive data collection effort for physical and economic data of dredging operations for shallow draft channels in support of the work for the General Assembly, expanding the extent of catalogued data in-house and now within a GIS format.

M&N will meet with NCDENR Division of Coastal Management (DCM) staff to identify an acceptable format and standards for electronic physical and socio-economic data sets. M&N will seek to provide data in uniform format compatible with NCDCM standards as may be available.

M&N will review available GIS based web-service tools for spatial analysis and data cataloging used by other State and Federal Agencies (e.g., CIRP – Inlets Online – US Army Corps of Engineers (USACE), SONRIS used by the Louisiana Department of Natural Resources (LADNR)). M&N staff will meet with NCDENR staff to review examples and identify alternative approaches which may be appropriate for cataloging and maintaining a spatial data archive.

M&N will develop a draft list of requisite data to meet the NCBIIMP objectives and review with NCDENR project partners (project technical committee). Upon review and editing, M&N will coordinate a comprehensive data collection program. It is anticipated that the project team will first catalog all in-house data, gaps and data requirements.

An effort will be made to contact municipalities, state and federal agencies, public and private universities and non-profit organizations to identify the extent of the available data and acquire that data. All ongoing and planned coastal data collection programs will be identified.

In accordance with the RFQ, the project team will:

- Create a general description of beaches and inlets to be managed and describe the natural processes that affect beaches and inlets to be managed.
- Develop a catalogue, including location and volume, of known beach-compatible sand resources (upland and submarine) already identified by other agencies and institutions (e.g., USACE, NCGS, USGS, NCSU, ECU, UNCCH, UNCW, Duke).
- Develop a data archive of historical beach fill projects (location, dates, linear reach, volume, cost, sponsor, cost-share ratio, digitized copies of pertinent permits and reports, etc.). This data archive shall also include pertinent information regarding the type (grain size data) and the source of beach fill sediment (e.g., dredged material disposal from navigation channel maintenance; offshore and upland borrow sites for beach nourishment, storm protection, and/or habitat restoration; beach bulldozing) as well as the funding source(s) for the project.
- Update the data archive of historical inlet management projects, including at a minimum, maintenance dredging, structure placement and channel relocation, pertinent monitoring data, digital orthophotos, and digitized copies of pertinent permits and reports.
- Compile other pertinent technical data for inclusion into a digital data archive (e.g., geophysical data such as swath bathymetry, seismic, and SONAR; oceanographic data such as magnitude and direction of waves, tides, and currents; and meteorological data related to storms such as date, location of landfall, path of storm, magnitude and duration).
- Develop a spatial data archive of critical coastal fish habitats (i.e., water column, shell bottom, submerged aquatic vegetation, wetlands, soft bottom, and ocean hard bottom), as well as threatened and endangered species (sea turtles, piping plover, etc.) that may be affected by beach and inlet management operations.

- Collect socio-economic data which may be used to estimate the local and regional economic cost and benefits for beach and inlet management. The cost of dredging and beach fill projects will be compiled where readily available. Prior economic investigations estimating economic benefits of beach stabilization and dredging projects will be catalogued. Raw data will be collected, where readily available, that may be used to quantify the economic benefits to the local and the regional economy (e.g., recreational benefits, commercial navigation benefits, businesses and jobs dependent on beaches and inlet maintenance). Where possible, a summary of data will be provided for regions or specific inlets.
- Develop a data archive of references for all information considered during the development of the BIMP (including digital copies of reference where allowable by file size and copyright).

Deliverables

A draft technical memorandum (TM) will be developed summarizing: (a) the extent of all compiled data and existing or planned monitoring programs, (b) gaps in data and (c) recommendations for a future monitoring program. The TM will be circulated for review by project partners, edited and finalized based on additional input.

Assumptions

- M&N will identify and collect readily available physical & socioeconomic data. It is assumed that minor data formatting will be performed to electronic data sets in accordance with an agreed upon protocol.
- Where it is not practical to digitize and/or acquire the aforementioned data, a descriptive catalog will be created that references data specifics (e.g., type of data, geospatial and chronological coordinates, acquisition entity, data format, location of data).
- Significant gaps in data will be noted in both physical as well as socio-economic data. Recommendations will be made for future data collection. No new data collection efforts will be performed under this task. Additional data can be collected by team members under a separate contract.
- M&N staff will meet with NCDENR staff to review examples and identify alternative approaches which may be appropriate for cataloging and maintaining a spatial data archive. Development of any new GIS/web based platform would be conducted under a separate contract.
- All datasets within the GIS data archive will be converted to the same horizontal (NAD 83 State Plane (ft)) and vertical (NAVD88 (ft)) datums.

Service 2 – Define Beach and Inlet Management Regions (4 Months)

Sediment management regions will be initially defined based on coastal physiography and natural processes. Typically sediment management regions are delineated in association with littoral cells. A littoral cell is a control volume which contains the complete cycle of sediment movement, including source, transport pathways and sinks. The boundary of a littoral cell may be delineated by a distinct change in the longshore transport rate of sediment. Along the North Carolina coast, inlets, headlands, embayments and the capes (Cape Hatteras, Cape Fear and Cape Lookout) all serve as logical boundaries for delineating littoral cells and sediment management regions.

Further delineation into management subregions will be performed based on local physical processes, ecological considerations, and social/political management boundaries. The project team will use prior investigations and available data to determine locations where there is a change in predominant direction of alongshore transport.

The project team will prepare a draft delineation for general sediment management regions. Delineations of regions and subregions will be based on review of available data and prior investigations. Gaps in understanding of local physical processes and recommendations for future investigation for refining subregion delineation will be identified.

The delineation will be presented for review by the project partners and refined based on input. The final delineation will serve as the geographic planning framework of the NCBIMP.

Deliverables

A TM will be prepared providing a brief discussion of the basis for the delineation of sediment management regions. The TM will be circulated for review by project partners, edited and finalized based on additional input from the project partners. GIS data layers outlining the regions and the datasets within them will also be provided.

Assumptions

- No additional new data collection efforts will be performed under this effort. The delineation of regions and subregions will be based upon available data.

Service 3 – Hold and Facilitate Stakeholder Meetings (8 Months)

An integral component of the NCBIIMP planning process is public education and stakeholder involvement. The project team will facilitate a series of stakeholder meetings in each beach and inlet management region. The purpose of the meetings will be to summarize the data collection and analyses as well as introduce the draft strategies for beach and inlet management and obtain input on the general approach and specific strategies recommended. Based on prior regional experience, the project team is familiar with many of the key stakeholders who will be involved in the process.

Deliverables

Meeting summaries and a list of attendees will be prepared for each meeting.

Assumptions

- M&N will be responsible for preparing public presentations, leading technical discussions for each of the meetings, and preparing meeting summaries.
- DENR staff will be responsible for advertising meetings and coordinating meeting logistics, including setting up meeting locations.
- M&N staff will participate in a total of up to 10 stakeholder meetings. It is anticipated that two meetings will be held in each of five regional locations (e.g., Brunswick County (Shallotte), New Hanover County (Wilmington), Onslow/Pender/Carteret Counties (Jacksonville), Dare/Hyde Counties (Manteo/Nags Head), Raleigh – depending on first round of meetings, Raleigh may be replaced with Carteret County (Morehead City))
- In addition to public meetings, representatives of M&N staff will participate in up to 4 technical advisory meetings and 3 advisory committee meetings.

Service 4 – Develop Draft Management Strategies (8 Months)

M&N will work with NCDENR staff to develop draft principles and guidelines for the comprehensive plan based on **current** North Carolina coastal policies and the objectives defined in the request for qualifications. (e.g., restore natural pathways of sediment transport, encourage regional approaches to geographic coordination & sequencing of priorities, reduce equipment mobilization and demobilization, and extend the life of beaches & reduce frequency of nourishment)

M&N will work with NCDENR staff to define critical eroding areas for management based on the data collected in Service 1 and the subregions defined in Service 2.

For each management region, the project team will summarize existing activity and draft management strategies will be developed for each beach and inlet management region in accordance with the overarching principles and guidelines.

It is anticipated that an overview will be developed including the following information:

1. Area description and characterization of background erosion rates
 - a. Global view
 - b. Sub-region view (where applicable)

2. Document existing sediment budget (where data available) & current and prior beach and inlet management actions
3. Identify critically eroding areas based on background erosion rates, underlying geology, vulnerability to damage due to erosion
4. Develop a list of available resources and potential management measures (e.g. sediment trapping, fixed mechanical bypassing at inlets, beach nourishment, retreat, etc.). The draft strategies will be physics based and permissible under current state regulations and policies. Strategies will be considered in relation to the following criteria:
 - a. Effective in addressing critically eroding shoreline – areas with severe erosion & high risk of damage to development
 - b. Minimize potential direct & indirect impacts - (e.g., erosional impacts to adjacent areas)
 - c. Environmentally responsible - minimize impacts on fisheries, habitat, etc.
 - d. Compatible with existing local, state and federal coastal policies (e.g., NCDOM coastal management, NCDWQ water quality planning) and politically viable
 - e. Economically justifiable - including capital and maintenance costs, financial benefits (business and jobs), ecological, navigation (commercial and recreational) and public safety
 - f. Fundable – funding mechanisms (extent of local government sponsor commitment, availability of matching funds)
 - g. Likelihood of Success - Prior success/anticipated performance
5. Identify a preliminary strategy for managing the region's inlets and beaches
 - a. Short-term (Over the next 20 – 30 years)
 - b. Long-term (Identify concerns (e.g., sea level rise) that should be considered when developing strategies and addressed in future plans)
6. A funding strategy
 - a. Annual cost estimate for regional management plan
 - b. Economic impact of beach and inlet related activities for cost-benefit analysis of future management operations
 - c. Identify funding sources (Federal, State, and Local) and strategies for securing funding
7. List of supporting data and references

M&N will involve key national experts from the project team to provide input on alternative management strategies.

Deliverable

A draft TM will be prepared, providing an overview of the draft beach and inlet management plan strategies. The summary will be revised and incorporated into the draft beach and inlet management plan.

Assumptions

- Potential strategies will be permissible in accordance with existing North Carolina coastal policies.
- Strategies will be developed based on available data and analytical coastal analyses (detailed coastal wave, hydrodynamic and sediment transport modeling will not be completed during this task)
- M&N will not seek to develop an optimum strategy, rather the goal will be to identify options that generally make sense and are reasonable, providing a factual context under which stakeholders may make informed decisions.

Service 5 – Prepare Final Beach and Inlet Management Plan Report (2 Months)

Based on the findings from Services 1 through 4, the project team will develop a comprehensive Beach and Inlet Management Plan for the State of North Carolina. It is anticipated that NCBIMP will be a “living document”. Similar to the NCDWR and NC Division of Water Quality (DWQ) Basinwide Plans, the framework will be developed anticipating that it will be updated periodically, with additional monitoring data.

In accordance with the RFQ the Inlet Management Plan shall contain at a minimum the following:

- Description of the study elements and process
 - Executive Summary
 - Stakeholder process
- Proposed Management Plan by Region
 - Area description
 - List of available resources and management strategies
 - Description of compiled data in the data archive, identification of gaps and recommendations for monitoring
 - Preliminary strategy for managing the inlets subregions and beaches
- Potential Funding Sources
 - Annual cost-estimate for sub-region management plan
 - Economic impact of beach and inlet related activities
 - Potential funding sources and strategies for securing funding
- Supporting Data (Appendices, Data archive Catalog, Maps, References, etc.)

Deliverables

A draft outline of the comprehensive Beach and Inlet Management Plan will be prepared and circulated for review and comment. A Draft Plan will be prepared in accordance with the agreed upon outline. The Plan will be finalized based on receipt of input from NCDENR project partners. M&N will also develop a summary Powerpoint presentation of the final plan suitable for presentation to the appropriate legislative committees.

LIST OF CONSULTANTS

Our proposed team is composed of **Moffatt & Nichol (M&N)**, **Environmental Services, Inc. (ESI)**, **Geodynamics**, and **Alpine Ocean Seismic Survey (Alpine)**.

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SCHEDULE

Please see attached document for the overall project schedule.